REVIEW AND APPROVALS

MULESHOE NATIONAL WILDLIFE REFUGE

Muleshoe, Texas

ANNUAL NARRATIVE REPORT

Calendar Year 1987

Donald R Clapp — 2-25-88
Refuge Manager — Date

Johnny N. Beall — 2-25-88
Complex Manager — Date

James J. Hubert — 3-7-88
Regional Supervisor Review — Date

4/20/88
Regional Office Approval — Date

RECEIVED
REFUGES
MAR 7 '88

MLS1-1/88 DRC

Early morning view seen from the Refuge Headquarters.

INTRODUCTION

Muleshoe NWR is located on the high plains of West Texas along State Highway 214. It is 20 miles south of Muleshoe in Bailey County. The refuge, established by Executive Order No. 7214 on October 24, 1935 is the oldest National Wildlife Refuge in Texas.

The refuge consists of 5,809 acres broken by two caliche outcroppings in the form of rimrock. Approximately 4,800 acres are covered with short grasses and scattered mesquite. Three saline lakes on the refuge provide over 1,000 surface acres of water and marsh when they are full. There usually is much less surface water present. The refuge was originally acquired due to the waterfowl use on the lakes. Since then, changes in land use practices in the surrounding area and an extended period of reduced runoff has resulted in a decrease in waterfowl habitat.

Beginning in the early 1930's, sandhill cranes began using the high plains in ever increasing numbers. The cranes roost on saline or large playa lakes at night and fly out to surrounding agricultural fields at dawn to feed on waste grain. Muleshoe NWR normally hosts the largest concentration of sandhill cranes in North America, and by definition the world, during the winter months. The roosting population on Muleshoe NWR peaked at over 250,000 on February 14, 1981.

HISTORY

The acquisition of land progressed quickly after President Roosevelt signed the Executive Order establishing the refuge. The first tract purchased was 738 acres from George and Mattie Robinson and Annie Robinson on August 17, 1936. This land includes the area where the refuge headquarters is located. The second tract of 1,416.8 acres was purchased from Henry and Vivian Wilson on February 6, 1937 and included Goose Lake. The last tract of land of 1,440 acres was purchased from Isaac and Crawford Enochs in 1938.

The refuge lands were placed under the protection of a caretaker in May, 1937 and the first manager, J.K. Walton, arrived on August 24, 1937. A Works Progress Administration (WPA) Project was established February 1, 1938 and work started on the headquarters buildings and the residence diversion canal. By May 1, there were 77 WPA workers on payroll increasing to 112 workers by June 1. Work was frequently hampered with problems getting WPA workers to the refuge from Muleshoe and Morton due to wet, slippery road conditions. All of the buildings and major improvements on dikes and roads were completed between May 1, 1938 and May 24, 1942 when the WPA Project was terminated due to a lack of manpower. The number of WPA workers dropped rapidly after 1939 and only about 10-15 worked in 1942.

During the early years water was present in nearly all lakes every year and the number of ducks using the refuge during the winter frequently exceeded 300,000. Geese were never present in large numbers like ducks but several thousand usually used the lakes. The number of waterfowl in recent years has been drastically reduced to less than 30,000 ducks and a few thousand geese. This can be attributed to the nationwide decline in waterfowl numbers, less water available, and the abundant available food supply near other Panhandle lakes due to increased farming and irrigation.

One interesting item found while reviewing the records is the small number of sandhill cranes that used the refuge. Today Muleshoe refuge is well known for the huge concentrations of 100,000 to 250,000 sandhill cranes that visit the refuge each year. During the early refuge history the number of cranes present were commonly reported at 3,000-15,000.

The sharp increase in sandhill cranes present is probably the result of the reduced water in the lakes leaving large open expanses for the cranes to roost on and the abundant food supply due to irrigation.

In January, 1945 Muleshoe Refuge recorded the first documented case of avian cholera among wild free flying waterfowl. It is

believed this first outbreak was the result of infected domestic chickens being disposed of in roadside ditches near the refuge. Outbreaks still occur on the refuge and cholera outbreaks occur nearly every year somewhere in the Panhandle killing thousands of birds.

The refuge has changed very little since the "early" days. Wildlife is still abundant during winter months only now it is sandhill cranes instead of ducks which attract visitors to this winter haven. Only three new buildings, an office and shop in 1982 and a storage building in 1979 have been added in the 50 years since the WPA days.

INTRODUCTION

Page

TABLE OF CONTENTS

A. HIGHLIGHTS 1

B. CLIMATIC CONDITIONS 1-2

C. LAND ACQUISITION

1. Fee Title..... NTR
2. Easement..... NTR
3. Other..... NTR

D. PLANNING

1. Master Plan..... NTR
2. Management Plan..... 2
3. Public Participation..... NTR
4. Compliance with Environmental Mandates and Cultural Resource Mandates..... NTR
5. Research and Investigations..... 2-3
6. Other..... NTR

E. ADMINISTRATION

1. Personnel..... 3-4
2. Youth Programs..... NTR
3. Public Participation..... NTR
4. Volunteers Program..... 5
5. Funding..... 5-6
6. Safety..... 6
7. Technical Assistance..... 6
8. Other..... 6-7

F. HABITAT MANAGEMENT

1. General..... NTR
2. Wetlands..... 7-8
3. Forests..... NTR
4. Croplands..... 8
5. Grasslands..... 8-9
6. Other Habitats..... NTR
7. Grazing..... 9
8. Haying..... NTR
9. Fire Management..... NTR
10. Pest Control..... NTR
11. Water Rights..... NTR
12. Wilderness and Special Areas..... NTR
13. WPA Easement Monitoring..... NTR

G. WILDLIFE

1. Wildlife Diversity..... NTR
2. Endangered and/or Threatened Species..... 9
3. Waterfowl..... 9-10
4. Marsh and Water Birds..... 10-11
5. Shorebirds, Gulls, Terns, and Allied Species..... 11
6. Raptors..... 11
7. Other Migratory Birds..... 11
8. Game Mammals..... NTR
9. Marine Mammals..... NTR
10. Other Resident Wildlife..... 12
11. Fisheries Resources..... NTR
12. Wildlife Propogation and Stocking..... NTR
13. Surplus Animal Disposal..... NTR
14. Scientific Collections..... NTR
15. Animal Control..... 12
16. Marking and Banding..... NTR
17. Disease Prevention and Control..... 12

H. PUBLIC USE

1. General..... 12
2. Outdoor Classrooms - Students..... NTR
3. Outdoor Classrooms - Teachers..... NTR
4. Interpretive Foot Trails..... 13
5. Interpretive Tour Routes..... NTR
6. Interpretive Exhibits/Demonstrations..... 13-17
7. Other Interpretive Programs..... 18
8. Hunting..... 18
9. Fishing..... NTR
10. Trapping..... NTR
11. Wildlife Observation..... 18-19
12. Other Wildlife Oriented Recreation..... 19
13. Camping..... NTR

14. Picnicking..... NTR
15. Off-Road Vehicling..... NTR
16. Other Non-Wildlife Oriented Recreation..... NTR
17. Law Enforcement..... 19
18. Cooperating Associations..... NTR
19. Concessions..... NTR

I. EQUIPMENT AND FACILITIES

1. New Construction..... 20
2. Rehabilitation..... 21
3. Major Maintenance..... 21
4. Equipment Utilization and Replacement..... 21-22
5. Communications Systems..... NTR
6. Computer Systems..... NTR
7. Energy Conservation..... NTR
8. Other..... 22

J. OTHER ITEMS

1. Cooperative Programs..... 22
2. Other Economic Uses..... NTR
3. Items of Interest..... NTR
4. Credits..... 22

K. FEEDBACK NTR

L. INFORMATION PACKET

(Inside Back Cover)

HIGHLIGHTS

- A peregrine falcon was sighted on May 4 (section G.2)
- On June 19, the refuge acquired a new stake bed truck (section I.4)
- Sandhill crane numbers peaked at 58,000 during the end of October (section G.4)
- The refuge campground and picnic areas were relocated (section I.1)
- The office visitor center interpretive display was completed (section H.6)

B. CLIMATIC CONDITIONS

During the year 24.83 inches of precipitation were recorded at the refuge headquarters which serves as an official U. S. Weather Service Station. The average annual precipitation for the area is 16 inches. The year began with mild temperatures continuing throughout most of January. Average temperatures ranged from 21° F to 51° F. Seven inches of snow fell during the month. Three inches of snow were recorded for February when daytime temperature ranged from 18° F to 75° F while nightly temperatures averaged around the freezing mark or below. Total precipitation recorded was .98 inches. Only a slight amount of moisture was recorded for March when daytime temperature averaged 52° F and nightly average temperatures were 20° F. During April temperatures had reached the eighties toward the end of the month and little moisture was recorded. Temperatures remained fairly consistent in May when daily temperatures were around 80° F and nightly temperatures were 50° F. Total rainfall amounted to 3.26 inches. Although the thermometer reached 100° F during mid-June daily temperatures averaged 89° F and normally cooled down to 60° F by nightfall. Total precipitation for June was 2.16 inches. July weather was almost identical to June's, including the amount of precipitation. August weather was slightly cooler and a lot wetter. Precipitation was recorded on 11 separate days, the most precipitation recorded for one day was 2.22 inches on August 21. Total rainfall received for the month was 6.46 inches. Daytime temperatures for September averaged in the mid-eighties. Several rain showers fell during the month totalling 2.88 inches. By mid-October temperatures had dropped to the mid-seventies during the day. Total rain received was 1.22 inches. Daily temperatures for November were around 60° F during the day. Towards the end of the month nightly temperatures were in the 20° F range. Only .15 of an inch of rain was recorded. December temperatures ranged from -2° F to 80° F. Although average temperatures were 53° F during

the day and 24° F at night. The first snow for the winter fell on December 12 and was measured as 16 inches. Several light snows fell during the remainder of the month, total moisture recorded was only .47 of an inch.

MLS2-12/87 DRC

The Heaviest Snowfall for the year was 16 Inches During Mid-December.

D. PLANNING

2. Management Plans

Revision of the Wildlife Inventory Plan was required for FY 1987. A draft of the plan has been completed.

5. Research and Investigation

Acid Rain Deposition Study.

National Atmospheric Deposition Program supported by the U. S. Geological Survey.

A precipitation collection station was initiated on the refuge in 1985. The field portion of this study is conducted by refuge personnel and includes data and precipitation collection. These are sent to the Water Survey Central Analytical Laboratory at Champaign, Illinois.

Determining the Taxonomic Status of Tiger Beetles

E. Gage, Research Entomologist, San Antonio, Tx.

The purpose of this is to determine the taxonomic status of tiger beetles (Cicindelidae) associated with the refuge and establish ranges for all species which occur in these areas. Specific goals include determining the taxonomic status of C. willistoni, C. evadica and other tiger beetles which could potentially be described as new taxa. Field work for this project was initiated during August.

E. ADMINISTRATION

1. Personnel

MLS3-1/88 DRC

Johnny Beall - Complex Manager, GS-11, PFT stationed at Buffalo Lake NWR - Complex Headquarters.

E. ADMINISTRATION

MLS4-1/88 LEC

3 2 1

1. Don Clapp - Resident Refuge Manager, GS-9, EOD 6/87, PFT.
2. Glenda Copley - Refuge Clerk, GS-4, EOD 7/87, TPT.
3. Dean Gilliam - Maintenance Worker, WG-8, PFT.

Refuge Manager Allen Jones, GS-9, transferred to San Bernard NWR, Texas on February 14.

Refuge Clerk Jennifer Rike, GS-4, TPT, entered on duty on May 10 and terminated her position on June 20.

Refuge Manager Don Clapp entered on duty June 29, having transferred from Browns Park NWR, Colorado.

Refuge Clerk Glenda Copley entered on duty July 19.

	Permanent		
	Full-Time	Part-Time	Temporary
FY-87	2	0	1
FY-86	3	1	1
FY-85	4	0	1
FY-84	4	0	1
FY-83	4	1	1

4. Volunteer Programs

This station has no formal volunteer program. Although assistance from groups and individuals occurs occasionally. The Llano Estacado Audubon Society of Lubbock, Texas contributed census information at various times throughout the year. Three volunteers, Donna Noriega, Doug Gilliam, and James Hightower performed 88 hours of clerical and maintenance work during the year.

5. Funding

Funding for FY 87 was less than in past years since the administration of the Complex Headquarters was shifted from Muleshoe NWR to Buffalo Lake NWR.

Funding for FY 1983 through FY 1987 is as follows:

FY 1987	Total O&M	ARMM	RPRP	Fire
1260	84,900	15,000		3,000
1510	2,800			
8610	2,600			
Total	90,300	15,000		3,000

FY 1986	Total O&M	ARMM	RPRP	Fire
1260	167,000	74,000	20,000	3,000
1520	12,500			
1971	510			
8610	1,200			
Total	180,010	74,000	20,000	3,000

FY 1985	Total O&M	ARMM	RPRP	Fire
1260	180,100	47,000	29,000	3,000
1520	12,000			
1994	2,000			
Total	194,100	47,000	29,000	3,000

FY 1984	Total O&M	ARMM	RPRP	Fire
1260	123,400	20,000		2,000
1520	14,600			
1994	2,000			
Total	140,000	20,000		2,000

FY 1983	Total O&M	CM
1210	104,000	19,000
1220	9,000	
1240	8,000	2,000
1520	16,370	
1994	1,500	
6810	5,500	
Total	144,370	21,000

6. Safety

Monthly safety meetings were attended regularly by refuge personnel. No lost time accidents occurred during the year. The present station record of no lost time accidents is 13,108 calendar days.

Refuge personnel participated in baseline audiogram testing conducted by the State Department of Health at Muleshoe, Texas. The Refuge Manager was certified for fire control and presently is the only person eligible for fire control certification at this station.

A fire equipment technician from Clovis, New Mexico performed the annual inspection of all refuge fire extinquishers.

Although no safety problems of any significance occurred during the year there is the on-going one of rattlesnakes. Two large rattlesnakes were discovered beside the refuge quarters during September. Safety measures taken have included safety meeting discussion on what to do in case of snake bite and the closest medical facilities where the snake bite victim could be treated. Areas near the refuge headquarters, quarters, and the public campground have been cleared of debris and tall grass in order to create less desirable rattlesnake habitat.

7. Technical Assistance

The refuge maintains eleven propane gas powered zon guns for use in the local area to prevent wildlife depredation of agriculture crop lands. Several of the zon guns were loaned out and a few boxes of cracker shotgun shells were distributed to adjacent landowners during the year.

8. Other Items

Official Visitors - FWS

March 25 Gary Burke RO-RF-Zone 2 Assistant Supervisor-annual refuge inspection.

November 18 Gary Burke RO-RF Zone 2 Assistant Supervisor-visit.

Training and Meetings

Refuge Manager Clapp - Soil Conservation District #1 Water Conservation Demonstration, Muleshoe, Tx., July 16

- Regional Programmatic Meeting and Holistic Management Seminar, Albuquerque, N.M., August 10-14.

- L. E. Update and Pistol Requalification, Washita NWR, October 21.

- Interagency Playa Lakes Disease Council Meeting, Lubbock, Tx., November 19.

Maintenance Worker Gilliam - Pre-retirement Seminar, Oklahoma City, Ok. March 16-19.

F. HABITAT MANAGEMENT

2. Wetlands

Wetlands on the refuge consist of three lakes, each divided by dikes. Two of the lakes, Goose Lake and White Lake, are typical saline playa lakes and have no major inlet or outlet, are shallow and generally dry up in the areas below the dikes during periods of low precipitation.

Upper Paul's Lake, located at the northeast part of the refuge, maintains the most consistent water level since there is a fresh water spring at its upper end. When adequate precipitation allows, water from Upper Paul's Lake flows over a concrete spillway into Lower Paul's Lake.

Lake levels were fairly low by late spring. Although over two inches of rain fell during the last of June, temperatures remained high and the daily evaporation rate was around 50% causing Lower Goose Lake and Lower White Lake to completely dry up. Precipitation during August put some water in both lakes. During mid-December a heavy snow provided enough water to keep both lakes around 75% full and raised the levels of the other refuge lakes to nearly full.

MLS5-12/87 DRC

Lower Paul's Lake - Most of the Refuge Lakes Held Water Throughout the Year.

4. Croplands

No crops are raised on Muleshoe NWR. However, crops grown on farmland surrounding the refuge strongly influence sandhill crane and waterfowl use of Muleshoe NWR. Various studies of sandhill cranes on the High Plains have suggested that the amount of milo (grain sorghum) grown in the surrounding area is one of the factors in the selection of roost lakes. The cranes also utilize winter wheat fields for feeding and resting. Cotton fields are occasionally used for daytime roosts.

Muleshoe refuge is located in the southern half of Bailey County which is primarily dryland farming with cotton, wheat, and milo the primary crops. The northern half of Bailey County is mostly irrigated farming with fields of corn, soybeans, and vegetables frequently grown.

5. Grasslands

Blue grama and buffalograss dominate the upland grass communities while alkali sacaton dominates the high lime soils near the lakes. The rank, almost monotypic stands of the alkali sacaton are both unpalatable to cattle and of limited usefulness to wildlife. The Grassland Management Plan specifies prescribed burning and grazing

of these dense alkali sacaton areas near the lakes. Primarily, to produce a more diverse grass species stand in order to create a more desirable habitat for sandhill cranes and other wildlife.

7. **Grazing**

Grazing on the refuge was permitted under a special use permit to Lewis Brothers of Muleshoe, Texas. Eighty AUM's were allowed for cows and calves to be grazed on the refuge for six months, beginning May 1. Four pastures were grazed this year and three were rested. The table below indicates the number of days cattle were in each unit.

Pasture #	# AUMS	Dates Grazed	Days
P6	80	May 1 - May 20	20
P4	80	May 21-June 10	21
P3	80	June 11-June 30	20
P2	80	July 1-Aug. 15	46
P6	80	Aug. 16-Sept. 10	26
P4	80	Sept. 11-Oct. 5	25
P3	80	Oct. 6-Oct. 31	26
Total	480	May 1-October 31	184

The grazing units are separated with solar powered electric fence which is very efficient and eliminates the alternative of having to replace batteries. All units have water tanks located at various locations in order to more evenly distribute grazing. Water is supplied both from windmills and wells and gravity flow lines from the domestic water storage tank.

Grazing fees were $6.00/AUM for this year. The grazing rate will increase to $7.00/AUM for 1988 and will continue to increase to $8.50/AUM. This is the results of grazing rate appraisal conducted in 1985.

G. WILDLIFE

2. **Endangered and Threatened Species**

A peregrine falcon was sighted on May 4.

An occasional bald eagle was observed near the refuge headquarters during the winter months.

3. **Waterfowl**

At the beginning of the year refuge lakes were full of water and waterfowl numbers were slightly higher than for the previous year. By mid-March 32,000 ducks were using the refuge, major species were pintail, American widgeon and green-winged teal. During the

summer several ducks of various species remained on Paul's Lake. The only nesting observed included one ruddy duck brood and a green-winged teal brood. By mid-August nearly 2,000 ducks, mostly blue-winged teal, had arrived on the refuge lakes which were nearly full due to heavy mid-summer rains. Several thousand ducks used the refuge throughout the remainder of the year, primary species were mallard, pintail, and American widgeon.

Of special interest was a lone oldsquaw sighted at Goose Lake on April 27 and again on November 9 at Paul's Lake. Oldsquaw had also been observed on the refuge last year.

Nearly 1,000 Canada geese and 330 snow geese were observed near the first of the year. Only seven snow geese were counted during the fall. Between 200 to 400 Canada geese were often seen at Paul's Lake from October until the end of the year.

4. Marsh and Water Birds

There were 40,000 sandhill cranes on the refuge in February and all had migrated north by mid-April. During the fall migration returning sandhill cranes began to arrive at the refuge lakes on September 25. Numbers had peaked at 58,000 by the end of October. The refuge crane population then gradually decreased to 16,000 near the first of December and remained at that number the rest of the month. Most of the cranes that had left apparently moved further southeast since proportional numbers were reported roosting in lakes near Littlefield and Brownfield, Texas, fifty to seventy miles from the refuge. The majority of crane use on the refuge was on Goose Lake and White Lake. The sandhill cranes seemed to prefer the shallow White Lake but as the lake began to dry up, toward the end of the year the cranes began roosting at Goose Lake which was still around 60% full. Fewer sandhill cranes use Paul's Lake since it has little exposed shoreline, although nearly 1,500 cranes continued to roost at its lower end throughout November and December. Sandhill crane numbers and periods of use were comparative to last year except for a short time during November, 1986 when refuge crane use was around 25% higher.

Marsh and water birds that commonly use the refuge include American coots, eared grebes, pied-billed grebes. A few great blue herons and snowy egrets were seen during the summer. Several black-crowned night herons nest on the refuge and frequent Paul's Lake during the summer. Yellow-crowned night herons are not nearly as common but one was observed using Paul's Lake throughout the summer. White-faced ibis were seen on Paul's Lake during May. White pelicans and double-crested cormorants are seldom seen on the refuge, but nearly forty of each species were observed during the spring.

MLS6-11/87 DRC

Sandhill cranes using Goose Lake.

5. Shorebirds, Gulls, Terns, and Allied Species

During March there were a few ring-billed gull, Wilson's phalarope, killdeer, greater yellowlegs, and long-billed curlew using the refuge lakes. As the spring migration progressed, other species observed included western snowy plover, semipalmated plover, common snipe, Baird's sandpiper, long-billed dowitcher, common tern, Forester's tern, and black tern. Wilson's phalarope numbers at Paul's Lake had increased to 3,800 by late June. Nesting species included several killdeer, American avocet, black-necked stilt, and a few snowy plovers, and were primarily seen in the White Lake area. Unusual sightings included three spotted sandpipers (rare-8/15), and three common terns (rare-9/14).

6. Raptors

An American kestrel was seen nesting in the eave of the office roof. Although the success of the nest was not known, kestrels had not normally been known to nest on the refuge.

7. Other Migratory Birds

Rare and accidental birds seen on the refuge this year and not discussed in other sections included a white-winged dove (acc.-7/24), an American redstart (rare-10/30), and a golden-crowned kinglet (rare-10/30).

10. Other Resident Wildlife

Porcupines have occasionally been seen on the refuge during past years. Two sightings occurred on the refuge this year.

A few ring-necked pheasant were observed on the refuge again this year. They seem to be slightly increasing on the refuge as well as on areas northwest of the refuge.

15. Animal Control

Refuge personnel assisted area farmers with depredation control of migratory birds to agriculture crops (see section E.7).

During July approximately 100 active prairie dog dens on the lawn between the refuge headquarters and quarters were treated with phostoxin pellets. Prairie dogs from adjacent areas quickly moved in to replace those exterminated. Later in the summer prairie dog use of the lawn area ceased completely, although the reason for this is not known.

17. Disease Prevention and Control

The Muleshoe NWR, in cooperation with the Buffalo Lake NWR Complex, participates as a central receiving point for receiving and investigating all waterfowl disease reports in the Playa Lakes Region. This includes the Texas Panhandle and South Plains, Eastern New Mexico, and the Oklahoma Panhandle. Each disease report is checked out by the Interagency Playa Lakes Disease Council (IPLDC) which consists of the Fish and Wildlife Service, Texas Parks and Wildlife Department, and Texas Tech University personnel. Appropriate action is taken and if a cleanup operation is required it is arranged between these agencies.

During the last of October, refuge personnel assisted Buffalo Lake NWR personnel in investigating a botulism outbreak near Brownfield, Texas. The number of affected waterfowl totalled 890. Major species were gadwall, pintail, and green-winged teal. The outbreak occurred just before waterfowl season opened. Refuge personnel re-visited the area a few days later and found no sign of any recently diseased ducks.

H. PUBLIC USE

1. General

During the year nine wildlife oriented programs were presented to various organizations which included school, scout, church, and community groups, totalling 320 individuals.

4. Interpretive Foot Trails.

The refuge had no interpretive foot trails until this fall when a short trail was developed adjacent the campground. Since then it has had much use from groups and other refuge visitors.

MLS7-11/87 DRC

The new foot trail has received a lot of use.

6. Interpretive Exhibits/Demonstrations

Refuge personnel completed the interpretive display in the refuge office. A panel relating to the three dimensional sandhill crane exhibit that had been completed last year was installed as well as an interpretive panel describing the playa lakes region.

MLS8-12/87 DRC

The visitor contact portion of the office building was completed.

The new waterfowl disease display was set up in the corner of the office visitor center. This display is constructed of sections which fit over a collapsable aluminum frame for easy disassembly. The refuge plans to have a reproduction of the interpretive panel made which would be available to display at appropriate events or meetings and would also be available to other stations upon request.

MLS9-12/87 DRC

The new waterfowl disease display was installed in the refuge office.

Three other interpretive panels installed in the office visitor center describe differences of beaks and feet of different birds, waterfowl habitat, and the difference between dabbler and diving ducks. These, along with duck mounts and identification plaques, were displayed on a partition that had been constructed last year and are the first exhibits that visitors see upon entering the office. More duck mounts are to be acquired and additions made to the beaks and feet section before the display is complete and is in compliance with the Interpretive Management plan.

MLS10-12/87 DRC

These interpretive panels and duck mounts are the first exhibits visitors see upon entering the refuge office.

The prairie dog interpretive signs that had been at the refuge headquarters were relocated to a new site along the refuge entrance road east of the office. Two culverts were placed in road ditches and a vehicle turnout was constructed beside the signs and surfaced with crushed caliche rock.

MLS11-12/87 DRC

The prairie dog interpretive signs were located to a new site east of the office.

MLS 14 - 12/87 DRC

View of prairie dog town as seen from prairie dog town interpretive signs and vehicle turnout.

7. Other Interpretive Programs

A reporter representing the Hunting and Fishing News called regularly during the sandhill crane hunting season for information on population trends.

8. Hunting

Although hunting is not allowed on the refuge, assistance is provided to the Texas Parks and Wildlife Department by issuing sandhill crane hunting permits during the hunting season. Over 300 permits were issued this year.

11. Wildlife Observation

Total visitor use recorded for the year was 18,000. Wildlife observation on foot or by land vehicle and photography accounted for approximately 60% of total refuge visits for the year. Visitor use on the refuge was more concentrated during the periods of January and February and October through December, when the sandhill cranes were present.

MLS13-11/87 DRC

Girl Scouts and instructors from three surrounding towns participated in various scout workshops conducted on the refuge on November 7.

The Llano Estacado Audubon Society of Lubbock, Texas conducted various group outings on the refuge throughout the year and were responsible for many of the unusual bird sightings on the refuge.

12. Other Wildlife Oriented Recreation

The refuge maintains a small picnic and camping area located near the headquarters and is used by visitors pursuing wildlife oriented activities such as wildlife observation and photography. This area is also used for group camping by scout, church, and other groups.

MLS14-11/87 DRC

Visitors using the campground and picnic area.

17. Law Enforcement

Since no hunting is allowed on the refuge and adequate hunting opportunities exist on adjacent lands, and also because the refuge is approximately 20 miles from towns of any size, few wildlife violations or vandalism problems occur. No citations were issued during the year.

I. EQUIPMENT AND FACILITIES

1. New Construction

During July refuge personnel initiated work on a new campground as required by Regional Office personnel since the existing campground and picnic area were located in an area that was susceptible to flooding. The new site is adjacent to the old one but is situated on higher ground. The new area was mowed, a "tear-drop shaped" road was graded, and picnic tables and fire grills were moved to create five new camping and picnicing sites. A short nature observation trail was also mowed adjacent to the area (see section H.4). In August 666 tons of crushed caliche rock were spread on the new road by a local contractor. Future plans for the area include planting trees, remodeling or replacing toilets, and relocating the water line and hydrant.

MLS15-9/87 DRC

During July work began on relocating the new campground and picnic area.

The interpretive prairie dog signs were moved to a new site on the entrance road east of the refuge office in July (see section H.6). Two culverts were placed in the road ditches at the site and a vehicle turnout was constructed and covered with crushed caliche rock.

2. Rehabilitation

The south side of the Paul's Lake dike toward the west end was graded and several yards of nearby stock-piled caliche rock were spread over the dike in order to repair eroded areas.

MLS16-11/88 DRC

Dike repair at Paul's Lake.

3. Major Maintenance

Approximately 600 yards of barbed wire fence and posts were replaced in the extreme northwest corner of the refuge. The fence had been removed for ditch and road repairs.

During the first of the year the refuge electric bill nearly doubled the normal amount and it was discovered that the office heat pump was the problem. Total cost for labor and replacement of parts to the heat pump amounted to $946.37.

4. Equipment Utilization and Replacement

A new, long awaited, stake/dump truck, GMC 7000 series, was acquired in May. It replaced an old International stake bed truck that was transferred to Buffalo Lake NWR.

MLS17-1/88 DRC

The refuge acquired a new truck in May.

8. Other

The antiquated diesel furnace in the refuge quarters was replaced with a new heat pump and is a combination heating and air conditioning system.

J. OTHER ITEMS

1. Cooperative Programs

A revenue sharing check for $3,401 was presented to Bailey County during April.

4. Credits

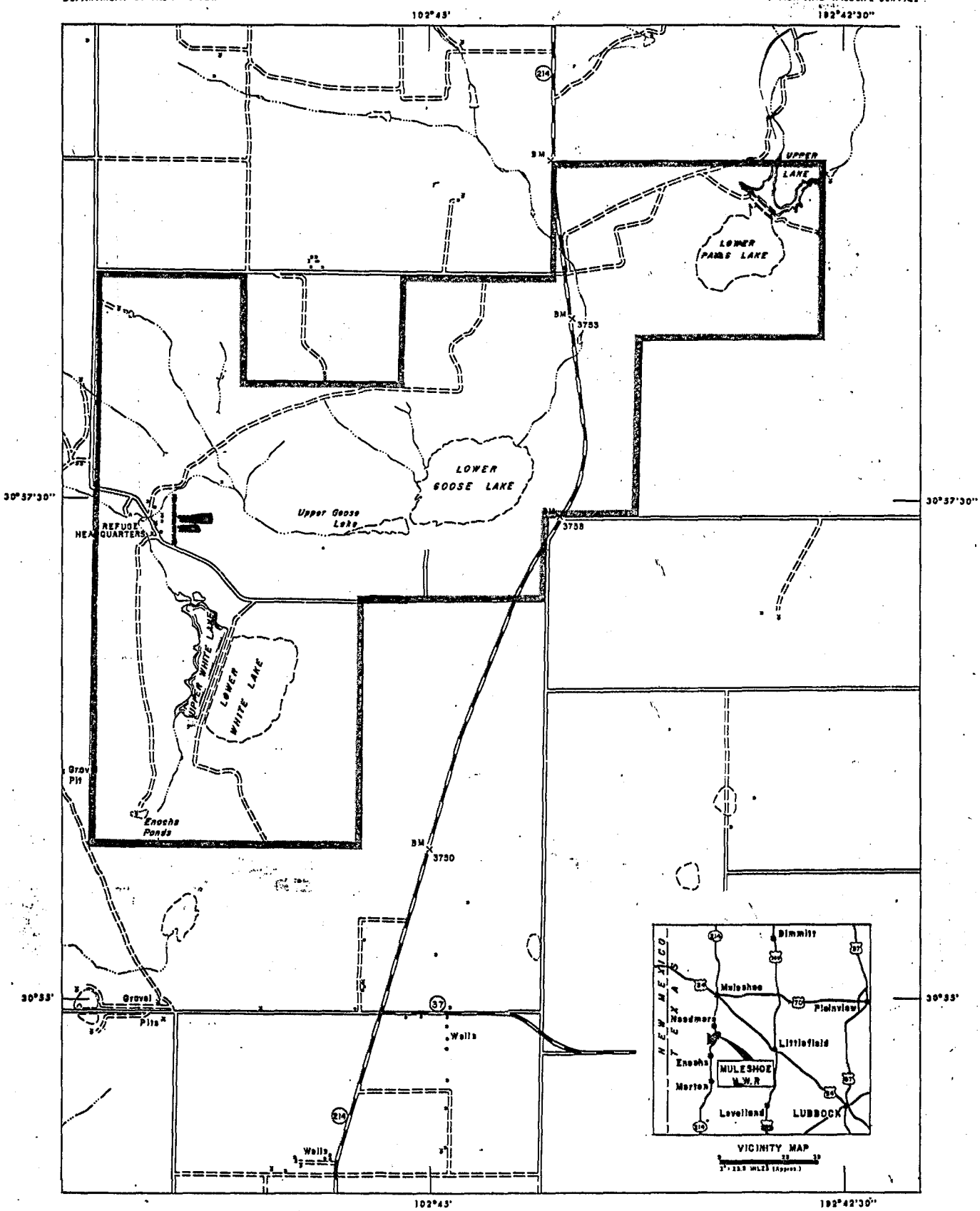
Refuge Manager Don Clapp wrote the report. Refuge Clerk Glenda Copley printed, typed, and assembled the report. Complex Manager Johnny Beall reviewed and edited the report.

MULESHOE NATIONAL WILDLIFE REFUGE

UNITED STATES
DEPARTMENT OF THE INTERIOR

BAILEY COUNTY, TEXAS

UNITED STATES
FISH AND WILDLIFE SERVICE



COMPILED IN THE DIVISION OF REALTY
FROM U.S.G.S. QUADRANGLES AND OTHER
OFFICAL INFORMATION.

ALBUQUERQUE, NEW MEXICO APRIL 1976

0 2000 4000 6000 8000 FEET

0 0.5 1 1.5 2 KILOMETERS

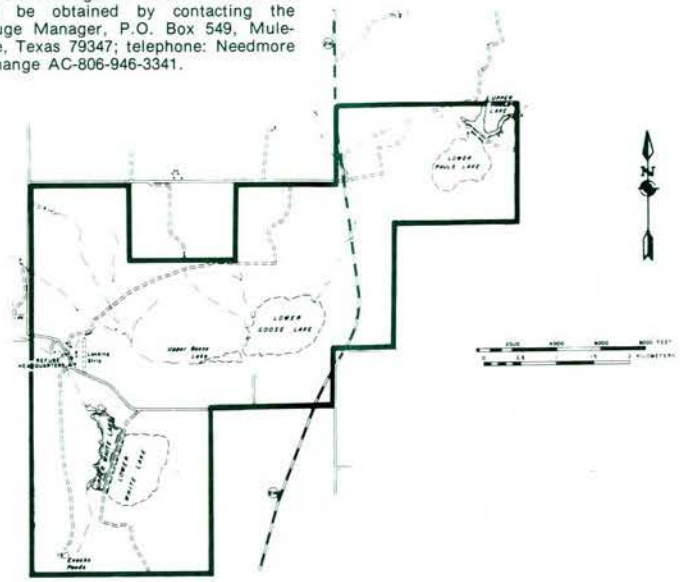
12°30' TRUE N. MAGNETIC N.

MEAN DECLINATION 1968

2R TEXAS 191 404

picnic and camping area is available at the refuge headquarters. Visitors are welcome to travel the refuge roads during daylight hours. The refuge office is open Monday through Friday, 8:00 AM to 4:30 PM.

Refuge headquarters may be reached by traveling west for 2¼ miles on a gravel road from highway 214. Visitors may register here and obtain information about the refuge. Additional information may be obtained by contacting the Refuge Manager, P.O. Box 549, Muleshoe, Texas 79347; telephone: Needmore exchange AC-806-946-3341.



As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service

RF-21590-1
February 1988

MULESHOE

national wildlife refuge

MULESHOE NATIONAL WILDLIFE REFUGE

Muleshoe National Wildlife Refuge is one of a chain of refuges in the central flyway administered by the U.S. Fish and Wildlife Service. It was established as a wintering area for migratory waterfowl and sandhill cranes. Located on the High Plains of west Texas at an elevation of 3,750 feet above sea level, this refuge hosts tremendous populations of sandhill cranes through the winter as well as a variety of waterfowl, especially in years of sufficient water. Established on October 24, 1935, it is the oldest National Wildlife Refuge in Texas.

The 5,809 acres of the refuge are broken by two caliche outcroppings -- in the form of rimrock -- near the north and west boundaries, with frequent prominent draws leading into the lakes. Over 5,000 acres of short-grass rangelands with scattered mesquite are under a managed grazing program. Livestock are rotated among several pastures to maintain the grasses in optimum condition for wildlife. The three sink-type lakes have no outlets, depend entirely on runoff for water supply, and are periodically dry. When all lakes are full, 600 surface acres of water are available for wildlife.

The outstanding feature of Muleshoe National Wildlife Refuge is the wintering sandhill cranes. They normally begin arriving at the refuge around the end of September or the first of October. During the six month period the cranes are away from their arctic breeding grounds, the refuge hosts the largest concentration of this species in North America. Sandhill cranes reach their peak numbers between late December and mid-February, often with over 100,000 of these interesting birds present at one time. The all-time peak of 250,000+ cranes was reached in February, 1981. The cranes roost on the

refuge lakes at night, as well as on other large saline lakes in the area. At sunrise, they fly out to feed in the surrounding agricultural land, where they search harvested fields for waste grain and invertebrates and graze in the grasslands and wheat fields. Most cranes have departed northward by the end of March.

In addition to the population of wintering sandhill cranes, large numbers of waterfowl are present when sufficient water is available. Migrating waterfowl begin to arrive at the refuge lakes during August and reach their peak population by the end of December. During the mid 1970's, when water was plentiful, duck numbers reached 700,000. Recently, the peak has been below 350,000 ducks. A few Canada geese winter here when water is available. During spring and fall migrations, small flocks of snow geese visit the refuge for a short period of time.

Pintails are the most common species of duck during the winter, followed by American widgeon, mallards, green-winged teal, and ruddy ducks. Blue-winged teal, canvas-backs, redheads, lesser scaup, ring-necked ducks, and buffleheads are present during the migration periods. The northern shoveler is usually late in it's northward migration, often arriving in late March and remaining into June. Occasionally, when adequate water is available, a few duck broods are hatched on the refuge.

There are 247 species on the refuge bird list with the largest species diversity occurring during the spring and fall migrations. This is especially true of the songbirds, but also of shorebirds and herons. Mourning doves, scaled quail, common nighthawks, horned larks, cactus wrens, curved-billed thrashers, and lark sparrows are prominent nesting birds. Many small birds can be seen in the shelterbelt planting which surrounds the refuge headquarters. In addition, 54 accidental species have been recorded on the refuge.

Permission is not required for amateur photography on the refuge, except that the construction of blinds and special travel related to photography must be authorized by the refuge manager. Refuge lakes are closed to boating. No part of the refuge is open to hunting and firearms are prohibited. No rocks, arrowheads, or other antiquities may be hunted or disturbed.

Visitors might watch for some of the species common to this area. Cottontails and jackrabbits are abundant and scaled quail are common over most of the refuge. Prairie dogs and burrowing owls may be seen in appropriate habitat, as well as many species of hawks. During the winter, golden eagles may be residents. Although primarily nocturnal, a coyote, badger, or skunk may sometimes venture out in the daylight.

The refuge is located 20 miles south of Muleshoe, Texas, on state highway 214 and about the same distance north of Morton on the same road. Littlefield is 30 miles east of the refuge on state highways 54 and 37. The populations of these communities are approximately 4,800, 2,500, and 6,500 respectively and all have motel accommodations available. A small

	S	S	F	W
____ Long-billed Marsh Wren	u		u	u
____* Rock Wren	u	u	u	u
MIMIDAE				
____* Mockingbird	c	c	c	u
____ Catbird	r		r	
____* Brown Thrasher	c	c	c	u
____* Curve-billed Thrasher	c	c	c	c
____ Sage Thrasher	o		o	
TURDIDAE				
____ Robin	c		c	c
____* Hermit Thrush	u	u	u	
____ Swainson's Thrush	r			
____ Eastern Bluebird	r		r	r
____ Western Bluebird	r		r	
____ Mountain Bluebird	c		c	c
____ Townsend's Solitaire	o		o	o
SYLVIIDAE				
____ Blue-gray Gnatcatcher	o		o	
____ Golden-crowned Kinglet	r			r
____ Ruby-crowned Kinglet	c		c	u
MOTACILLIDAE				
____ Water Pipit	c		c	c
____ Sprague's Pipit	o		o	o
BOMBYCILIDAE				
____ Bohemian Waxwing			r	r
____ Cedar Waxwing	u		c	c
PTILOGONATIAE				
____ Phainopepla		r	r	
LANIIDAE				
____ Northern Shrike				r
____* Loggerhead Shrike	c	c	c	c
VIREONIDAE				
____ Bell's Vireo	r		r	
____ Solitary Vireo	o		u	
PARULIDAE				
____ Black-and-White Warbler	o		o	
____ Orange-crowned Warbler	o		u	r
____ Nashville Warbler	o		o	
____ Yellow Warbler	c	u	c	
____ Yellow-rumped Warbler	u		c	r
____ Black-throated Gray Warbler			r	
____ Townsend's Warbler	r		r	
____ Black-throated Green Warbler			r	
____ Northern Waterthrush	r		r	
____ Kentucky Warbler	r			
____ MacGillivray's Warbler	c		u	
____ Common Yellowthroat	o			
____ Yellow-breasted Chat		r		

	S	S	F	W
____ Wilson's Warbler	c		c	
____ American Redstart	r		r	
PLOCEIDAE				
____* House Sparrow	o	o	o	o
ICTERIDAE				
____* Eastern Meadowlark	c	c	c	c
____* Western Meadowlark	o	o	o	o
____ Yellow-headed Blackbird	u	u	u	
____* Red-wing Blackbird	o	c	o	c
____* Orchard Oriole	u	u		
____* Northern Oriole	c	c	c	
____ Rusty Blackbird				r
____ Brewer's Blackbird	c		c	c
____ Common Grackle				r
____ Brown-headed Cowbird	c	c	c	o
THRAUPIDAE				
____ Western Tanager	r		r	
____ Summer Tanager	r	r		
FRINGILLIDAE				
____ Cardinal	o		o	o
____ Pyrrhuloxia	o		o	o
____ Black-headed Grosbeak	o		r	
____ Blue Grosbeak	u	c	u	
____ Indigo Bunting	r			
____ Lazuli Bunting	r			
____ Painted Bunting	o	o	o	
____ Evening Grosbeak			r	r
____ House Finch	c	o	c	c
____ Pine Siskin	o		o	o
____ American Goldfinch	u		u	u
____ Lesser Goldfinch			r	r
____ Green-tailed Towhee	u		u	
____ Rufous-sided Towhee	c		c	c
____ Brown Towhee	u	u	u	u
____* Lark Bunting	o	o	o	u
____ Savannah Sparrow	c	o	c	u
____ Grasshopper Sparrow	u	u	u	
____ Baird's Sparrow			r	
____ LeConte's Sparrow			r	
____ Vesper Sparrow	c		c	u
____* Lark Sparrow	c	c	c	o
____* Rufous-crowned Sparrow	u	u	u	u
____* Cassin's Sparrow	o	o	u	
____ Black-throated Sparrow	r	r	r	
____ Sage Sparrow	o			
____ Dark-eyed Junco	c		c	o
____ Gray-headed Junco	o		o	o
____ Tree Sparrow	u		u	c
____ Chipping Sparrow	c	o	c	o
____ Clay-colored Sparrow	c		c	
____ Brewer's Sparrow	o			
____ Field Sparrow				o
____ Black-chinned Sparrow			r	

	S	S	F	W
____ Harris' Sparrow			r	r
____ White-crowned Sparrow	c		o	o
____ Fox Sparrow	r		r	r
____ Lincoln's Sparrow	o		o	
____ Swamp Sparrow				r
____ Song Sparrow	c		c	c
____ McCown's Longspur	u		u	c
____ Lapland Longspur			r	r
____ Chestnut-collared's Longspur	u		u	u

ACCIDENTAL SPECIES

These species have been observed on Muleshoe National Wildlife Refuge only once or twice since the refuge was established in 1935.

Common Loon	White-winged Dove
Brant	Black-belled Cuckoo
Oldsquaw	Black Phoebe
White-winged Scoter	Eastern Wood Peewee
Goshawk	Beardless Flycatcher
Harris' Hawk	Common Raven
Osprey	Tufted Titmouse
European Crane	White-breasted Nuthatch
Yellow Rail	Red-breasted Nuthatch
Black Rail	Crissal Thrasher
Ruddy Turnstone	Wood Thrush
Dunlin	Red-eyed Vireo
Sanderling	Warbling Vireo
Pomarine Jaeger	Blackburnian Warbler
Glaucous Gull	Grace's Warbler
Glaucous-winged Gull	Ovenbird
Western Gull	Hooded Oriole
Bonaparte's Gull	Golden-crowned Sparrow
Band-tailed Pigeon	

REFUGE MANAGER
MULESHOE
NATIONAL WILDLIFE REFUGE
P.O. BOX 549
MULESHOE, TEXAS 79347

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
RF-21590-2 AUG 1979
GPO 852-246

BIRDS of MULESHOE - National Wildlife Refuge

Muleshoe is an important wintering area for ducks, canadian geese and sandhill cranes. Three playa lakes, often dry, are the main features which provide a food supply and resting area during wetter years. During recent years, mid 1970's, good water conditions have supported as many as 350,000 ducks, 86,000 canadian geese and over 100,000 lesser sandhill cranes. The cranes are most noticeable and generally begin arriving in late September and remain on the refuge until the end of March. Since the winter concentration of Lesser Sandhill Cranes at Muleshoe is the largest in the United States, this refuge is a very important link in the chain of National Wildlife Refuges. This list of 247 species have been observed on the refuge since its establishment in 1935. In addition 36 accidental species have been observed once or twice during that period.

BIRDS WHICH ARE KNOWN TO NEST on Muleshoe National Wildlife Refuge are designated by an asterisk (*).

THREATENED AND ENDANGERED SPECIES are marked by the GREEK LETTER OMEGA (Ω), traditional symbol of "the end."

Other symbols used in this list are defined as follows:

S —Spring	March–May
S —Summer	June–August
F —Fall	Sept.–Nov.
W—Winter	Dec.–Feb.

a–abundant	a common species which is very numerous
c–common	certain to be seen in suitable habitat
u–uncommon	present, but not certain to be seen
o–occasional	seen only a few times during a season
r–rare	seen at intervals of 2 to 5 years

	S	S	F	W
PODICIPEDIDAE				
____ Horned Grebe			o	o
____ Eared Grebe	c	r	c	r
____ Western Grebe			r	r
____* Pied-Billed Grebe	u	o	c	o
PELECANIDAE				
____ White Pelican	r		r	
PHALACROCORACIDAE				
____ Double-crested Cormorant		r		
ARDEIDAE				
____ Great Blue Heron	c	o	c	u
____ Green Heron	o	o	o	
____ Cattle Egret			o	
____ Great Egret		r	r	
____ Snowy Egret	r	r	o	r
____* Black-crowned Night Heron		u	u	
____ Yellow-crowned Night Heron		r	r	
____ American Bittern	r		r	
THRESKIORNITHIDAE				
____ White-faced Ibis	r		r	
ANATIDAE				
____ Whistling Swan			r	r
____ Canada Goose	u	r	o	o
____ White-fronted Goose	r		r	r
____ Snow Goose	u		u	c
____ Ross' Goose	u		u	u
____* Mallard	a	a	a	a
____ Black Duck	r		r	r
____ Gadwall	a	a	a	a
____* Pintail	a	a	a	a
____ American Green-winged Teal	a	r	a	a
____* Blue-winged Teal	a	a	a	a
____* Cinnamon Teal	c	a	c	a
____* American Wigeon	a	a	a	a
____* Northern Shoveler	c	a	c	u
____ Wood Duck			r	r
____* Redhead	c	a	c	c
____ Ring-necked Duck	u	r	u	u
____ Canvasback	c	a	c	c
____* Lesser Scaup	c	r	c	c
____ Common Goldeneye			r	r
____ Bufflehead	r		c	c
____* Ruddy Duck	c	a		c
____ Hooded Merganser			o	r
____ Common Merganser			o	o
____ Red-Breasted Merganser			r	r
CATHARTIDAE				
____* Turkey Vulture	u	o	u	o
____ Black Vulture	r	r		
ACCIPITRIDAE				
____ Mississippi Kite			r	
____ Sharp-shinned Hawk	u		u	u
____ Cooper's Hawk	u	r	u	o
____ Red-Tailed Hawk	c	u	c	c
____* Swainson's Hawk	c	c	c	r
____ Rough-legged Hawk	u	r	c	c
____* Ferruginous Hawk	c	u	c	c
____ Golden Eagle	u		c	c
Ω Bald Eagle	o		u	u
____* Marsh Hawk	c	u	c	c
FALCONIDAE				
____ Prairie Falcon	u	r	u	u
Ω Peregrine Falcon	r		r	r
____ Merlin	r		o	o
____ American Kestral	c	o	c	c
TETRAONIDAE				
____ Lesser Prairie Chicken	r	r	r	r
PHASIANIDAE				
____* Bobwhite	c	c	c	c
____* Scaled Quail	o	o	o	o
____* Ring-necked Pheasant	o	o	o	o
GRUIDAE				
____ Sandhill Crane	o	o	o	o
RALLIDAE				
____ Virginia Rail	r	r	r	
____ Sora			r	
____ Common Gallinule		r		
____* American Coot	o	o	o	c
CHARADRIIDAE				
____ Semipalmated Plover	u		u	
____* Snowy Plover	c	c	c	
____* Killdeer	c	c	c	u
____ Mountain Plover	r		o	
____ Black-bellied Plover			o	
SCOLOPACIDAE				
____ Common Snipe	u		u	o
____ Long-billed Curlew	u	o	c	
____ Whimbrel	r		r	
____* Upland Sandpiper	r	r	r	r
____ Spotted Sandpiper	u	u	u	
____ Solitary Sandpiper	u	u	u	r
____ Willet	o	o	o	
____ Greater Yellowlegs	u	c	c	r
____ Lesser Yellowlegs	u	c	c	r
____ Pectoral Sandpiper	r	r	r	
____ White-rumped Sandpiper		r		
____ Baird's Sandpiper	c	c	c	
____* Least Sandpiper	c	c	c	
____ Semipalmated Sandpiper	u	u	u	
____* Western Sandpiper	o	o	o	
____ Long-billed Dowitcher	c	c	c	
____ Stilt Sandpiper	u	u	u	
RECURVIROSTRIDAE				
____* American Avocet	c	o	o	
____* Black-necked Stilt	u	u	u	
PHALAROPODIDAE				
____ Wilson's Phalarope	o	o	o	o
LARIDAE				
____ Herring Gull	r		r	u
____ Ring-billed Gull	u		u	u
____ Franklin's Gull	o		o	r
____ Gull-billed Tern				r
____ Forster's Tern	o	r	o	
____ Common Tern		r	r	
____ Least Tern		r		
____ Black Tern	c	c	c	
COLUMBIDAE				
____ Rock Dove				r
____* Mourning Dove	o	o	o	c
CUCUUIDAE				
____* Yellow-billed Cuckoo	c	c	u	
____* Roadrunner	c	c	c	c
TYTONIDAE				
____* Barn Owl	u	u	u	u
STRIGIDAE				
____* Great Horned Owl	c	c	c	c
____* Burrowing Owl	c	c	c	c
____* Long-eared Owl	u	u	u	u
____ Short-eared Owl	o		o	o
CAPRIMULGIDAE				
____* Common Night Hawk	c	c	u	
____ Lesser Nighthawk	r	r		
TROCHILIDAE				
____ Black-chinned Hummingbird	r	u	u	
ALCEDINIDAE				
____ Belted Kingfisher	o	o	u	
PICIDAE				
____ Common Flicker	c		c	c
____ Red-bellied Woodpecker	r		r	r
____ Golden-fronted Woodpecker			r	r
____ Red-headed Woodpecker	r	r		r
____ Yellow-bellied Sapsucker	r		r	r
____ Hairy Woodpecker	r	r	r	r
____ Downy Woodpecker			r	r
____* Ladder-backed Woodpecker	c	c	c	c
TYRANNIDAE				
____* Eastern Kingbird	r	r	r	
____* Western Kingbird	c	c	c	
____ Cassin's Kingbird	r	r	r	
____* Scissor-tailed Flycatcher	c	c	c	
____* Ash-throated Flycatcher	u	u	u	
____ Eastern Phoebe	u		u	r
____ Say's Phoebe	c	o	r	u
____ Least Flycatcher	u		u	
____ Western Flycatcher	c	c	c	
____ Western Wood Pewee	c	c	c	
____ Olive-sided Flycatcher	u	u	u	
____ Vermilion Flycatcher		o		
ALAUDIDAE				
____* Horned Lark	o	o	o	o
HIRUNDINIDAE				
____ Violet-green Swallow	r			
____ Tree Swallow	o	o	o	
____ Bank Swallow	o		o	
____ Rough-winged Swallow	o	o	o	
____ Barn Swallow	u	u	u	
____ Cliff Swallow	u	u	u	
CORVIDAE				
____ Blue Jay			r	r
____ Scrub Jay	o		o	o
____* White-necked Raven	u	u	o	o
____ Common Crow	u	u	u	
PARIDAE				
____ Mountain Chickadee				r
CERTHIIDAE				
____ Brown Creeper			o	r
TROGLODYTIDAE				
____ House Wren	o	r	o	u
____ Bewick's Wren		u	u	u
____* Cactus Wren	c	c	c	c