

RAINWATER BASIN WETLAND MANAGEMENT DISTRICT
Kearney, Nebraska

ANNUAL NARRATIVE REPORT
Calendar Year 1986

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

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REVIEW AND APPROVALS

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<u>Alan P. Trout</u>	<u>2/3/87</u>	<u>[Signature]</u>	<u>2/5/87</u>
Refuge Manager	Date	Refuge Supervisor Review	Date
<u>[Signature]</u>		<u>3/2/87</u>	
Regional Office Approval		Date	

INTRODUCTION

The Rainwater Basin Wetland Management District, headquartered in Kearney, Nebraska, administers 40 Waterfowl Production Areas (WPA's) and McMurtrey National Wildlife Refuge. These landholdings are scattered across a 7 county area in south-central Nebraska known as the Rainwater Basin Area (Figure 1).

When the initial WPA land purchases were made in 1963, the units were administered by the Valentine National Wildlife Refuge. By 1966, the total acreage had increased to 7,000; necessitating initiation of a separate office - the Hastings Wetland Management District. The office location was moved to Kearney (50 miles west) in 1976 in order to be more centrally located for administration of the proposed Platte River NWR. Purchase of the proposed refuge eventually failed, but the office remained in Kearney. The name was changed to Rainwater Basin WMD in 1980 to more descriptively define our area of operation.

The McMurtrey Refuge is a 1,071 acre tract that was transferred in 1966 to the Fish and Wildlife Service from the Department of Defense (Hastings Naval Ammunition Depot). GSA transferred the land under authority of "Public Law 537" for use in the National Migratory Bird Management Program". Therefore, the area has been managed as a sanctuary and will require Secretarial action before it can be opened to public hunting.

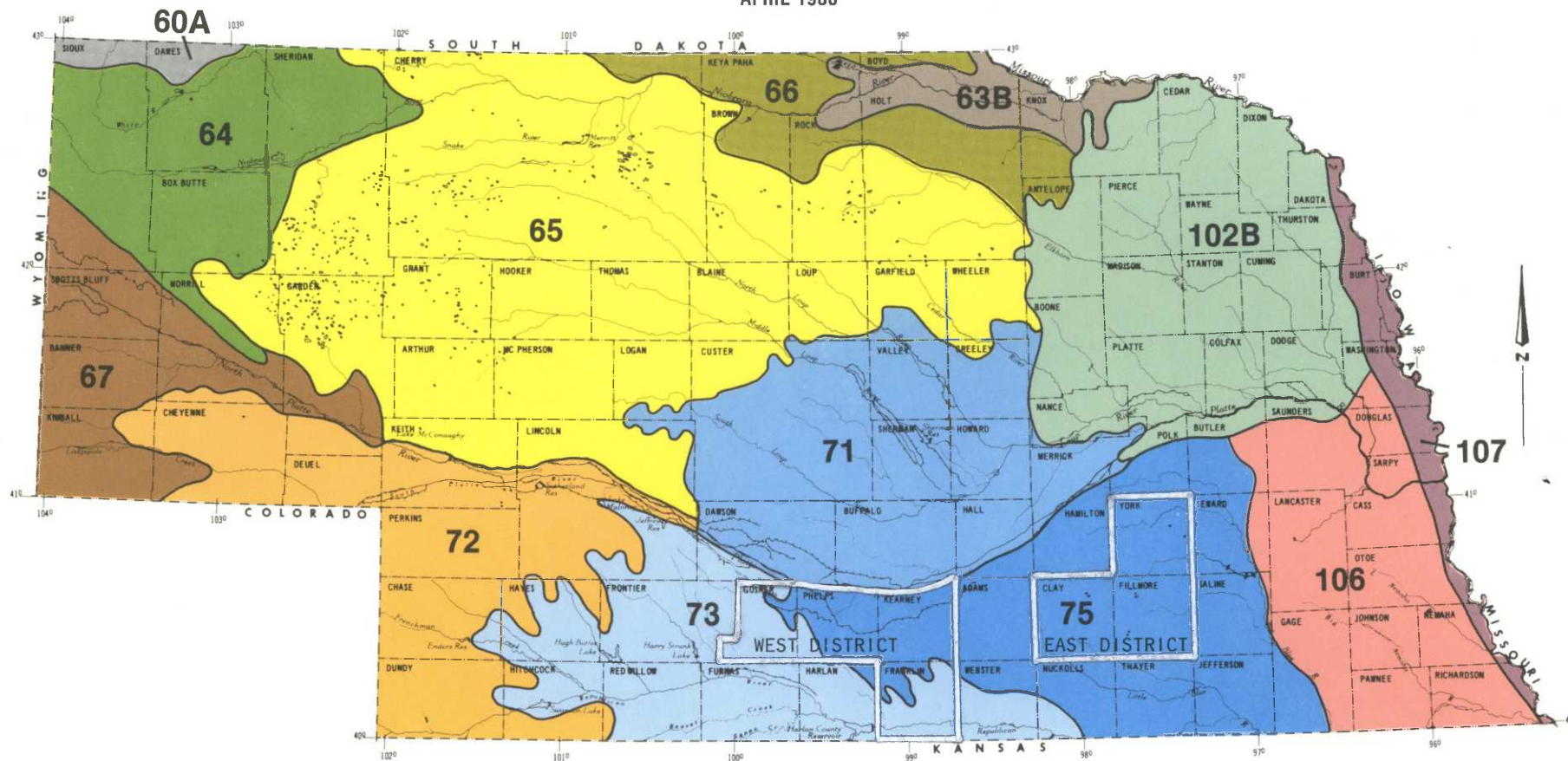
Currently, the WPA's and McMurtrey Refuge total 15,380 acres which is comprised of 8,043 acres of fresh water wetlands and 7,337 acres of uplands. Native grass seedings (restored prairie) make up 77%, small tracts of native prairie total 6%, and tame grass and legumes represent 5% of the total uplands.

The Rainwater Basin Area encompasses 4,200 square miles and originally contained over 3,900 fresh water wetlands. The topography is flat to gently rolling Peorial Loess Plains.

Soils are predominately silt loams and silty clay loams. Depressions or "basins" in the topography have accumulated clay bearing runoff waters over the years. The clay particles settle into the subsoils, creating a nearly impervious seal for a wetland to develop. These soils are classified in the Scott series. The surrounding upland soils are deep and fertile, lending themselves to row crop farming. Widespread land leveling and irrigation development has occurred throughout the region. An abundance of groundwater supports a farming economy based primarily on irrigated corn. Lesser amounts of unirrigated grain sorghum (milo) and winter wheat are planted. Land values have exceeded \$2,000 per acre for irrigated cropland.

The rapid and intense agricultural development has brought about the destruction of 90% of the original wetland basins. Only half of the scant 10% that remain are under public ownership. Unless further action is taken, and soon, the remainder of the unprotected wetlands could be destroyed.

MAJOR LAND RESOURCE AREAS

NEBRASKA
APRIL 1980

LEGEND

60A	PIERRE SHALE PLAINS AND BADLANDS	72	CENTRAL HIGH TABLELAND
63B	SOUTHERN ROLLING PIERRE SHALE PLAINS	73	ROLLING PLAINS AND BREAKS
64	MIXED SANDY AND SILTY TABLELAND	75	CENTRAL LOESS PLAINS
65	NEBRASKA SANDHILLS	102B	LOESS UPLANDS AND TILL PLAINS
66	DAKOTA-NEBRASKA ERODED TABLELAND	106	NEBRASKA AND KANSAS LOESS DRIFT HILLS
67	CENTRAL HIGH PLAINS	107	IOWA AND MISSOURI DEEP LOESS HILLS
71	CENTRAL NEBRASKA LOESS HILLS		

1/3,210,000

SCALE 0 10 20 30 40 50 60 70 80 MILES
0 20 40 60 80 100 120 KILOMETERS

SOURCE:
STATE FAMILY OF MAPS, SCS DRAWING NO. 5-S-32,930
AND INFORMATION FROM SCS FIELD PERSONNEL
ALBERS EQUAL AREA PROJECTION

There are two separate and distinct clusters of WPA's within the District, as shown in Figure 1. The eastern cluster of WPA's is centered in the Clay and Fillmore County area. The topography in this vicinity is gently rolling and wetlands commonly fall into the Type IV category. The western cluster, centered in the nearly flat Kearney-Phelps County area, contains mostly Type I and III wetlands.

Waterfowl production is many times greater in the eastern section since the more permanent Type IV wetlands commonly retain adequate water for brood rearing. The Type III wetlands in the western cluster of WPA's are generally dry by early summer, with few areas producing waterfowl.

The primary objective of the District is to provide critical spring "staging" habitat for the 9 to 12 million waterfowl that arrive here annually on their journey north to breed. Birds concentrate into this relatively small area for several weeks before wetlands farther north become ice-free. The Rainwater Basin Area is known to support 90% of the entire mid-continent population of white-fronted geese at this time. Total waterfowl use days approach 30,000,000 in years when good spring wetland conditions are present.

With the extensive loss of wetlands, intense crowding occurs during peak migrations in March and April. This crowding is, in part, believed to be responsible for the fowl cholera epizootics first observed in 1975. Outbreaks have occurred annually since then, killing an estimated 200,000 waterfowl in the basin area and making an unknown impact on the survivors that headed north to breed. The development of an effective cholera management program is the single most urgent wildlife management need.

The principle land management activities presently carried out are:

1. Wetland improvement by providing additional water with 29 pumping stations, diking (on boundaries and for sub-units), vegetation control by burning, mowing, and grazing.
2. Upland improvement via prescribed burning, haying, grazing, mechanical treatment, shelterbelt development, food plot plantings, noxious vegetation control, and establishment of permanent cover (native grass and DNC).

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A. HIGHLIGHTS

Funk WPA purchased. (Section C.1)

Master's thesis completed from nest dragging study. (Section D.5)

Spring pumping accomplished. (Section F.2)

Nebraska Game and Parks Commission funded shelterbelt planting and maintenance. (Section F.3)

High intensity-short duration grazing utilized in grassland management program. (Section F.7)

Spring waterfowl population peaked at 555,000 on WPA's. (Section G.3)

Fowl cholera occurred in both spring and fall. (Section G.17)

B. CLIMATIC CONDITIONS

For the most part, January was unseasonably warm with several daytime highs in the 60's. The December snows had melted before the new year and no precipitation was received in January.

Three inches of snow fell on February 5th. Below zero weather followed for several days, but unseasonably warm weather again returned the last 2 weeks, encouraging an early migration of waterfowl into the area.

March was also warmer and dryer than normal. Only one light snowstorm hit, dropping temperatures for a couple of days. No snow accumulated and other than that storm, the migration was not held up by bad weather.

On April 10th we received a hard frost. Due to early warm weather, shrubs, alfalfa, wheat and some trees were beginning to grow rapidly. The frost set them back substantially, but no permanent damage resulted.

As usual, spotty thunderstorms dropped $1\frac{1}{2}$ - 5 inches of rain on the District during the summer months. Figure 2 and Table 1 show the precipitation and temperature readings taken in Hastings, NE for the National Oceanic and Atmospheric Administration. Overall, the counties of York, Fillmore, and eastern Clay received more precipitation than was recorded in Hastings. The rest of the District was very similar to the Hastings data.

August was unseasonably cooler, making outdoor work much more pleasant.

On November 1st the first snowfall for the up-coming winter was received. Only a couple of inches accumulated, and it melted within a few days.

December was a bit unusual this year. On the 6th, an ice and snowstorm hit and from then on the daytime highs were mostly in the lower to upper 50's. For that time of year, it was a very pleasant month to be outdoors.

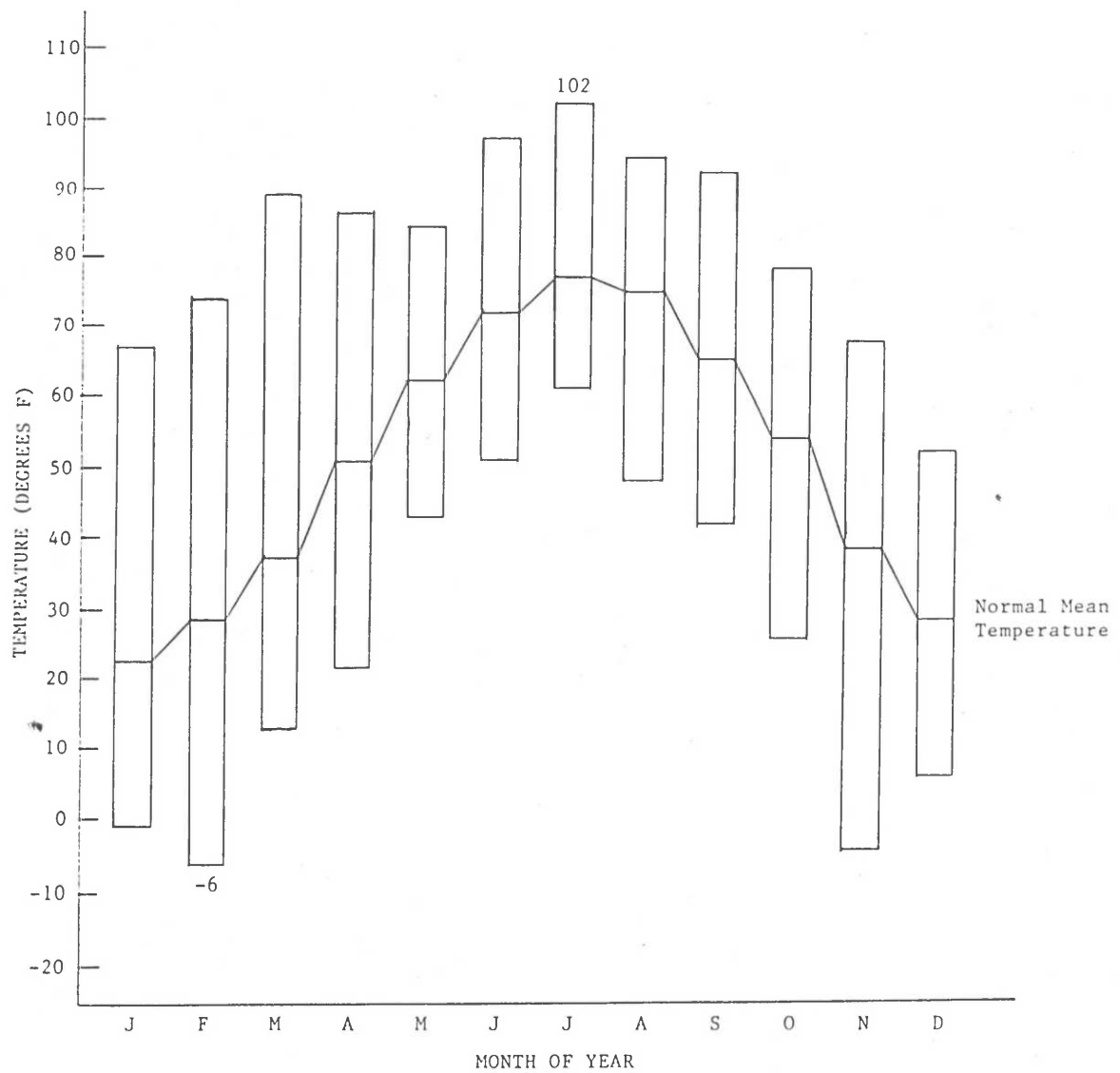


Fig. 2.

Table 1.

1986 MOISTURE DATA*

	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEPT	OCT.	NOV.	DEC.	Total
Precip.	0.0	0.82	2.58	2.99	3.36	1.46	3.80	2.80	4.70	3.10	0.17	0.70	26.48
Depart.													
From Norm.	-0.64	-0.10	0.82	0.26	-0.90	-2.87	0.45	-0.58	1.79	1.63	-0.62	-0.06	- 0.82
Snowfall	0	5.0	T	0	0	0	0	0	0	0	2.3	3.0	10.3

*Data obtained from records kept in Hastings, NE (located in the middle of the WMD). Due to the expanse of the WMD each WPA may vary.

C. LAND ACQUISITION1. Fee Title

- A. Funk WPA - Acquisition was completed on 16 individual tracts totaling nearly 2,000 acres (Fig. 3). Only one small 20 acre segment of the wetland is still in private ownership. The owner has recently expressed interest in selling, so we will hopefully acquire this tract in 1987.



Fig. 3. The newly posted Funk WPA - Crown Jewel of the western WPA's. A.T.

- B. Atlanta WPA - The long awaited 20 acre Fitch roundout was acquired. It completes a 461 acre wetland already owned by the FWS. Our water management capabilities will be greatly enhanced.
- C. Johnson Basin - Purchase offers were given to 8 landowners totaling nearly 600 acres. Purchase will hopefully be completed in 1987.
- D. Cottonwood WPA - An unsuccessful attempt to pick up a 300 acre roundout was made. The privately owned half of the marsh is also the deepest (Fig. 4). We believe the owner was "touched in the head" for not selling since there is an abundance of reasonably priced land on the market for his replacement.



Fig. 4. An attempt to purchase the Cottonwood roundout failed. The adjacent landowner has the deepest, most permanent half of the marsh. D.H.

2. Easements

No easements have been purchased to-date. The recently approved acquisition plan recommends an easement program.

3. Other

An acquisition plan was written and approved for the Rainwater Basin area. All we need now is funding!

Appendix D of the plan summarizes the future acquisition goals as follows:

	<u>Total Acres</u>	
Rainwater Basin - goal	58,500	
Accomplished through 7/1/86	17,493	
Future Acquisition	41,007	(rounded 41,000)
<u>Allocation of Future Acquisition</u>		
	<u>Acres</u>	
New Projects		
Wetlands	9,200	
Uplands	18,800	
Total		28,000
Roundouts - WPA's		
Wetlands	1,000	
Uplands	2,000	
Total		3,000
Restored/Created Wetlands		10,000
Grand Total		41,000 acres

D. PLANNING5. Research and InvestigationsRainwater Basin WMD N.R. 86 - Nesting Preference and Productivity of Waterfowl in South-Central Nebraska.

The 6th consecutive year of nest dragging was completed, with 2 drags between May 19-29 and June 9-11. Smith WPA was dropped from the study area due to a consistent history of few nests and Mallard Haven WPA was added in it's place. Although we had planned to include Harvard WPA, it went dry prior to the first drag and had to be excluded. Water conditions were fair to poor in Massie and Mallard Haven during early spring. However, late April rains improved Mallard Haven to excellent, while Massie remained with fair water.

Duckling production reflected the marginal water conditions (Table 2) with a 3 year low. Mallards composed 49% of the nests, outranking even the blue-winged teal (Table 3). This may be due to water conditions being somewhat better during the early spring when mallards began nesting. Later on, water conditions showed significant decline when blue-winged teal were nesting.

Table 2. Total Observed Duckling Production On Study Area

<u>Year</u>	<u>No. of Successful Nests</u>	<u>Est. No. of Ducklings Hatched</u>	<u>No. of Acres Searched</u>	<u>Ducklings Hatched/Acre</u>
1981	88	807	433	1.86
1982	58	623	514	1.21
1983	27	264	483	0.55
1984	110	1052	419	2.51
1985	64	585	385.5	1.52
1986	22	220	239.5	0.92

An "economy style" of electrified predator fence was erected around the DNC, Massie Unit 2 (Fig. 5). Only 4 strands of wire were used in an effort to exclude our suspected major predators - skunk, opossum, and raccoon. We did not target fox because they are extremely rare. Similarly, coyotes are felt to be doing a relatively small degree of nest predation. Hail screen was omitted because ground squirrels are uncommon and believed to be making little impact on nesting. The fence was unsuccessful in eliminating predators, with observed nest success being 33%. Plans are to try again in '87 by electrifying the fence in early spring in conjunction with trapping predators.

Over the years, higher nest densities have been consistently found in cool season grasses and legumes. Therefore, priority will be given to planting: (1) straight alfalfa; (2) DNC mixtures with wheatgrasses and/or brome; (3) native grass mixes with a significant amount of green needlegrass and western wheatgrass.

Table 3.

SUMMARY OF NEST DRAGGING 1981-86

	1981	1982	1983	1984	1985	1986
BWT nests	128(80%)	133(86%)	57(68%)	128(67%)	88(69%)	18(41%)
Mallard nests	24(15%)	15(10%)	17(19%)	40(21%)	24(19%)	21(49%)
All other species	8(5%)	7(4%)	11(13%)	23(12%)	16(12%)	4(10%)
Overall observed nest density (nests/acre)	.37	.30	.17	.46	.33	.18
Observed nests per acre: (total acres) ¹						
Native grass seedings	.17(332)	.26(413)	.12(393)	.31(335)	.21(301.5)	.15(109)
DNC	2.04(48)	.85(48)	.73(48)	1.85(48)	1.15(48)	.20(45) ²
Native prairie	.12(42)	.19(42)	0(42)	0(35)	.07(30)	0(0)
Smooth brome						.20(40)
Observed nest success: (overall)	58.4%	38.9%	33.0%	58.5%	50.0%	51%
Nest success (Mayfield method):						
BWT	33.2%	10.6%	11.6%	56.0%	22.0%	55.0%
Mallard	28.7%	1.8%	12.5%	13.0%	11.0%	9.0%
% Unsuccessful nests predated	85.0%	93.0%	93.0%	80.0%	91.0%	91.0%
% Unsuccessful nest abandoned	15.0%	7.0%	7.0%	20.8%	9.4%	19.0%
Ducklings hatched per acre:						
Native grass seeding	.93	1.31	.46	1.63	.85	.98
DNC	10.06	1.01	1.7	10.0	3.88	.62
Native prairie	.45	.78	0	0	.29	--
Smooth brome						1.1

¹ Acreages change annually due to excessive soil moisture limiting dragging area.² DNC acreage decreased by constructing predator fence.



Fig. 5. We attempted to build an electric fence that would ward off opossum, raccoons, and skunk. We saved considerable expense by not installing hail screen and cutting down the number of strands of wire. However, observed nest success was only 33% inside. Our second attempt will hopefully improve!
A.T.

6. Other

Nebraska Game and Parks Commission personnel sampled marsh transects for the presence of lead and steel shot (Fig. 6). A surprisingly high number of lead shot was present in some of the samples as shown in Table 4. Lead shot has been banned for waterfowl hunting since 1977 on the sample areas. Could it be that lead shot will persist for decades near the surface of the heavy clay marsh soils?

Table 4. LEAD SHOT SAMPLING

<u>WPA</u>	<u>% Samples With Shot</u>	<u>Number Lead Shot/Acre-95%</u>	<u>Number Steel Shot/Acre-95%</u>	<u>Transects in feet</u>
<u>Western</u>				
Prairie Dog	15.6	8,099	1,429	475
Sacramento	27.6	16,338	---	265
Lindau	28.8	23,100	660	233
Quadhamer	22.0	13,452	---	400
<u>Eastern</u>				
Harvard	37.4	26,647	4,375	500
Massie	22.2	18,805	3,050	500
Hansen	45.5	37,515	5,836	400
Mallard Haven	30.0	12,445	4,585	660 E 500 W



Fig. 6. Dave Oates, Nebraska Game and Parks, sampling marsh soils for lead and steel shot. He collected much higher levels of lead shot than we expected him to find.
A.T.

E. ADMINISTRATION

1. Personnel

No changes occurred with the permanent staff this year. Changes in the seasonal staff occurred when Laborer Wimberley accepted an offer in late May to go to Idaho and become a fishing guide. It didn't work out quite the way he expected, so he returned and was able to work again in October for a couple weeks. Upon Wimberley's departure, Biological Aid Smith was hired to work through August.

Robin Harding was put on again to run the nest drag data collection. Her appointment lasted 2 months.

On September 18th Bio. Tech. Huber received a certificate and pin for his 20 years of service with the government (Fig. 7).



Fig. 7. Project Leader Trout and his faithful companion "Rusty" presenting 20 year service certificate and pin to Bio. Tech. Huber. 9/86 R.P.

Bio. Tech. Huber was presented a Special Achievement Award in the amount of \$487 on December 12th. The award was given for his exceptional performance and the saving of government dollars while transporting heavy equipment to and from various Refuges within Region 6. Duane spent 28 days on the road this year. His most difficult achievement was in the transporting of two 18 ~~yd.~~ self-propelled earthmovers from Ft. Hood, Texas to this station. It required 4 separate trips, a lot of planning, and perserverance to accomplish (Fig. 8).



Fig. 8. Asst. Manager Poetter presenting Special Achievement Award of \$487 to Biological Technician Huber. ("Rusty" couldn't make it for the presentation.)

12/86 A.T.



8 5 6 2 1 4
3

Personnel

1. Alan K. Trout, Project Leader, GS-11, PFT
2. Richard D. Poetter, Asst. Manager, GS-9, PFT
3. Duane A. Huber, Biological Technician, GS-8, PFT
4. Susann M. Huber, Refuge Assistant, GS-5, PFT
5. Rich M. Routh, Biological Technician, GS-5, PPT
6. Bernard L. Siebke, Laborer, WG-2, Temp., 3/3/86-10/24/86
7. Woodrow W. Wimberley, Laborer, WG-2, Temp.(not pictured)
02/17/86-05/23/86 & 10/06/86-10/24/86
8. Harold W. Smith, Bio. Aid, GS-3, Temp., 5/26/86-8/29/86
9. Robin G. Harding, Bio. Aid, GS-3, Temp., 5/19/86-7/19/86



9



14, 13, 12, 11, 10

Youth Conservation Corps

10. Gregory T. Michl, Group Aid, GS-3, Temp., 6/9/86-8/1/86
11. Amy L. Rundstrom, Enrollee, 6/9/86-8/1/86
12. Clifton A. Brown, Enrollee, 6/9/86-8/1/86
13. Michael L. Brown, Enrollee, 6/9/86-8/1/86
14. Kristina M. Evans, Enrollee, 6/9/86-8/1/86

Table 5. STAFFING 1982-1986

<u>Fiscal Year</u>	<u>PFT</u>	<u>PPT</u>	<u>TEMP.</u>	<u>FTE Total</u>
1982	4	0	5	-
1983	4	2	0	5.3
1984	4	2	2	6.1
1985	4	1	3	5.8
1986	4	1	9	6.7

2. Youth Programs

This year's YCC program, which ran from June 9th thru August 1st, was a complete success. Hired were 2 male and 2 female enrollees, ranging in age from 15 to 18. A group leader was also hired for the first time ever. This was the largest program held at this station. Only 2 enrollees had been hired in past years, with no group leader.

The group leader position freed the assistant manager from the direct supervision of the enrollees, thus allowing him to perform more technical duties. This was probably the most important improvement over past years.

Everyone gave 100% and plenty of work was accomplished. Work projects included; 2 weeks chopping thistles, boundary line rehab. at Clark, Quadhamer and Prairie Dog WPA's, building and vehicle clean-up, and projects on the newly acquired Funk WPA consisting of setting boundary fence stretch braces, pulling out old fence lines and telephone poles (plus overhead wires), and helping with the clean-up of an old farmsite.

5. Funding

Table 6. FUNDING LEVELS SINCE 1982

<u>Year</u>	<u>O&M</u>	<u>ARMMS</u>	<u>YCC</u>	<u>TOTAL</u>
1982	\$188,800	-	-	\$188,800
1983	215,000	-	-	215,000
1984	258,000	\$65,000	\$3,000	326,000
1985	252,000	65,000	3,000	320,000
1986	200,000	48,800	7,000	255,800

6. Safety

Each month, in conjunction with one of the weekly staff meetings, a safety meeting was held. Topics discussed covered winter office safety (tripping hazards, lifting, paper shuffling and associated finger cuts, post hunting

season blues, mental health and it's relation to going stir-crazy, glue overdoses from licking government envelopes, typing cramps and daydreaming fatigue), safe handling and disposal of sick or injured small mammals and fowl, prescribed burning safety, vehicle and equipment preventative maintenance, fencing safety, wearing of seat belts, hunter safety and first-aid for frostbite.

In July a movie dealing with the wearing of seatbelts was shown to the staff. "Drive and Survive", "Chainsaw Safety" and a movie dealing with proper lifting methods were shown in September.

F. HABITAT MANAGEMENT

1. General

Management programs are tailored to meet the 3 primary objectives of this station: spring waterfowl maintenance, waterfowl production, and habitat diversity benefiting other migratory birds and resident wildlife.

Management practices most commonly used to manage the uplands include: grazing, haying, burning, rest, shelterbelt development and food plot plantings.

Wetland management tools include: pumping to improve waterlevels; grazing, mowing, burning, and chemical application to control emergent vegetation; and constructing dikes and water control structures to enable waterlevel manipulation.

2. Wetlands

The Rainwater Basin was once rich in wetlands. Originally 3,907 basins blessed the area with 94,063 acres of wetland area. Today, only 10% of the original basins remain. Half of these are in public ownership under the Fish and Wildlife Service and Nebraska Game and Parks Commission.

Drastic changes to the landscape have occurred in the past few decades. Extensive row crop irrigation has brought about intensive cultivation, land leveling, wetland destruction, stream channelization, etc. The few remaining wetlands have been affected by a reduction in surface water runoff and increased siltation.

In order to revive the wetlands on some WPA's, deep wells have been utilized to temporarily improve waterlevels. Under current funding levels it is possible to pump only a limited amount of water during the critical period of spring migrations. It is entirely out of reason at this point to attempt waterlevel maintenance throughout the entire spring and summer. Fall pumping, to provide hunting areas, was funded by the Nebraska Game and Parks Commission in the early 1980's. However, the program was cancelled when "habitat stamp" sales dropped and funds were short.

Wetland conditions for 1986 are summarized in Table 7.

Table 7. 1986 WETLAND CONDITIONS

Season	West Basin Area (Krny, Phelps, Gos., Franklin Cos.)	East Basin Area (Clay, York, Fillmore Cos.)
Winter	Poor except for good water in the Funk-Johnson marsh area.	Good - Excellent
Spring	Poor except for good water in the Funk-Johnson marsh area.	Good - Excellent early, falling to fair by late spring.
Summer	Poor except for good water in the Funk-Johnson marsh area.	Fair to poor in Clay County. Improved to excellent in Fillmore and York Counties.
Fall	Poor except for good water in the Funk-Johnson marsh area.	Maintained excellent conditions in York and Fillmore Counties. Most wetlands in Clay County were poor.

Spring pumping was done on 4 Clay County WPA's. No west district areas were pumped because general wetland conditions were poor across the area and pumping a few WPA's would cause an extreme concentration of waterfowl. The eastern area contained many naturally filled wetlands, therefore we pumped into wetlands in an attempt to increase the available habitat (Table 8).

Table 8. SPRING WETLAND PUMPING

Year	Ac. Ft. Pumped	#WPA'S	#Wells
1981	995	5	10
1982	245	6	11
1983	393	8	13
1984	0	0	0
1985	746	5	9
1986	345	4	5

Emergent vegetation control has become necessary in many WPA marshes. Both cattail and river bulrush stands have become so dense that waterfowl use has been reduced in some areas. Reed canary grass in shallow marshes can also become so rank that very little open water remains.

Methods to control excessive vegetation include: strip mowing, grazing, burning, discing and herbicides.

Two reed canary grass areas were strip hayed, totaling 117 acres (Section F.8). Marsh grazing was accomplished on 6 WPA's (Section F.7).

No burning or discing was accomplished on marsh vegetation in 1986.

The final, and least desirable tool for vegetation control, is application of chemicals. We consider chemical control a last resort. Application of Rodeo at 7.5 pts./acre during July has been effective in past years, but expensive (Fig. 9).



Fig. 9. An August 1984 application of Rodeo was successful in reducing a heavy stand of cattails on Lange WPA. This photo on 7/11/86 shows that the marsh has remained open for 2 summers thus far, even though waterlevels have been fairly low. R.P.

Several additional wetlands were selected for Rodeo application during July 1986 (Table 9). Cost was \$65.00/acre for chemical and \$3.50/acre for aerial application, totaling \$68.50/acre. The rate of application was reduced this year to 5.5 pts. Rodeo/acre. Two quarts of Activar 90 surfactant were added per 100 gal. of mixture. By mid-August results were already evident on Funk WPA (Fig. 10).

Table 9.

RODEO APPLICATIONS

<u>WPA</u>	<u>Acres Sprayed</u>	<u>Date</u>	<u>Rate</u>	<u>Method</u>
Funk	51	7/13	5.5 pts/ac	Helicopter
Smith	30	8/10	5.5 pts/ac	Fixed Wing
Green Acres	10	8/10	5.5 pts/ac	Fixed Wing



Fig. 10. A July 13th application of Rodeo at 5.5 pts/acre on Funk WPA was already showing results on Aug. 15th.
R.P.

BLHP funds provided dike rehab and installation of a water control structure on Wilkins WPA in 1984. The area, once drained via legal drainage district tile, has developed into a first rate semi-permanent marsh (Figs. 11 and 12).



Fig. 11. An aerial view of the restored wetland due to BLHP dike work which keeps water on the WPA from "going down the drain" - that is a legal tile installed in the early 1900's.
W.W.



Fig. 12. A closer look at the marsh on July 11th for all you marsh buffs out there. It sure beats looking at another corn field. R.P.

3. Forests

A 3-party agreement was signed in 1983 that authorized the Nebraska Forest Service to plant trees and shrubs on WPA's to improve resident wildlife habitat. All costs are borne by the Nebraska Game & Parks Commission. The 1986 program is summarized below:

I. Existing Shelterbelt Maintenance (Planted 1983-85)

<u>WPA</u>	<u>Mowing Grass In And Around Trees (Acres)</u>	<u>Applying Herbicide To Reduce Grass (Acres)</u>	<u>Cost</u>
Clark	34.8	17.4	1,392
Jensen	31	15.5	1,240
Gleason	31.6	16.3	1,304
Prairie Dog	43.6	21.8	1,744
Eckhardt	9.4	4.7	376
Smith	24	12	960
Moger	13.4	6.7	536
Massie	29.4	14.7	1,146
Green Acres	2.8	1.4	112
Harvard	85.8	42.9	3,432
Glenvil	12.4	6.2	496
Krause	32.4	16.2	1,296
Total	350.6	175.8	\$14,034

II. New Shelterbelt Plantings

<u>WPA</u>	<u>Acres Planted</u>	<u>#Trees</u>	<u>Cost</u>
County Line	12.4	6,452	\$5,719

4. Croplands

A total of 515 acres were tilled, representing 3% of the districts total acreage. Lands were cropped for 3 purposes: food plot maintenance, seedbed prep for permanent cover plantings and establishment of alfalfa by cooperators.

- A. Food plots (Table 10) are maintained primarily to improve winter survival of pheasants and, secondly to provide pheasant hunting "hot spots". The habitat diversity provided by food plots also benefits other species of migratory birds and resident wildlife.

Table 10.

FOOD PLOTS

<u>WPA</u>	<u>UNIT</u>	<u>CROP</u>	<u># ACRES</u>	<u>COOPERATOR</u>
Atlanta	3a,3b,1a	Milo/Hyb.Sorghum	6,5,0	K. Edgren
Clark	3,7	Milo/Hyb.Sorghum	7,7	R. Aspegren
Cottonwood	2	Milo/Hyb.Sorghum	11	R. Ebmeier
County Line	1	Milo/Hyb.Sorghum	15	B. Coffee
Gleason	5,4,9	Milo/Hyb.Sorghum	9,3,3	J. Anderson
Hansen	S $\frac{1}{2}$ 1	Milo/Hyb.Sorghum	6	C. Hansen
Harvard	3,11,15	Milo/Hyb.Sorghum	10,20,7	R. Stinnette
Jensen	1	Milo/Hyb.Sorghum	10	D. Johnson
Krause	3	Milo/Hyb.Sorghum	16	J. Konzak
Lange	2	Milo/Hyb.Sorghum	10	J. Arp
Mallard Haven	E $\frac{1}{2}$ 2	Milo	7.5	J. Konzak
Mallard Haven	6	Milo	3	M. Kempf
McMurtrey	1,10	Hyb. Sorghum	9	Refuge Staff
Peterson	5,N $\frac{1}{2}$ 14	Milo/Hyb.Sorghum	5,5	R. Ebmeier
Prairie Dog	4,7,9	Milo/Hyb.Sorghum	10,15,10	R. Aspegren
Quadhamer	9	Milo/Hyb.Sorghum	15	A. Alberts
Quadhamer	E $\frac{1}{2}$ 6	Hyb. Sorghum	7.5	J. Fritz
Rolland	2	Milo/Hyb.Sorghum	10	J. Arp
Sinninger	1,3	Milo/Hyb.Sorghum	8,15	B. Coffee
Smith	8	Milo/Hyb.Sorghum	5	B. Mihm
Theesen	1	Milo/Hyb.Sorghum	8	J. Cuba
Victor Lake	Marsh	Milo/Hyb.Sorghum	10	L. Wilkin
Wilkins	1	Milo/Hyb.Sorghum	10	H. Moravec
Total			298	

Hybrid sorghum continues to be our most favored crop in food plots since it provides good cover as well as food (Fig. 13).

- B. Seedbed preparation was needed on 2 areas for permanent cover plantings in spring 1986 (Table 11).

Prior to planting native grasses, cropping improves seedbeds by providing a firm, clean soil surface with a 10" stubble

from the previous crop. Prior to planting alfalfa and DNC, the soil must be free from atrazine. High rates of atrazine were applied by private landowners before the Funk WPA was purchased. Therefore, one year of atrazine-free farming was necessary to eliminate carry-over in the soils before legumes could be expected to establish well.



Fig. 13. This hybrid sorghum foodplot on Quadhamer WPA (Unit 9) will provide winter food and cover for resident wildlife. A.T.

Table 11.

CROPPING TO PREPARE SEEDBEDS

<u>WPA</u>	<u>Unit</u>	<u>Crop</u>	<u>Acres</u>	<u>Cooperator</u>	<u>Cover To Be Planted</u>
Funk	Lindstrom unit	Corn	73	A. Schneider	DNC and/or alfalfa
Rauscher	1,2	Hyb.Sorg.	18	M. Barnell	Native grass

C. Cropping was done for alfalfa establishment on 114 acres (Refer to Table 12 in Section F.5).

5. Grasslands

A. General

Two distinct vegetative zones encompass the WMD, true or tall grass prairie on the eastern half (Clay, Fillmore, and York Counties) and mixed prairie on the western portion (Gosper, Phelps, Kearney, and Franklin Counties). Grassland management programs are directed at 3 specific plant communities: (1) restored prairie (native grass seedings); (2) native prairie and; (3) tame grass/legume mixes (DNC).

Grassland management efforts are aimed at maintaining high succession with maximum species diversity and providing optimum waterfowl nesting cover. Pheasant nesting has been a spin-off benefit from grassland establishment and management on WPA's. A waterfowl nesting study (Section D.5) is currently underway to help further determine vegetative characteristics most beneficial to nesting waterfowl. Grasslands are currently manipulated with burning, grazing, haying, and rest in various combinations to achieve the desired results on a particular management unit.

B. Alfalfa Seedings

Cool season grasses and legumes have consistently had high nest densities in our nest drag studies. The main problem with most alfalfa varieties is that they have a short life span of less than 10 years. One or more nesting seasons are lost each time the area is replanted. In an effort to find alfalfa varieties that can be maintained over several decades or more, we planted 5 new varieties in 8 locations (Table 12). We selected varieties that were dryland adapted, grazable, late blooming and spread by rhizomes. The plots can be evaluated in future years for longevity as well as value for nesting. Management will include annual haying (between July 15 - August 30) or grazing, to control the build-up of dead plant material.

Table 12. 1986 ALFALFA PLANTINGS

<u>WPA</u>	<u>Unit</u>	<u>Acres</u>	<u>Variety</u>
Clark	2	9	Rhizoma
Lange	1&2	12	Rambler
Krause	3&4	25	Travois
Massie	1	15	Spredor II
McMurtrey	3	25	Travois
Quadhamer	6	8	Spredor II
Lindau	2(E½)	10	Anik
	2(W½)	10	Rhizoma
		114	

All fields were planted by cooperative farming agreement. A firm, clean seedbed was prepared and then seeded to alfalfa. Immediately thereafter, an oats nurse crop was drilled at $2/3$ normal seeding rate. The cooperator was allowed to take the entire crop of oats as silage or mature grain. Most seedings looked good by early fall (Figs. 14, 15, and 16).



Fig. 14. The oat companion crop was cut for silage on July 1 and removed to allow the alfalfa full sun. A.T.



Fig. 15. A closer examination shows the field (Unit 2, Clark WPA) had a good catch of alfalfa. A.T.



Fig. 16. By early fall, most of the plantings had put on a respectable growth. A.T.

7. Grazing

A. General

Grazing is used for 3 purposes: to reduce excessive stands of marsh vegetation, to improve and/or maintain native grass seedings and to improve the species composition and vigor of our small, isolated tracts of native prairie (Table 13).

Table 13.

GRAZING SUMMARY

Area	May Grazing Treat. (Refer Table 14)	Summer Short Duration Grazing(Refer Table 16)	Marsh Grazing (Refer Table 17)
Gleason		X	X
Hansen	X		
Harvard		X	
McMurtrey		X	X
Peterson	X	X	X
Prairie Dog	X	X	X
Quadhamer	X	X	X
Rolland			X
Smith	X	X	

The basic AUM rate was \$8.45. Adjustments of \$1.00 were made for the cooperator hauling water and \$1.00 for erecting electric fence. When cattle were moved weekly, a negotiated discount of \$2.50 was allowed for the additional labor and fencing materials needed.

B. May 1-31 Grazing Treatments

Our largest remnant of native prairie is located on Smith WPA where a 16 acre and 14 acre tract are found. These small prairies have an excellent species composition of native grasses and forbs, but they are heavily invaded by Kentucky bluegrass. A May grazing treatment of 2 AUM's per acre was prescribed on the 16 acre tract (Unit 2) and a 1 AUM per acre rate was set on the 14 acre tract (Unit 5). Unit 2 responded the best (Figs. 17, 18, and 19) with a tall dense regrowth of warm season grasses and a wide variety of forbs. The stocking rate of 1 AUM on Unit 5 failed to reduce the bluegrass enough, however improvement was still evident.

Future stocking rates will be set at 1.5 - 2.0 AUM's per acre on May grazing treatments.

Table 14 summarizes all May 1-31 grazing treatments.

Table 14.

MAY 1-31 GRAZING TREATMENTS

<u>WPA</u>	<u>Acres</u>	<u>Unit</u>	<u>AUM/AC</u>	<u>Total AUM's</u>
Prairie Dog	18	10	1.27	22.86
Peterson	20	"Go-Back"	1.53	30.5
Quadhamer	30	4	1.25	37.5
Smith	16	2	2.0	32.0
Smith	14	5	.93	13.0
Hansen*	35	2	1.34	47.0

*Divided into E $\frac{1}{2}$ and W $\frac{1}{2}$. Cattle were moved back and forth weekly i.e. (E $\frac{1}{2}$ grazed 5/1-5/7, 5/15-5/21 - W $\frac{1}{2}$ grazed 5/8-5/14, 5/22-5/30)

C. June-July High Intensity, Short-Duration Grazing

Under this type of grazing, cattle are allowed to graze for a 7 day period in a small pasture (paddock) and then removed. Each paddock is grazed only once. The permittee is responsible for all temporary electric fencing as well as hauling water to the cattle.

This type of grazing was applied primarily to well established native grass seedings dominated by warm season grasses.

Our first trial of high intensity short-duration grazing was in 1985. Several modifications were made for this year: (1) the AUM rate was increased by 20% and; (2) the start of grazing was advanced 1 week earlier and cut off 1 month sooner on August 3rd (Table 15). Grazing was not allowed through August (in 4 paddocks of 7 days each) because regrowth is limited prior to fall.



Fig. 17. Unit 2 of Smith WPA on 10/15/84 after 1 year of rest. Vigor of native grasses is low. A.T.



Fig. 18. On 10/15/85 a substantial improvement is evident after a 1.3 AUM/acre spring graze. A.T.



Fig. 19. Another May 1-31 graze was applied in 1986, but at an increased rate of 2 AUM's/acre. Further improvement in native grasses and forbs occurred.

R.P.

Table 15. COMPARISON OF SHORT DURATION GRAZING 1985 & 1986

	<u>1985</u>	<u>1986</u>
AUM rate	1.0	1.07 to 1.09
Days in each paddock	7	7
Number of paddocks	9	6
Begin graze in Paddock 1	July 1	June 23
End graze in last paddock	Aug. 31	Aug. 3
Number of cooperators	1	8

The earliest grazed paddocks (numbers 1-4) generally showed the best results as photographed on Harvard WPA (Figs. 20, 21, and 22). Plans for 1987 are to move yet another week earlier to begin grazing in the first paddock. Grazing the last paddock will therefore end 1 week earlier, giving more time for summer regrowth. Table 16 summarizes the 1986 program.

Table 16. HIGH INTENSITY-SHORT DURATION GRAZING 1986

<u>WPA</u>	<u>Units</u>	<u>Acres/ Paddock</u>	<u>AUM/AC</u>	<u>Total Acres</u>	<u>Cooperator</u>
McMurtrey	5	13.5	1.16	81	U.S.D.A.
Peterson	12	11	1.22	66	R. Ebmeier
Prairie Dog	3,5,6,8,9	23	1.18	163.13	R. Aspegren
Gleason	2,3	10	1.18	60	D. Dorn
Quadhamer	5,7,3	11	1.20	66	J. Fritz
Harvard	1,2	7	1.24	42	D. Samuelson
Smith	6,7	10	1.05	60	S. Shaw



Fig. 20. Harvard paddock 1 on July 2nd immediately
after a 7 day graze removed 1.24 AUM's of forage.
A.T.



Fig. 21. On August 8th the vigorous regrowth of grasses was apparent.
R.P.



Fig. 22. By early fall (October 5th) the area displayed a good stand of warm season grasses.
R.P.

One additional advantage to the high intensity-short duration grazing was the utilization of musk thistles by cattle (Figs. 23 and 24).



Fig. 23. After 3 days of grazing in paddock 2 (June 30-July 2) on Quadhamer WPA, both the leaves and seed heads were grazed off of musk thistle plants. R.P.



Fig. 24. A close-up reveals the full extent of defoliation by the cattle. We can use all the help we can get to control musk thistle. A.T.

D. Marsh Grazing

Many wetlands have become heavily vegetated with dense stands of emergent vegetation causing a decline in waterfowl value. Grazing is applied to create a patchwork of openings. Normally, grazing units are set-up for 30 days and targeted for .5 to 1.5 AUM's use, depending on the amount and species of plants available (Table 17).

Table 17. MARSH GRAZING 1986					
<u>WPA</u>	<u>Acres</u>	<u>Area of Marsh</u>	<u>AUM/AC</u>	<u>Total AUM'S</u>	<u>Dates</u>
McMurtrey	70	SE	.75	52.5	8/1-8/30
	120	NE	1.25	150	8/1-8/30
	138	NW	1.47	202.5	9/1-9/30
Peterson	66	W	.57	37.9	6/1-6/21
	71	SW	.75	53.5	8/3-8/31
	35.5	NW	.75	26.75	9/1-9/15
Prairie Dog	62	SE	1.18	73.16	5/1-5/30
	85	W	.96	81.56	6/1-6/21
	128	NE	.84	108.75	8/4-8/31
Gleason	58	W	.68	39.5	5/1-5/31
	51	NE	.58	29.63	6/1-6/22
	60	SE	.71	42.66	8/4-8/31
Quadhamer	10	SE	1.25	12.5	5/1-5/31
	40	S	1.0	39.75	6/1-6/21
	35	W	1.5	53	8/3-8/31
Rolland	40	S	1.3	52.5	5/15-8/30

Excellent results were achieved on McMurtrey Refuge during a Sept. 1-30 graze at 1.5 AUM's (Fig. 25), using cattle from the neighboring U.S.D.A. research station.



Fig. 25. After 1.5 AUM's of grazing (or should I say trampling), the marsh on McMurtry Refuge was much improved for waterfowl use when it refills with water.
A.T.

8. Haying

Haying is a valuable management tool for both grassland and marsh management. Two DNC fields were hayed (Table 18) in order to help maintain their alfalfa composition. Reed canary grass areas on Killdeer and Quadhamer were hayed to provide patches of open water when they refill (Fig. 26).

Table 18.

1986 HAYING PROGRAM

1. DNC

<u>WPA</u>	<u>Date</u>	<u>Acres</u>	<u>Cost/Acre</u>	<u>Amount</u>
Peterson (Unit 10)	7/1-7/15	41	15.00	615
Massie (Units 2,9,8a)	7/1-7/15	56	15.00	840

2. REED CANARY GRASS

Killdeer (Marsh)	7/1-7/15	8	5.00	40
Quadhamer (Marsh)	7/1-7/15	12.2	5.00	61
		<u>117.2</u>		<u>1,556</u>



Fig. 26. Strip haying of reed canary on Quadhamer WPA will improve use by waterfowl when the marsh refills.
A.T.

9. Fire Management

Prescribed burning is an important tool in our grassland management program. Burning is not considered "better" or "worse" than any of the other tools used for grassland management i.e. grazing, haying, and rest. Rather, we decide which tool to apply on each separate management unit by evaluating the area each fall. Under "average" conditions, we can accomplish about 1,000 acres of burns per year.

This year's burning is summarized in Table 19 and involved 6 individual burns totaling 325 acres.

We had a much smaller program this year partially due to persistent winds and poor burning weather which delayed burning until April 24th. Our plans also called for less burning than 1985 since we had treated 1,200 acres last year.

Table 19.

1986 BURNING SUMMARY

<u>WPA</u>	<u>Unit(s)</u>	<u>Acres</u>	<u>Cost</u>	<u>Date</u>
Killdeer	prairie	2	160	4/24
McMurtrey	2	65	268	5/25
Mallard Haven	1	80	328	4/29
Moger	1&2	65	298	4/29
Clark	5	15	358	5/01
Jensen	2	98	358	5/01
		<u>325</u>	<u>1,770</u>	

10. Pest Control

Musk thistle is the primary weed which comprises the bulk of this stations noxious weed control program, but some Canada and tall thistle control is also required. Because our WPA's are "islands of habitat" in an ocean of intensively farmed croplands, any so-called weeds growing on the WPA's are severely scrutinized by the neighbors.

Due to lack of funds, equipment, and manpower, prior to the late 70's weed control was virtually ineffective and the WPA's (especially the eastern district) had a major problem with musk thistles. Changes were made and a major effort was initiated to reduce and control the thistles. The problem was so enormous that the efforts only kept the problem from increasing. No reductions in the number of acres of thistles were realized until aerial spraying was utilized in 1984. Since then, substantial progress is evident. The steep reduction in complaints also indicates progress.

This spring's thistle control efforts (Tables 20 and 21) entailed aerial and ground spraying of a dicamba (Banvel)/2,4-D mix on non-native prairie areas and chopping by hand on native prairie areas (Table 22). The mix of $\frac{1}{2}$ lb. ($\frac{1}{2}$ pt.)/acre of dicamba and 1 lb./acre 2,4-D amine was applied by contracted aerial applicators, county weed control agents and by station employees. A total of 2,292 acres were treated. Aerial application of the herbicide cost an average of \$7.80/acre, with the chemical provided by the applicators.

In an effort to reduce or eliminate the largest and worst areas of musk thistles, fall applications of $\frac{1}{2}$ pt. picloram (Tordon)/acre were aerially applied. Refer to Table 23 for the WPA's and acres. The cost of the chemical and aerial application averaged between the eastern and western districts at about \$8.48/acre.

Table 20. SPRING WEED CONTROL (Banvel/2,4-D mix) - EAST DISTRICT

WPA	Method	Contractor	Date	Acres	Cost
Alberding	Aerial	McCool Air	05/19	20	\$158
Alberding	Ground	FA	05/29	2	FA
County Line	Aerial	McCool Air	05/19	28	221
Eckhardt	Aerial	McCool Air	05/19	23	182
Eckhardt	Ground	FA	06/04	5	FA
Eckhardt	Aerial	McCool Air	06/09	30	237
Glenvil	Aerial	McCool Air	05/19	19	150
Green Acres	Aerial	McCool Air	05/19	15	118
Hansen	Aerial	McCool Air	05/19	18	142
Hansen	Ground	FA	06/05	7	FA
Hansen	Aerial	McCool Air	06/19	12	95
Harms	Aerial	McCool Air	06/09	12	95
Harvard	Aerial	McCool Air	05/19	36	284
Harvard	Ground	FA	05/23	4	FA
Harvard	Ground	FA	06/10	5	FA
Krause	Aerial	McCool Air	05/19	32	252
Lange	Aerial	McCool Air	05/19	38	300
Mallard Haven	Aerial	McCool Air	05/19	238	1880
Mallard Haven	Ground	FA	05/19	3	FA
Mallard Haven	Aerial	McCool Air	06/09	9	71
Massie	Aerial	McCool Air	05/19	102	805
Massie	Ground	FA	05/30	8	FA
Massie	Ground	FA	06/02	20	FA
Massie	Ground	FA	06/03	20	FA
Massie	Ground	FA	06/10	40	FA
McMurtrey	Aerial	McCool Air	05/19	112	885
McMurtrey	Ground	FA	05/23	3	FA
McMurtrey	Ground	FA	05/29	2	FA
McMurtrey	Ground	FA	06/03	5	FA
McMurtrey	Ground	FA	06/04	4	FA
McMurtrey	Ground	FA	06/05	4	FA
Moger	Aerial	McCool Air	05/19	5	39
Moger	Ground	FA	05/29	8	FA
Moger	Aerial	McCool Air	06/09	24	190
Rauscher	Aerial	McCool Air	05/19	16	126
Rolland	Aerial	McCool Air	05/19	70	553
Sinninger	Aerial	McCool Air	05/19	30	237
Smith	Aerial	McCool Air	05/19	48	379
Wilkins	Aerial	McCool Air	05/19	15	118
Wilkins	Ground	FA	05/30	5	FA
Wilkins	Aerial	McCool Air	06/09	30	237
				1,127	\$7,754

FA- Force Account

Table 21. SPRING WEED CONTROL (Banvel/2,4-D mix) - WEST DISTRICT

<u>WPA</u>	<u>Method</u>	<u>Contractor</u>	<u>Date</u>	<u>Acres</u>	<u>Cost</u>
Atlanta	Aerial	Allied Helo	05/23	185	\$1,443
Atlanta	Ground	FA	06/06	25	FA
Atlanta	Aerial	Allied Helo	06/26	65	507
Bluestem	Aerial	Allied Helo	05/23	5	39
Bluestem	Ground	FA	06/06	7	FA
Clark	Aerial	Allied Helo	05/23	22	172
Elley	Aerial	Allied Helo	05/23	35	273
Frerichs	Ground	Kearney Co.	05/23	1	29
Funk	Aerial	Allied Helo	05/23	7	55
Gleason	Ground	Kearney Co.	05/21	2	58
Gleason	Aerial	Allied Helo	05/23	11	86
Gleason	Aerial	Allied Helo	06/26	30	259
Jensen	Ground	Kearney Co.	06/02	4	129
Lindau	Ground	Kearney Co.	05/21	3	77
Lindau	Aerial	Allied Helo	05/23	12	94
Macon Lakes	Aerial	Agri-Air	05/19	99	775
Macon Lakes	Ground	Franklin Co.	06/05	4	140
Peterson	Aerial	Allied Helo	05/23	28	218
Peterson	Ground	Gosper Co.	05/23	12	94
Prairie Dog	Aerial	Allied Helo	05/23	40	312
Prairie Dog	Ground	Kearney Co.	05/23	6	144
Prairie Dog	Ground	Kearney Co.	06/02	7	162
Prairie Dog	Aerial	Allied Helo	06/26	12	94
Quadhamer	Aerial	Agri-Air	05/19	42	329
Quadhamer	Ground	Franklin Co.	06/06	4	189
Quadhamer	Aerial	Agri-Air	06/09	17	133
Quadhamer	Aerial	Agri-Air	06/22	20	156
Youngson	Ground	FA	06/06	4	FA
				709	\$5,967

FA - Force Account

Table 22.

NOXIOUS WEED CONTROL (chopped by hand)

<u>WPA</u>	<u>Labor</u>	<u>Hours</u>
Atlanta	YCC	50
Bluestem	YCC	10
Clark	YCC	30
Cottonwood	Staff	2
County Line	Staff	4
Eckhardt	Staff	3
Frerichs	YCC	3
Gleason	YCC	50
Green Acres	Staff	4
Harvard	Staff	8
Jensen	Staff	4
Lindau	YCC	20
Macon Lakes	Franklin Co.	13
Macon Lakes	YCC	60
McMurtrey	Staff	16
Prairie Dog	YCC	45
Prairie Dog	Staff	2
Quadhamer	Franklin Co.	1
Quadhamer	YCC	60
Ritterbush	YCC	30
Sinninger	Staff	2
Smith	Staff	12
Smith	YCC	14
Theesen	Staff	3
Wilkins	Staff	6
Youngson	Staff	4
		<hr/> 456

Table 23.

FALL AERIAL WEED CONTROL (Tordon)

<u>WPA</u>	<u>Contractor</u>	<u>Date</u>	<u>Acres</u>	<u>Cost</u>
Atlanta	Allied Helo	10/29	27	\$ 216
Clark	Allied Helo	10/29	12	96
Gleason	Allied Helo	10/29	12	96
Harvard	McCool Air	10/29	14	122
Krause	McCool Air	10/29	36	313
Mallard Haven	McCool Air	10/29	132	1,148
Prairie Dog	Allied Helo	10/29	14	112
Quadhamer	Allied Helo	10/29	27	216
Wilkins	McCool Air	10/29	14	122
			<hr/> 288	<hr/> \$2,441

G. WILDLIFE1. Wildlife Diversity

Efforts aimed at providing a diversity of wildlife on the WPA's have centered around diversifying habitat. On the average, each WPA is made up of 50% wetlands and 50% uplands. Currently, the uplands are diversified through native grass seedings, native prairies, DNC plantings, food plots and woodlands made up of old farmsteads or shelterbelt plantings.

In addition, successional diversity is provided through grassland treatment patterns (grazing, burning, haying or rest) applied to both uplands and wetlands.

2. Endangered and/or Threatened Species

Known observations of endangered or threatened species, on WPA's this year, include the bald eagle, peregrine falcon and prairie falcon. All were observed during the spring and fall migrations.

The most bald eagles observed at one time were 6 on Funk WPA, March 14th.

Two whooping cranes were observed October 30th and 31st. They were located in the middle of a section of harvested corn a few miles north of Youngson and Jensen WPA's.

3. Waterfowl

The spring migration is this station's primary purpose for being established. The Rainwater Basin area of Nebraska is a major component of the Central Flyway by serving as a focal point of the migration corridor, the so-called "hourglass effect" with the ends of the hourglass the northern breeding and southern wintering grounds and the constriction being the Rainwater Basin area. Between 5 and 7 million ducks and geese, including Canada geese, snow geese, white-fronted geese, mallards, pintails, and many other duck species, utilize the Rainwater Basin area for spring staging.

Nearly all of the mid-continent population of 300,000 white-fronted geese stage in the area each spring. Snow goose use has greatly increased in the past 6 years and is expected to continue increasing as the migrational pattern of this species shifts westerly. Census totals show an increase in peak populations from 15,000 in 1974 to 352,000 in 1985. In addition, approximately 50% of the continental mallard breeding population, and 30% of the continental pintail breeding population, utilize this habitat for staging during spring migration.

Spring migration begins in late February and early March with the exact arrival date dependent on weather conditions and availability of open water. Early migrants such as Canada geese, mallards, pintails, and

white-fronted geese utilize the Platte River early in the migration, then move to the Rainwater Basin area when the wetlands thaw and become ice-free. Concentrations usually peak in March and then gradually decline through April as the northerly wetlands open and the migration proceeds (See Fig. 27 and Table 24).

Waste corn appears to be the dietary staple of most dabbling ducks, geese, and cranes during the annual stopover in south-central Nebraska. Winter wheat fields are also heavily utilized by feeding waterfowl. These birds utilize the area to prepare physiologically for the remainder of the migration and for the energetics of the reproductive cycle. Ongoing studies indicate that feeding on aquatic plants and animals is a vital component to meet maintenance energy requirements and to build body fat. The studies also indicate a large amount of waterfowl courtship activities and pair formations occur. While most pair bonds are established on the wintering grounds for most species, the Rainwater Basin provides a secondary pairing area. Other research indicates a close correlation between body weight of the hen on the breeding grounds and successful egg development and clutch size. Just how important this staging period is in the overall nesting success of waterfowl farther north is not fully known. The area is apparently critical to waterfowl in the Central Flyway. The presumption is that shortages of spring migration habitat may affect reproduction if birds arrive at nesting areas in poor physical condition. With 9 out of 10 wetlands already destroyed, the remaining ones become that much more important.

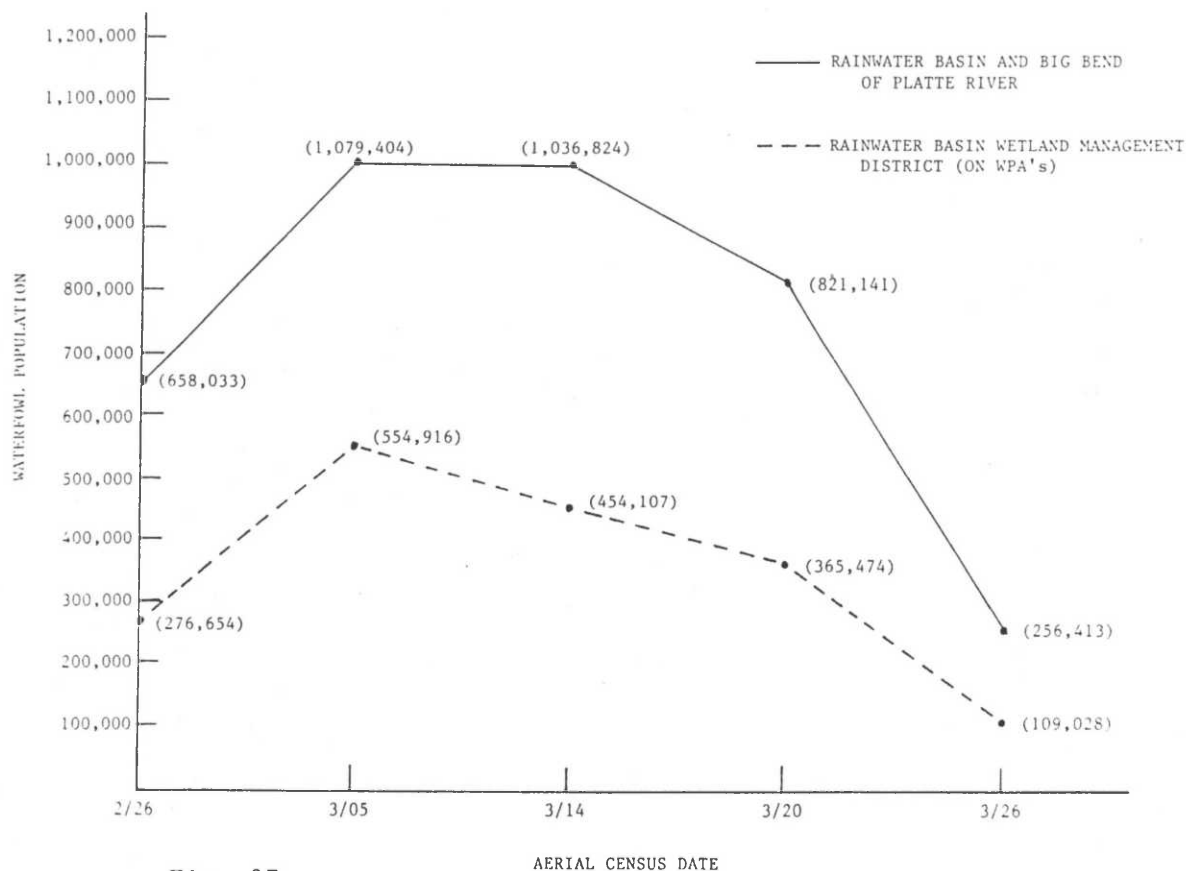


Fig. 27

AERIAL CENSUS DATE

Table 24.

PEAK WATERFOWL POPULATIONS

<u>Year</u>	<u>Population</u>	<u>Count Date</u>
1977	513,450	----
1978	703,350	----
1979	653,900	----
1980	613,850	----
1981	340,000	----
1982	256,774	----
1983	256,200	3/08
1984	462,000	3/07
1985	448,380	3/05
1986	554,916	3/05

Peak spring populations, recorded on aerial surveys of ducks and geese, can be found on Tables 25 and 26.

Table 25.

WATERFOWL POPULATIONS - ON WPA'S

<u>Aerial Survey</u>	<u>Canada</u>	<u>Snows/Blues</u>	<u>White-fronted</u>	<u>Ducks</u>	<u>Total</u>
02/26	140,640	38,152	43,333	54,529	276,654
03/05	179,525	160,510	94,550	120,331	554,916
03/14	55,120	147,721	126,025	125,241	454,107
03/20	27,170	119,290	88,395	130,619	365,474
03/26	2,498	10,617	42,688	53,225	109,028

Table 26.

WATERFOWL POPULATIONS - OFF WPA'S

<u>Aerial Survey</u>	<u>Canada</u>	<u>Snows/Blues</u>	<u>White-fronted</u>	<u>Ducks</u>	<u>Total</u>
02/26	162,243	51,039	45,643	122,454	381,379
03/05	135,013	157,312	73,638	158,525	524,488
03/14	61,288	212,158	167,111	142,160	582,717
03/20	20,862	157,016	145,087	132,702	455,667
03/26	1,500	20,074	54,068	71,743	147,385

Historically, the Rainwater Basin was a major waterfowl nesting area before habitat destruction reduced wetland numbers. Production is predominantly by 6 species; mallard, pintail, blue-winged teal, widgeon, gadwall, and shoveler.

This year's nest drag was conducted on Harvard, Massie, and Mallard Haven WPA's (see Sec. D.5). Estimated ducklings produced on the 18 WPA's, that carried enough water for brood rearing, was 2,120. Based on nest drag data, 48% were mallards, 41% blue-winged teal, 8% gadwall and 3% misc. other

species. An estimated 3,399 young were produced last year. The decline can be attributed to reduced amounts of good water during the pair formation period. Before and after that critical period, water conditions were slightly better.

The fall migration began with waterfowl numbers being comparable to previous years. But, later on it appeared that duck numbers were down with geese numbers pretty much normal.

4. Marsh and Water Birds

White pelicans, grebes, rails, herons and sandhill cranes comprise the bulk of the marsh and water birds found on the WMD.

A flock of 25 to 30 white pelicans spent the entire summer on and around the lower basin of Funk WPA. No nesting occurred.

Concentrations of sandhill cranes occurred on Green Acres WPA on February 25th with 75 cranes, Harvard WPA on March 3rd with 25 cranes and on April 7th with 350 also on Harvard WPA. Fifty cranes spent the first 3½ weeks of April on Massie WPA, constituting a somewhat unusual sighting that late after the main spring migration.

A small grouping of 6 cattle egrets were observed on Funk WPA. They are not commonly seen in this area.

A rare sighting of 2 glossy ibis was made on the 13th of August. They were observed on the east side of Johnson Basin, which is being purchased as a WPA.

6. Raptors

A northern harrier nest was, for the 3rd year in a row, located on the southeastern marsh edge of Harvard WPA. The nest was found while dragging the area for waterfowl nests.

7. Other Migratory Birds

The mourning dove coo count surveys were conducted on May 21st by Bio.Tech. Routh and Laborer Wimberley. On the route near Phillips, Nebraska, 80 doves were observed and 145 calls heard. The other route between Rosemont and Red Cloud, Nebraska totaled 121 birds observed and 168 heard. These totals are slightly less than last year's but close to normal.

8. Game Mammals

White-tailed deer are thriving in the area. The WPA's provide excellent cover while adjacent grain fields contain an abundant food supply. Deer hunting on the WPA's is mostly by the local residents of farms and small towns. Bow hunting is popular on the WPA's.

An electrified predator exclusion fence was installed around the Massie WPA dense nesting cover (Unit #2) in late April. Predators were trapped for 6 days before the fence was electrified using 5 live traps and 4 conibear traps on both the DNC unit and the adjacent native grass seeding (Unit 3). Three opossum, 1 skunk, 1 raccoon, and 1 domestic dog were trapped and removed during this time. During the 5 days after the fence was electrified, 4 live traps and 2 conibear traps were placed inside the fenced area. During this time, only 2 opossum, 1 skunk, and 1 raccoon were trapped. After the first nest search began on May 19th, the traps were checked once every 2 to 5 days rather than daily because few nests were found inside the fenced area. One opossum was trapped after May 19th,

10. Other Resident Wildlife

Good winter and spring weather this year was conducive to helping the ring-necked pheasant population make a big rebound from the last 2 years. By hunting season, numbers of birds available made for surprisingly "good" hunting, rather than the "poor" hunting we had expected.

Bobwhite quail also made a big rebound this year. Larger, more numerous coveys could be found on the WPA's.

To restock the gene pool of the captive breeding flock of ring-necked pheasants on the Sacramento State Wildlife Area in Phelps County, State biologists netted 47 roosters and 70 hens on McMurtrey NWR. The netting took place on the nights of January 6th and 7th.

17. Disease Prevention and Control

Cholera hit both spring and fall in 1986. The 12th annual spring dieoff occurred with an estimated total mortality of 3,500 waterfowl (Table 27). The losses occurred on 10 WPA's as well as 6 state and private wetlands. Highest pickup areas were: Harvard (544), Funk (232), Mallard Haven (204), Johnson Basin (58), and Massie (56). Snow geese are making up a bigger proportion of the dieoff in recent years due to their rapid population increase during both spring and fall migrations (Table 28).

Table 27. NUMBER OF WATERFOWL PICKED UP 1975-1986

<u>Year</u>	<u>Number</u>	<u>First & Last Pick-Up Date</u>	<u>Est. Loss</u>
1975	13,748	April 11 - April 21	22,500
1976	7,453	Feb. 25 - April 20	8,000
1977	4,340	March 18 - April 16	8,750
1978	106	March 14 - April 07	250
1979	375	March 15 - April 24	875
1980	30,677	March 2 - May 1	76,000
1981	2,904	Feb. 22 - April 10	7,900
1982	11,954	Feb. 25 - April 06	34,550
1983	3,677	Feb. 23 - April 05	15,200
1984	1,769	Feb. 14 - April 17	7,500
1985	1,235	Feb. 21 - April 10	3,000
1986	1,262	Feb. 24 - March 31	3,500
	1,304	Nov. 20 - Dec. 20	1,800
	80,804		189,825

Table 28.

SPECIES COMPOSITION

Species	# Picked Up - 1986			Percent of Total	
	Spring	Fall	Total	1986	1975-1985 Avg.
mallard	72	134	206	5.7	27.3
w-fronted geese	297	343	640	23.4	26.6
pintail	185	0	185	14.7	21.6
Canada geese	356	74	430	28	12.1
widgeon	25	0	25	2.0	5.2
redhead	19	0	19	1.5	--
snow geese	265	744	1,009	21.0	--
other	43	9	52	3.7	7.2
	1,262	1,304	2,566		

Fall cholera hit in November and December at the U.S.D.A. Meat Animal Research Center reservoir on Sandy Creek (Fig. 29).



Fig. 29. A fall outbreak of cholera occurred on the Meat Animal Research Center reservoir where over 100,000 snows were attracted in November and December.
U.S.D.A.

A low, but persistent mortality rate occurred among the 100,000 plus snow geese and white-fronts using the area. Unseasonably warm weather allowed the birds to remain in the area until mid-December. Then, as soon as cold weather arrived, zone guns were set out to "help" the birds decide to migrate south where they were supposed to be. Total pickup was 1,304, with a total estimated mortality of 1,800.

Lead poisoning was also more visible in 1986. In early spring, the first 80 waterfowl (mostly Canada's) picked up on Harvard and Mallard Haven between Feb. 24th and March 2nd were victims of lead poisoning. Could lead poisoned birds be triggering cholera?

Lead poisoned white-fronts were collected in mid-May off Mallard Haven. Several hundred white-fronts were on the area. They were quite possibly all too weak to migrate north.

Finally, an unidentified toxin was determined to be the cause of death to several waterfowl on Mallard Haven in April. Madison Health Lab was unable to make a specific ID of the poison.

H. PUBLIC USE

1. General

Slide programs are presented to various schools, clubs and organizations upon their request. Requests are accepted for giving programs if other more important station programs/activities are not adversely affected.

Asst. Mgr. Poetter presented a slide talk on duck stamps, land acquisition and birds of the Rainwater Basin, to the Brooking Bird Club. The presentation was at the Hastings Museum on the evening of January 20th.

On the evening of March 6th, a public workshop dealing with wildlife values in the Rainwater Basin and Platte River complexes was held at the Fort Kearney facilities by the local Audubon Society, Nebraska Game and Parks Commission and FWS (Mgr. Trout). Approximately 250 people were in attendance.

Project Leader Trout gave a slide talk on wetlands to an "issues forum" made up of adults at the First Presbyterian Church in Kearney on April 13th.

Asst. Mgr. Poetter participated in Conservation Day held at Cottonmill Park, Kearney, NE on the 16th of April. The theme was Conservation Figures. Several rural grade schools participated in having groups of 20 students rotate between 6 stations where professionals would present different ideas on how to develop a 100 acre tract of native prairie with a creek running through it. Some ideas were wildlife oriented and others were strictly people oriented.

Asst. Mgr. Poetter participated in the Annual Environmental Awareness Day Program, sponsored by the U.S. Army Corps of Engineers. It was held May 1st at the Harlan County Reservoir campgrounds. Some 180 local 5th and 6th graders attended.

A slide talk was presented to the Big Bend Audubon Society by Project Leader Trout. About 50 adults were in attendance for his program on "Wetland Management".

On August 6th, the local news media's were invited to a press conference held on the newly acquired 1900 acre Funk WPA. The purpose of the conference was to disseminate to the public, the why and how concerning the purchase, future development and management of the area for wildlife and the public, and permitted public uses of the new WPA.

8. Hunting

All of the WPA's are open to hunting in accordance with the seasons and limits set by State regulations. McMurtrey Refuge is closed to public use.

Since 1982, steel shot has been required for all shotgun hunting on the WPA's, including upland and small game. The possession of lead shotshells is unlawful. Hunter compliance this year has been excellent.

The first part of the waterfowl season was pretty much normal as far as bird numbers go. The month of December brought low numbers of ducks but better than normal geese. Frozen water on the basins didn't help.



Fig. 28. A limit of "woodies" shot opening day on Funk WPA by "Elmer Fudd". Asst. "Fudd" also had his limit, but someone had to take the photo! 10/86 R.P.

A Hastings sporting goods shop rounded up \$551 from local hunters to be paid to the electric company if we would pump extra water into the Harvard WPA marsh. Seventy-five acre feet of water was added to the existing 100 acres of surface water.

Pheasant hunting is the largest public use activity the WPA's receive. The ring-necked pheasant season opened November 1st and closed January 18th. Brief blizzard conditions kept about half the hunters home or in the coffee shops until after noon on opening day. A substantial rebound of the population from the past 2 year lows was evident from hunter reports of "good" numbers of birds being bagged and seen. Groups of the more "serious" hunters claimed that during the first week of the season they were "filled up" by 10:30 each morning with their 3 bird limit.

9. Fishing

No fisheries development has been attempted. However, some basins support populations of bullheads and other rough fish and do get an occasional fisherman on them.

10. Trapping

All of the WPA's are open to trapping during the State's seasons. Species sought after include; beaver, muskrat, mink, opossum, and raccoon.

In general, the seasons run from November 5th until March 30th. Conflicts have arose where wetlands holding tens of thousands of waterfowl are being reduced to a few hundred waterfowl by muskrat trappers scaring the birds away by spending the entire day on the marsh. Due to this disturbance Harvard, Massie, Smith, Hansen, Wilkins, Mallard Haven, and Rauscher WPA's were closed to trapping the month of March this year. Trappers were notified and signs were posted. No complaints were received.

11. Wildlife Observation

Numerous groups and individuals come to view the millions of waterfowl that stage and migrate through the area in the spring of the year. Yet, this is usually second to the interest in viewing the tens of thousands of sandhill cranes that congregate along the Platte River during that time.

A group of 4 national wildlife writers were escorted by Asst. Mgr. Poetter around Clay County WPA's on March 22nd. They were interested in photographing and writing about the waterfowl migration of the Rainwater Basins.

17. Law Enforcement

Fig. 29. In September, 4 permanent blinds were destroyed on the newly acquired Funk WPA. Only daily temporary blinds are allowed on the areas.
10/86 A.T.

The regional week long law enforcement refresher held in Denver the week of March 10th, was attended by Manager Trout and Asst. Mgr. Poetter. Bio. Tech. Huber attended the refresher held in Bismarck, North Dakota the week beginning March 31st.

Bio. Tech. Huber, Mgr. Trout, and Asst. Mgr. Poetter spent the afternoon and evening of August 28th at Ft. Niobrara requalifying with Service weapons. The next morning was spent with Game and Parks Commission, Asst. Chief of Enforcement Ted Blume. He discussed State game statutes, which completed our training for Nebraska Conservation Officer Credentials, which were finally re-issued to those with law enforcement authority.

A \$250 citation was issued to a hunter who cut the fence and drove across the native grass seeding, on the south side of the marsh, on Eckhardt WPA. He did this to get his blind closer to the marsh, where he wanted it to stay for the season. He was given that day to get it out or it would be burned. It was torched the next day!



Fig. 30. In June, a \$250 fine for this unauthorized ditch cut across the native seeding on Mallard Haven WPA was issued after the area was restored. He wanted to move the irrigation water off his field and into the marsh. This was the shortest route, so why not?
A.T.

Two instances of hunting wild geese which were under the influence of captive flocks were brought to light this month. The captive flocks are located along the Platte River near Kearney (Steve Matthews) and Odessa (Dr. Sidner). Matthew's flock is owned by him and Dr. Sidner's are part private and part state birds. The CFR doesn't say how far away from a captive flock you can hunt, so Special Agent Vaughn (Omaha) held a meeting on December 16th with the goose-blind owners that have blinds near the flocks. Thousands of Canada geese were being drawn into the area by these captive geese. Feed was also being provided. The net results of the meeting were that blinds within $\frac{1}{2}$ mile of the captive flocks were in definite violation of the regulations and would have to quit hunting. Blinds $\frac{1}{2}$ - 1 mile away are far enough away at the present time, but could be shut down if the bird movements into and out of the areas of the captive flocks ever change. The Matthews' flock was put in a shelter and outside feeding stopped, making the adjacent area huntable again.

I. EQUIPMENT AND FACILITIES

1. New Construction

- A. Funk WPA - Posted and put in wood fence braces on surveyed corners.
- B. Massie - Built electric predator fence around DNC.

- C. Gleason* - Installed culvert with overflow riser and mounted flapgates on 2 other culverts.
- D. Peterson* - Removed silt from channel.
- E. Lindau - Graveled well access road.

*Done as part of the "Consent Decree" settlement of 1985.

3. Major Maintenance

- A. Funk - Cleaned up "Peterson" farmsite and buried junk; removed old blinds from marsh (Figs. 31 and 32); removed old fences.
- B. Quadhamer, Clark and Prairie Dog WPA's - Rebuilt 6 miles of fence.
- C. Cottonwood - Buried cistern at old farmsite.



Fig. 31. The Peterson farmstead prior to clean-up.
R.P.



Fig. 32. By early fall the area was ready for seeding.
A.T.

4. Equipment Utilization and Replacement

Additions were: 2 military surplus 18 yd. earthmovers, Chevy 1 ton flatbed.



Fig. 33. Two surplus 18 yd. earthmovers were picked up
at Ft. Hood, Texas. R.P.

Major deletions were: John Deere plow delivered to LaCreek NWR, 1 Hustler, 1979 Dodge 4x4, and barn on the "Peterson tract" of Funk WPA sold to highest bidder (Fig. 32).

A flatbed and pumper unit was installed on a 1977 Ford crewcab received by transfer from Immigration and Naturalization Services (Fig. 34).



Fig. 34. Our newly remodeled crewcab will now serve as a fire rig. D.H.

8. Other

Duane spent 17 days on the road with the semi-truck and flatbed hauling equipment to and from: Ouray, Seedskaadee, Flint Hills, Quivera, Crescent Lake, Valentine, and Long Lake.

J. OTHER ITEMS

1. Cooperative Programs

On September 23rd, some 20 Nebraska Game and Parks Commission Game Wardens held their biannual weapons qualification at the range on McMurtrey NWR. Several days prior, the Nebraska Game and Parks Commission spent a day rehabing the 4 station range to a 6 station. The target boards were modified, also. The wardens were pleased to use the site since they were having extreme difficulties finding a range to use. They are welcome to use our range whenever they need it.

3. Items of Interest

Training courses completed include:

<u>Course</u>	<u>Dates</u>	<u>Location</u>	<u>Attendee(s)</u>
LE Refresher	03/10-03/14	Denver	Poetter, Trout
LE Refresher	03/31-04/04	Bismarck	Huber
Holistic Res. Mgmt.(Intro)	11/04-11/06	Albuquerque	Poetter
Holistic Res. Mgmt.(Course II)	06/09-06/13	Casper	Trout
Firearms Qualifications	08/28-08/29	Valentine	Trout,Poetter,Huber
Basic Firefighting	04/14-04/16	Jamestown	Siebke, Wimberley

The Refuge Revenue Sharing Act payments to the counties were distributed in May by Refuge Asst. Huber. This year's payments were 64.4% of the total requested. The counties and dollars received are as follows:

Clay - \$26,658	Phelps - \$8,204	Fillmore - \$14,155	Kearney - \$8,641
York - 2,916	Gosper - 7,507	Franklin - 7,372	

Total of payments to 7 counties - \$75,453.

The RO Realty Office has been working on new appraisals for the revenue sharing payments. Kearney, Phelps and Gosper counties were worked on this fall.

We hosted a "Range Tour" on October 1-2. Attendees included Bob Koerner from SCS; Bill Baxter, Dick Gersib, and 6 of their land managers from the Game and Parks Commission; Gordon Hayes and Steve Kappas who are herd managers at the Meat Animal Research Center; FWS Biologist Lonnie Schroeder, Gene Williams and Milt Suthers from Kirwin NWR and Steve Berlinger from the RO. The tour involved looking at grasslands that were grazed this summer with high cattle numbers for a short duration (7 days) of time. Also some marsh grazes and alfalfa plantings using different varieties were looked at.

Several good suggestions were made and others picked up some new ideas from the exchanges of information.

Bob Immer of the Federal Protective Service, Kansas City, MO. inspected our GSA rented office/shop facilities for protection from thieves. The security check was done on October 23rd. His report will follow.

Admin. Asst. (CGS-Denver) Joe Young spent November 18th and 19th in Kearney working on details of a new rental agreement for Rainwater's headquarters. The current lease is up in December, 1987.

Project Leader Trout attended the "Mid-Western" Fish and Wildlife Symposium held December 8th-10th in Omaha, NE.

4. Credits

Al wrote sections A, C, D, F.1-9, G.17, I, J.3, K, and editing; Rick wrote sections B, E, F.10, G.1-16, H, J.1 and editing; Sue typed and final editing.

K. FEEDBACK

Many acres of public lands, including refuges, are back in the stone age of land management. They suffer from the extremes of either overgrazing or, equally as bad; overresting. Vegetation, soils, watersheds and wildlife all suffer in such circumstances. How can we expect the private sector to do any better when they see these examples of management.

Refuge managers have the will to accomplish better management, but actions have fallen short due to staff and funding restraints. Land management simply gets second priority behind "urgent" administrative tasks, reporting, planning, public use regulation, political maneuvering, etc. As a step in the right direction, Holistic Resource Management "HRM" is being taught to field station staffs as well as Regional supervisors. Without doubt, the HRM approach is the most effective means to achieving goals for the land that I have seen. The HRM model is used as the basis for deciding what will be done on the land in order to achieve pre-set goals. The HRM courses have helped to focus our attention back onto the land and the goals set for it. Healthy exchanges of ideas have taken place between refuges. There is a long way to go, but we are moving together in the right direction.

YOUR RESPONSIBILITIES

- **ALL MOTOR VEHICLES, INCLUDING SNOW-MOBILES AND ALL-TERRAIN VEHICLES, ARE PROHIBITED** unless specific areas are posted as open to this use.
- **Parking lots, where available, will be used for motor vehicle parking.**
- **Hunting is subject to all applicable federal and state laws.**
- **Firearms permitted only during open hunting seasons.**
- **Do not pick or destroy flowers, shrubs, or any other living vegetation.**
- **Littering is prohibited.**
- **Camping and overnight use is prohibited.**
- **Fires are prohibited -- use caution with matches.**

KNOW YOUR DUCKS

Learning how to recognize different kinds of ducks in flight pays dividends in extra hunting opportunity. When some species drop sharply in numbers, good management requires they not be shot. Unless you know your ducks and avoid killing birds that are scarce, all hunting has to be curtailed. When you know how to harvest only ducks in good supply, a longer season is possible.

WATERFOWL PRODUCTION AREAS

are open in the fall to public hunting except where occasionally posted otherwise. Upland game birds and big game may be hunted and furbearers trapped, in accordance with applicable federal and state laws.



FOR MORE INFORMATION AND A FREE WATERFOWL IDENTIFICATION GUIDE WRITE:

U.S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
RAINWATER BASIN WETLAND MGT. DIST.
P.O. BOX 1786
KEARNEY, NEBRASKA 68847

MAP OF CLAY COUNTY NEBRASKA

WATERFOWL PRODUCTION AREA

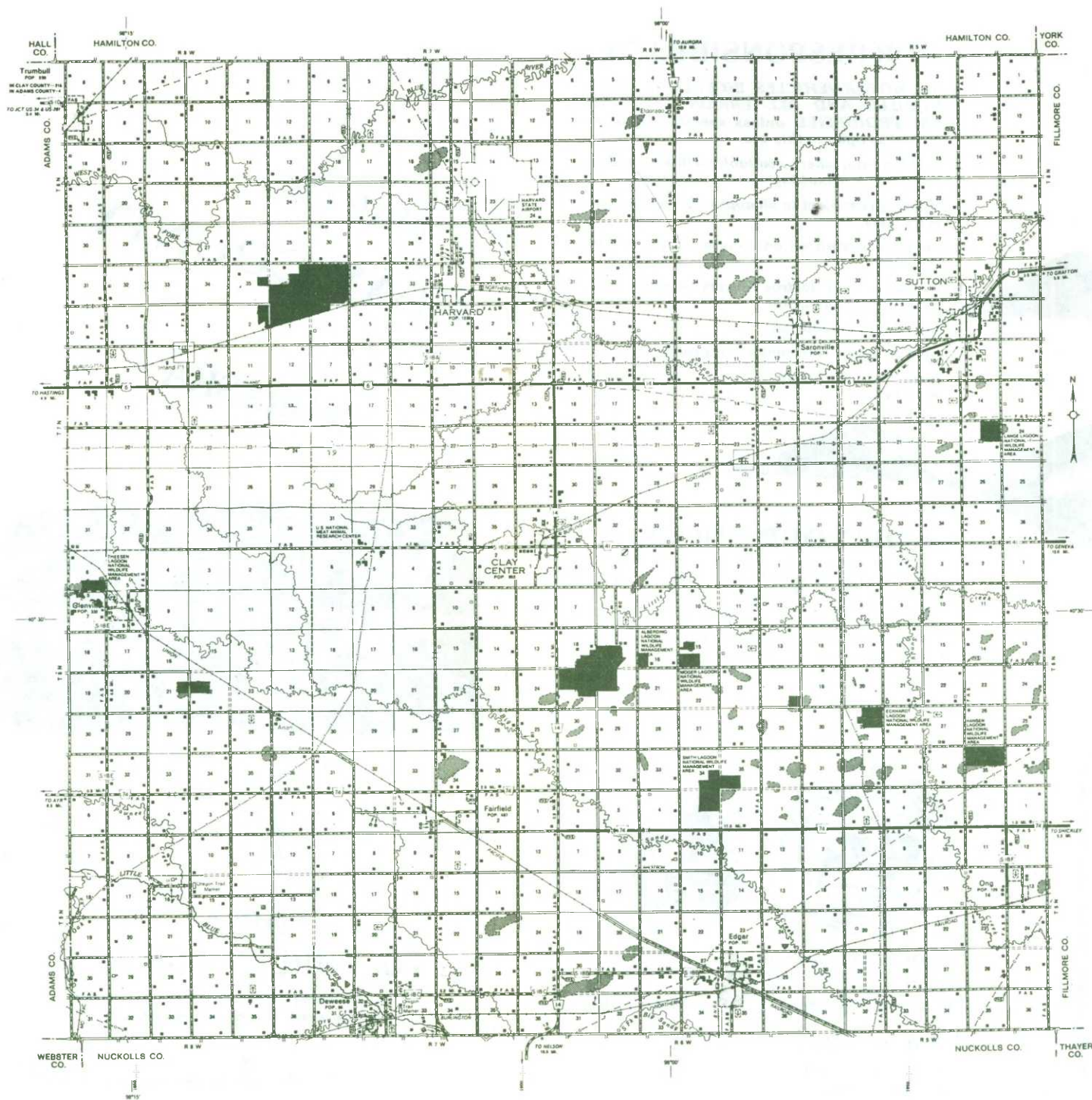


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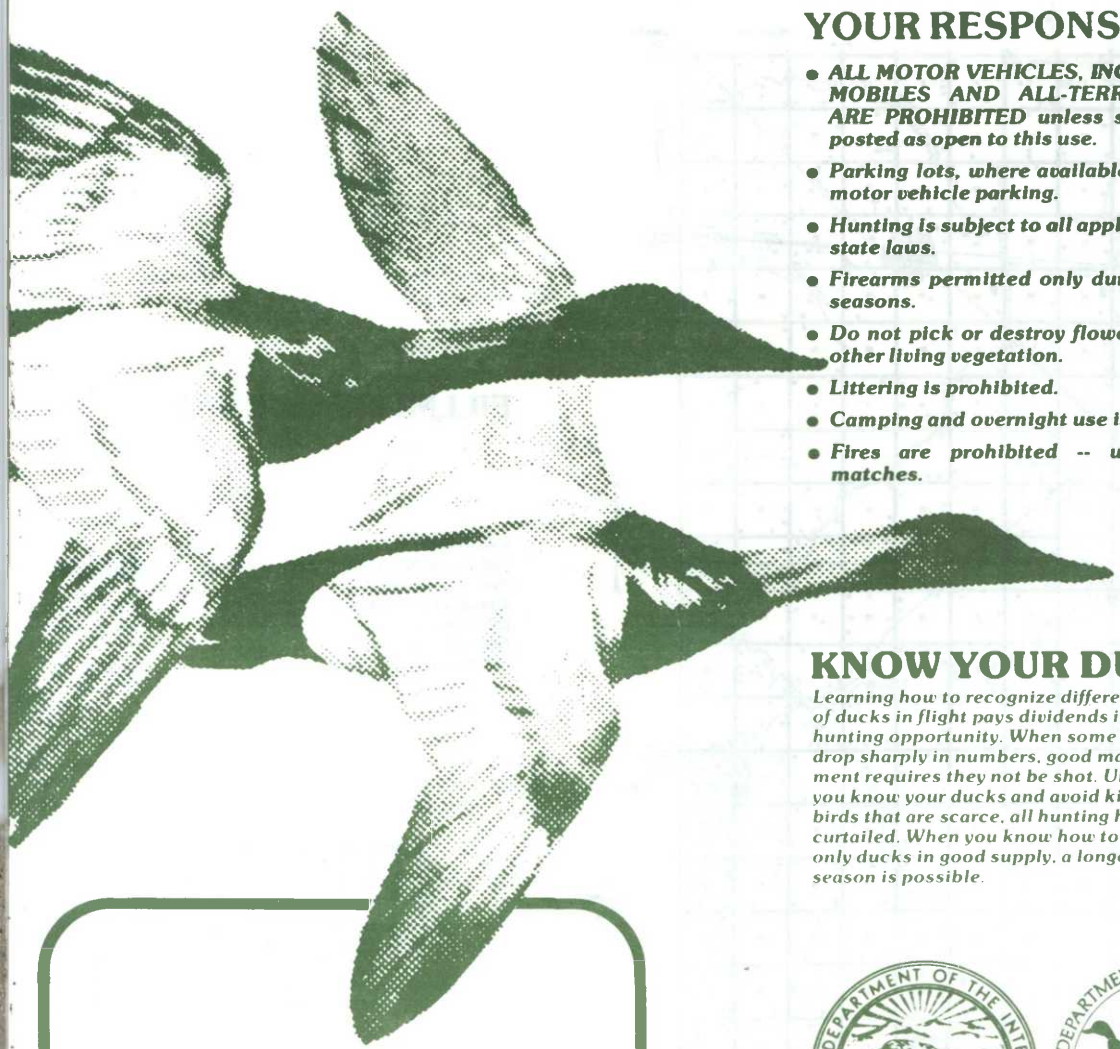
CLAY COUNTY

LEGEND

- Waterfowl Production Areas (Federal) 
- Primitive Road 
- Gravel or Stone Road 
- Bituminous Road 
- Section Line 
- Pond or Lake 



LOCATION MAP



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MAP OF
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NEBRASKA

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WATERFOWL IDENTIFICATION GUIDE WRITE:

U.S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
RAINWATER BASIN WETLAND MGT. DIST.
P.O. BOX 1786
KEARNEY, NEBRASKA 68847

WATERFOWL PRODUCTION AREA

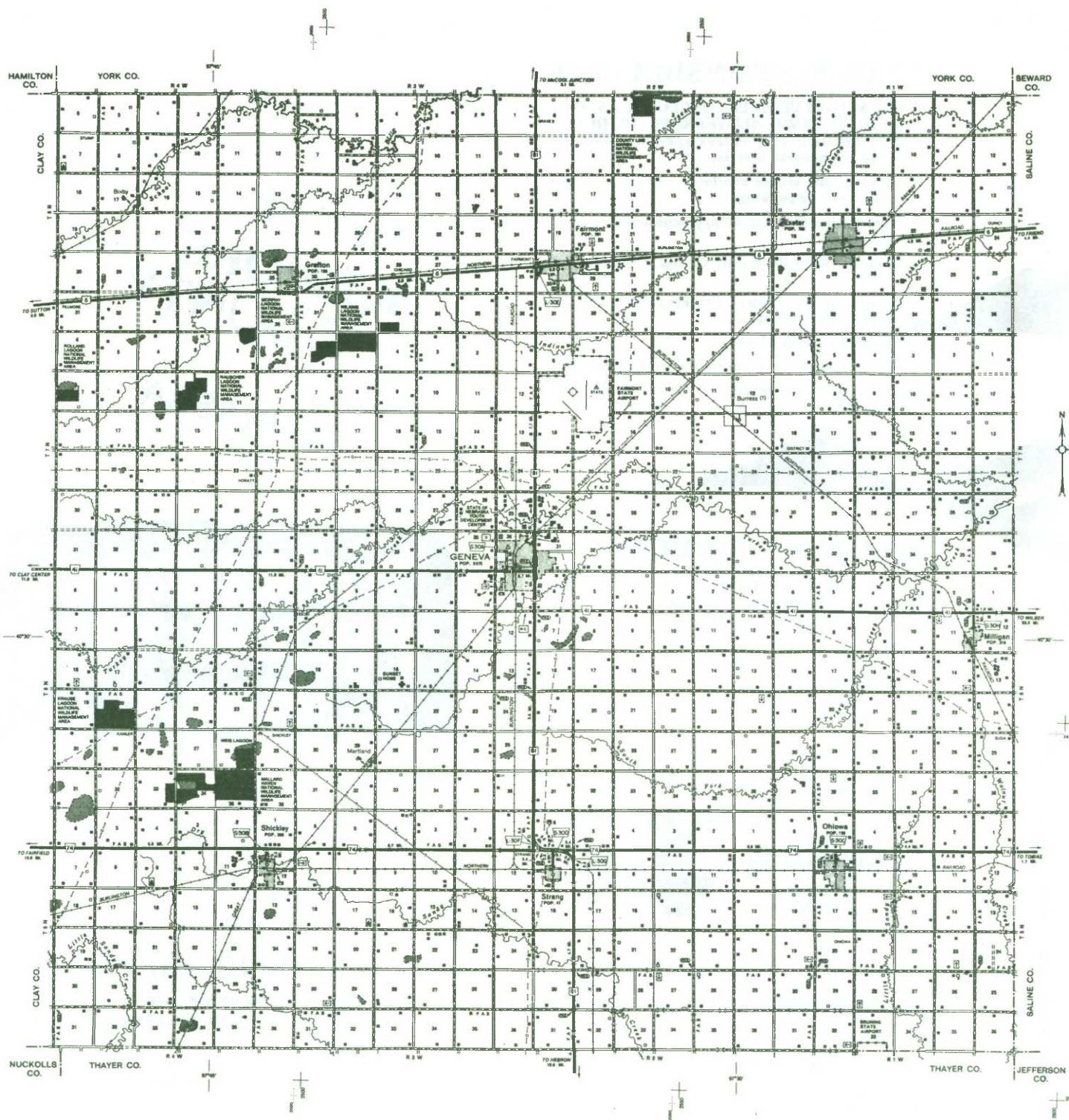


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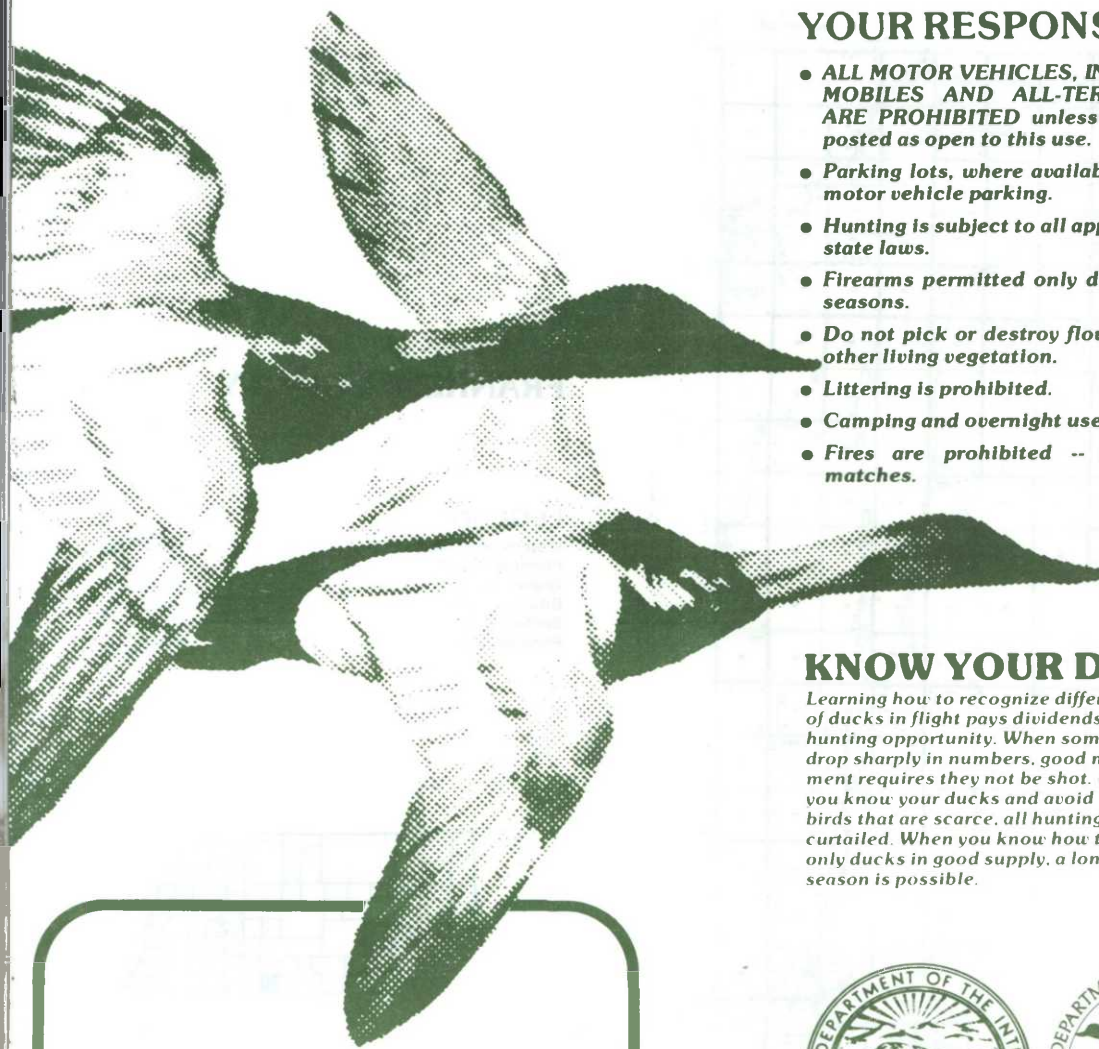
FILLMORE COUNTY

LEGEND

- Waterfowl Production Areas (Federal)
- Primitive Road
- Gravel or Stone Road
- Bituminous Road
- Section Line
- Pond or Lake



LOCATION MAP



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MAP OF
FRANKLIN
COUNTY
NEBRASKA

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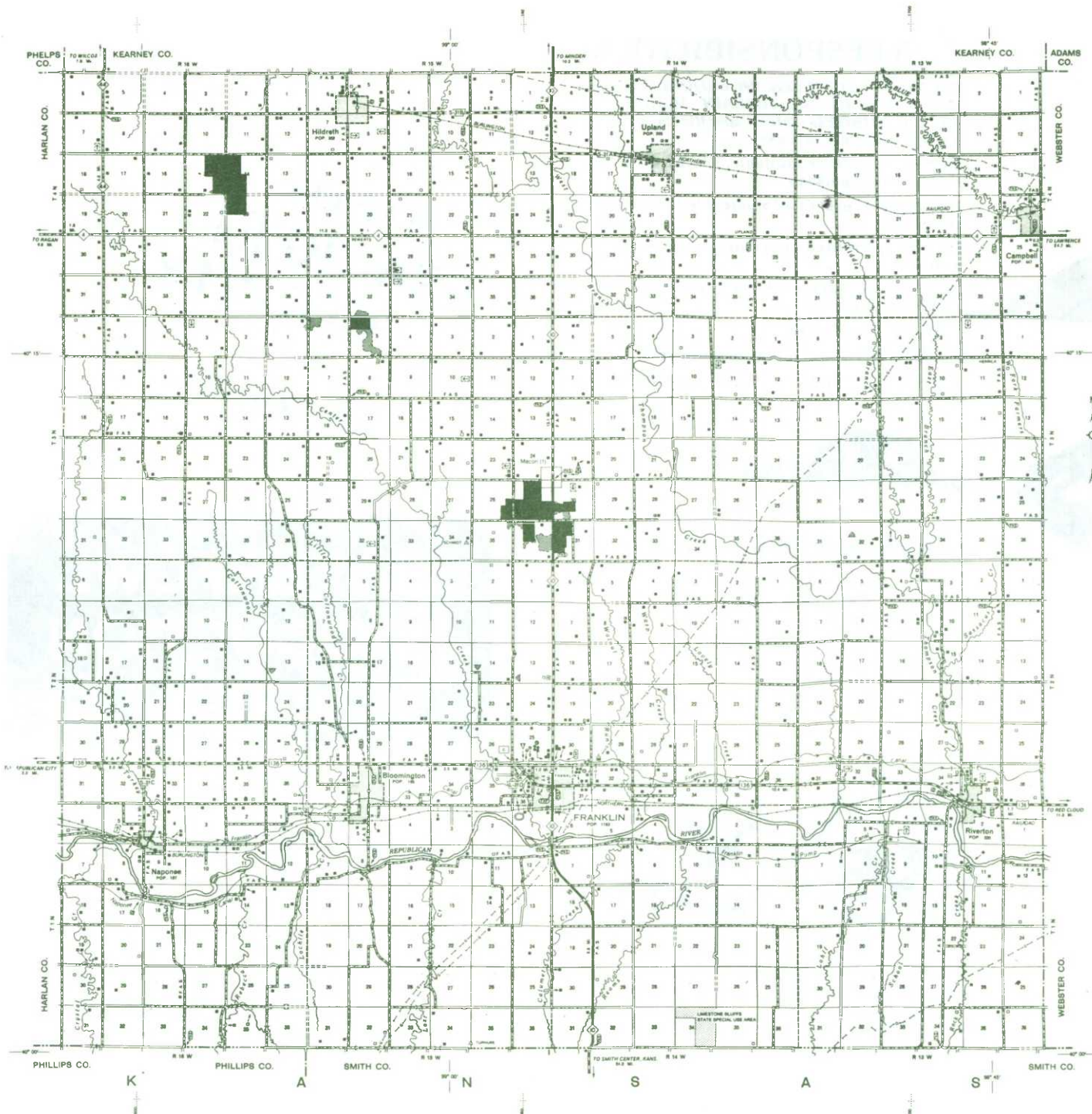


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MAP OF GOSPER COUNTY NEBRASKA

WATERFOWL PRODUCTION AREA

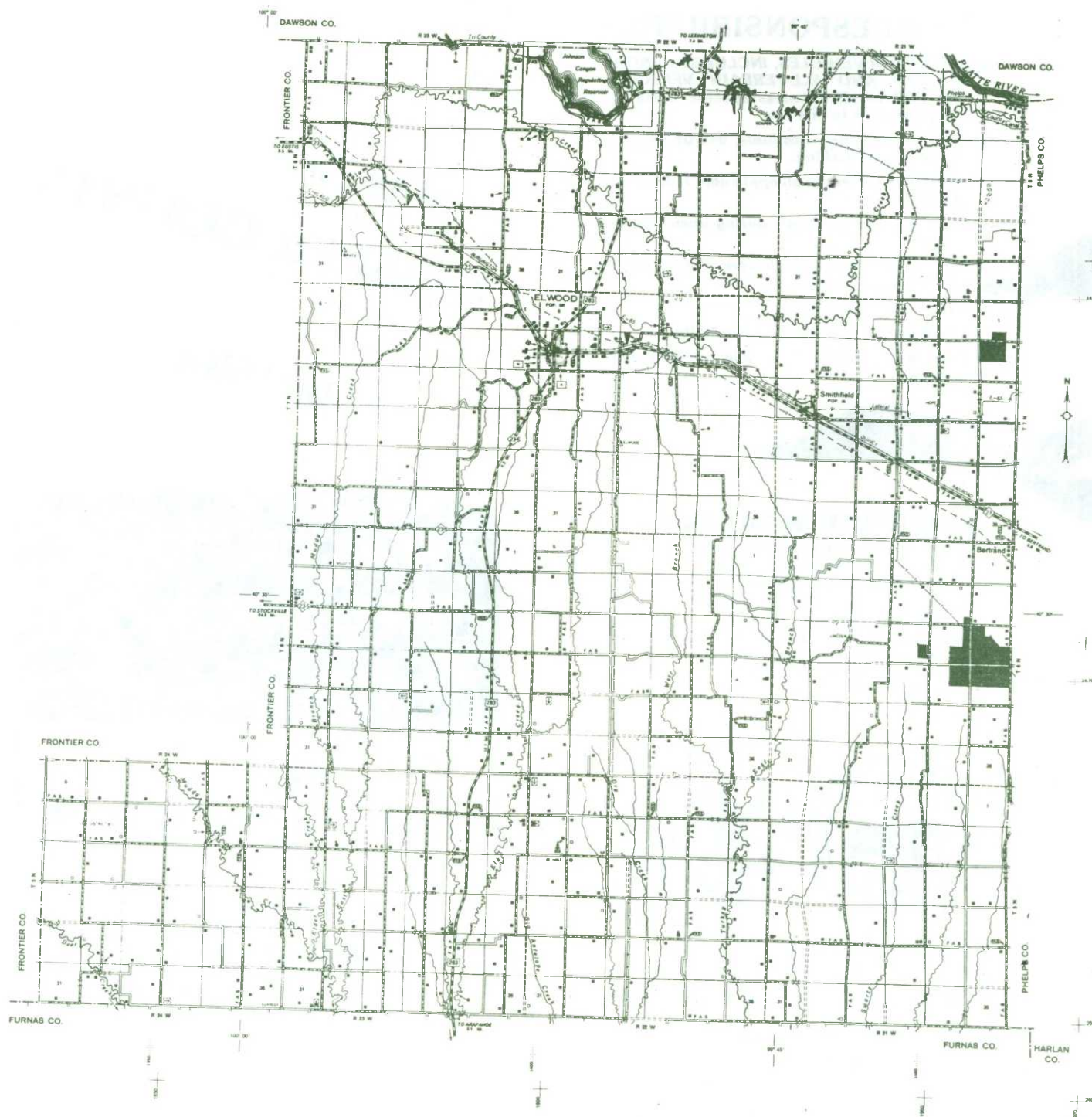


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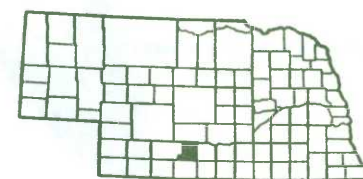
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GOSPER COUNTY

LEGEND

Waterfowl Production Areas (Federal)	
Primitive Road	
Gravel or Stone Road	
Bituminous Road	
Section Line	
Pond or Lake	



LOCATION
MAP



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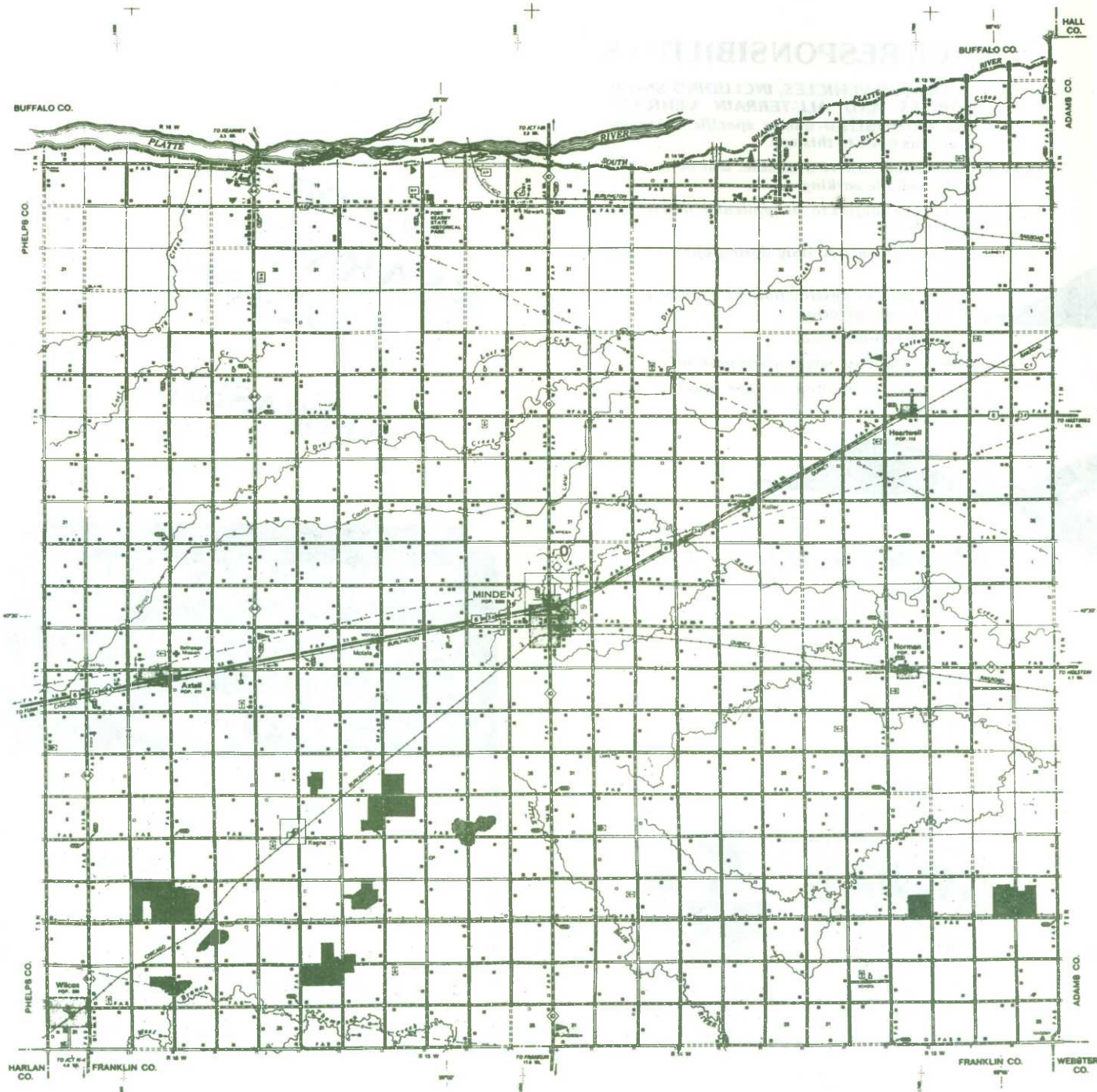


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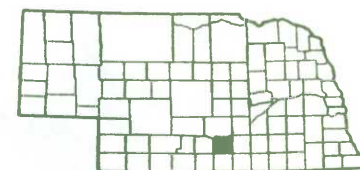
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KEARNEY COUNTY

LEGEND

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WATERFOWL PRODUCTION AREA

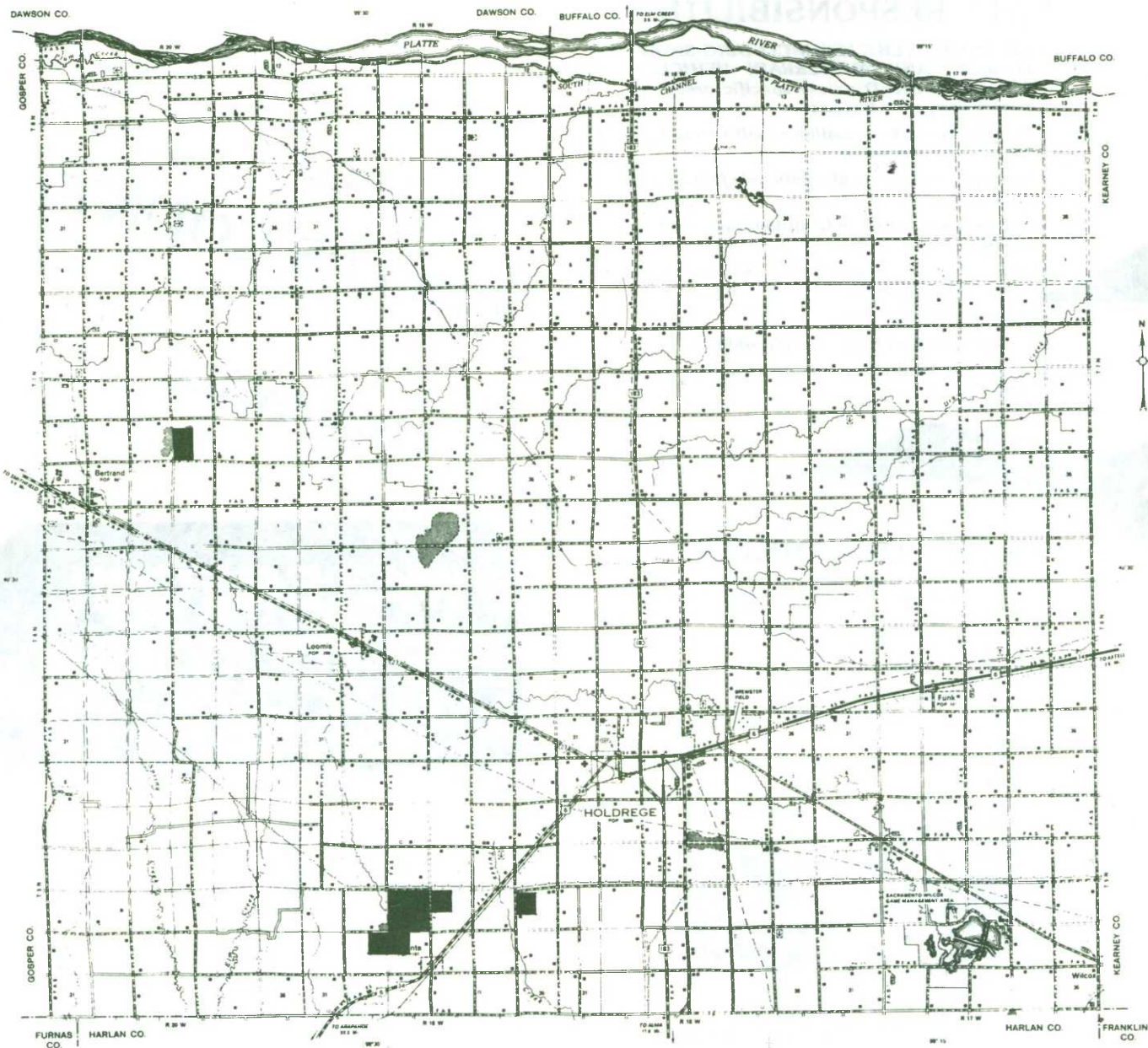


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MAP OF
YORK COUNTY
NEBRASKA

WATERFOWL PRODUCTION AREA

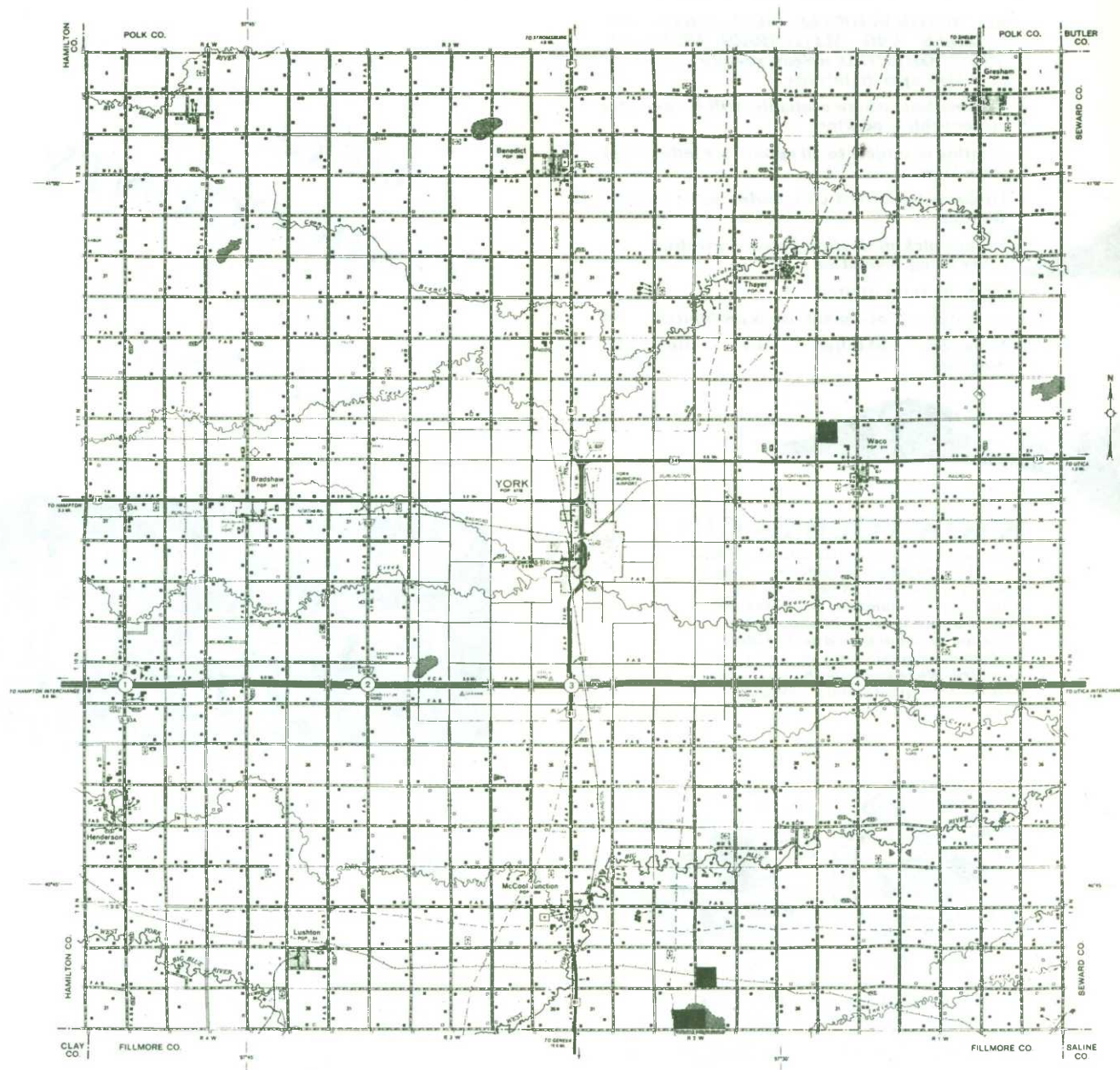


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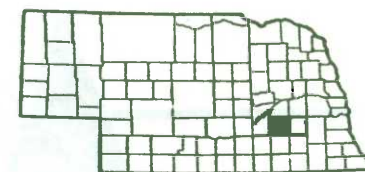
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YORK COUNTY

LEGEND

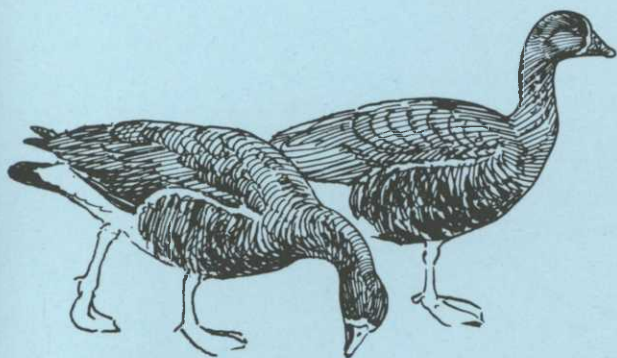
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LOCATION MAP

Birds of the Rainwater Basin

**WETLAND
MANAGEMENT
DISTRICT**



White Fronted Geese



* WETLAND MGT. DISTRICT OFFICE, KEARNEY
HISTORICAL RAINWATER BASIN BOUNDARIES

The rainwater basin area of south central Nebraska encompasses approximately 4,200 square miles, and lies within the counties of: Gosper, Phelps, Kearney, Harlan, Franklin, Adams, Hamilton, Clay, Polk, Butler, York, Seward, Fillmore, Saline, Nuckolls, and Thayer. Topography of this region is characterized by flat and nearly level to gently rolling loess plains. Private upland areas are under extremely intense agricultural use both for dryland farming and deep well irrigation. Other habitat includes irregularly distributed grasslands, fresh water wetlands, and riparian habitat found along drainages and small creek bottoms. The climate is dominated by long, hot summers and very cold, dry winters.

Within the rainwater basin area the Fish and Wildlife Service administers 40 Waterfowl Production Areas (WPA's) and one refuge totaling 16,000 acres. These areas are managed primarily for the spectacular spring migrations that occur throughout this region. Waterfowl numbers often peak in late March to early April and these often include 90% of the total mid-continent population of white-fronted geese. Further management of these public areas are directed towards abundant pheasant populations as well as quail, rabbit, squirrel and deer.

This list contains 257 species. Birds which have been observed to be nesting are noted with a •. Endangered species in the United States stand out in **reverse print**. The relative abundance of each species at each season is coded as follows:

Season Code

S—March–May
S—June–August
F—September–November
W—December–February



WHOOPING CRANE

Abundance Code

a—A common species, very numerous in suitable habitat and during proper season.
c—Certain to be seen in suitable habitat.
u—Present, but not certain to be seen.
o—Not expected each year, seen only a few times each season.
r—Seen at intervals of 2 to 5 years.
AC—Accidental, not normally seen, can be considered to be outside their normal range.

	S	S	F	W
Common Loon	u	r	u	
Horned Grebe	u		u	
Eared Grebe	c	o	c	
Pied-billed Grebe	c	c	c	
White Pelican	c	o	c	
Double-crested Cormorant	c		c	
Great Blue Heron	c	c	c	
Green Heron	c	u	c	
Little Blue Heron	o	r	r	
Cattle Egret	u	o	u	
Great Egret (Common)	o	o		
Snowy Egret	r		r	
Louisiana Heron		AC		
Black-crowned Night Heron	c	o	c	
Yellow-crowned Night Heron	r		r	
Least Bittern	u	r	u	
American Bittern	c	c	c	
White-faced Ibis	r			
Whistling Swan	o		r	
Canada Goose	a	o	a	u
White-fronted Goose	a		a	r
Snow Goose (Snow & Blue)	c	c	c	o
Mallard	a	c	a	c
Gadwall	c	c	c	r
Pintail	a	u	a	o
Green-winged Teal	a	o	a	o
Blue-winged Teal	a	c	a	r
Cinnamon Teal	u	o	u	
American Wigeon	a	o	a	o
Northern Shoveler	a	c	a	r
Wood Duck	c	u	c	
Redhead	c	u	c	
Ring-necked Duck	u		u	
Canvasback	u		u	
Greater Scaup	r			
Lesser Scaup	a		c	r
Common Goldeneye	u			
Bufflehead	u			u
Black Scoter	r			
Ruddy Duck	c	u	c	
Hooded Merganser	u		u	
Common Merganser	o			o
Turkey Vulture		u		
Goshawk	o		o	
Sharp-shinned Hawk	u	u	u	u

	S	S	F	W
Cooper's Hawk	u		u	u
Red-tailed Hawk	c	u	c	u
Broad-winged Hawk	o			
Swainson's Hawk	c	u	u	
Rough-legged Hawk	u		u	c
Ferruginous Hawk	u		u	u
Golden Eagle	u		u	o
Bald Eagle	u		u	o
Marsh Hawk	c	c	c	u
Osprey	o		o	
Gyr Falcon				r
Prairie Falcon	o		o	u
Merlin (Pigeon Hawk)	r		r	r
American Kestrel (Sparrow Hawk)	c	c	c	c
Bobwhite	c	c	c	c
Ring-necked Pheasant	c	c	c	c
Whooping Crane	o		o	
Sandhill Crane	a		c	
King Rail	r			
Virginia Rail	u	u	u	
Sora	c	c	c	
Yellow Rail	r			
Black Rail	r			
American Coot	a	a	a	o
Semipalmated Plover	c	r	c	
Snowy Plover		r		
Killdeer	a	c	a	c
American Golden Plover	u			
Black-bellied Plover	o		o	
Ruddy Turnstone	o			
American Woodcock	o		o	
Common Snipe	c		c	
Long-billed Curlew	u	u	u	
Whimbrel	r			
Upland Sandpiper (Plover)	u	u	u	
Spotted Sandpiper	c	c	c	
Solitary Sandpiper	c		c	
Willet	c		c	
Greater Yellowlegs	c		c	
Lesser Yellowlegs	c	u	c	
Pectoral Sandpiper	a		a	
Baird's Sandpiper	c		c	
Least Sandpiper	c		c	
Dunlin	o		o	
Short-billed Dowitcher	c		c	
Long-billed Dowitcher	u		u	
Stilt Sandpiper	c		c	
Semipalmated Sandpiper	c		c	
Western Sandpiper	r	r	r	
Buff-breasted Sandpiper	r			
Marbled Godwit	u		u	
Hudsonian Godwit	c			
Sanderling	o		o	
American Avocet	u	u	u	
Wilson's Phalarope	c		c	
Northern Phalarope	u		u	

	S	S	F	W
Herring Gull	u		u	u
Ring-billed Gull	c		u	u
Franklin's Gull	a	r	a	
Bonaparte's Gull	r		r	
Forster's Tern	c	u	c	
Common Tern	u		u	
Least Tern	r		r	
Black Tern	a	c	a	
Rock Dove	c	c	c	c
Mourning Dove	a	a	a	a
Yellow-billed Cuckoo	c	c	c	
Black-billed Cuckoo	c	c	c	
Barn Owl	o	o	o	o
Screech Owl	u	u	u	u
Great Horned Owl	c	u	c	u
Snowy Owl				o
Burrowing Owl	u	u	u	
Long-eared Owl	u	u	u	u
Short-eared Owl	u	u	u	u
Common Nighthawk	c	c	c	
Chimney Swift	a	a	c	
Ruby-throated Hummingbird	u	u	u	
Belted Kingfisher	c	c	c	u
Common Flicker (Yellow & Red-shafted)	c	c	c	c
Red-bellied Woodpecker	c	c	c	c
Red-headed Woodpecker	c	c	c	o
Hairy Woodpecker	c	c	c	c
Downy Woodpecker	c	c	c	c
Eastern Kingbird	a	a	c	
Western Kingbird	a	a	c	
Scissor-tailed Flycatcher	r	r		
Great Crested Flycatcher	c	o	c	
Eastern Phoebe	c	c	c	
Say's Phoebe	c	c	c	
Yellow-bellied Flycatcher	u			
Least Flycatcher	c	r	c	
Eastern Wood Pewee	c	c	c	
Olive-sided Flycatcher	u		u	
Horned Lark	a	c	a	a
Tree Swallow	c	o	c	
Bank Swallow	u	u	u	
Rough-winged Swallow	c	c	c	
Barn Swallow	a	a	c	
Cliff Swallow	c	c	a	
Purple Martin	c	c	c	
Blue Jay	c	c	c	c
Black-billed Magpie	u	u	u	u
Common Crow	a	c	a	a
Black-capped Chickadee	c	c	c	c
White-breasted Nuthatch	u	u	u	u
Red-breasted Nuthatch			o	o
Brown Creeper	o		o	o
House Wren	c	c	c	

	S	S	F	W
Winter Wren			u	u
Long-billed Marsh Wren	u	u	u	
Short-billed Marsh Wren	u	u	u	
Mockingbird	u	u	u	u
Gray Catbird (Catbird)	c	c	c	
Brown Thrasher	c	c	c	r
American Robin	a	c	a	c
Wood Thrush	u	u	u	
Swainson's Thrush	c			
Gray-cheeked Thrush	u			
Veery	o			
Eastern Bluebird	u	u	u	u
Townsend's Solitaire				o
Blue-gray Gnatcatcher	u			
Golden-crowned Kinglet	c		c	u
Ruby-throated Kinglet	u		u	
Water Pipit	c		c	
Sprague's Pipit	r		r	
Bohemian Waxwing				o
Cedar Waxwing	c	u	c	u
Northern Shrike			u	u
Loggerhead Shrike	c	c	c	c
Starling	a	a	a	a
Bell's Vireo	c	c	c	
Red-eyed Vireo	u	o	u	
Philadelphia Vireo	u		u	
Warbling Vireo	c	c	c	
Black-and-white Warbler	c			
Golden-winged Warbler	r			
Tennessee Warbler	c		c	
Orange-crowned Warbler	c		c	
Nashville Warbler	u		u	
Northern Parula	r		r	
Yellow Warbler	c	c	c	
Magnolia Warbler	u		u	
Black-throated Blue Warbler	r			
Yellow-rumped Warbler (Myrtle & Audubon's)	c		c	
Black-throated Green Warbler	u			
Blackburnian Warbler	u		u	
Yellow-throated Warbler	r			
Chestnut-sided Warbler	u		u	
Bay-breasted Warbler	u		u	
Blackpoll Warbler	c		c	
Palm Warbler	u			
Ovenbird	u		u	
Northern Waterthrush	u		u	
Connecticut Warbler	r			
Mourning Warbler	u			
Common Yellowthroat	c	c	c	
Yellow-breasted Chat	o	o	o	
Hooded Warbler	r			
Wilson's Warbler	u		u	
Canada Warbler	o		o	
American Redstart	c	c	c	
House Sparrow	a	a	a	a

S	S	F	W
c	c		
o	o	o	
c	c	c	c
c	c	c	
a	c	a	o
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c		u	
o		a	
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Favorite Birding Spots

Name	Directions from nearest town	Upland acres	Wetland acres	Total
York County				
1. Waco	Waco—1.5 miles north, .5 mile west	34	125	159
2. Sinninger Lagoon	McCool Junction—2 miles south, 3 miles east	123	37	160
3. County Line Marsh	3 miles south, 2.5 miles east	176	232	408
Hamilton County				
4. Pintail Marsh	Aurora—4.75 miles south, 2 miles east	94	190	284
Fillmore County				
5. Wilkins Lagoon	Grafton—1 mile east, 1 mile south	160	370	530
6. Murphy Lagoon	1 mile south, 1 mile west	13	76	89
7. Rauscher Lagoon	3 miles south, 2.5 miles west	111	140	251
8. Rolland Lagoon	Sutton—1 mile east, 1.5 miles south	76	53	129
9. Krause Lagoon	Shickley—4 miles west, 3.5 miles north	184	213	397
10. Weis Lagoon	2.5 miles north	40	120	160
11. Mallard Haven	2 miles north	331	436	767
Clay County				
12. Harvard Marsh	Harvard—3 miles west	724	760	1484
13. Lange Lagoon	Sutton—2 miles south, .5 mile east	104	56	160
14. Theesen Lagoon	Glenville—.5 mile north	34	46	80
15. Glenvil Basin	1.5 miles east, 2 miles south	37	83	120
16. Massie Lagoon	Clay Center—3 miles south	359	493	852
17. Alberding Lagoon	3 miles south, 2 miles east	13	22	35
18. Harms Lagoon	3 miles south, 3 miles east	26	34	60
	.5 mile north			
19. Moger Lagoon	3 miles south, 3 miles east	67	53	120
20. Green Acres	4 miles south, 6 miles east	9	34	43
21. Eckhardt Lagoon	4 miles south, 8 miles east	108	66	174
22. Hansen Lagoon	5 miles south, 10 miles east	115	205	320
23. Smith Lagoon	6 miles south, 3.5 miles east	229	220	429
Nuckolls County				
24. Smartweed Marsh	Edgar—2.25 miles south, 2 miles west	6	74	80
Kearney County				
25. Bluestem Basin	Axtell—2.75 miles south, 3.25 miles east	32	44	76
26. Gleason Lagoon	2.75 miles south, 4.75 miles east	372	197	569
27. Northeast Sacramento	Minden—5 miles south, 1 mile west	40	—	40
28. Youngson Lagoon	Norman—6 miles south, .5 mile east	70	113	183
29. Jensen Lagoon	6 miles south, 2.5 miles east	278	187	465
30. Prairie Dog Marsh	Wilcox—2 miles north, 1 mile east	382	430	812
31. Lindau Lagoon	3 miles north, 6.5 miles east	47	105	152
32. Killdeer Basin	3 miles east, 1.5 miles north	2	36	38
33. Clark Lagoon	5 miles east, .5 mile north	224	227	451
34. Frerichs Lagoon	2 miles east, .5 mile north	13	33	46
Franklin County				
35. Quadhamer Marsh	Hildreth—1 mile south, 2.75 miles west	286	308	594
36. Ritterbush Marsh	5 miles south	32	49	81
37. Macon Lakes	Macon—.25 mile west or .5 mile south	466	498	964
Phelps County				
38. Cottonwood Basin	Bertrand—1 mile north, 2 miles west	161	79	240
39. Atlanta Marsh	Atlanta—.5 mile north	697	418	1115
40. Jones Marsh	2 miles north, 2 miles east	76	90	116
41. West Sacramento	Wilcox—6 miles west	43	277	320
42. Sacramento-Wilcox	2.5 miles west	1190	1050	2240
Harlan County				
43. South Sacramento	Wilcox—2 miles south, 2.5 miles west	85	82	167
44. Southeast Sacramento	Ragan—3.5 miles east, 2.25 miles north	54	120	174
Gosper County				
45. Victor Lake	Bertrand—4.5 miles north, .5 mile west	64	174	238
46. Elley Lagoon	2 miles west, 2.5 miles south	27	33	60
47. Peterson Basin	3 miles south	627	527	1154

Areas listed are federally owned Waterfowl Production Areas (WPA's), with the exception of those whose numbers are underlined. These are state owned Wildlife Areas. Location maps of federal WPA's are available from the U.S. Fish and Wildlife Service, Box 1786, Kearney, NE 68847.

Acknowledgments: To Jim Ducey, Univ. of Nebraska, for his contribution in compiling this list.

FIELD NOTES

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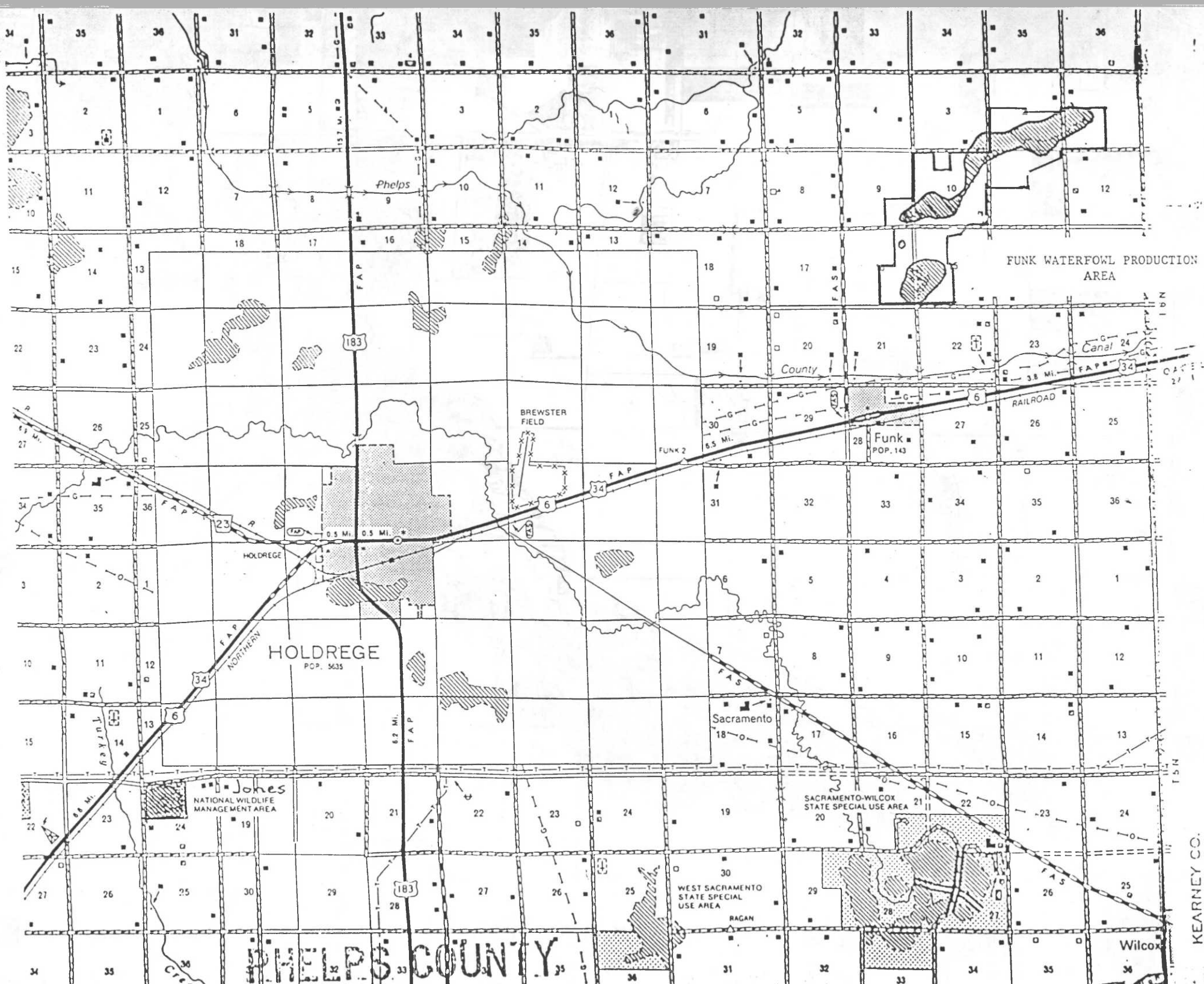
**FURTHER INFORMATION
CAN BE OBTAINED FROM:
MANAGER
WETLAND MGT. DISTRICT
U.S. FISH & WILDLIFE SERVICE
P.O. BOX 1786
KEARNEY, NEBRASKA 68847
PHONE # (308) 236-5015**



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