

KIRWIN NATIONAL WILDLIFE REFUGE

Kirwin, Kansas

ANNUAL NARRATIVE REPORT

Calendar Year 1988

Milton B. Little
Refuge Manager

2-17-89
Date

Ralph F. Fries

Regional Office Approval

Ray Ranch

Refuge Supervisor Review

8/24/89

Date

8/22/89
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INTRODUCTION

The Kirwin National Wildlife Refuge, authorized under a General Plan approved by the Secretary of the Interior on June 17, 1954, was established to provide habitat for and facilitate the management of the Nation's migratory bird resource. Basic authority for the existence of the refuge stems from the Migratory Bird Treaty Act, the Migratory Bird Conservation Act, and the Fish and Wildlife Coordination Act. The refuge is an overlay project on the Bureau of Reclamation's Kirwin Reservoir, fed by the North Fork of the Solomon River and Bow Creek. Fee title to the land is held for the United States by the Bureau of Reclamation. Control of the reservoir rests with the Kirwin Irrigation District and the Bureau of Reclamation. The watershed of these two sources extends into western Kansas and covers approximately 800,000 acres. The 10,778 acre refuge is located 4 miles west of Kirwin, Kansas, in Phillips County in Northcentral Kansas.

The primary purposes of the reservoir are to provide flood control and irrigation water for the Kirwin Irrigation District. The Kirwin Irrigation District irrigates over 7,000 acres of cropland below the reservoir. The combined effects of reduced stream flow and irrigation release are that the lake level has steadily decreased in recent years. Lake bottom land exposed by the receding water level has grown up into brushland and riparian timber. This decline in the water level and brush invasion has led to a decline in waterfowl use. In an effort to halt this decline, the refuge has used cooperative farmers to clear brushland and keep this land open by farming. At present, the refuge has nearly 2,780 acres in timber and brushland, 2,600 acres of water, 1,900 acres of cropland (alfalfa, cane/milo, corn, wheat) and nearly 3,500 acres of grassland.

The primary management purpose of the refuge is to provide food and resting habitat for spring flights of migratory waterfowl. Secondary objectives are: (a) to feed and protect fall flights of migrant waterfowl; (2) to provide food and protection for wintering ducks and geese; (3) to protect and maintain indigenous species of upland game birds, small game, and big game; (5) to cooperate with the Kansas Fish and Game in furnishing a warm water fishery; and (6) to provide the public an opportunity to enjoy, through observation, the aesthetic values of the wildlife resource.

The topography of the refuge is rolling with grass covered hilltops nearly 200 feet higher than the wooded creek bottoms. The lake covers over 5,000 acres at conservation pool level. Land above the conservation pool is cropland and grassland with shelterbelts of cedar and deciduous trees. The lake has been below the conservation pool elevation of 1,728 feet since 1971.

Changes in the watershed have largely caused the decline in water levels. Conservation tillage, terraces, and the oil refinery, and numerous farm ponds have considerably reduced stream flow. An increase in agricultural use of groundwater for irrigation purposes in the western portions of the watershed have lowered the water table, further reducing stream flow.

KANSAS	Atwood.....A-2	Cimarron.....D-2	Ellis.....C-3	Goodland.....B-1	Hugoton.....E-1	Larned.....D-4	Marysville.....A-6	Osawatomie.....C-8	St. Francis.....A-1	Syracuse.....D-1
Population: 2,249,071	Augusta.....D-6	Clay Center.....D-2	Ellsworth.....C-5	Great Bend.....C-4	Humboldt.....D-7	Lawrence.....C-6	Meade.....E-2	Osborne.....B-4	St. John.....D-4	Tonganoxie.....B-8
Area: 82,284 Sq. Miles	Baldwin City.....C-8	Coffeyville.....E-7	Elwood.....B-8	Greensburg.....D-3	Hutchinson.....D-5	Leavenworth.....B-8	Medicine Lodge.....E-4	Oswego.....C-7	St. Marys.....B-7	Topeka.....B-7
Capital: Topeka	Baxter Springs.....E-8	Colby.....B-2	Emporia.....C-7	Harper.....C-5	Independence.....E-7	Leoti.....C-1	Minneapolis.....B-5	Ottawa.....C-8	Salina.....C-5	Tribune.....C-1
	Belleville.....A-5	Columbus.....E-8	Erie.....D-8	Hays.....C-6	Junction City.....D-1	Liberal.....E-2	Mulvane.....D-6	Parsons.....E-8	Scott City.....C-2	Troy.....A-8
	Beloit.....B-5	Concordia.....B-9	Eureka.....D-7	Hawthorne.....A-7	Kansas City.....D-5	Lincoln.....B-5	Ness City.....C-3	Peabody.....C-6	Sedan.....E-7	Ulysses.....D-1
	Blue Rapids.....B-6	Cottonwood Falls.....C-6	Fredonia.....D-7	Hill City.....B-3	Killbuck.....B-8	Lindsborg.....C-5	Newton.....D-5	Phillipsburg.....B-3	Seneca.....A-7	WaKeeney.....B-3
	Burlington.....D-7	Council Grove.....C-2	Dighton.....C-6	Hillsboro.....C-6	Kinsley.....D-3	Lyndon.....C-7	Norton.....A-3	Sharon Spgs.....C-1	Smith Center.....B-4	Wamego.....B-5
	Caldwell.....E-5	Dodge City.....D-6	El Dorado.....D-3	Holingson.....C-4	Kiowa.....E-4	McPherson.....C-5	Oakley.....B-3	St. Paul.....B-4	Wellington.....A-6	Washington.....E-6
	Caney.....E-7	El Dorado.....D-3	Garden City.....D-2	Horton.....B-7	La Crosse.....C-3	Manhattan.....C-6	Oberlin.....C-4	Sterling.....D-5	Winfield.....E-5	Wichita.....D-5
	Chanute.....D-7	Elkhart.....C-1	Garnett.....C-8	Hoxie.....B-2	Lakin.....D-1	Marion.....C-6	Olathe.....C-8	Stockton.....B-3	Sublette.....D-2	Yates Center.....D-7
	Ashland.....E-3	Elkwood.....C-4	Goessell.....C-5				Osage City.....C-7	Sabetha.....A-7		
	Atchison.....B-8	Linwood.....C-4								

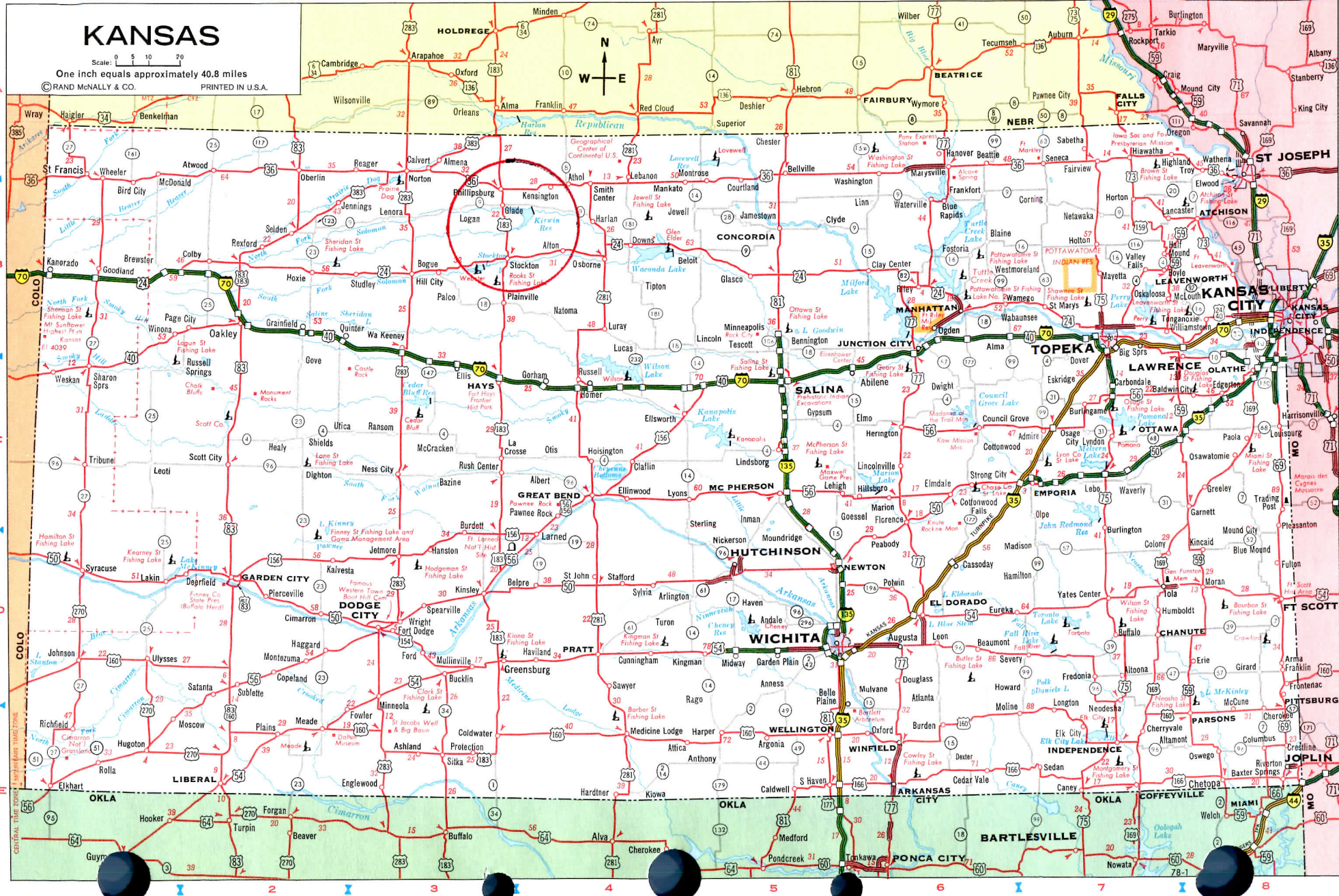


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K. FEEDBACK

NTR

L. INFORMATION PACKET - - - (inside back cover)

A. HIGHLIGHTS

Construction of a new equipment shed was completed. (Section I.1)

A record peak of eagles occurred December 20, when 38 bald eagles and 10 golden eagles were observed. (Section G.2)

A wandering bull moose spent the spring and summer in and around Kirwin NWR. (Section G.1)

A dry season brought new twists to the new rotational farming program (Section F.4) and grazing program implemented in recent years. (Section F.7).

B. CLIMATIC CONDITIONS

The early months of 1988 were cool and dry with no major storms. The summer was extremely dry causing poor vegetation growth throughout the refuge. The temperatures were relatively hot. On June 21, it reached 115 degrees at refuge headquarters.

The fall and early winter months brought mild temperatures with little stress experienced by the local wildlife.

See the graph on page 2 for high and low lake elevations recorded since 1956.

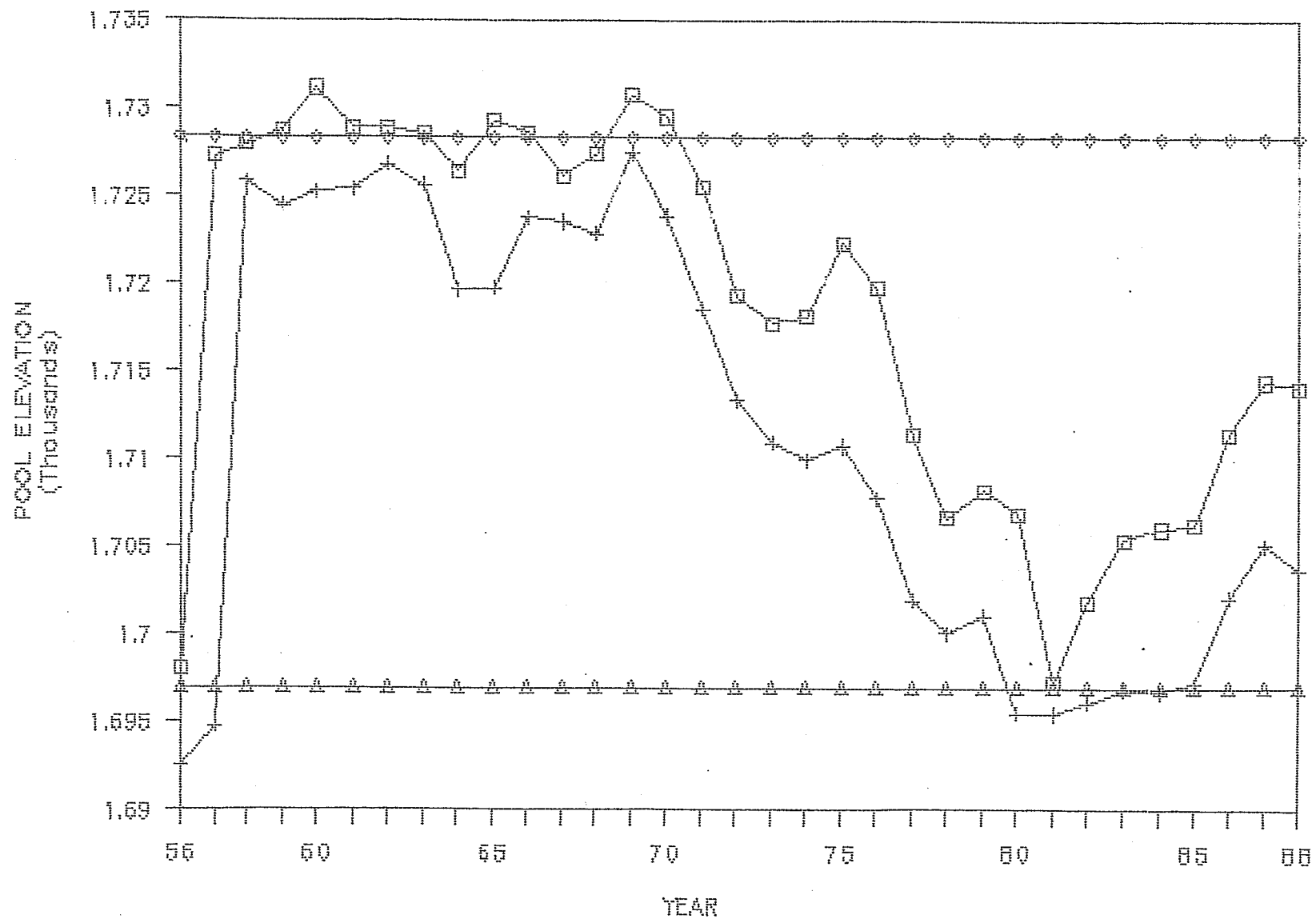
The following table provides a month-by-month summary of weather conditions during the year at the Kirwin dam:

MONTH	PRECIPITATION		TEMPERATURE						LAKE ELEV.*	
	Amt.	Aver.	Monthly High	'88 Average Low	High	Average Low	Normal** High	Normal** Low	1988	1987
January	.79	.35	62	-18	34	09	40	16	12.24	5.19
February	.43	.61	67	-20	39	09	45	20	13.05	5.87
March	.21	1.51	84	05	54	22	54	26	13.48	8.04
April	1.57	2.01	84	23	63	32	64	35	13.95	12.85
May	2.69	3.95	91	34	76	49	75	47	14.16	14.09
June	1.31	3.67	M 112	50	92	55	86	57	12.62	14.47
July	2.61	2.71	M 100	50	91	61	93	63	8.22	14.02
August	1.83	2.84	M 99	40	90	61	89	61	4.40	11.38
September	1.38	2.62	M 96	36	77	49	80	51	4.02	11.09
October	.15	1.58	M 89	18	69	34	66	38	3.69	11.03
November	1.00	.77	M 74	11	58	22	50	25	3.75	11.44
December	.15	.38	M 69	8	49	17	37	14	3.84	11.83
Total	14.12	23.00								

M = Missing some data during the month.

*Lake elevations are all plus 1700 feet.

**Normal high and low temperatures are computed from a 4 year data base.



1

+ LOW

◇

CONSERVATION POOL

□

HIGH

△

INACTIVE POOL

2

Kirwin Irrigation District began withdrawing water on June 10 with a lake elevation of 1714.00 feet. The gates were closed on August 20, leaving the lake elevation at 1704.00 feet and 19,720 acre feet. A total of 19,702 acre feet were taken during the irrigation period.

C. LAND ACQUISITION

1. Fee Title

The Bureau of Reclamation offered to turn over to the Fish and Wildlife Service some acreage around the dam. They plan to maintain all of the operations features. The land being offered is primarily a brome grassland. The transfer should be completed in 1989. Delays occurred in 1988 as the Bureau had to go through Congress to effect the change.

D. PLANNING

1. Master Plan

Kirwin National Wildlife Refuge functions without a Master Plan. The refuge is an overlay of a Bureau of Reclamation irrigation and flood control reservoir.

2. Management Plan

In lieu of a Grassland Management Plan an Action Plan was written to cover grazing activities during the year. (Section F.5)

5. Research and Investigations

This fall Mike Rezsutek, a masters student at Ft. Hays State University, visited the refuge for an initial briefing on his proposed masters topic. He will return next spring to see if the Franklin's ground squirrel still exists on the refuge. If he finds a colony he plans to study their food preferences and feeding behaviors.

E. ADMINISTRATION

1. Personnel

Maintenance Worker Sam Milazzo received a \$200 award for the outstanding work he did, over and beyond his regular duties, when he installed the hoist and raised the ceiling in the shop.

Manager Mueller received a grade increase from a GS-7 to a GS-9 on May 8.



Maintenance worker Milazzo receiving special achievement award.
6-13-88 CLM

Two summer laborers were hired to help during the busy field season. One started work on April 25 and the other started May 6. Jeffery Werner was rehired for a second year. Both worked until August 12.

One Biological Aid was hired on a 30 day appointment to assist with grazing monitoring. Michael Ohlsen, who volunteered last summer, was a GS-2 from May 12 - June 9.

The following is a table of staffing patterns in the last five years.

	<u>Permanent</u>			<u>Total FTE</u>
	<u>Full-Time</u>	<u>Part-Time</u>	<u>Temporary</u>	
FY 1988	5	0	3	5.6
FY 1987	5	0	2	5.6
FY 1986	5	0	1	5.25
FY 1985	5	0	1	5.25
FY 1984	5	0	0	5

TEMPORARY EMPLOYEES - not pictured

1. Jeffery Werner, Laborer, WG 2/1, TFT, EOD 04/25/88, End of Appointment 08/12/88.
2. Dennis Berry, Laborer, WG 2/1, TFT, EOD 05/06/88, End of Appointment 08/12/88.
3. Michael Ohlsen, Biological Aid, GS 2/1, TFT, EOD 05/12/88, End of Appointment 06/09/88.



5 4 3 2 1

PERSONNEL

1. Milton B. Suthers, Refuge Manager, GS 11/7, PFT, EOD
03/17/86.
2. Connie L. Mueller, Assistant Refuge Manager, GS 9/1, PFT, EOD
04/27/87.
3. Doris E. Hagman, Refuge Assistant, GS 5/10, PFT, EOD
05/22/61.
4. Richard S. Erdahl, Maintenance Worker, WG 8/5, PFT, EOD
03/21/83.
5. Samuel L. Milazzo, Maintenance Worker, WG 8/4, PFT, EOD
5/11/87.

3. Other Manpower Program

An employee enrolled in the Green Thumb program was acquired to work 22 hours per week as a maintenance assistant. The person worked three weeks before resigning this spring. A replacement was not found by year end. Efforts continue to fill the position.

4. Volunteer Programs

Twelve members of Honkers, Inc. spent 3 hours on April 26 building 12 floating goose nesting structures at the refuge. The group and individual members contributed \$400 for supplies for the project. The state also contributed \$275 from a Wild Trust Fund for supplies. The tubs will be placed following ice break up each year. (Section G.3).



Phillips County "Honkers" assembling goose nesting structures.
4-26-88 CLM

Boy Scout Troop #1234 from Phillipsburg placed two hand made wood duck boxes on the refuge on May 26. They plan to build more and coordinate placement with the refuge staff.

Bobby Thompson, a fourteen year old 4-H member, volunteered June 30 to fill one of the requirements for his Federal Conservation Award. He transplanted two young cottonwood trees to Cottonwood Grove picnic area and helped staff with the grazing program.

5. Funding

The following table outlines funding and its source over the last five years of operation at Kirwin.

<u>Fiscal Year</u>	<u>Base 1260</u>	<u>Base 1261</u>	<u>Base 1262</u>	<u>Quarters 1994/8610</u>	<u>YCC 1520</u>	<u>TOTAL</u>
1989	0	145,000	85,000	?	0	\$230,000
1988	0	145,000	108,900 ^{a/}	3,762	0	\$257,662
1987	232,000 ^{b/}	0	0	2,924	0	\$234,924
1986	212,550 ^{c/}	0	0	4,176	9,000	\$225,726
1985	193,000 ^{d/}	0	0	4,300	9,000	\$206,300

^{a/} Includes \$46,900 for pole barn

^{b/} \$52,000 Small ARMM

^{c/} \$57,300 Small ARMM plus \$8,000 Resource Problems Funds

^{d/} \$20,000 Small ARMM

6. Safety

The following are films shown at the monthly safety meetings.

January	Anatomy of An Accident
February	Cold Can Kill
March	For Jamie
April	Weld In Safety
May	Day of the Killer Tornado
June	Inland Water Search/Rescue and Ready
July	New Breath of Life
August	Split Second
September	Winter Walking
October	Winter Driving Tactics
November	Survival in the Winter Storm
December	Surviving Winter Driving

On November 10, the Hays Fire Equipment Company made an annual inspection and certified all fire extinguishes (5# and larger) as required by Kansas law.

Material Safety Data Sheets were requested and received for all existing refuge supplies.

An updated station safety plan was written and approved.

Hearing tests were completed by Erdahl, Milazzo, Mueller and Suthers on September 13. This is the second year of testing.

Manager Suthers completed his Cardio-Pulmonary Resuscitation renewal on September 13 and 14.

A local electrician checked electrical components for PCB's. None were found.

A safety condition that existed due to a drainage channel in front of the wood shop was corrected by covering it with metal sheets.

No loss-time accidents occurred on the refuge during the calendar year.

7. Technical Assistance

Advice was exchanged with the local Soil Conservation Service (SCS) to encourage sign up in the Conservation Reserve Program (CRP). Local support is low with Phillips County lagging behind in the signup.

The refuge provided a meeting place for a day long SCS workshop on burning. SCS personnel from all over northwest Kansas attended the April workshop designed to make burning a workable management option on CRP land. The workshop was presented by Paul Owensbush, a Kansas University professor considered the expert for Kansas burning.

SCS employees visited the refuge to tour the progress of our grassland management program.

8. Other

A payment of \$3,000 was received for renewal of a Special Use Permit issued to the Kirwin Trailer Village. There are now 20 trailers at the court which is slowly being eliminated by attrition.

Interest in wood cutting has been expressed by several local residents. Five permits were issued free of charge in 1988. The permits last for up to one month and are issued before or after the hunting season to minimize wildlife/hunter conflicts. Compliance on access and cutting limitations was very good.

A Special Use Permit was issued to Phillips County Road Department to excavate and crush approximately 12,000 yards of rock from the shoreline near Cottonwood Grove. The rock was used to surface five miles of county roads bordering and traversing the Refuge. The refuge assisted with the removal of trees along the roadway right-of-way in two areas. The areas were from Gray's Park to two miles east of the office and just west of the Kirwin Cemetery at the Refuge's northeast entrance. In return the refuge received better access roads, an improved alternate road to the Scenic Drive road and 1,000 yards of crushed rock left for refuge use.

F. HABITAT MANAGEMENT

2. Wetlands

The Bureau of Reclamation and Kirwin Irrigation District control the reservoir water levels. Draw downs usually occur from mid-June to mid-August to irrigate cropland downstream. Surface acres of the reservoir pool have varied from 800 to 2,500 in recent years. The variation is a result of irrigation needs and precipitation amounts.

During June of 1988, the reservoir reached a level of 1,714.16 feet before irrigation water was released on June 20.

3. Forests

There are no forests on Kirwin, however, riparian timber/brush and shelterbelts do exist.

Riparian timber/brush comprises approximately 3,500 acres. The habitat is primarily located along the old lake shore and active waterways. It provides excellent habitat for white-tailed deer, Rio Grande turkey and pheasant.

Shelterbelts make up 40 acres and provide excellent cover for resident wildlife in the predominantly grass and cropland areas. Most shelterbelts are made up of eastern red cedar trees planted shortly after the refuge was acquired.

The regional tree spade was used this fall to move cedar trees from areas that they are undesirable or overpopulated. These trees were planted along the exterior of two parking areas to form a shelterbelt, natural barrier for vehicle trespass and reduce erosion.

4. Croplands

1988 was the second year under our new six-year crop rotation plan. When initiating the plan, we agreed with cooperators to convert to conservation tillage practices as near as possible using farm equipment on hand. The 1988 drought, coupled with equipment that does not fit the program, resulted in a poor production year. In virtually every crop, production ranged from nothing to only fair.

The poor crop year crystallized the realization in cooperators minds that to make the program work economically they must place a concerted effort to each phase of production.

Major problems encountered included, cultivation of row crops to rid in row competition, obtaining uniform stands while planting in increased residue, conserving enough moisture to span

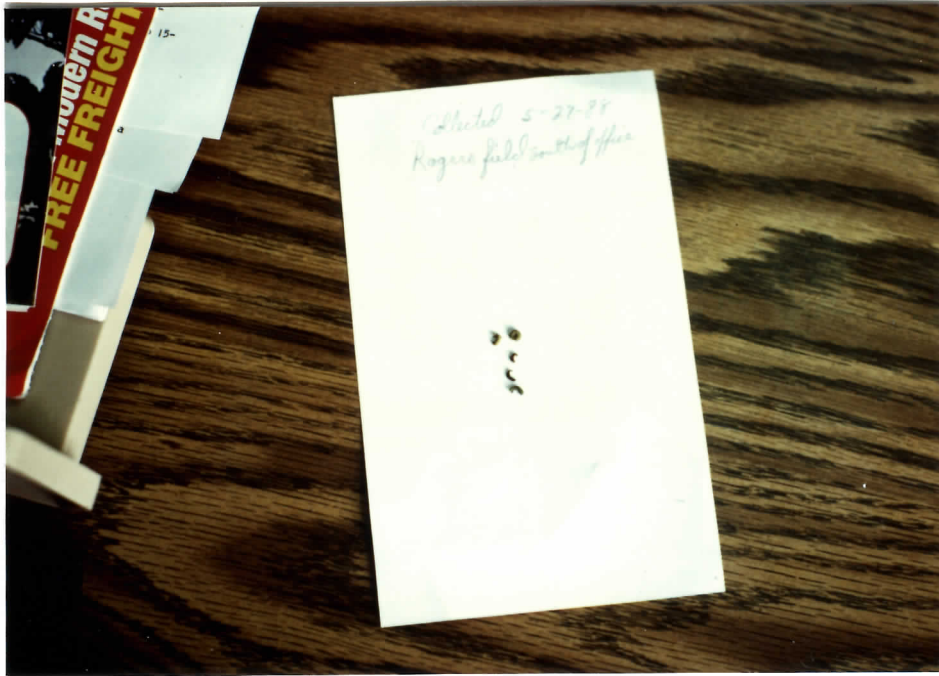
abnormally long dry spells, and establishing legumes during drought conditions. The drastic reduction in chemical use, down 88% from 1986 use, may also have contributed to unfavorable land response. However, the drought also revealed that chemicals are not infallible as their response on neighboring farm land varied from poor to good. Where moisture was too low to activate chemicals a carry over may exist affecting the 1989 crop year.

Soil samples were taken from each differing soil type farmed and analyzed to see deficiencies. One finding that correlated with the 1988 production results was the organic matter contained in the samples. The refuge land analyzed contained from 1% to 2.2%, directly indicating a low moisture retention capability. The land that was truly conservation tilled, leaving high residue and ground cover, produced the greatest yields.

Flexibility in thinking and a positive attitude seem paramount to successfully making the conversion. Cooperators are beginning to share and exchange land and equipment to get crops produced and avoid an initial large investment.



Weevil damaged alfalfa next to clover.
6-88 MBS



Alfalfa weevil larvae dead from naturally occurring
Bacillus fungus.
5-27-88

MBS



Competing foxtail in uncultivated corn. Corn
eventually burned up and produced nothing.
7-26-88

MBS



Yellow blossom sweet clover - planted as soil builder and wildlife cover.
5-4-88

MBS

1988 was the second year that no insecticide was used on alfalfa to control the alfalfa weevil. Yields and insect damage varied throughout the refuge depending on soil type, age of stand, distance to water, etc. The highest yield and also least weevil damage occurred where the initial parasitic wasp release (500 wasps) was made in 1987. Damage to the first cutting was no more than 15 to 20% as observed by entomologist Martinez and Manager Suthers. This field was also one of two where verified deaths of weevil larvae could be attributed to a Bacillus fungus that occurs naturally in the environment. Martinez also stated the fungus would not have occurred if insecticides had been used. This dryland field produced 4.5 tons per acre in 1988. Older, deep rooted stands of alfalfa withstood the drought much better than young stands and likewise weevil damage affected plants similarly.

During 1988, 20,000 parasitic wasps Bathyplectes anurus were released. This release was the result of an appeal to the Kansas State Board of Agriculture and Niles Michigan Lab to saturate the refuge and hopefully establish the wasps much sooner than normal. Also 500 parasitic wasps Microctonus aethiopoides were released. The Bathyplectes genus parasitizes the larvae while the Microctonus genus parasitizes the adult weevil. By late summer entomologist Martinez verified the establishment of the wasps. Now only time will be needed for the population to reach a level that will hopefully lessen economic damage from the weevil.

The beetles released in 1987 for all aphid control did not establish on the refuge and entomologist Martinez has advises

that a new release will be made in northwest Kansas at a different release site in 1989. Native lady bugs were plentiful during 1988.

The borders of alfalfa fields were treated with Nolo bait to control grasshoppers that build up in mid to late summer. Cooperators reported good success in some areas and very little success in others.

The following table compares crops and acre figures for the years 1984 through 1988. In 1984, approximately 900 acres of bottomland started converting from Special Use Permits (alfalfa) to Cooperative Farming Permits (mixed crops). This bottomland was flooded out in 1987 and 1988.

<u>CROP</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Winter wheat (harvest)	491	722.6	362.6	393.5	272.00
Milo	617	387.3	806.2	266.3	217.52
Corn	66	299.3	295.6	263.6	339.42
Fallow (fall plant wheat)	552	315.8	397.6	295.8	295.80
Alfalfa	1,035	759.6	492.8	376.5	366.82
Millet	-	39.0	-	-	-
Spring Barley	-	88.3	24.5	-	-
Cane**	-	50.9	10.0	37.6	102.20
Peas	-	20.0	-	-	-
Sunflowers	-	118.5	-	22.5	-
Pinto Beans	-	-	-	-	18.00
Food Plots	29	72.0	57.0	57.0	57.00
Legumes (Clover/Alfalfa Peas/Vetch)***	-	-	-	282.1	339.69
TOTAL	2,790	2,873.3	2,782.9	1,877.5	1,888.25*

* This figure does not include approximately 900 acres of flooded bottomland. Approximately 20 acres of cane was produced in the bottomlands during 1988.

** All cane planted, other than the 20 acre bottomland, was an alternate crop after a primary crop had failed.

*** Any legume can be used as a wildlife crop and would remain only two years.

Permittees on the Kirwin Refuge are not allowed to participate in government programs, however, the 1988 disaster program was considered different. The refuge is considered one farm, so the average crop production on the refuge for each individual crop was collectively shared when figuring eligibility for disaster payments. Although all yields were lower than normal, only corn and pinto beans qualified for disaster payments. All cooperators did not plan on filing. If a cooperator collected on a crop that crop would have to be insured in the 1989 crop year.

Austrian winter peas, hairy vetch, and nitro alfalfa were legumes that were tried experimentally on the government 1/6 share in 1988. Although each survived, production was minimal because of the drought. Birdsfoot trefoil will be tried in 1989, along with some more nitro alfalfa. The nitro is an annual alfalfa that produces approximately twice the nitrogen of perennial alfalfas.

The refuge hosted a seminar January 14, to explain the Holistic Resource Management Model to cooperators and any other interested citizens. The seminar was presented by Champe Green. A critique showed that the people who attended felt it was too general for them. The staff felt most participants did not appear to understand the overall model.

Managers Suthers and Mueller and four refuge farming employees with two wives attended the Flint Hills Farming Workshop August 30 and 31. The refuge staff and permittees were particularly impressed with the Vogelsburg farm program. This farm homestead has never had chemicals (pesticides or fertilizers) applied. Despite the cracked dry soil, the crops were in very good condition. Seeing actual results leaves a deeper impression than reading or hearing. The entire seminar was well organized and Dave Wiseman and staff are to be commended.

A post season meeting was held with the cooperative farmers to discuss success, failures, and possible changes. The only change that will be implemented in 1989 is a 1/4 - 3/4 refuge to farmer share on row crops.

5. Grasslands

A grassland management action plan was written and followed for 1988.

Hot, dry weather produced a limited native grass seed supply. Harvesting of seed was put out on bid, but nothing was harvested due to lack of production.

The refuge transferred 1,489# of 1987 seed credit to Lake Andes NWR.

Strips of annual grass and weeds along the shoreline south of headquarters was disced and planted to dense cane. These areas will be farmed with milo for a few years and then planted to native grass.

Two units planted to grass in 1987 received maintenance mowing treatment in 1988.

Managers Suthers and Mueller attended a CRP grass seminar hosted by Casterline Seed in May. The information being distributed seemed to be in line with wildlife concerns.

6. Other Habitats

The Refuge received its share (207 1/2#) of Illinois bundleflower seed from Star Seed Co. This completed the arrangement made in 1987 to use the companies plot thrasher. Kirwin gave half its share to Flint Hills NWR and broadcast the rest onto sandy hills in G-11 on April 29. Cattle hoofs incorporated the seed. Some seed emergence occurred but it appears seedlings were lost due to the drought.

Proso millet was broadcast seeded with a 4-wheeler in August on mudflats created by declining water. Mud proved to be a problem in accessing some areas. Some millet was observed present during the fall. Stinkgrass (Eragrostis cilianensis) was by far the most common native plant growing and it was being used extensively by waterfowl.

7. Grazing

Grazing was initiated on Kirwin Refuge in 1987, solely as a land management tool. The Kirwin Refuge contains 3,500 acres of grasslands of which 95% were originally farmed. The five percent non-broken prairie and other grasslands are deteriorating from overrest, evidenced by dying grasses, invasion by exotic grasses, annual forbes, smothering grass mats and woody species.

A goal was established to maintain the unbroken upland in as natural of a prairie state as possible and maintain remaining uplands in native prairie species. Past management has employed primarily rest and haying to maintain uplands. Small areas had been burned prior to 1984 when a more aggressive burn plan was initiated. Currently fire, haying, grazing, rest and animal impact are being utilized.

During 1988, 1,190 acres were grazed using biological planning and time control. Mineral feeders are used to direct grazing and hoof action. Grazing fees vary by tract and were established by bid and/or negotiation. Fees vary primarily due to quality of forage and amount of labor, material, and supplies supplied by the bidders.

UNIT G-11

Unit G-11 grazing commenced April 29, and ended July 15. One hundred ten pairs and four bulls were utilized. This is an increase from 88 pairs and three bulls that were grazed in 1987. The increase was made to obtain more animal impact, a reduction in time was made to offset the increase in numbers by reducing the animal exposure to plants. The paddocks were grazed in reverse order as compared to 1987 to put pressure on downy brome in the northern paddocks and also not impact each paddock at the same time as in 1987.

The spring of 1988 was drier than normal and became a full drought after mid-June when the last appreciable rainfall occurred. Paddocks 12 through 8 in reverse order had been grazed prior to this rain. Temperatures soared to as high as 115 degrees and remained above 100 degrees for nine consecutive days accompanied with some hot southerly winds.

Grazing moves were slowed for the remainder of the summer as plant growth slowed. The six paddocks that were grazed prior to the extreme heat and mid-June rain recovered for a second graze. The remaining paddocks did not recover after 60 days rest, our outside parameter in slow growth. The cattle were moved to G-14 and remained until removed August 15. G-14 had never been grazed before and was utilized in 40-acre paddocks leaving ample cover for wildlife. This was a good test of replanning.

The cool season grasses stopped all growth with the extreme hot dry weather. Warm season grass response was also very slow and little seeding occurred during 1988, whether grazed or ungrazed. It appears that the grasslands with healthier water and mineral cycles are less vulnerable to extremes and plant health is maintained at a higher level. The rationing of forage is difficult with a roughly 50-50 mix of cool and warm season grasses if a fixed number of cattle are being utilized throughout the season. To reduce the chance for mismanagement the paddock numbers need to be increased.

The patches of Kentucky bluegrass and cheat mats that were broken up in 1987, continued a successional change from sunflowers to clover and ragweed. Grass seedlings of tall dropseed and blue grama were evident also.

Water was provided totally by wells and solar pumps in 1988, compared to river water points in 1987. Two pumps were used in each well, one connected to a large 12-volt battery for 24 hour service and the second straight solar. A double collector panel was used to supply electricity to the pump as well as recharging the battery. A large 12-volt tractor battery would last 30-45 days without additional full recharging. With 224 head of livestock and extreme heat the pumps must be checked daily. Two sets of brushes and one bearing went out in the pumps during the summer. Two eleven foot stock tanks provided the water capacity necessary.

Plant growth was monitored daily and moves made accordingly. Several factors influence plant growth monitoring and it appears that several plants would need to be measured to determine growth rates for different plant species in fast or slow growth. The important thing is to be cognizant of full plant recovery before regrazing.

Time controlled grazing needs to be continued on this unit at least until the entire unit can be classified in good to excellent condition. The extremely dry year of 1988 crystallizes the realization that restoring abused rangelands may be a slow process.

During 1989, grazing should commence in P-7 continue through P-12, then reverse order from P-6 through P-14. This will start grazing in those paddocks that recovered well in 1988. April 28 should be the starting date. Paddocks will be divided into 20-acre tracts using white polychord. Cattle numbers will be reduced back to 88 pairs as utilized in 1987. Grazing should end by August 1 to allow adequate wildlife cover. The grazing period may be extended in the future when the plant community and water and mineral cycle are in a more healthy state.

UNIT G-14

When the drought of 1988 stopped grass production on a portion of G-11 replanning was initiated. The cooperators, Robert Rahjes, was prepared to remove all cattle from the refuge. G-14 was planned for grazing but had no bidders in 1988. The Rahjes cattle were moved to G-14 from G-11. Cattle grazed 40-acre paddocks for five days each. The 108 pair removed .5 AUM forage per acre. Outside grazing dates were July 18-August 15.

The cell had never been grazed before and had not been hayed since 1984. Brome grass is invading hillsides, cheat mats are developing, and slow deterioration of the uplands is evident. To reverse this trend the unit should be grazed in 1989 with enough animal impact to break up cheat mats, tromp decadent vegetation onto the surface and stop the cool season invasion. The cell should be split into 20-acre paddocks to achieve the desired density for soil compaction and trampling. Cattle numbers will be such that no more than three days are allowed in any paddock to prevent grazing of regrowth before complete recovery is made. Grazing should not extend past July 15 to allow for adequate fall regrowth or decrease the amount of forage removed after this date. The .5 AUM of forage removed during 1988 left adequate cover during extreme dry conditions. This cell and G-7 that was grazed later in the fall give a good picture of late grazing and the amount of forage that should be left with this type of graze.

Paddocks 11 and 12 in G-14 had been burned by a wildfire in the northeast corner during a March prescribed burn on adjacent land. When cattle were in the adjacent paddocks to the burned area, it was nearly impossible to keep the cattle from the burns. Although growth was inadequate the cattle gleaned the burned area. The electric fence was not hot enough with one wire to turn the cattle during extreme dry conditions. The single strand did not turn cattle next to a clover seeded farm field on the east side either.

During 1989, a two-wire exterior fence should be used to provide adequate grounding during dry periods. Any fence jumpers should be removed from the herd to prevent the added lure to others to get out. Permittee indicated that cattle performance was good, but later conception rates were found to be lower than normal.

UNITS G-7 & 8

A fall graze was permitted in G-7 because of the drought of 1988. Refuge personnel were advised to provide drought relief on unutilized land if possible. The public inquiries seeking hay were advised that all planned haying was obligated but this unit was available if grazed. By using animals, winter wildlife cover was maintained.

Unit G-7 was divided into six approximately 23-acre paddocks and grazed with 76 animal units for 5 days each commencing September 7 to October 12. This removed .53 AUM's of forage per acre. This amount of grazing was during extreme drought conditions following several years of rest. Adequate wildlife cover was left on uplands, however, draws were left too short. Marijuana and rag weed were eaten before some side-oats and blue grama were consumed (see picture on page 19). This seems to indicate the need for something green or possibly the preferred high nutritional condition of these plants at this time of year. Cattle performance was good as indicated by the permittee.

During 1989, cells G-7 and G-8 should be combined to make 16 paddocks of approximately 18.5 acres each. Grazing should commence on or about April 28 in G-8. Cattle numbers and timing should be such that less than 25% of plant growth is removed. Timing should not exceed three days per paddock to prevent eating of regrowth before complete recovery is made. Complete uniformity of use from every species of plant is not possible considering the variability in plant phenology. This schedule of use should leave ample wildlife cover and also increase the health of the ecological processes.



Western ragweed consumed during September graze.
9-12-88 CLM



G-11 stock watering facility.
6-10-88 CLM

Areas grazed in 1988

- = G-7
- = G-11
- = G-14
- = G-15
- = G-24

LEGEND

- PARKING AREAS
- REFUGE BOUNDARY
- TOWNSHIP ROADS
- REFUGE ACCESS ROADS
- COUNTY ROADS
- 17284 IRRIGATION POOL

BASE MAP FROM BUREAU OF RECLAMATION
LAND OWNERSHIP PLAT - JAN. 8, 1952

0 1 2 3 4 5 MILES
SCALE

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

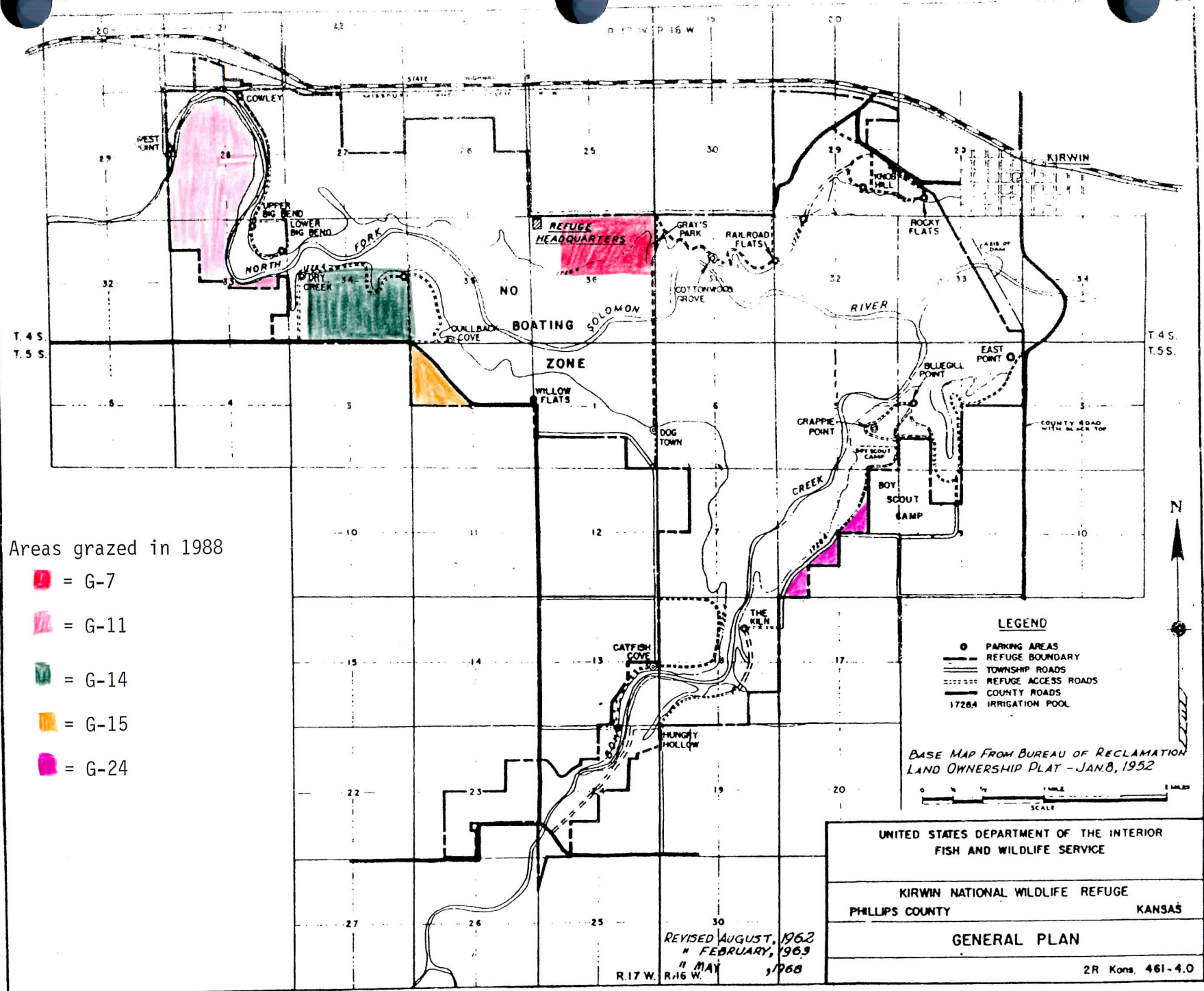
KIRWIN NATIONAL WILDLIFE REFUGE
PHILLIPS COUNTY KANSAS

GENERAL PLAN

2R Kans. 461-4.0

REVISED AUGUST, 1962
" FEBRUARY, 1963
" MAY, 1968

R. 17 W. R. 16 W.



G-7

Well house



GRAZING UNIT G-7

Paddock borders are electric

Water piped from well house to center tank

140 acres

G-11

P 13, 14

Refuge
Rahges

440 AC.
220 AC.

N
↑

GRAZING UNIT G-11

Legend

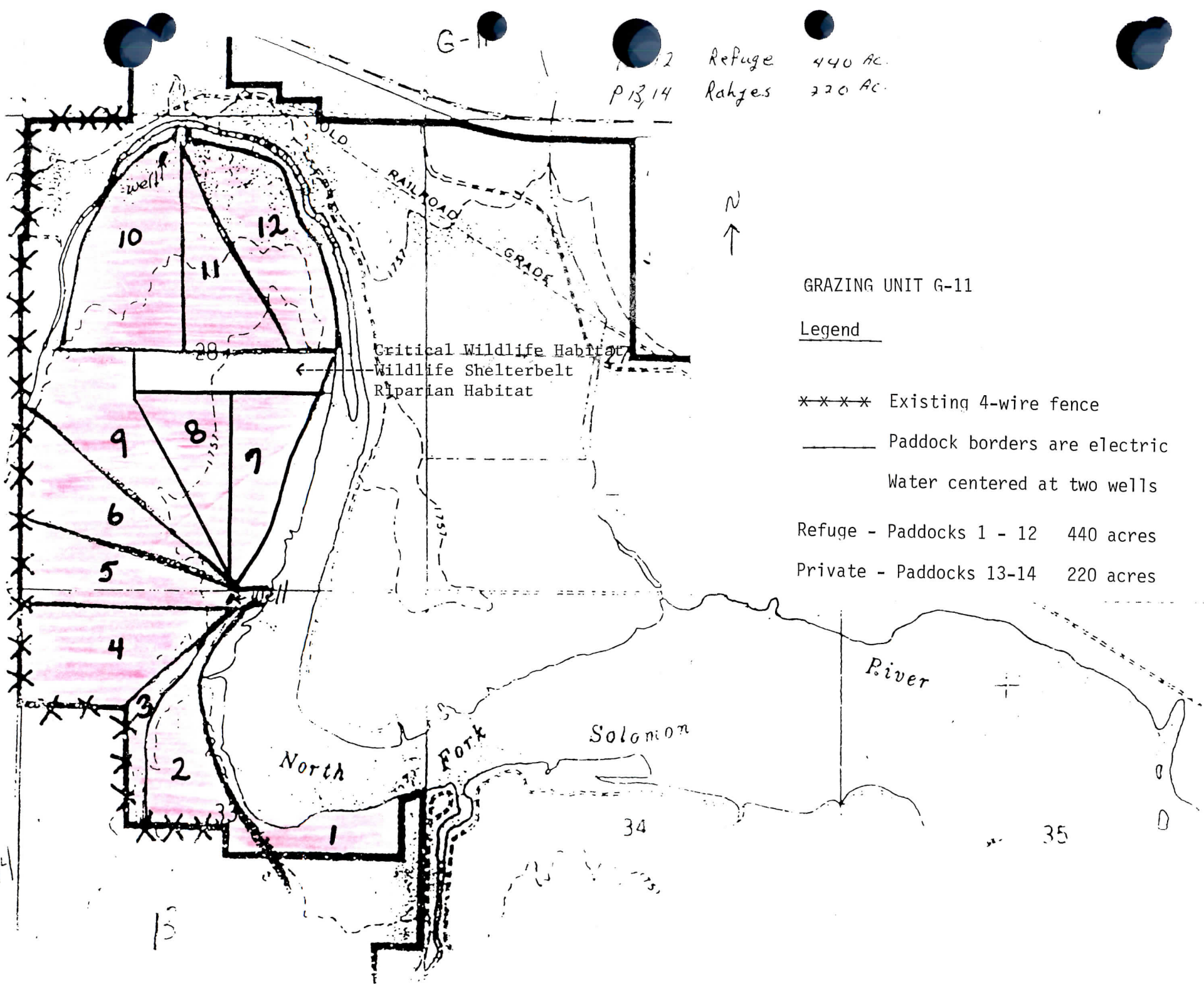
***** Existing 4-wire fence

—— Paddock borders are electric

Water centered at two wells

Refuge - Paddocks 1 - 12 440 acres

Private - Paddocks 13-14 220 acres



G-14

North



Guilback Cove

GRAZING UNIT G-14

Paddock borders - electric fence

Well with two stock tanks in center for water

320 acres

In 1988 only the fences with hatches
were in place 1 1 1 1 1 1

Actual 108 pairs

P344 July 18-22

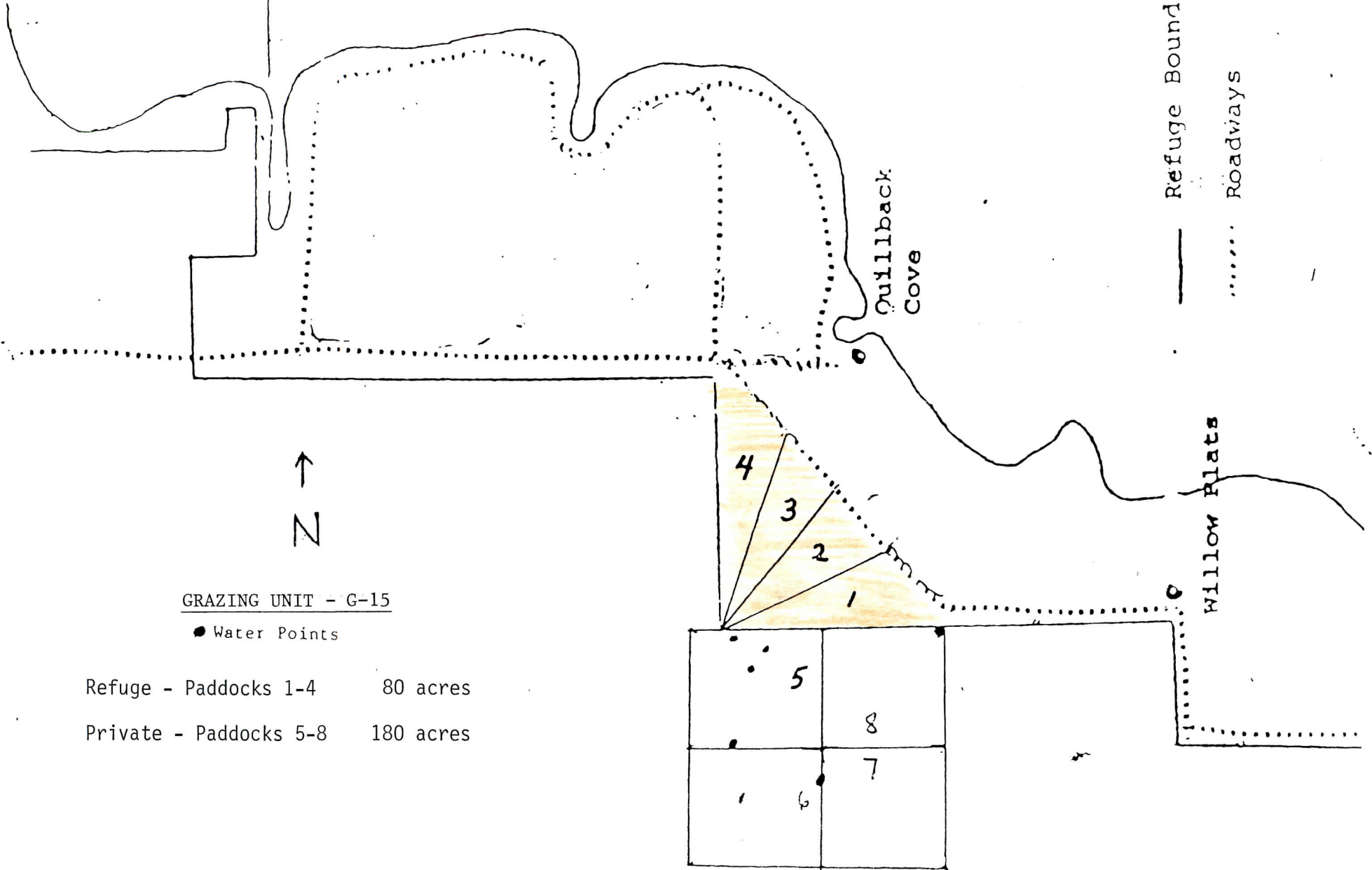
P586 July 23-27

P748 July 28-Aug 2

P9410 Aug. 3 - Aug 7

P344, 15, 6 Aug 8 - Aug 15

N

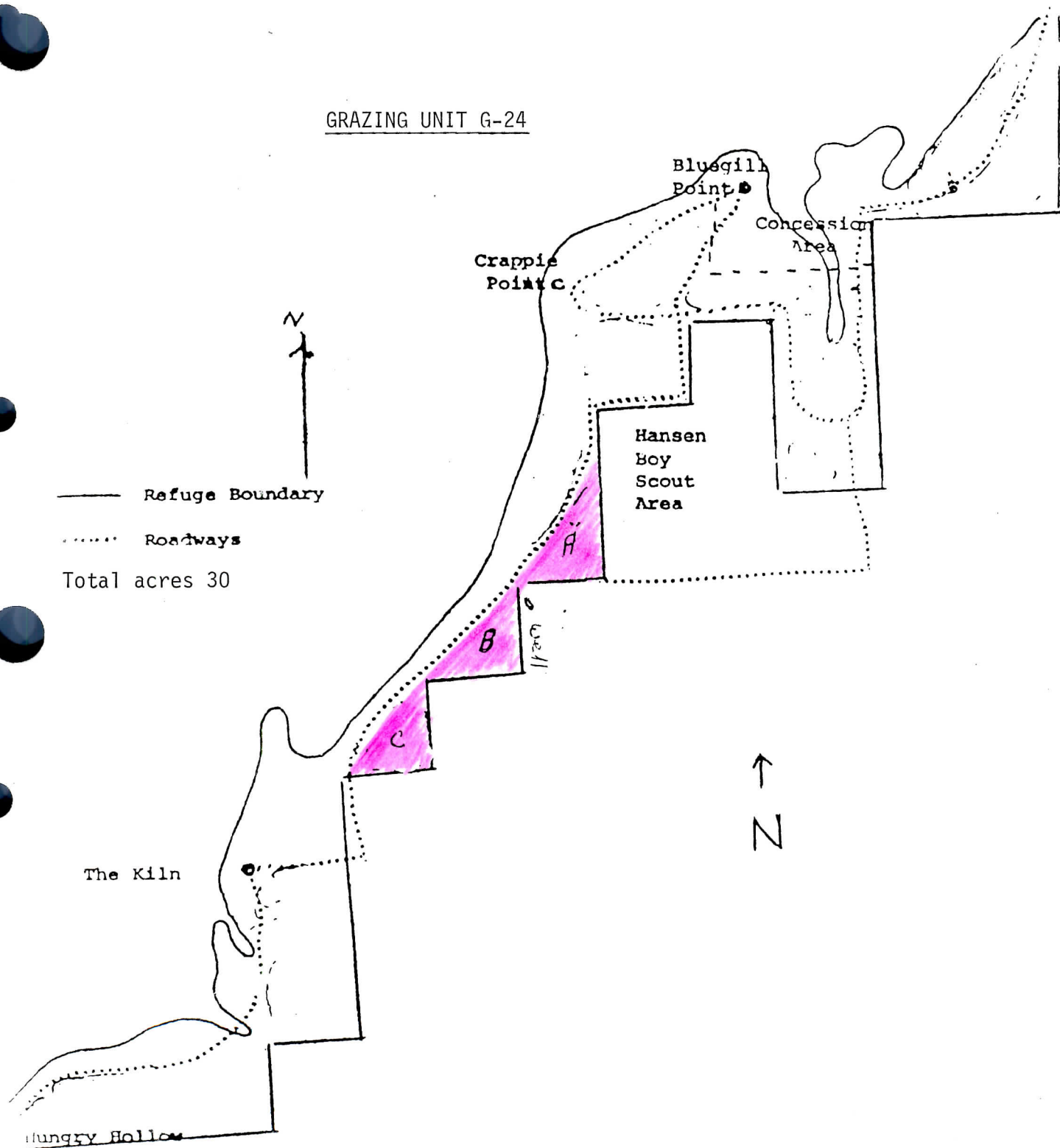


GRAZING UNIT - G-15

● Water Points

Refuge - Paddocks 1-4 80 acres

Private - Paddocks 5-8 180 acres

GRAZING UNIT G-24

UNIT G-15

The 80 acres in G-15 was combined with 180 acres on the William Stowell property. The refuge 80 acres was divided into four 20-acre paddocks and the Stowell property into four 45 acre paddocks for a total of eight paddocks in the 260 acre cell. All water is on the Stowell property at five different locations. The refuge 80 acres had been rested for several years while the Stowell property had been lightly stocked summer long for several years. The refuge rangeland was gradually deteriorating from over rest as indicated by the brome invasion up draws and hillsides, disappearance of native warm season grasses, and invasion of musk thistle in the extreme southwest corner. The Stowell rangeland suffered from overrest and overgrazing evident by the patchy plant distribution (from spotted utilization) and increase of early successional grass species such as dropseed. Late summer continual grazing tended to favor cool season grasses also.

Grazing began on the refuge in paddock one on April 23, 1988, grazing counter clockwise as the paddocks are numbered. Grazing continued through August 28 on the refuge and ended October 1 on the Stowell property. Initially 56 animal units were to be utilized, however, we started with 43 AU's and remained with this number throughout the dry summer. Moves were made using plant growth recovery as a guide. Rest varied from 37 to 49 days. The intense heat and dry weather caused cool season grasses to remain dormant throughout the summer. This put more pressure on warm season species. The compliment is about 50/50 cool season versus warm season on the refuge 80 acres.

During late summer a distinct color line developed at the refuge fence line. The refuge grass appeared to maintain a dark color late in the fall while the Stowell grass turned brown much earlier. This may indicate the health of the root system and thus the ability to produce during a drought.

With this number of animal units the Stowell rangeland was not utilized evenly. The more lush tall grasses, mainly big bluestem, was kept short while the buffalo and grammas were left untouched in some areas. The refuge was utilized more evenly but was left with insufficient wildlife cover. Cattle also remained on the Stowell grass late in the fall when they were needing to build root reserve.

The grazing should continue in 1989 with grazing commencing about April 23 and start in Paddock 8 and graze in reverse to 1988. The Stowell property should be divided into eight 22.5 acre paddocks to give more even utilization. The mineral feeder should again be utilized and moved onto areas needing high animal impact.

UNITS G-24 & 25

Paddocks A & B in Grazing Unit 24 & 25 were grazed twice in 1988. Paddock B was grazed May 3-6 and May 26-31. Paddock A was grazed May 7-10 and June 1-4. Paddock C was grazed once June 7-13. Thirty-nine and one-half animal units were used to graze.

Cheat mats that were broken up in 1987, continued through early succession with clover and ragweed dominating in 1988. Regrowth and wildlife cover was good considering drought conditions. A similar treatment should be accomplished in 1989.

The most glaring factor influencing plant growth learned during 1988 was the amount of foliage removed during each graze. Plants that were grazed to or beyond 50% of current years foliage did not recover in the extreme dry conditions. Plants, that received grazing but had adequate surface area left to continue photosynthesis, grew all season long. This was evidenced by the marked absence of recovery in G-11 after one graze as compared to G-15 that received three successive grazes with subsequent recovery. Moisture and range conditions were similar.

In order to receive outside ideas and comments on the grazing program, the refuge conducted a field tour day on September 20. Eleven people attended, including a local person interested in the refuge, SCS staff and Rainwater Basin WMD staff. Some good comments were received on what happened during the dry year and what changes should be made.

Managers Suthers and Mueller attended other field tour days to get ideas for improvements and to learn from others. FWS areas visited included Rainwater Basin WMD, October 11, Valentine NWR on October 12-13, and Lake Andes NWR on November 9-10. In addition, privately owned and operated ranches were visited near Lakin, KS, on April 16-17 and Cassody, KS, on June 28. These visits continue to be valuable tools in planning refuge grazes.

8. Haying

Two tracts of grass were bid for hay in 1988. Tract I was awarded at \$18.75/Ton and Tract IV & V were bid at \$10.75/Ton. In addition, one historic permittee on the Bureau of Reclamation (BR) land being converted to the Refuge was non-competitively allowed to hay the land for the average of the above tracts (\$14.75/Ton) with the refuge conditions (1/2 taken in strips). Next year, when the land exchange is complete, the tract will be competitively bid. Harvest on the areas were Tract I - 76.03 Ton; Tract IV & V - 117.7 Ton; BR - 47.4 Ton.

9. Fire Management

One wildfire occurred on Kirwin in 1988. A planned burn got out of prescription and burned an additional 99 acres, all on refuge.

Six grassland tracts were prescribed burned between April 6 and 27 for a total of 161 acres. The map on page 29 documents the burn areas.

The following table summarizes acres involved in prescribed fires in recent year:

<u>Year</u>	<u>Acres Burned</u>
1988	161
1987	200
1986	846
1985	1,095
1984	0

After burning, one unit sprouted giant puff balls in a circular arrangement. This occurrence has never been documented before.



Giant puff balls on prescribed burn.
5-10-88 CLM

The primary objective of the burn program is to maintain a healthy grassland community and associated wildlife species. Burning the second week of April seems to be the best time to influence plant succession. Burned areas have been very successful in increasing wildlife cover. An additional goal to set back the invasion of brome grass in upland natives, also was

accomplished. Low subsoil moisture and lack of rain following the burns combined for very little growth in 1988. In the future, care will be taken to monitor subsoil moisture before burning.

Manager Mueller attended the S-390 course, Intermediate Fire Behavior in Valentine, Nebraska in July.

A 1,550 gallon water tank was purchased in November to provide a mobile source of water for fire suppression. (Section I.8)

10. Pest Control

The following table summarizes pesticide use on Kirwin NWR during 1987:

<u>Site</u>	<u>Target Pest</u>	<u>Chemical</u>	<u>Acres</u>	<u>Active Ingredients</u>
Cropland	Broadleaf weeds	2,4-D ester	78.50	45.24#
Cropland	Broadleaf weeds/ foxtail	2,4-D and glyphosate	107.42	74.27#
TOTAL			185.92	119.51#

The implementation of the new 6-year farm program resulted in a decreased pesticide use of 88% since 1986 by cooperative farmers as measured by pounds of active ingredient. The new program no longer allows spraying for alfalfa weevil. Parasitic insects were released to biologically control these pests (Section F.4). Early spring burns in alfalfa fields were also tried with poor success due primarily to timing chosen by the cooperator.

Nolo bait was used to combat grasshoppers that thrived in the warm open winter (Section F.4).

Musk thistle is well established on the refuge and on the railroad just north of the refuge boundary. The refuge spent many man-hours hand digging and mowing these plants. Spraying pesticides has limited success so the refuge control has evolved to a more labor-intensive control technique. Last fall musk thistle heads infested with weevil larvae (Rhinocyllus conicus) were collected 11 miles northwest of Kensington, KS, and distributed in the heavier infested areas of the refuge. They invaded the refuge's musk thistle in the spring with the first ever reported weevils found in a large percentage of blooms on the south side of the lake. Blooms with weevil were given to two cooperative farmers who knocked down viable plants and placed the blooms on the plants. Despite expert opinions that this would not work, weevils were later found in live heads.



Weevil larvae munching ovary of musk thistle.
5-31-88 CLM

Webworms continue to spread on the refuge brush (plum and honeysuckle thickets) and defoliate and even kill plants annually. A late effort to find a non-chemical control led us to blending worms with water into a liquid to spray other infected areas. Worm collection must be done early in the morning before they leave the web to feed. This approach has potential since individually burning each web when worms are present is time consuming. Next year the experiment will be initiated earlier so results can be interpreted more completely.

12. Wilderness and Special Areas

In 1969, a 120-acre tract was established as the Solomon River Grassland Natural Area. This re-planted bluestem-grama grassland is suffering from overrest and invading cool season grasses. To maintain this grassland natural area it was grazed in 1988 as Unit G-11 (See Section F.7).

G. WILDLIFE

1. Wildlife Diversity

The refuge's new approach to grassland management is designed to increase wildlife diversity. By creating a healthier and more diverse grassland the associated insects, birds and mammals will also become more diverse.

Kirwin increased its diversity this year when a wandering 1 1/2 year old bull moose arrived on the area during February and stayed until early fall. The animal appeared to be in good condition despite the hot, dry Kansas summer. After leaving the refuge for a walk to Texas, his condition had worsened and he was then transplanted to Colorado in February, 1989.



Kansas's wandering moose.
2-24-88 CLM



One of 38 bald eagles sighted during 1988.
3-8-88 CLM

2. Endangered and/or Threatened Species

Bald eagles accompany the Canada geese on their southward migration. The geese, particularly cripples, appear to be the eagle's primary food. The first bald eagle was sighted on the refuge on October 5, with the highest count for the year of 38 occurring on December 20, 1988. In addition 10 golden eagles were seen on the refuge that day.

A dead immature bald eagle was found near the equipment storage yard on December 18. The emacipated appearance and light green bile stains on the feathers indicate lead poisoning. The bird was sent to the National Wildlife Health Lab in Madison, WI, for final diagnosis. Although annual mortality is low lead poisoning has been the primary non-hunting mortality on waterfowl at Kirwin for many years. The refuge has enforced non-toxic shot regulations on Federal lands for three years. The rest of Kansas is not scheduled to change until 1991.

3. Waterfowl

Kirwin's primary function is to serve as a migration refuge for waterfowl, with an emphasis on the white-fronted goose. When the reservoir was filling the white-fronts were the most abundant goose. In recent years the refuge has attracted many more Canada geese than white-fronts. Snow geese are usually present during migrations in small numbers. Ducks are always present with a large number of species and low number of individuals. Mallards are by far the most abundant duck visiting the refuge.

The spring peaks of geese are as follows: Canada geese - 30,000 taken in early February (ten year average - 32,708); White-fronted geese - 100 in early February. This is the lowest peak ever recorded (ten year average - 2,351, with a downward trend present except for 1987); Snow geese - 200 in late February (ten year average - 249).

Fall peaks were as follows: Canada geese - 30,000 in mid-December (ten year average - 28,178); White-fronted geese - 50 in early November (ten year average - 3,978); Snow geese - 50 in late December (ten year average - 1,121).

A peak count of all species of ducks during the spring migration was 18,630 in late March. The ten-year average is 23,419. The fall migration peak was 13,420 in mid-December. The ten-year average is 25,590.

Overall spring peaks were average but occurred at an earlier date for geese and a later date for ducks. Fall peaks were near average with no large buildups until December. The drop in snow and white-fronted populations is not considered significant this year but the steady drop in recent years is serious.

Goose nesting occurs in very limited amounts on the refuge. Low water in recent years has caused a steady decline in goose nesting habitat.

Duck nesting consisted of mallards, wood ducks, and blue-winged teal. Production estimates totaled 20 mallards, 15 wood ducks, and 15 teal. This is average for Kirwin.

The refuge share of standing crops is mowed after the hunting season. By mowing after the hunting season no baiting occurs. This practice also gives the birds a readily available grain meal during spring migration.

The twelve structures discussed in section E.4 were built at a cost of \$112.75/each. The tubs alone cost \$50. The refuge adapted a design that Red Rock Lakes NWR use for trumpeter swans. The frame consists of 4" PVC pipe in a 5' square with a cross piece. The tub is clamped to the cross piece. Concrete in buckets are used for a double anchor. Water skiing poly-rope with a swivel secures the structures to the anchors. The twelve structures plus three built by the refuge were placed in 1988 to familiarize the birds with the structures even though it was too late for nesting. A few were used for loafing sights during the summer.

The refuge received 20 young Canada geese from the Kansas propagation program. These birds were released on the reservoir in conjunction with the new floating nesting structures in an effort to build the resident population. Additional birds will be released next year.

4. Marsh and Water Birds

Double-crested cormorants and great blue herons are the only marsh birds known to nest on Kirwin.

Lack of suitable habitat keeps shorebird use to a minimum. Ring-billed and Franklin's gulls are the most common. Other species present include killdeer, common tern and avocet. As the lake receded, brush has been mowed to maintain a clear shoreline in selected areas.

6. Raptors

Red-tailed hawk, marsh hawk and turkey vulture are common during warmer months. Great horned owls are present year around. Winter species include bald eagle (Section G.2), golden eagle and rough-legged hawks.

8. Game Mammals

White-tailed deer are common on the refuge with a late fall population estimate of 500 animals. Winter severity directly influences overwintering herd size. Habitat conditions are excellent with the majority of animals using the brush bottomlands and coop farm fields. Nutritional levels are high as evidenced by the large antler and body size of the deer.

Mule deer are present south and west of the refuge but are a rare visitor to Kirwin. No more than a dozen animals are present on the refuge at a given time.

Cottontail rabbit, jack rabbit, and fox squirrel are all residents of Kirwin.

10. Other Resident Wildlife

Results of this year's pheasant crow counts show the population to be close to the 1985 level but down 28% from 1986 when the last count was done. This decline can probably be attributed to the winter of 1986-87. The encouraging news is the great number of broods seen this spring. On the evening of June 23, seven broods and two additional hens were seen on 4 miles of refuge road. Lack of birds later in the year may indicate some young birds perished during the hot, dry weather in late June.

Quail continue to be present in small numbers. Four coveys have been identified on the refuge.

Greater prairie chicken populations are increasing. The birds are common on the private land south of the refuge.

The Rio Grande turkey population grew this year to about 225 birds. Many chicks were observed throughout the spring and summer.

Coyotes are common on Kirwin with fall population estimates of 30 animals.

No bobcats were observed on the refuge this year, but they are fairly common in the area.

A 50-acre black-tailed prairie dog colony makes its home on the refuge. The colony continues to spread and contains approximately 1,500 animals. An area adjacent to the new interpretive sign was mowed to encourage expansion in that direction. The dogs obliged with new holes now adjacent to the sign.

11. Fisheries Resource

Fisheries management on Kirwin Reservoir is the responsibility of Kansas Department of Wildlife & Parks. The sport fishing is maintained by a total fisheries management program. Wide water fluctuations has eliminated natural reproduction of several species and greatly reduced survival of fry into their second season.

There were 13,875,000 walleye eggs taken from the refuge in 1988. The State stocked 5.7 million walleye fry on April 19 and 210,000 wipers on May 3.

Assistant Manager Mueller assisted with the fall netting survey on October 14. From the age class data collected, it appears Kirwin is an up and coming fishery for walleye and white bass. The walleye have been stocked and the 1987 age class of bass survived well due to favorable water levels.

14. Scientific Collection

In February, two geese were sent to the Illinois Natural History survey. The survey is hoping to obtain more information on race distributions. The geese were evidence in law enforcement cases that have been closed.

In March, a northern shrike was donated to Fort Hays State University Museum. The bird was turned over to the refuge staff after it was found dead in a private yard in Kensington, KS.

An immature bald eagle found dead on the refuge in December was sent to the National Wildlife Health Lab. (See Section G.2)

H. PUBLIC USE

1. General

Refuge visitation reached an 8-year high this year with 87,292 visits (232,137 activity hours). This represents a steady climb from 61,832 in 1985 to 79,882 in 1986 and 85,464 in 1987. This rise is despite a drop in northwest Kansas population. The rise may be due partially to rising reservoir levels until this year.

A new public use brochure was published in 1987. It serves as the refuge hunting regulations as well as the general visitor's map and guide. A total of 2,500 were distributed in a 12-month period. A few modifications were made and a reprinting requested. The updated brochures were received February 1989.

A wheel chair ramp was built for office access and outhouse door modifications initiated.

A clear literature rack was installed in the office.

Seven of the access points to the north shore were closed in 1987 and seeded to grass this spring. Other roads were improved so that the roads would not cause an erosion problem on the old lake shore bank. In addition two roads were developed that lead along the current lake shore so that all areas are still accessible.

Manager Mueller and Maintenance Worker Milazzo staffed the federal wildlife refuges in Kansas display at the Kansas State Fair on September 15 and 16. There were 1,486 contacts made on the first day and 1,629 on the second. This is more than double the contacts from 1987. The total visitation for the fair was 12,653. The new site with the Kansas Wildlife and Parks simplifies the contacts and was a preferred location.

The Boy Scouts of America maintain Special Use Permit KIR-220 for use of 28 acres of the refuge as a waterfront for Camp Hansen. On August 22, Manager Suthers noticed that the parcel had been hayed. The permit does not authorize this activity. Upon inquiry the local Camp Ranger stated it had been handled this way for 20 years. The land was never bid, the same person received the haying annually, and the Boy Scouts of America received the payment. A call to the executive council headquarters in Salina resolved the issue. The council will abide by the Special Use Permit and the refuge will manage the land.

Manager Mueller collected plants for the refuge herbarium that was donated in 1987 as a memorial fund. In conjunction with the collecting, she attended a course at Fort Hays State University entitled "Field Study of Prairie Plants."

4. Interpretive Foot Trails

The Woodland Nature Trail consists of a half mile loop through a shelterbelt. The new system installed in 1987 replaces the trail guide brochures and numbered stakes with individual interpretive signs. Many positive comments were received during 1988. A metal strip was installed on the edges of all signs to protect the wood from gnawing rodents.

5. Interpretive Tour Routes

Ten interpretive displays were designed for the North Shore Tour Route. They are currently in the review process.

7. Other Interpretive Programs

Manager Mueller was the Fish & Wildlife Management merit badge counselor for Phillipsburg and Agra Boy Scouts during campouts on

the refuge January 30 and February 27. Their service projects consisted of litter pickups March 28 and September 24, and construction of two wood duck boxes.

The Long Island Lions Club was given a 45-minute program on the bald eagle at their February 10 meeting. Eleven members attended the program conducted by Manager Mueller.

Manager Mueller attended a two-day workshop on Project Wild. The workshop was sponsored by the Fish and Wildlife Service primarily for teachers.

National Wildlife Week was celebrated in the Phillipsburg Grade School by programs that Manager Mueller presented on March 24. Sixty second graders learned about Kansas wildlife and endangered species. Sixty third graders learned about National Wildlife Refuges and Kirwin in particular. Each program lasted 1 1/2 hours.

Manager Suthers presented a refuge overview and update to the Phillipsburg Chamber of Commerce on April 11. It is hoped that this will open communication channels and dispel local rumors of the refuge changing ownership.

Manager Mueller presented a 3 1/2 hour program to 13 Cadette Girl Scouts at the refuge on April 24. A variety of Project Wild activities were completed.

On April 28, 60 members of the Phillipsburg second grade class and 10 chaperons took a field trip to the refuge. Manager Mueller led the youth as they visited the Nature Trail, followed a "Habi-track trail", constructed collages from items brought from home, observed waterfowl with binoculars/spotting scopes and played "Oh Deer" and "The Thicket Game" (see page 39 for photo).

Manager Mueller gave a presentation on "Woman's Work" to the Business & Professional Women's Club of Phillipsburg on May 3.

Manager Mueller presented an hour long talk to 22 members of the Women of Zion Lutheran Church on June 1. The topic was on bird watching and refuge opportunities.

On June 8, Assistant Manger Mueller gave an hour long program on eagles and refuge opportunities to 29 members of the Presbyterian Church at their annual dinner meeting.



Second graders break for lunch on the Nature Trail.
4-22-88 CLM

Two hour-long programs were presented to the Girl Scouts at Hansen Scout Camp on June 16, by Manager Mueller. A total of 28 girls participated in the Project Wild activity called "Deadly Links", dealing with pesticides and how they travel up the food chain. This activity as well as the ice breaker "What Am I" were well received.

On July 5, the film Wood Duck World was shown to the Phillipsburg Boy Scouts who made wood duck boxes for the refuge. Manager Mueller then explained wood duck biology and answered questions.

An hour long presentation on refuges was given July 8, 15, and 22, at the Boy Scout Camp as scouts worked on their Forestry and Fish and Wildlife Management merit badges with Manager Mueller.

A 2-hour refuge tour was given to members of the Phillipsburg 4-H Club on July 19 by Manager Mueller.

September 19, Manager Mueller assisted seven Agra Boy Scouts in completing their merit badge "Citizenship in the Nation".

September 30, Manager Mueller gave a tour for eight fifth and sixth grade students and instructor from the Gaylord, KS, school to learn about wildlife and the recreational opportunities available on the refuge.

Manager Mueller represented the refuge at the Phillipsburg High School Career Day on November 3. The hosting school invited two other nearby schools to participate. A total of 32 students visited the table during three 40 minute sessions.

Manager Mueller spoke to the Phillipsburg Vocational Agriculture I and II classes on November 9. A total of 18 students were introduced to the wildlife science career field.

Manager Mueller presented a program on firearms safety for the Borderline Rod & Gun Club Christmas Party on December 5. The hour long program was attended by 45 people.

8. Hunting

Legal species on Kirwin include waterfowl, doves, pheasant, quail, turkey, prairie chicken, snipe, coots, cottontail rabbits, fox squirrels, and archery deer hunting.

Waterfowl hunting was poor this fall as mild weather kept the birds north. Goose hunting picked up in late-December. The Bow Creek Arm of the reservoir provides the only "over water" hunting. This is where what little duck hunting that occurs on the refuge takes place. This was the third season that all federal lands in Phillips County were steel shot for waterfowl hunting. Many hunters are still complaining that steel will not kill. The number of lead shot cases made indicate the continued unrest.

An answering machine with the current waterfowl count was run after hours to answer hunters most frequently asked questions. Up to 20 calls per day are answered during the peak of hunting season.

Two complaint letters on goose hunting were received in January. Every hunter seems to have their own solution for increasing goose kills. Their comments will be taken into consideration. Letters were written to them thanking them for their input and providing them information on our program. We will be looking into changing the hunting program in 1989, to improve the quality of hunting.

The spring and fall turkey hunts draw very little interest from local hunters despite large numbers of birds on the refuge.

Firearms deer hunting is not allowed on the refuge. The state continues to omit this from the deer hunting regulations and every year deer are reportedly taken off the refuge. On opening day, the last three years, violations of this regulation have been made. A widespread distribution of a news release may have helped this year since no violations were found.

Kirwin provides a white-tailed archery hunting area which supports some trophy animals. Groups of hunters from around the state came to hunt Kirwin this fall after a record holding buck was taken in 1987.

There is some upland bird hunting that occurs on the refuge. The mild fall left birds scattered and hunting pressure was light.

9. Fishing

Walleye, crappie, wiper and catfish draw crowds to the shores during the summer.

The Phillipsburg Area Chamber of Commerce hosted a fishing derby at Kirwin Reservoir on May 7. The weather was bad and participation low for this first ever event.



A happy angler with a 50+ pound flathead catfish.
6-17-88 CLM

The refuge was approached for a permit to operate a fishing supply concession on the refuge. The request was denied due to the competition it would have created with existing private businesses.

11. Wildlife Observation

A significant portion of Kirwin's public use consists of wildlife observation. Most visitors are local residents who realize the opportunity and make repeat visits throughout the year. The fall waterfowl migrations draw people from quite a distance to observe Canada geese. The high eagle concentration this year offered renewed enthusiasm for a trip to Kirwin.

12. Other Wildlife-Oriented Recreation

Wildlife photography opportunities at Kirwin are excellent. A Special Use Permit was given to two avid photographers. One of them later donated 52 prints to the refuge.

13. Camping

Camping is one of Kirwin's most popular recreational activities. Camping peaks with the fishing season from April-June. Holiday weekends often bring overcrowding situations but with the heat of 1988 many people stayed away.

14. Picnicking

Picnicking is often associated with fishing excursions. Local groups hold get-togethers at Kirwin. The Boy Scouts use the refuge for outpost cookouts throughout the summer.

All picnic shelters were repaired, primed and painted in 1988. Two picnic tables were removed due to poor condition.

15. Off-Road Vehicling

Vehicle trespass occurs throughout the year. Kirwin has many county roads that provide access to the refuge. The local custom is to ride instead of walk. Signs are posted across a trail whenever one is started. The signs are removed when the vegetation regrows and the temptation to follow the trail is gone. Violators of the regulation are hard to catch but two violations of off road travel and another for travel on a closed road was issued this year.

16. Other Non-Wildlife Oriented Recreation

Boating, water-skiing, swimming and horseback riding occur in limited amounts on Kirwin.

17. Law Enforcement

The following is a summary of cases made during the year by Federal personnel.

<u>Number of Cases</u>	<u>Violation</u>	<u>Fine</u>
3	Hunting migratory birds with toxic shot in possession.	\$50/each
1	Attempt to take over the limit of geese	\$50
1	Taking Canada geese without Kansas State Waterfowl stamp, signed/affixed	\$50
1	Taking Canada geese without Waterfowl stamp	\$50
2	Driving on a closed road.	\$25/each
1	Driving vehicle off road	\$25
1	Hunting with unplugged shotgun	Pending
2	Retrieve goose in closed area	\$50/each
1	Failure to kill goose when wounded	\$35

Numerous cases of vandalism were observed in 1988. Nearly every weekend at least one refuge sign would be knocked down. A number of signs were removed and used for firewood.

Building of permanent tree stands continues to be a problem. This year four stands were removed by refuge personnel.

The wording the public use brochure was changed to make use of spikes or other permanent climbing devices strictly prohibited.

Night sights were installed on all refuge officers revolvers.

Adjusted work schedules permitted one officer to be on duty on weekends throughout the hunting season. Kansas Wildlife and Parks personnel also targeted much of their effort towards Kirwin Reservoir. This is evident from the chart below showing the summary of cases made by State personnel on Kirwin during 1988. Phillips County had a change of State Game Protectors in November/December when Bill Ramshaw left and Larry Stones arrived.

Cases made by State personnel in 1988.

<u>Number of Cases</u>	<u>Violation</u>
4	Fish without a valid license.
11	Insufficient or unserviceable life saving device.
2	No boat registration.
6	No boat registration card on board vessel.
5	No sound producing device on boat.
1	No boat registration numbers displayed.
2	Water ski without a rear view mirror or observer.
5	Boat fire extinguisher not in working order(warnings).
7	Color Code Decals not displayed on boat (warnings).
1	Failure to tag set lines.
2	Hunt without a valid license.
7	Failure to produce hunter safety card.
1	No state waterfowl stamp.
1	Possess lead shot in steel shot zone.
2	Un-plugged shotgun.
1	Operate vehicle in restricted area of refuge.

I. EQUIPMENT & MAINTENANCE

1. New Construction

A requisition for a 40'x80'x14' metal open front equipment storage shed was submitted in January after \$35,000 was allocated. The low bid came in at \$46,911 from Nelson Brothers Construction, Norton, Kansas. Additional money was found from

projects other refuges did not complete. Construction commenced October 24, and finished November 23. The finished facility will be used to store equipment that is currently being left outside year around.



New equipment storage shed.
12-88 CLM

A new Bend Pak hoist costing \$4,282 was installed in the mechanic shop (See page 45 for photo). This involved tearing out the ceiling in one bay of the shop and reconstructing a higher ceiling. The directions that came with the hoist were limited. The pads vehicles rest on had to be constructed for each different make of refuge vehicle. Maintenance Worker Milazzo received a Special Achievement Award for all of his efforts.

A low water crossing was installed on the Solomon River one mile west of headquarters during November. A 2" size crushed rock was laid in the river channel and a path mowed along the public hunting and archery deer hunting zone. This short cut saves 10-15 minutes compared to using the existing bridge which is west of the refuge.

2. Rehabilitation

Exterior refuge fence was repaired or removed as appropriate.

A new metal door and entrance foyer was installed in the mechanic shop. The entire shop was repainted.

A local electrician rewired the shop to accommodate the hoist and bring the wiring to code. New outlets were added. The cost was

\$1,469. In addition maintenance workers installed hanging fluorescent lights.



View of raised ceiling to accommodate new hoist.
3-29-88
CLM

4. Equipment Utilization and Replacement

A new Chevrolet, 4 x 4, 8 cylinder, diesel pickup was received.

A 15' Woods rotary mower was purchased and hydraulic line adaptions made.

A Miller Roughneck Welder was purchased.

The refuge received a 1969 Allis Chalmers articulating loader with a 2 1/2 cubic yard multi-segment bucket from excess at Toole Army Depot. It was put to use almost immediately and proved to be in good shape with the exception of tires. The old Clark loader with a 3/4 cubic yard bucket was placed on excess.

5. Communications Systems

A radio received from the Special Agent in Hays and converta-coms received from excess property were installed. Currently the two newer pickups have refuge and state band radios. All pickups, dump trucks and road grader have either a refuge radio or a converta-com. The state radios are critical for communication during hunting weekends when up to four Kansas officers may be working in the county.

6. Computer Systems

Refuge Assistant Hagman and Manger Mueller attended the Word Perfect 5.0 update training in Denver from December 12-14. The training was well done.

Kirwin began using Word Perfect on a daily basis in 1988. Many more uses for dBase, Qdos and Lotus were also found. Electronic mail is checked regularly using PolyCom. The comfort level for all computer use rose in 1988.

7. Energy Conservation

The following table compares 1988 energy consumption with 1987:

<u>Energy Conservation Table</u>					
	<u>Gas</u>	<u>Diesel</u>	<u>Electricity</u>	<u>Propane</u>	<u>Mileage</u>
<u>1987 Use</u>	2,618	2,020	12,340	2,780	30,074
<u>1988 Use</u>	1,771	3,082	10,460	2,760	31,647
<u>Increase/Decrease</u>	-847	+215	-1,665	- 20	+1,573
<u>% Increase/Decrease</u>	- 32	+ 10	- 13		+ 5

The increase in diesel use can be attributed to two diesel pickups added to the fleet in the last 1 1/2 years. The additional mileage is a result of being fully staffed throughout the year and having more meetings to attend.

8. Other

A 1,550 gallon water tank was purchased in November. The tank fits into the back of a dump truck. It will be used for a mobile water source for fire suppression and watering transplanted trees.

J. OTHER ITEMS

1. Cooperative Programs

Kirwin has three cooperative agreements that affects the refuge. These agreements are:

1. A Cooperative agreement between the Bureau of Reclamation and the Fish and Wildlife Service was approved on June 17, 1954. This is the basic agreement which allows the refuge as an overlay on the reservoir for the management of habitat and wildlife resources. As of a 1987 amendment the refuge has primary jurisdiction.

2. A Cooperative agreement between the Fish and Wildlife Service and the Kansas Department of Wildlife and Parks for the management of public hunting and public fishing on the Kirwin National Wildlife Refuge was approved on June 28, 1954. This agreement stipulates the U.S Fish and Wildlife Service will manage the land for wildlife benefits and that areas will be opened for hunting and fishing when conditions permit. It also gives the State the responsibility for management of the fisheries resources.

3. A Cooperative agreement exists between the U.S. Fish and Wildlife Service and the Kansas Department of Wildlife and Parks to improve upland habitat. This agreement requires the Service to maintain food plots totalling approximately 50 acres in the grasslands open to hunting. In return the Department will establish and maintain woody habitat plantings for wildlife utilization in these same areas.

2. Other Economic Uses

Special Use Permit #343 was issued to a bee keeper. He maintains a total of 112 bee hives at 3 different locations on the refuge. The cost for the permit is \$1.00 per hive.

3. Items of Interest

The state agency that manages Kansas wildlife underwent a metamorphosis on July 1, 1987. The old Kansas Fish and Game Division combined with their park agency to become Kansas Department of Wildlife and Parks. All Federal refuge managers met with the new Assistant Secretary and area chiefs in February to promote a cooperative working atmosphere.

Visitors during the year included Deputy Director Spinks and SAC Grosz on April 29 and Deputy Assistant Regional Director Fries on June 8. All visitors received a general tour and explanation of current programs.

Manager Suthers attended Advanced Refuge Academy in Washington, D.C. from March 13 - April 11.

The Kirwin Refuge Rome disc plow was loaned to Sand Land NWR for cattail control.

A cooperative farmer was loaned the refuge grass drill to plant CRP land.

Manager Mueller assisted Rainwater Basin WMD with biological monitoring on July 12. Mueller taught trainee Hanley the techniques used to evaluate grazing.

Manager Mueller assisted Monte Vista NWR on nest transect counts on May 16-20.

Manager Mueller worked at the Happy Jack Interstate Road Stop between October 2-5. This inter-agency effort included officers from Wyoming, Idaho, Utah, Colorado and federal agents and refuge officers.

Manager Mueller was instructed in the use of the new water quality testing kit on September 28, at the Rainwater Basin WMD office.

Manager Mueller attended Firearms Instructor Training at FLETC, Marana, AZ, between October 17-28. She now serves as a regional certified instructor.

Kirwin staff observed Drug Free America week October 24-28. The tape was viewed by all available staff.

4. Credits

The narrative sections were written by the following employees:

Hagman : I.7

Suthers: F.4, F.7

Mueller: others

All typing done by Hagman