

ARAPAHO NWR

NARRATIVE REPORTS

1970

C.D. Copy

NARRATIVE REPORT
ARAPAHO NATIONAL WILDLIFE REFUGE
JANUARY - DECEMBER 1970



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
WALDEN, COLORADO

COVER PHOTO

We thought that a view of some typical high altitude waterfowl habitat on Arapaho Refuge, with Parkview Mountain (Elevation 12,433 ft.) would be appropriate to adorn our NR cover.

Photo by Heffernan, June 2, 1970.

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Arapaho

MONTHS OF September 1 TO December 31, 19 70

(1) Species	(2) Weeks of reporting period									
	8/30-9/5	9/6-12	9/13-19	9/20-26	9/27-10/3	10/4-10	10/11-17	10/18-24	10/25-31	11/1-7
	1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	50	40	40	35	20	20	20	20	5	5
Black										
Gadwall	40	35	30	25	15	10	10	5		
Baldpate	60	50	50	50	30	25	20	15	5	5
Pintail	50	40	30	25	15	15	10	10	10	10
Green-winged teal	60	75	60	50	40	30	20	10	5	
Blue-winged teal	10	15	15	10	10	5				
Cinnamon teal	15	15	15	10	5	5				
Shoveler	10	10	10	5	5					
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup	20	15	15	15	15	10	10	10		
Goldeneye										
Bufflehead										
Ruddy										
Other C. Merg.			5	5	5					
Total Ducks:	315	295	270	230	160	120	90	70	25	20
Coot:	10	5	5	5	5					

3-1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Arapaho

MONTHS OF September 1 TO December 31, 1970

(1) Species	(2) Weeks of reporting period (5 days)								(3) Estimated	(4) Production	
	11/8-14	11/15-21	11/22-28	11/29-12/5	12/6-12	12/13-19	12/20-26	12/27-31	waterfowl	Broods:Esti	seen : to
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada											
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard	----- Water Areas Frozen -----								1,785		
Black											
Gadwall									1,190		
Baldpate									2,170		
Pintail									1,505		
Green-winged teal									2,450		
Blue-winged teal									455		
Cinnamon teal									455		
Shoveler									280		
Wood											
Redhead											
Ring-necked											
Canvasback											
Scaup									770		
Goldeneye											
Bufflehead											
Ruddy											
Other									105		
Total Ducks									11,165		
Coot:									210		
				(over)							

	(5)	(6)	(7)	SUMMARY
	Total Days Use	Peak Number	Total Production	
Swans	- -	- -	- -	Principal feeding areas <u>Open meadows near water,</u>
Geese	- -	- -	- -	<u>temporary potholes.</u>
Ducks	11,165	315	- -	Principal nesting areas <u>Open meadows in sedges and</u>
Coots	210	10	- -	<u>grasses.</u>
				Reported by <u>V. Carrol Donner</u>
				Observed by <u>David E. Heffernan</u>

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751

Form NR-1A

(Aug. 1952)

MIGRATORY BIRDS

(Other than Waterfowl)

Refuge ArapahoMonths of September 1 to December 31, 19 70 (1)

(1) Species Common Name	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production		(6) Total
	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young Estimated Use
I. <u>Water and Marsh Birds:</u>									
Great blue heron	5	9/1	5	9/1-15	1	9/26			100
Black-crowned night heron	9	9/1	10	9/10-30	2	10/10			350
American bittern	5	9/1	5	9/1-10	1	9/26			85
Virginia rail	10	9/1	10	9/1-30	2	10/10			350
Sora	150	9/1	150	9/1-20	10	10/15			4,250
II. <u>Shorebirds, Gulls and Terns:</u>									
Killdeer	15	9/1	30	9/5-30	3	10/30			1,200
Common snipe	15	9/1	25	9/10-10/10	1	11/5			1,150
Spotted sandpiper	5	9/1	15	9/10-30	2	10/10			500
Willet	1	9/1	5	9/10-10/10	1	10/15			200
American avocet	10	9/1	10	9/1-10/1	2	10/10			350
Wilson's phalarope	25	9/1	60	9/10-30	10	10/10			1,900
(over)									

(1)	(2)	(3)	(4)	(5)	(6)			
III. Doves and Pigeons:								
Mourning dove	60	9/1	150	9/10-30	15	11/15		6,000
White-winged dove								
IV. Predaceous Birds:								
Golden eagle	5	9/1	5	9/1-30	3	12/31		425
Duck hawk	1	10/1	1	10/1-30	1	10/30		30
Horned owl	10	9/1	10	9/1-10/15	6	12/31		1,000
Magpie	200	9/1	200	9/1-11/1	150	12/31		21,500
Raven								
Crow	50	9/1	50	9/1-30	5	12/31		2,500
Turkey vulture	2	9/1	2	9/1-12/31	2	12/31		244
Red-tailed hawk	1	9/26	1	9/26-10/30	1	10/30		35
Swainson's hawk	20	9/1	20	9/1-30	3	12/31		1,050
Rough-legged hawk	1	10/28	1	10/28-11/6	1	11/6		10
Ferruginous hawk	1	9/16	1	9/16-30	1	9/30		15
Marsh hawk	7	9/1	10	9/5-10/5	2	12/31		600
Osprey	1	9/25	1	9/25-27	1	9/27		3
Prairie falcon	5	9/1	5	9/1-30	2	12/31		340
Pigeon hawk	1	9/20	1	9/20-30	1	9/30		10
Sparrow hawk	15	9/1	15	9/1-30	3	12/31		800
Reported by V. Carrol Donner								

Observed by: David E. Heffernan **INSTRUCTIONS** (See Sec. 7532, Wildlife Refuges Field Manual)

- (1) **Species:** Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) **First Seen:** The first migration record for the species for the reporting period.
- (3) **Peak Numbers:** Estimated number and inclusive dates when peak population of the species occurred.
- (4) **Last Seen:** The last refuge record for the species during the season concerned.
- (5) **Production:** Estimated number of young produced based on observations and actual counts.
- (6) **Total:** Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1750c

Form NR-1C

(Sept. 1960)

WATERFOWL HUNTER KILL SURVEY

Refuge

Arapaho

Year 1967 70

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
			Refuge closed to hunting.					

(over)

(over)

INSTRUCTIONS

- (1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.
- (2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.
- (3) Record the total number of hours the hunters spent hunting on the refuge.
- (4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).
- (5) Record total numbers of waterfowl bagged.
- (6) Record total numbers of waterfowl reported knocked down but not recovered.
- (7) Total of Columns 5 and 6.
- (8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).
- (9) Kill sample projected to 100 percent. $\text{Column 9} = \frac{\text{Column 8}}{\text{Column 2}} \times \text{Column 7}.$

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Arapaho

Months of September 1 to December 31, 19 70

(1) Species	(2) Density		(3) Young Produced	(4) Sex Ratio	(5) Removals	(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs 'v' d. Estimated Total	Percentage	Hunting For Re- stocking For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Sage grouse	Sagebrush flats and draws, open meadows. 2,500 acres	33.3		100:100		75	Refuge closed to hunting. Surrounding area season; Sept. 12-14, 2 birds/day, 4 in possession. Some utilization by hunters as birds move off refuge. Hunting pressure around refuge light, success good.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Arapaho

Calendar Year 1970

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover Types, Total Acreage of Habitat	Number	Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At Period of Greatest Use	As of Dec. 31	
Pronghorn	Sagebrush flats and draws, some meadow areas. 1,000 A.	1										10	5	20:100
Mule deer	Sagebrush draws, willow- choked meadows. 1,200 A.	2										200	40	20:100

Remarks:

Observed by David E. Heffernan
Reported by V. Carol Donner

INSTRUCTIONS

Form NR-3 (Form-1753) - BIG GAME

- (1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated total number of young produced on refuge.
- (4) REMOVALS: Indicate total number in each category removed during the year.
- (5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.
- (7) TOTAL REFUGE POPULATION: Give the estimated population of each species on the refuge at period of its greatest abundance and also as of December 31.
- (8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

116008

DISEASE

Refuge Arapaho

Year 1970

Botulism

Lead Poisoning or other Disease

Period of outbreak None observed.

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) _____

Condition of vegetation and invertebrate life _____

Remarks _____

Kind of disease None observed.

Species affected _____

Number Affected Species	Actual Count	Estimated
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

(1)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

Collections and Receipts (Seeds, rootstocks, trees, shrubs)							Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Nothing to report.													

- Remarks: _____

Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Arapaho County Jackson State Colorado

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
None									
								Fallow Ag. Land	None

No. of Permittees: Agricultural Operations 0 Haying Operations 0 Grazing Operations 1

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
None				1. Cattle*	1453 6 horses	5,001	12,001.20	4,433
				2. Other				
				1. Total Refuge Acreage Under Cultivation				None
Hay - Wild				2. Acreage Cultivated as Service Operation				None

* Includes horses incidental to grazing operations.
Reporting period, January 1 - December 31, 1970.

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

REFUGE GRAIN REPORT

Refuge Arapaho

Months of September 1 through December 31, 19570[illegible]

(8) Indicate shipping or collection points _____

(9) Grain is stored at Hutton Lake Refuge Granary.

(10) Remarks _____

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (4) A total of columns 2 and 3.
- (6) Column 4 less column 5.
- (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters granary," etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge
Arapaho

Proposal Number

Reporting Year

1-70

1970

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7/13/70 to 8/4/70	Willow, spp.	Oklahoma #1 irrigation ditch banks.	Less than 5 acres.	2,4-D	7.5 gal.	4 lb. acid- equivalent per acre	Water, 1 part chemical 200 part H ₂ O	Pickup mounted gasoline engine powered sprayer with hand- gun.

10. Summary of results (continue on reverse side, if necessary)

Nearly 100% kill on treated willows.

N A R R A T I V E R E P O R T

Arapaho National Wildlife Refuge

January through December
1970

REFUGE PERSONNEL

Refuge Manager V. Carrol Donner
Refuge Manager David E. Heffernan
Clerk Typist Barbara J. Smith
Engineering Equipment Operator William O. McDermith
(Transferred in EOD 5/4/70)

TEMPORARY PERSONNEL

Farm Equipment Operator John G. Hartman
(May 6 - June 30, 1970)
Summer Aid Orlando O. Romero
(June 10 - July 17, 1970)
Farm Equipment Operator Bennie H. Baldonado
(June 12 - June 16, 1970)
Farm Equipment Operator Rodney F. Krey
(August 31, 1970 - January 5, 1971)

Satellite refuges administered from the Arapaho office are:

Hutton Lake National Wildlife Refuge
Pathfinder National Wildlife Refuge
Bamforth National Wildlife Refuge

Separate reports were prepared and submitted for Hutton Lake and Pathfinder Refuges, with Bamforth covered in the Hutton Lake Report. There are no personnel assigned to these satellites.

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
Walden, Colorado

NARRATIVE REPORT
1970

Arapaho National Wildlife Refuge
- - - - -

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NARRATIVE REPORT
January through December
1970

Arapaho National Wildlife Refuge

- - - - -

I. GENERAL

A. Weather Conditions

An official weather station is located in Walden, approximately eight miles north of the refuge subheadquarters. An unofficial station was established on the refuge in 1969 for comparative purposes, and figures recorded at this station are also included.

The following tables present a summary of weather conditions for the year, as recorded at the official Walden station, and at the refuge station.

Walden Weather Station

Month	Snowfall	Precipitation		Temperature	
		This Month	Normal*	Max.	Min.
January	10.5	.46	.43	44	-33
February	5.5	.35	.47	41	-10
March	6.0	.31	.43	48	-15
April	5.5	.37	.69	62	- 2
May		.39	.86	77	11
June	5.0	1.54	1.27	87	21
July		.67	.96	84	32
August		1.01	1.39	86	30
September	.5	.98	1.67	74	14
October	12.0	1.41	.52	71	0
November	7.8	.67	.43	51	- 2
December	4.0	.39	.60	43	- 5
Totals	56.8	8.55	9.72		
Extremes				87	-33

*Normal = 1961-67 Average

Arapaho Refuge Weather Station

<u>Month</u>	<u>Snowfall</u>	<u>Precipitation</u>		<u>Temperature</u>	
		<u>This Month</u>	<u>Walden</u>	<u>Max.</u>	<u>Min.</u>
January	7.0	.41	.46	43	-24
February	7.0	.18	.35	46	-15
March	5.0	.17	.31	47	-16
April	5.0	.31	.37	59	0
May	.5	.22	.39	74	5
June	4.0	1.33	1.54	85	19
July		1.33	.67	82	25
August		.89	1.01	85	29
September	2.0	1.35	.98	73	15
October	16.5	1.63	1.41	69	- 3
November	16.0	.63	.67	50	- 1
December	6.0	.15	.39	44	- 7
Totals	69.0	8.60	8.55		
Extremes				85	-24

The valley floor of North Park experienced a dry year, even when compared to the norm for the area. This was in contrast to the surrounding mountains, which had snow-pack conditions much above normal by late spring.

The January-April months produced an official total of only 1.5 inches of precipitation, or 75% of normal. This was a cold, dry period, marked by infrequent light snows. The low temperature for the year, -33°, was recorded during this period.

Precipitation was also less than normal during the May-August period, as 3.61" was recorded in Walden, nearly one inch below normal. A wet snowstorm on June 12 accounted for a large portion of the precipitation for that month, as five inches of snow was recorded.

The September-December period was the only one which produced more precipitation than the normal, and this only by a small degree. Snowstorms in early October accounted for most of the gain for that month, and the remaining three months were typically dry.

Data recorded at the refuge weather station did not differ greatly from that recorded in Walden. The total precipitation figure of 8.60" compared with 8.55" recorded in Walden. Total snowfall at the refuge subheadquarters was 12.2 inches more than that recorded in town.

In general, 1970 was a cold, dry year on the refuge itself. With the exception of the June 12 snowstorm, precipitation amounts during the growing season were quite low. However, snow-pack conditions above the refuge, along the Illinois River, were above normal, and meadow plants flourished once flood-irrigation began in May. Freezing temperatures occurred during all twelve months of the year at both locations.

B. Habitat Conditions

1. Water

The water supply during 1970 was more than adequate for the Refuge and all other users on the Illinois River and its tributaries. Normally the runoff comes in two separate peaks, one during the latter part of April, the other in the early part of June. This year the Illinois River started rising the last weeks of April and continued running very high until after June 15. Much of this time it was completely overflowing the banks, providing automatic irrigation on most of the bottomlands. Only on the higher grounds lying under the Oklahoma #1 Ditch was it necessary to divert water in the early part of the season to accomplish irrigation. At no time during the irrigation season was it necessary to "check up" the main stream in order to divert water.

Normal irrigation season on the meadows locally is about May 1 to July 10 with some variation on both ends due to numerous factors. We began diverting water on May 18 and shut all water off on June 29. The pressing need for work on facilities before irrigation began, and the need to 'dry up' for subsequent work was our reason for cutting short the irrigation period. The shortened season seemed to have little or no adverse effect on plant growth.

As reported earlier and also in other sections of this report, permanent impoundments on the refuge are very scarce. With some major repairs completed on diversion facilities, we are planning and preparing for installation of facilities that will create numerous small ponds along old channels and in other strategic places.

We will follow our example of last year and use this section to discuss water rights and decree data. The writer now has a full year's experience on the Allard Tract plus several days time searching court records to back up his knowledge regarding water rights on the Illinois River. The information presented last year is quite accurate and nearly complete.

During the irrigation period this summer we found that we have one more water diversion point for the Allard Tract that was listed in last years' NR. This makes a total of 8 diversion points for the Allard Tract. Four of these are for use solely on the Allard Tract, the other four are shared with other land owners.

Acquisition of two additional tracts of land during 1970 has added several miles of ditches, 3 small reservoirs (296 AF total storage) and numerous water control structures to our irrigation system.

As regards the water right and diversion facilities, these acquisitions will have only moderate effect on the refuge. Operationally, the impact will be somewhat greater. A use-reservation until May 1, 1972 on the Case Tract will give us time to absorb this unit into our operations in an orderly fashion.

Acquisition of the Case Tract, 2,954 acres, adds no new facilities for diversion from the Illinois River. This transaction gives us complete ownership of the Hubbard #1 diversion right and control system and additional ownership in the Hubbard #2 system. Actually we now share Hubbard #2 with only one other party.

The Case property includes a diversion from Potter Creek, a decree on Antelope Spring and three storage reservoirs with decreed water rights. Handling of the water and care of the facilities on this tract will not become our responsibility until May 1, 1972.

The Hackley Tract (631 acres, 170 irrigated) was purchased during 1970 also. There is no use-reservation on the land so this tract will come under our jurisdiction upon completion of all paperwork related to the deed. This property adjoins the portion of the former Allard land lying west of State Route 125. Water for this tract comes from the Midland Ditch, which also supplies the former Allard land just mentioned.

There is a 5.0 cfs decree of medium priority water attached to the Hackley Tract. Drainage water from this tract runs to the former Allard land and is available for our reuse there. Irrigation of the Hackley Tract ties into lands already acquired and will add only slightly to the irrigation work load.

The Refuge Manager has undertaken and nearly finished a complete run-down on water right appropriations on the Illinois River. After the information is digested and put in brief form, it will

be made a matter of record here in the office and possibly appended to a future Narrative Report.

2. Food and Cover

The amount of available waterfowl food produced on the refuge is relatively small and may become one of the basic management problems for the refuge. Currently, seed production by the various species of grasses, sedges, spikerushes and forbs is more than adequate for even a large number of ducks, but the availability of this food source is limited by the absence of open water areas on the meadows. As small ponds are established at strategic locations, this particular food source will become more accessible as birds are better dispersed.

There are very few permanent or semi-permanent impoundments on the refuge at present. Aquatic plant growth is therefore very limited. The many small depressions on the meadows fill with water during the irrigation season, but dry up as water diversion is discontinued in July. Very little aquatic plant growth is realized.

Several of the larger irrigation ditches, as well as the river itself, exhibited fair amounts of aquatic plants by late summer, usually in the form of widgeongrass. These sites were frequented by ducks during the late summer and fall, and most brooding was carried out on these areas.

Another food source found in the river and, to a lesser extent, in the larger ditches, is in the form of aquatic insects and small crustaceans. These are among the principle foods of the ducklings and brood hens as well. Terrestrial insects, such as mosquitos and small flies, are also fed on by ducklings and adult birds, and the nutrient value of this source is quite high.

Since the upland areas of the refuge are dominated by sagebrush, little use by ducks occurs on them. However, sage grouse, mule deer, antelope and several species of small perching birds depend on these sagebrush areas during a large part of the year, particularly during the winter months. The moisture during the past growing season was adequate for upland sites, and the winter food source for deer and sage grouse should be sufficient.

Cover conditions on the refuge were good throughout the period. As birds began arriving late in the spring, they found good grass cover remaining from the previous years' growing season. Nesting cover was more than adequate for the number of nesting ducks, even ~~early~~ in the season. As the growth of various meadow plants became more evident in June, their mixture with dead vegetation provided excellent nest and brood cover. The

current years growth of meadow plants also served as sufficient cover during the late summer and fall. Cover in the form of low-growing willows is also present throughout the meadow area.

Upland cover was also good throughout the year. Sage grouse production was influenced more by inclement weather than by a lack of nesting cover, as large expanses of suitable cover are located near strutting grounds. Cover for other species on the upland areas was also adequate.

II. WILDLIFE

A. Migratory Birds

1. Ducks

Duck-use during the first full year of active waterfowl management was very encouraging. Abundant cover remained following the 1969 grazing season, and spring runoff was much above normal, producing favorable conditions for birds as they began arriving in April.

As the flood-irrigated meadows contain only small potholes formed as irrigation waters build up in depressions, dabbling duck species are the most common waterfowl present, and production was also restricted to dabblers.

Nesting begins relatively late in North Park, and ducks did not begin nesting in large numbers until early June. The peak of nesting occurred on about June 20, and several nests were still recorded as "laying" as late as June 29.

Again this year, nest transect lines were used to obtain nesting data. These lines closely coincided with those established last year, which served as the basis for the limited amount of pre-management data we were able to get. Under this system, lines were walked at 900 foot intervals across (east-west) the wet areas and well into the uplands. Nests located were flagged for rechecking, and all pertinent data concerning the status of the nest, primary and secondary cover types, and subsequent fate of the nest were recorded. A total of thirty transects were walked, totalling approximately 35 miles. The transect lines were first walked from June 2 through June 16. All transect lines were rewalked during the period from June 24 to June 29, at which time all flagged nests were rechecked and any new nests found were flagged and information recorded.

During the late summer months, transect lines were marked permanently. This will aid greatly in future nest surveys.

A total of 44 nests were located while walking the transect lines, as compared to only 19 found in 1969, prior to management. Mallards, with 19 nests, and pintails with 11, accounted for two-thirds of the total number of nests located. Other species, and the number of nests located for each, included shoveler (4), green-winged teal (4), cinnamon teal (3), gadwall (2), and widgeon (1).

The primary nest cover selected appeared to be the various species of sedges (Carex spp.) present on the meadows, as 17 nests were located in this type of vegetation. Thirty nests were built within 20 feet of standing or moving water on the flooded meadows.

In addition to nest surveys, brood counts were made along the river itself and on the few small ponds that remained during late summer. From these counts, the mallard again appeared to be the main producer, as 11 broods were recorded. The American widgeon again produced a good number of broods, despite the few nests located. Pintails and green-winged teal followed in the number of broods recorded. A total of 305 ducks were produced, nearly double the number recorded in 1969.

Mallards and pintails were also the most numerous waterfowl in terms of use-days. The following table (Table 1) illustrates the breakdown in use-days and production. Data from 1969 is included for comparison.

Table 1: Duck Use-days and Production, 1969 - 1970

<u>Species</u>	1970		1969 (July 1-Dec. 31)	
	<u>Use-days</u>	<u>Prod.</u>	<u>Use-days</u>	<u>Prod.</u>
Pintail	10,465	35	3,235	10
Mallard	9,555	100	5,430	40
American widgeon	7,581	65	11,065	65
Green-winged teal	6,580	55	4,660	25
Gadwall	5,180	20	7,080	25
Lesser scaup	2,905		466	
Cinnamon teal	1,561	20	525	
Blue-winged teal	1,162		1,568	5
Shoveler	959	10	312	
Common merganser	287		124	
Totals	46,235	305	34,465	170

The mallard and pintail were present in nearly equal numbers, and the combined total was nearly half of the total use-days. Both of these species increased by a marked degree over last year's figures, which included only the period from July 1 - December 31, 1969. The American widgeon and gadwall declined in use-days, but were still present in good numbers. Most other species showed sizable increases.

Production figures were also recorded for the Case Tract, which is due for inclusion in the refuge project in May, 1972. These figures are based on brood counts made on the many small ponds and lakes on this area. Line-transects were not used on this tract; however, as tracts are acquired, the line-transect system established on the present refuge area will be expanded to include the acquired lands. Based, therefore, on brood counts, the American widgeon was the main producer on the Case Tract, with the pintail producing nearly equal numbers. The mallard was third in production and these three species combined produced a total of 420 ducklings. Of interest also was the production of 100 lesser scaup on this area. The numerous small lakes and reservoirs attract good numbers of scaup, and suitable nesting cover for this species is present. Twenty ruddy ducks were also produced, reflecting the presence of marshy areas on this tract.

Waterfowl censuses were also made on several of the larger lakes within about 20 miles of the refuge. Lakes included were the same as those mentioned in the 1969 narrative. The spring migration peaked at 6,695 ducks, recorded on May 5. This included 2,000 redheads and 2,100 scaup. The fall migration peak was much higher than this, as 28,050 birds were recorded on September 28, compared to a peak number of 24,000 in 1969. During the peak this year, 15,000 widgeons were present, along with 5,000 gadwalls and 2,000 mallards. The main use occurs on Walden Reservoir, which is approximately five miles from the present boundary and less than one mile from the proposed boundary. Thousands of coots also frequent this reservoir, as it is a large, fairly shallow, weed-choked body of water. The total summer duck population on these lakes is approximately 3,000 birds.

2. Geese

There are relatively few geese in the park as a whole. Approximately 75 birds were present in the park during a large part of the summer, but their use was largely confined to Lake John and its annex, which is about 10 miles from the present refuge boundary. It is here that the Colorado Game, Fish and Parks Department released 198 goslings in 1969 in an attempt to establish a nesting flock. However, only a very small fraction of these birds returned in 1970. Again in August of this year, the state department released 225 live-trapped birds, which had been taken near Ft. Collins, Colorado. Most of these were mature birds and the feeling was

that they would be less vulnerable to hunters as they migrated out of the park.

Goose hunting was not allowed in the county again this year, in an attempt to allow the birds to become used to the area.

The Canada goose is the most common migrant in the area, and all transplants were of this species. Snow geese are rarely seen in North Park.

No geese were recorded on the refuge during 1970. Small flocks were often observed on the lakes on the Case Tract, but suitable habitat on the present tract is lacking.

3. Swans

No swans were recorded on the refuge or in North Park. It is doubtful that birds frequent the area, and recent records for the park would bear this out.

4. Coots

Coots are not abundant on the present refuge area. The limited small marshy areas account for nearly 100% of the coot-use, and in one particular marsh, all of the small amount of coot nesting takes place. Production was estimated to be ten coots during 1970.

The Case Tract attracts the largest number of coots, when compared to all other proposed refuge tracts. An estimated 150 coots were produced on this tract.

Walden Reservoir supported as many as 4,000 coots during the fall migration. The total North Park population peaked at about 8,000 birds.

5. Other Waterbirds

The sora was the most abundant bird in this category again this year. This small rail was present on nearly all meadow areas. A peak of 150 sora's was recorded during most of the summer months, and 65 young were produced. Other small birds present in good numbers were the common snipe and the Wilson's phalarope, and each produced young on the refuge.

Larger birds which were present throughout the summer and produced young included the great blue heron and the black-crowned night heron. The American bittern was present during the late summer and increased greatly compared to last year's use-days.

Three species of "waterbirds" were seen this year for the first time. Two snowy egrets made a brief stop during early June. One long-billed curlew was noted on the south end of the refuge, also during June. An adult yellow-crowned night heron was observed several times during the early part of June and was noted with interest. This particular species is largely confined to the gulf coast states and has seldom been recorded in Colorado.

6. Mourning Doves

Mourning doves are present on the refuge during all but the winter months. A peak population of 150 birds was recorded during the fall migration. A few birds nest on the refuge, and 15 young doves were produced. This is a decrease in production from last year and may reflect unfavorable weather conditions during June. Use for mourning doves as a whole was well above that recorded in 1969, as 8,900 use-days were recorded this year.

B. Upland Game Birds

The sage grouse is the only species of upland game bird occurring on the refuge, and is present in good numbers. Again during the spring of this year, the two "strutting" grounds located east of the present refuge boundary were observed. One of these is located just inside the proposed refuge boundary, the other just outside. Presently, both areas are on BLM land.

On ground No. 1 (inside proposed boundary) a total of 63 birds were recorded, including 24 cocks and 39 hens, on April 21. On this same day, ground No. 2 contained 18 cocks and 31 hens for a total of 49 birds. The two grounds together showed a total of 112 adult birds, although a few birds may have left the grounds before daybreak, while others may have been elsewhere that particular morning.

A count on May 7 showed only 81 adults, as many hens had already begun nesting.

Although hatching success may have been good, ultimate production figures were quite low, as inclement weather in mid-June inflicted heavy losses on small chicks. A wet snowstorm on June 12 produced 4-6" of snow and many chicks may have died from exposure. Thirty young grouse were recorded as being produced on the refuge this year, compared to 50 in 1969.

A peak refuge population of 120 grouse was recorded and was present during most of the summer and early fall period. This compares to a peak of 150 last year.

C. Big Game Animals

Mule deer were present on the refuge throughout the year, but were most numerous during the winter months, as animals moved down to their winter range. As many as 250 deer were seen along the slopes of Owl Ridge during February and early March, and many of these wandered on and off the refuge. A peak number of 200 animals was recorded on the refuge during this period.

A relatively small number of deer were present on the refuge at other times during the year. Approximately ~~ten~~ animals were present during the summer months, and two fawns were produced on the refuge.

Pronghorn numbers were generally quite low on the refuge. Sizable herds are present north of the town of Walden, but few animals are seen south of town, in the area of the refuge. A peak population of ten animals was recorded during the year, and these were present during most of the summer. One pronghorn was produced on the refuge and it was seen several times during July and August.

A small group of about 20 pronghorns was present on an on-off basis on the Case Tract. This is the area of maximum pronghorn numbers on the proposed refuge area.

D. Fur Animals, Predators, Rodents and Other Mammals

The beaver and muskrat are present on the refuge in fair numbers. Muskrats number about 20, with beavers somewhat more plentiful, numbering around 35 animals. The river channel itself is marked by numerous beaver dams, as are several irrigation ditches. Dams have been removed when and where necessary for proper water control.

The striped skunk is the most abundant mammalian predator on the refuge, particularly in the meadow areas. For this reason it does present a problem to nesting ducks. No predator control plan has been finalized for the refuge, but nuisance animals around the living quarters are generally removed.

Badgers are common in the sagebrush areas, and are also seen quite commonly in the vicinity of the refuge subheadquarters. These may be a problem to nesting sage grouse, but as they are largely confined to upland areas, little problem concerning nesting ducks was encountered this year. Their main diet consists of ground squirrels, prairie dogs, and other small rodents.

Other large predators include the coyote and red fox. These are largely confined to the upland areas, but animals are occasionally seen on the meadows. The diet of these animals is largely restricted to jackrabbits and small rodents.

Among rodents, the Richardson's ground squirrel is probably the most abundant. An estimated 600 animals were present during the summer months. A lone porcupine was observed on the refuge during the late summer.

White-tailed jackrabbits are common in the sagebrush areas and Nuttall's cottontails are frequently encountered in areas of dense willow growth on the meadows.

E. Hawks, Eagles, Owls, Crows and Magpies

A large variety of hawks was observed during the year, including the Swainson's, marsh, red-tailed, rough-legged and ferruginous. Of this group, only two are known nesters, as the Swainson's hawk produced ten young and the marsh hawk, 4.

Golden eagles are common on the refuge, and bald eagles are occasionally seen during the spring and fall migrations. An osprey was observed along the river on the refuge in September. This was the first sighting of this bird on the refuge.

Among owls, the great horned owl is the most common, with other species occasionally seen.

Crows are fairly common and nest on the refuge, as do sizable numbers of black-billed magpies. The magpie accounts for more use-days than any other bird species, as it is present in large numbers throughout the year.

Both the peregrine falcon and prairie falcon were seen this year, and the latter produced four young on the refuge.

A pigeon hawk was noted around the subheadquarters in September. It seemed to feed principally on the mourning doves which gathered around the buildings for grit. Sparrow hawks were also present during most of the year.

F. Other Birds

Many species of small perching birds have been recorded on the refuge. Finches, blackbirds, larks, and various other groups are present. These are included in a refuge birdlist compiled for the refuge and now awaiting publication.

G. Fish

The Illinois River, which flows through the refuge, is regarded as one of the top brown trout streams in northern Colorado. Many forms of aquatic insects are present in the river and these serve



Heffernan

7/11/70

Added note of interest:

While fishing on Goose Creek in the northwest corner of North Park, Operator McDermith noticed what he thought was an osprey, nesting; However, he was not sure of his identification.

On July 11, Refuge Manager Heffernan accompanied Mr. McDermith on a return visit to the same area and verified identity of the bird as an osprey. They also determined that the bird was nesting and had actually hatched young, which were still in the nest. The number of young was not determined.

There are very few known instances of ospreys nesting in Colorado. Dr. Ryder of CSU and the curator, Denver Museum of Natural History were notified.

The nest was in an old dead pine tree close to a series of beaver ponds. The tree leans considerably, so Mr. Heffernan decided against making a close-up examination of the nest.

as one of the main food sources for the brown, as well as the much less abundant rainbow and brook trout. Terrestrial insects are also fed on, as they drop from overhanging willow branches. One particular brown trout caught during the late summer had even ingested a full grown mouse, which was found in its stomach.

As was the case in 1969, various sections of the river were shocked during the fall in order to obtain fish population and condition data, and stomach samples were taken from a few of the collected fish. Colorado Game, Fish and Parks Department personnel carried out the shocking on October 15, with refuge personnel assisting. From the data collected from the sample areas shocked, it appears that public fishing pressure during August and September had little effect on the trout population as a whole.

The refuge portion of the Illinois River was opened to public fishing on August 1, 1970. A public parking area was established near the river, and creel checks were made at the parking area on weekends, when the most fishing pressure was exerted. During August, fair numbers of fishermen were recorded on weekends, with a maximum of about sixty on August 1. During weekdays this number dropped to about four fishermen per day. Very few fishermen were seen during September, which is about the end of open water fishing on streams in North Park.

A total of 153 trout were checked at the parking area by refuge personnel. Included in this total were 125 browns, 20 rainbows, and 8 brookies. This proportion is nearly the same as that recorded from shocking, although rainbows appeared to be less numerous than creel checks would indicate. Rainbows are reputed to be easier to catch, at least in part due to the browns' nocturnal feeding habits. This may well account for the larger number of rainbows in the fishermen's creel.

Most fish caught ranged in size from 10-14", although a few larger fish were taken, up to about 2 1/2 lbs. An average twelve-inch brown will weigh about one pound.

The river itself is relatively difficult to fish, due in part to overhanging willows, and it is felt that only the devoted stream fishermen will return on a regular basis.

Several species of suckers, including the northern redhorse, western longnose, and western white, are present in varying numbers in the river, as are several species of chubs, daces, and other small minnows.

A leaflet showing the portion of the Arapaho Refuge open to public fishing, with regulations included, is appended. The fishing plan

ARAPAHO NATIONAL WILDLIFE REFUGE

JACKSON COUNTY, COLORADO



0 1/4 1/2 1 2
SCALE IN MILES

PETERSON

RIDGE

Hackley
Ranch

4 MILES TO WALDEN

125

PACIFIC

RAILROAD
RIVER

ILLINOIS

COUNTY ROAD 32

Allard
Ranch

PARKING

Anderson
Ranch

OWL

RIDGE

LEGEND



NATIONAL WILDLIFE REFUGE
PUBLIC FISHING AREA

1970 FISHING REGULATIONS

ARAPAHO NATIONAL WILDLIFE REFUGE

The area of the Arapaho National Wildlife Refuge shown on the map, reverse side, is open to fishing beginning August 1, 1970, subject to the following restrictions:

1. Fishing will be governed by the State laws and regulations in effect for this area.
2. Fishing will be between 4 a.m. and 9 p.m. only, using standard time in effect locally.
3. Access for fishing will be by foot from the parking area designated.
4. Parking is limited to the designated parking area. Vehicle travel is limited to the county road and the marked trail to the parking area.
5. No open fires.
6. No overnight camping.
7. Dogs must be on a leash.

Please do not litter. Even small pieces, such as cigarette packages and gum wrappers, accumulate and spoil the primitive conditions along our stream. Just as you prefer unlittered conditions, so will the people who use the area after you. If everyone will bring their litter back to the parking area and place it in the litter cans, the area will remain clean and the surroundings natural and enjoyable.

calls for closure during the months of June and July, to avoid disturbance of nesting ducks and early broods. With the exception of these two months, the refuge will be open to fishing year-round, although the months of May, August, and September will provide the most opportunities for anglers.

H. Reptiles

No reptiles were seen on the refuge during 1970.

I. Disease

None noted.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

There was no formal refuge development carried out in 1970. Several rehabilitation jobs, major in nature were accomplished with operation and maintenance funds.

Most of the activity in this category during the early part of the year consisted of screening and picking up of surplus equipment and materials. Several trips were made to Pueblo Ordnance Depot to pick up materials suitable for small bridges.

An Allis Chalmers HD-6 crawler with a matching hydraulic scraper was picked up from Bureau of Land Management in Glenwood Springs. The tractor had 1900 actual hours on it, and the scraper is like new. A new hydraulic angle dozer was purchased to match the tractor. The tractor-dozzer unit has really been a handy item here.

Mr. William McDermith transferred here from Monte Vista Refuge as Engineering Equipment Operator. Since his arrival in early May field work accomplishments have been noticeably greater.

During June the entire Arapaho project was flown for vertical aerial photos. Contact prints were in color; several black and white mosaics were made also. Preparation for this was quite a task, but the resulting photos ~~are~~ very worthwhile.

Opening of the Illinois River to fishing on August 1 required some preparatory work. A parking area was fenced. Access required about 1/2 mile of new road, parts of which will require fills of various height. This is only about one-half done at present.

A local man starting a new dirt moving business was contracted to finish cleaning the Oklahoma #1 ditch. This job was started last year, but the original contractor was unable to finish the job.

The Oklahoma #2 ditch carries water from a diversion point on the Burr ranch. It follows an old channel nearly a mile before reaching the Allard Tract. This portion of the Burr ranch is a veritable willow jungle. The new contractor was hired to remove the willows from one bank of this ditch and restore a channel. The work was done during October and the ditch is in good shape to our present boundary.

Work is needed on the lower end of the Oklahoma #2 ditch but the really bad part is finished. Beaver dams were nearly too numerous to count. Some of them were four feet high. Prior to cleaning, it was virtually impossible to find the dams, let alone remove them.

An extended high water period during the spring runoff put the river diversion structures completed in 1969 to a good test. These structures survived the test in fine shape and as a result this work was pursued with added vigor in 1970.

New Diversion structures were installed at five diversion points: Oklahoma #1, Hubbard #1, Hubbard #2, Ward #1 and Ward #3.

Facilities for controlling the amount of water diverted into the irrigation ditches were installed at Hubbard #2 and Ward #3. These facilities consisted of tubes with screw-controlled headgates fabricated to the culverts.

As winter weather restricted field activity, work moved to the refuge shop. The various types of control gates, as received from our suppliers, have several features added to them in our shop before they are installed. A large amount of this work is "stock piled" for winter activity here. As the year ended this work was well underway.

B. Plantings

None

C. Collections and Receipts

None



Donner

4/13/70

The diversion check-structures designed by the Refuge Manager and installed in 1969 were well-tested in the spring of 1970, as this series of pictures will show. Above is Oklahoma #2 at moderately high river.



Donner

5/21/70

This picture shows the same structure (Oklahoma #2) with the Illinois really rolling along.



Donner

5/21/70

Different shot of Oklahoma #2 with Operator McDermith checking to see if riprap is still in place.



Donner

Aug/ 70

Oklahoma #2 is still in place after Illinois River has resumed being a creek.



Donner

5/22/70

Island 2-bay structure during "flood stage".



Donner

Aug/ 70

Same structure at later date, with flashboards in place.



Donner

5/21/70

North Park #6, 1-bay diversion structure during "flood stage".



Donner

Aug/ 70

Same structure at later date, with flashboards in place.

D. Control of Vegetation

Chemical control of vegetation was the only means of control used here in 1970. Herbicide use was limited to willow-infested ditch banks, where removal of willows facilitates proper maintenance.

The chemical used was 2,4D ester, 4 lbs. acid-equivalent per gallon. It was mixed at the rate of 1 gallon of chemical per 200 gallons of water. A pickup mounted, gasoline-engine powered, sprayer with handgun was used for application. A spreader-sticker solution was added also.

Individual plants were wetted thoroughly. It is difficult to measure the acres treated, but 5 acres is a reasonable estimate. Seven and one-half gallons of spray chemical were used. Total cost of the operation was \$200.

E. Planned Burning

None

F. Fires

None

IV. RESOURCE MANAGEMENT

A. Grazing

This is the first full year of the grazing program on the Arapaho Refuge. A permit authorizing 5,500 AUM's grazing by 1,550 cattle and 10 horses was issued to the former owners, the Allard Cattle Company. Actual use was 5,463 AUM's by 1,453 cattle and six horses. Grazing occurred on 4,433 acres of fee title land and some 5,000 acres of BLM land under our administration by memorandum of understanding until such time as formal withdrawal can be accomplished.

Main grazing period was from May 1 until October 1. One hundred thirty-six bred heifers were left until November 24.

The grazing fee per AUM is \$2.40. The basic animal unit is one cow over 18 months old. For stocking rate and billing purposes, adjustments are made for different age-classes of cattle. Horses also have an adjusted rate.

Yearling cattle, aged 6 to 18 months, are figured at a .75 use-rate. A cow with calf up to 6 months is figured at 1.25, horses any age are figured at 1.5. This makes it that a yearling costs

\$1.80 per month, a dry adult cow \$2.40, cow and calf \$3.00 and horses \$3.60. Only enough horses to carry out handling of the cattle are allowed each permittee. From the time cattle are put on the refuge in the spring until October 1, the Allards have a rider living at the subheadquarters.

B. Haying

None

C. Fur Harvest

None

D. Timber Removal

None

E. Commercial Fishing

None

F. Fires

None

V. FIELD INVESTIGATION AND APPLIED RESEARCH

A. Progress Report

There was no activity along this line during 1970.

VI. PUBLIC RELATIONS

A. Recreational Uses

Stream fishing along the Illinois accounted for over 60% of the public use on Arapaho Refuge in 1970. Results of fishing activity is discussed in a previous section of this report.

Other recreational uses of the refuge were bird-watching, general sight-seeing and non-fishermen accompanying fishermen.

A summary of recreational use in 1970 indicates a total of 590 visits, 365 of which were fishermen.

As the public becomes aware of the presence of Arapaho Refuge we expect more birders and sight seers. There will also be quite a

'come and go' clientele looking for a good fishing spot. Vehicle access to our fishing is limited and the fishing itself is quite difficult. With the several easily accessible lakes available nearby, we expect to wind up with only the hardy, devoted fishermen returning on a regular basis.

B. Refuge Visitors

<u>Date</u>	<u>Name</u>	<u>Organization</u>	<u>Purpose</u>
1/16	T.M. Conrardy	R.O. Realty Albuquerque, N.M.	Acquisition
1/16	D. H. Kimbrell	R.O. Realty Albuquerque, N.M.	Acquisition
2/5	T.M. Conrardy	R.O. Realty Albuquerque, N.M.	Acquisition
2/25	Rolf Nittmann	Game & Fish Dept. Ft. Collins, Colo.	visit
2/25	Jerry Lorentzen	Game & Fish Dept. Ft. Collins, Colo.	visit
4/29	M.G."Red" Sheldon	R.O. Refuges Albuquerque, N.M.	Earth Day Program
5/12	Gordon Folzenlogen	Wildlife Biologist Jet, Oklahoma	grassland, grazing, S&M inspection
5/20	Vic Medina	R.O. Engineering Albuquerque, N.M.	cadestral survey
5/22	Gene Decker and about 40 students	CSU Ft. Collins, Colo.	refuge tour
5/27	Bob Osthoff	R.O. Engineering Albuquerque, N.M.	survey
6/2	Ken Ystesund	R.O. Realty Albuquerque, N.M.	acquisition
6/23	Bill Wilson	Quivira NWR Stafford, Kansas	visit
6/23	David Mickelson	Lansing Unit, Upper Mississippi NWR Lansing, Iowa	visit

<u>Date</u>	<u>Name</u>	<u>Organization</u>	<u>Purpose</u>
6/28	Robert Scott	Refuges Washington, D.C.	visit
7/3	Morris Le Fever	Laguna Atascosa NWR San Benito, Texas	visit
7/6	George Wiseman	Assoc. Reg. Supervisor Atlanta, Georgia	visit
7/10	Wes Signs	State Engr. Office Steamboat Spgs, Colo.	water
7/13	Marcus Nelson	Reg. Supervisor Albuquerque, N.M.	BLM land
7/13	Ken Ystesund	R.O. Realty Albuquerque, N.M.	acquisition
8/10	D.H. Kimbrell	R.O. Realty Albuquerque, N.M.	acquisition
8/10	Glen Jacobs	Sacramento NWR Willows, Calif.	visit
8/25	Ken Ystesund	R.O. Realty Albuquerque, N.M.	acquisition
8/27	Vern Helbig	River Basin Studies Denver, Colorado	visit
8/27	Art Hale	River Basin Studies Denver, Colorado	visit
9/15	Harvey Combs	R.O. Engineering Albuquerque, N.M.	cadestral survey
9/24	Rolf Nittmann Frank Bush Jerry Lorentzen	Game & Fish Dept. Ft. Collins, Colo.	visit
9/30	Vic Medina	R.O. Engineering Albuquerque, N.M.	cadestral survey
10/8	Ken Ystesund	R.O. Realty Albuquerque, N.M.	acquisition

<u>Date</u>	<u>Name</u>	<u>Organization</u>	<u>Purpose</u>
10/15	Rolf Nittmann	Game & Fish Dept. Ft. Collins, Colo.	fisheries investigation
10/22	George Wiseman	Assoc. Reg. Supervisor Atlanta, Georgia	visit
11/6	Eldie Mustard	SCS, Denver, Colo.	tour
11/9	Charles "Pete" Bryant	Monte Vista NWR Monte Vista, Colo.	water rights
11/19	Jim Harman Jim Pulliam	R.O. Refuges Albuquerque, N.M.	Game & Fish Club Program
12/2	Ken Ystesund	R.O. Realty Albuquerque, N.M.	acquisition
12/22	Ken Ystesund	R.O. Realty Albuquerque, N.M.	acquisition

C. Refuge Participation

Refuge Manager Donner belongs to the Jackson County Lions Club and attends meetings and work sessions quite regularly. He is also a member of the North Park Game and Fish Club.

Refuge Manager Heffernan belongs to the North Park Game and Fish Club and is an active member. In addition, Mr. Heffernan leads a 4-H Wildlife Conservation Club with 8 members.

In addition to the recurring participation previously mentioned, refuge personnel attended the following meetings.

February 9-12 Refuge Manager Donner attended the annual National meeting of the American Society of Range Management in Denver, Colorado.

March 21 Refuge Manager Donner attended the Annual Meeting of North Park Stockgrowers Association.

April 3 Refuge Manager Donner attended annual banquet of North Park Soil Conservation District. Immediately preceding the banquet, the District held an open house in their office building to show the public the office facilities they have developed and have rented to several government agencies. Agencies with offices

in the building are: Arapaho Refuge, Bureau of Land Management, Agricultural Stabilization and Conservation Service and Soil Conservation Service. Each organization was requested to have someone present to show their offices. We were proud to show them ours.

- April 10 Refuge Manager Donner attended the cooperative meeting of Wyoming Game and Fish Department relative to annual seasons and regulations; held in Laramie, Wyoming.
- April 29 Refuge Managers Donner and Heffernan attended Earth Day Program at North Park Jr.-Sr. High School Mr. M.G. "Red" Sheldon of R.O., Albuquerque was one of several featured speakers.
- May 22 The Senior year Wildlife students from Colorado State University visited the Arapaho Refuge on their Spring Tour. Refuge Managers Donner and Heffernan explained our operation and outlined our plans for making this refuge into a waterfowl production area.
- July 6 Refuge Manager Donner attended a meeting in Steamboat Springs, called by the District Engineer to explain new legislation and other changes in water administration in Colorado.
- July 29 Refuge Manager Donner attended a water meeting in Walden similar to the one in Steamboat Springs.
- August 27-30 Refuge Manager Donner attended the Fall Tour of the Colorado Section, American Society of Range Management, held near Saguache, Colorado.
- October 8 Refuge Manager Donner attended the IMEAC meeting at Cheyenne, Wyoming.
- November 5 Refuge Managers Donner and Heffernan attended an RC&D meeting in Craig, Colorado.
- November 20 All members of the regular refuge staff plus temporary employee Rodney Krey, and their spouses attended the November meeting of the North Park Game and Fish Club, held at Gould. Messrs. Harman and Pulliam of the Albuquerque office were on the program.

D. Hunting

None

E. Violations

No violators were apprehended.

F. Safety

Safety meetings have been held monthly since March. The monthly Safety publication TIPS has been the source of most topics discussed. One movie, "Passport to Safe Winter Fun", stressing snowmobile Safety was shown. All personnel in the building saw the movie.

Safety is discussed seriously at all meetings, also during informal on-the-job discussions. It is our belief that employee attitude plays a great part in the overall safety program. It is a responsibility of management to provide safe working conditions, but poor employee attitude can quickly wreck a good safety record.

At the end of 1970, Arapaho Refuge has a record of 777 days without a lost-time accident.

In reviewing Narrative Reports for Hutton Lake Refuge it was noted that Hutton Lake did not have a lost time accident during the 13 years that the refuge was staffed. We hope we can continue and equal this record at Arapaho.

VII. OTHER ITEMS

A. Acquisition

Acquisition of land for Arapaho Refuge is progressing well. The Case Tract (2,954 acres) is ours in title now, but is subject to a complete use-reservation until May 1, 1972.

Negotiations for the Hackley Tract (631 acres) are completed and only minor items of legal transfer remain to be taken care of before this land is officially ours. The only use-reservation on this tract is for the house, which is reserved until December 31, 1971. We are expecting to get possession of this tract at any time.

A purchase agreement has been signed on the Brocker Tract (891 acres). There is a complete use-reservation on this tract until December 31, 1972.

An item that seems to be taking considerable time is withdrawal of public (BLM) lands that are scheduled to be included in the project by direct withdrawal. The Bureaus involved are working on a plan which calls for withdrawal of all lands within the proposed boundary at the same time. However, actual custody of the lands

involved would not fall to us until such time as the lands to which they were originally attached come under our full jurisdiction. Thus, BIM would continue to administer lands attached to base properties scheduled for inclusion in the refuge until such time as acquisition is complete and use-reservations are ended.

Under this plan we would take over fee title lands and attached BIM lands at the same time.

Presently we are operating the 5,000 acres of BIM land formerly attached to the Allard Tract under a special Memorandum of Understanding between us and Bureau of Land Management.

B. Personnel Actions

Mr. William O. McDermith transferred here from the Monte Vista Refuge on May 4 to fill the Engineering Equipment Operator position allotted this station.

David Heffernan's position as Refuge Manager (part-time) was converted to full-time effective July 9. Mr. Heffernan had been in the Refuge Manager position on a 36 hours per week schedule since beginning here on May 5, 1969.

Barbara Smith, Clerk Typist, was promoted to GS-4 effective August 23.

C. Personnel Training

Refuge Manager Heffernan attended the Wingbee in Ft. Collins, February 16 through 20.

Refuge Manager Heffernan and Operator McDermith attended the Law Enforcement Workshop in Albuquerque July 27-31, and successfully completed the instruction course.

Refuge Manager Donner attended the Systems Analysis Training Session held in Albuquerque, October 12-13.

D. Items of Interest

On October 9, Refuge Manager Donner presented a check for \$6,787.08 from the Bureau to the Jackson County Treasurer. This money is paid the County as a result of the Refuge Revenue Sharing Act.

Sections I and II, except the Water portion, were written by Heffernan. Smith compiled the visitor list and did the typing. The remainder of the report was written by Donner. Editing, proofreading, and the many other tasks involved are by joint effort of the staff. Any and all accomplishments reported herein are also by 'joint effort'.


E. Photographs

A few photographs are included in the body of the report, but the major portion of them ~~is~~ included in a separate section. Photo credits are included with the date on each picture.

Black and white pictures were taken with a government camera and film processing was at government expense.

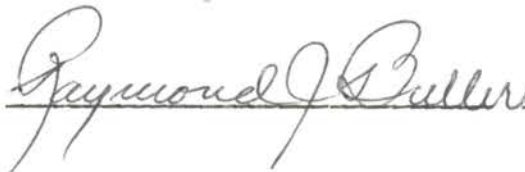
Color pictures are prints made from slides belonging to Mr. Heffernan. Processing of prints from the slides was at government expense.

Submitted by:


V. Carroll Donner
Refuge Manager

February 11, 1971

Reviewed by: 



Acting Assistant Regional Director-Operations

APR 30 1971

Acquisition Progress

Allard Tract - under Bureau jurisdiction since July 1, 1969.

Hackley Tract - to come under Bureau jurisdiction momentarily.

Case Tract - to come under full Bureau jurisdiction May 1, 1972.

Brocker Tract - purchase agreement made, use-reservation to be
in effect until December 31, 1972.

BLM land attached to tracts acquired or in process of acquisition are shaded in colors the same as base property to which formerly attached. This land will come under Bureau jurisdiction at such time as withdrawal occurs and/or the base property comes under our full control.

ARAPAHO NATIONAL WILDLIFE REFUGE

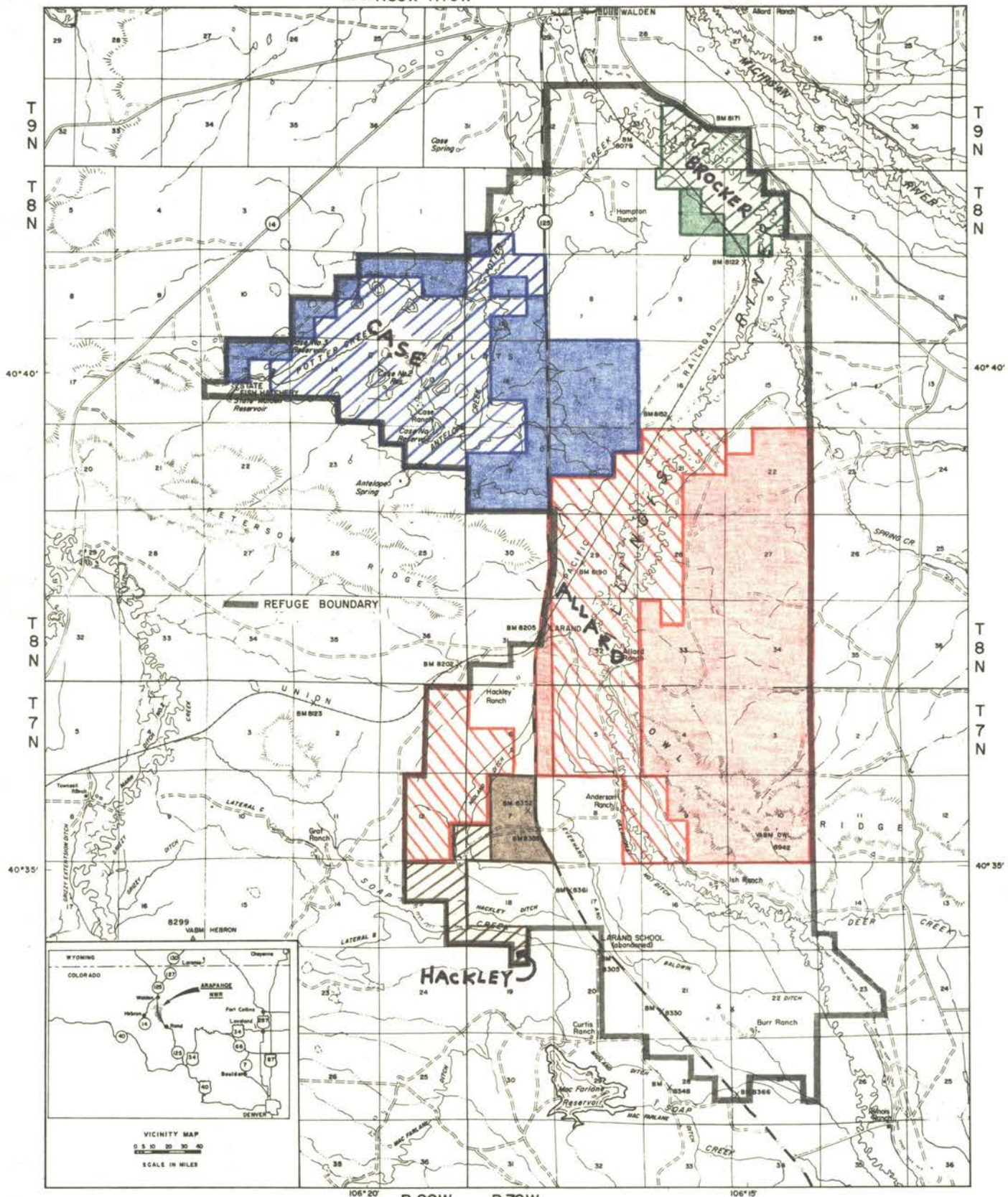
JACKSON COUNTY, COLORADO

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

106° 20' R80W R79W

106° 15'



COMPILED IN THE DIVISION OF ENGINEERING
FROM G.L.O. PLATS, U.S.G.S. QUADRANGLES.
REVISIONS: JAN. 1968, MAY 1968, NOV 1968, MARCH 1969

ALBUQUERQUE, NEW MEXICO

MAY, 1966

R 80W R 79W

SIXTH PRINCIPAL MERIDIAN

SCALE 0 1/4 1/2 1 2 3 MILES

6	5	4	3	2	1
7	6	5	4	3	2
8	7	6	5	4	3
9	8	7	6	5	4
10	9	8	7	6	5
11	10	9	8	7	6
12	11	10	9	8	7
13	12	11	10	9	8
14	13	12	11	10	9
15	14	13	12	11	10
16	15	14	13	12	11
17	16	15	14	13	12
18	17	16	15	14	13
19	18	17	16	15	14
20	19	18	17	16	15
21	20	19	18	17	16
22	21	20	19	18	17
23	22	21	20	19	18
24	23	22	21	20	19
25	24	23	22	21	20
26	25	24	23	22	21
27	26	25	24	23	22
28	27	26	25	24	23
29	28	27	26	25	24
30	29	28	27	26	25
31	30	29	28	27	26
32	31	30	29	28	27
33	32	31	30	29	28
34	33	32	31	30	29
35	34	33	32	31	30
36	35	34	33	32	31

TOWNSHIP
DIAGRAM



MEAN
DECLINATION
1965

2R COLO. 788 406



Donner

1/6/71

The ARAPAHO 'crew'. Left to right: Heffernan, Smith
McDermith and Donner.



Donner

May/ 70

This depicts the water situation in 1970. Plenty. The
flow-level of the Illinois River ranged from 'high' to
'out of its banks' from May 1 through June 15.



Heffernan

1/31/70

Making "snowfence" on the meadows can save considerable on keeping the inroad to subheadquarters passable in winter.



Heffernan

1/31/70



Heffernan

5/22/70

The Illinois bottom at one of its narrower points at high flow. The channel enters the opening in the willows in the very immediate foreground. About 300 yards above road to subheadquarters.



Heffernan

6/12/70

In the evening, following the June rain-snow storm. Flooding in this case is from irrigation water supplemented by precipitation. Improved control at diversions should prevent this.



Heffernan

6/12/70

This is how it looked as we headed for the office on June 12.



Heffernan

6/12/70

Looking back (east) from hill.



Heffernan

1/30/70

Mule deer on south slope of Owl Ridge.



Heffernan

4/21/70

Sage grouse on strutting ground 2 miles east of sub-headquarters. Wildlife that stays year-round in North Park is of the hardy types.



Heffernan

5/2/70

At times the subheadquarters takes on the aspects of its former status - a cattle ranch. Above are cattle in the yards ready to go to summer pasture, below the bull wagons are waiting to take them out.



Donner

10/3/70



Donner

10/3/70

With some 500 head of yearlings yet to be loaded and hauled, this truck fell through the bridge.



Donner

10/4/70

The next day, 2 "straight trucks" hauled them across the gravel-bottom "river" and discharged them into the "big jobs".



Donner

5/28/70

An ambitious young man starting a new contracting business was hired to finish a job started last fall - cleaning Oklahoma ditch No. 1.



Donner

9/8/70

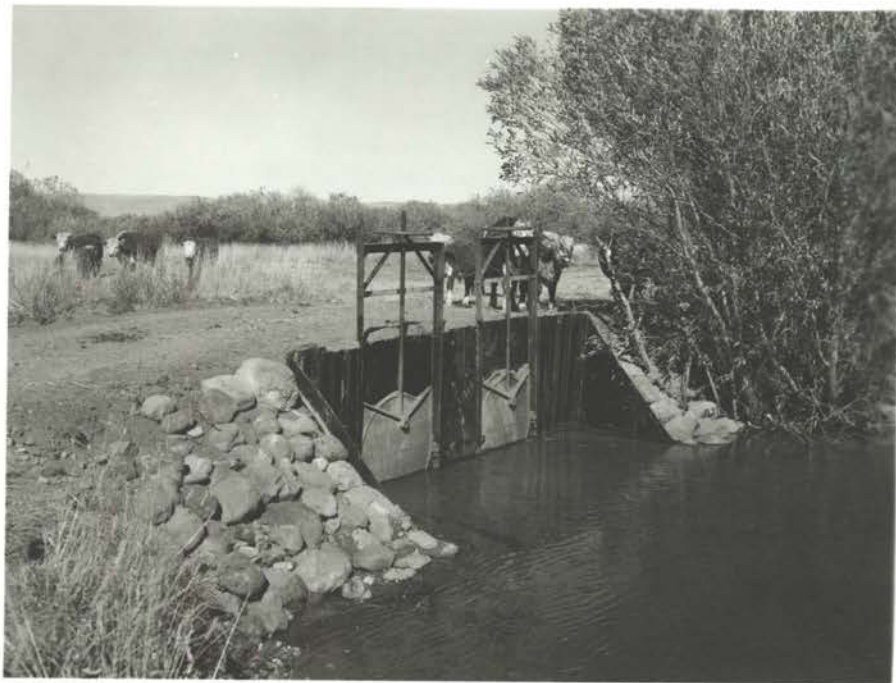
A used backhoe adapted to our International tractor comes in mighty handy. Here, Operator McDermith is setting a canal-check, to be used in creating a small pond for "brood water" - a much needed item here.



Donner

Aug/ 70

Headgates on Hubbard #2 Ditch BEFORE. Most of the water in this ditch is attached to Case Tract, purchased this year. George Allard, former owner of land on which it was located, says it washed out annually.



Donner

9/17/70

Same headgate as above, with our added features. Anti-seep collars were installed in center of fill also. We plan on this one staying.



Donner

Aug/ 70

Diversion and control gate at Oklahoma #1, before. A beaver had 'volunteered' his help here.



Donner

8/26/70

First step of 'rehabilitation'. The county's special post-driver mounted on a mobile crane was used to drive the pipe posts.



Donner

9/4/70

Further progress on Oklahoma #1. Operators McDermith and Krey laying out pieces of sheet piling to be used in extending 'wall' into bank when backhoe operator (contracted) returns from lunch.



Donner

9/9/70

Refuge Manager Heffernan and Operator Krey "on the rockpile". Riprap is an important part of these structures.



Donner

Nov/ 70

Hubbard #1 diversion check and control gate in place. Wherever feasible the check structure in the river and the control-gate to the irrigation ditch will be installed as a single unit.



Donner

Nov/ 70

Refuge Manager Heffernan looks over our diversion check and headgate control combination at Ward #3.



Donner

Nov/ 70

All our canal-checks and headgates get some "added features" before being installed. Above is a small portion of the structures receiving treatment in our shop this fall.



Donner

Nov/ 70

Here, Operator McDermith contemplates our work as 'cut out for us' next summer.

Jan.-April

WATERFOWL

REFUGE Arapaho

MONTHS OF January TO April , 1970

[illegible]

3-1750a
 Cont. 1
 (Rev. March 1953)

WATERFOWL
 (Continuation Sheet)

REFUGE Arapaho

MONTHS OF January TO April, 19 70

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production Broods: Esti seen : to
	3/8-14 11	3/15-21 12	3/22-28 13	3/29-4/4 14	4/5-11 15	4/12-18 16	4/19-25 17	4/26-5/2 18		
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard				5	20	60	75	75	1,645	
Black										
Gadwall					5	15	15	10	315	
Baldpate					5	10	15	20	350	
Pintail				5	30	90	85	80	2,030	
Green-winged teal				10	20	40	25	25	840	
Blue-winged teal					5	15	15	15	350	
Cinnamon teal						10	15	15	280	
Shoveler							5	5	70	
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup						5	10	10	175	
Goldeneye										
Bufflehead										
Ruddy										
Other										
Total Ducks				20	85	245	260	255	6,055	
Coot:						1	2	2	35	
				(over)						

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans	- -	- -	- -
Geese	- -	- -	- -
Ducks	6,055	260	- -
Coots	35	2	- -

SUMMARY	
Principal feeding areas	Rivers, nearby meadows, temporary ponds.
Principal nesting areas	Open meadows in sedges and grasses.

Reported by V. C. Donner
Observed by D. E. Heffernan

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Arapaho

Months of January to April, 19 70

(1) Species	(2) Density	(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks	
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'd.	Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Sage grouse	Sagebrush flats and draws, open meadows. 2,500 A.	50			75%./100%.				50	At least two "strutting" grounds situated on BLM land east of Allard tract. This land will ultimately be withdrawn for inclusion in Arapaho refuge. Approximately 135 birds on these two grounds.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1751

Form -1A

(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)Refuge ArapahoMonths of January to April, 19 70

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. <u>Water and Marsh Birds:</u>										
Great blue heron	1	4/15	1	4/15-30	1	4/30				15
Sora rail	2	4/18	5	4/20-30	5	4/30				60
II. <u>Shorebirds, Gulls and Terns:</u>										
Killdeer	2	3/11	20	4/10-30	20	4/30				500
Common snipe	1	3/6	10	4/15-30	10	4/30				250

(1)	(2)	(3)	(4)	(5)	(6)		
III. Doves and Pigeons:							
Mourning dove	2	3/20	20	4/15-30	20	4/30	400
White-winged dove							
IV. Predaceous Birds:							
Golden eagle	5	1/1	5	1/1-2/28	3	4/30	500
Duck hawk	1	3/20	2	4/20-4/30	2	4/30	50
Horned owl	8	1/1	8	1/1-4/30	8	4/30	1,000
Magpie	150	1/1	150	1/1-2/15	100	4/30	15,000
Raven							
Crow	5	1/1	30	3/15-4/30	30	4/30	2,000
Turkey vulture	1	1/1	2	2/1-4/1	1	4/30	180
Marsh hawk	1	3/1	5	4/15-30	5	4/30	100
Red-tailed hawk	1	4/16	1	4/16-25	1	4/25	10
Swainson's hawk	2	1/1	8	4/10-30	8	4/30	600
Rough-legged hawk	2	1/1	2	1/1-2/28	1	3/15	135
Ferruginous hawk	3	1/1	3	1/1-3/15	2	4/30	325
Bald eagle	1	1/1	1	1/1-3/31	1	3/31	90
Prairie falcon	2	1/1	3	4/1-4/30	3	4/30	275
Sparrow hawk	2	3/1	8	4/1-30	8	4/30	375
Saw-whet owl	1	4/29	1	4/29	1	4/29	1

Reported by V. C. Donner
Observed by D. E. Heffernan

appropriate spaces. special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)

II. Shorebirds, Gulls and Terns (Charadriiformes)

III. Doves and Pigeons (Columbiformes)

IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1754
Form No. 4
(June 1945)

SMALL MAMM

10-month period

Refuge Arapaho

~~Year~~ ending April 30, 1970

(1) Species Common Name	(2) Density Cover Types & Total Acreage of Habitat	Acres Per Animal	(3) Removals						(4) Disposition of Furs					(5) Total Popula- tion
			Hunting	Fur Harvest	Predator Control*	For Re- stocking	For Re- search	Share Trapping Permit Number	Trappers Share	Refuge Share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
Long-tailed weasel	Sagebrush-meadow transition. 750 A.	75												10
Striped skunk	All irrigated meadowland. 3,000 A.	60												50
Badger	Sagebrush and sagebrush-meadow transition. 2,000 A.	133												15
Red fox	"	500												4
Coyote	"	200												10
Richardson's ground squirrel	"	3.3												600
White-tailed prairie dog	"	100												20
Muskrat	River, standing water areas. 500 A.	25												20
Beaver	River, old oxbows, irrigation ditches. 1,000 A.	28.5												35
White-tailed jackrabbit	Sagebrush and sagebrush-meadow transition. 2,400 A.	40												60
*List removals by Predator Animal Hunter														
Nuttall's cottontail	Meadow areas with dense willows. 1,500 A.	60												25
REMARKS:														

Observed by D. E. Heffernan
Reported by V. C. Donner

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i.e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

- (1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)
- (2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.
- (4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.
- (5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.
- REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

May-Aug.

WATERFOWL

REFUGE Arapaho

MONTHS OF May TO August, 19 70

[illegible]

3-1750a
Cont. 1 1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Arapaho

MONTHS OF May TO August, 19 70

(1) Species	(2) Weeks of reporting period							(3) Estimated waterfowl days use	(4) Production Broods: Esti seen : to	
	7/12-18 11	7/19-25 12	7/26-8/1 13	8/2-8 14	8/9-15 15	8/16-22 16	8/23-29 17		18	
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	55	50	45	40	40	50	55	6,125	11	100
Black										
Gadwall	30	30	30	30	35	40	45	3,675	2	20
Baldpate	40	40	40	40	50	55	60	5,061	6	65
Pintail	50	55	60	60	65	65	65	6,930	3	35
Green-winged teal	25	25	30	30	35	40	50	3,290	5	55
Blue-winged teal				5	5	5	5	357		
Cinnamon teal	5	5	5	5	10	10	10	826	2	20
Shoveler	5	5	5	5	5	5	10	609	1	10
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup	15	20	15	20	20	20	25	1,960		
Goldeneye										
Bufflehead										
Ruddy										
XXXX C. Merg.				5	5			182		
Total Ducks	225	230	230	240	270	290	325	29,015	30	305
Coot:	5	5	10	10	10	10	10	770	1	10
				(over)						

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans	- -	- -	- -
Geese	- -	- -	- -
Ducks	29,015	325	305
Coots	770	10	10

SUMMARY
Principal feeding areas <u>Open meadows, along shoreline of river, small stockponds.</u>
Principal nesting areas <u>In open and willow-choked meadows.</u>

Reported by V. Carrol Donner
Observed by David E. Heffernan

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751

Form -1A

(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)Refuge ArapahoMonths of May to August, 19 70

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. <u>Water and Marsh Birds:</u>										
Great blue heron	1	5/1	5	8/1-30	5	8/31		1	2	350
Snowy egret	2	6/16	2	6/15-30	2	6/30				30
Black-crowned night heron	5	5/18	9	8/10-31	9	8/31		3	6	675
Yellow-crowned night heron	1	6/1	1	6/1-10	1	6/10				10
American bittern	2	6/1	5	8/10-31	5	8/31				325
Virginia rail	3	6/1	10	8/1-31	10	8/31				650
Sora	5	5/1	150	7/1-8/31	150	8/31		10	65	13,500
II. <u>Shorebirds, Gulls and Terns:</u>										
Killdeer	20	5/1	35	7/15-8/15	15	8/31		8	20	2,750
Common snipe	10	5/1	15	7/15-8/31	15	8/31		6	18	1,500
Long-billed curlew	1	6/1	1	6/1-30	1	6/30				30
Spotted sandpiper	5	5/20	10	6/15-7/15	5	8/31			10	675
Willet	2	5/15	4	6/1-30	1	8/31		2	5	250
American avocet	5	6/1	10	7/1-8/31	10	8/31		5	10	800
Wilson's phalarope	25	5/15	75	7/1-8/15	25	8/31		20	50	5,800
Forster's tern	2	5/15	3	6/1-30	3	6/30				120
Black tern	1	6/1	1	6/1-10	1	6/10				10
(over)										

(1)	(2)		(3)		(4)		(5)		(6)
III. <u>Doves and Pigeons:</u>									
Mourning dove	20	5/1	60	8/15-31	60	8/31	2	15	2,500
White-winged dove									
IV. <u>Predaceous Birds:</u>									
Golden eagle	3	5/1	5	7/1-8/31	5	8/31			450
Duck hawk	2	5/1	2	5/1-6/30	1	8/10			160
Horned owl	8	5/1	10	7/15-8/31	10	8/31	1	4	1,050
Magpie	100	5/1	200	7/15-8/31	200	8/31	25	100	18,500
Raven									
Crow	30	5/1	50	8/1-31	50	8/31	5	15	4,000
Turkey vulture	1	5/1	2	7/1-8/31	2	8/31			180
Red-tailed hawk	1	5/1	1	5/1-8/12	1	8/12			100
Swainson's hawk	8	5/1	20	7/15-8/31	20	8/31	4	10	1,900
Rough-legged hawk	1	6/1	1	6/1-15	1	6/15			15
Ferruginous hawk	2	5/1	3	7/1-30	1	8/12			225
Bald eagle	1	5/10	1	5/10-20	1	5/20			10
Marsh hawk	5	5/1	7	8/1-31	7	8/31	1	4	675
Prairie falcon	3	5/1	7	8/1-31	7	8/31		4	600
Sparrow hawk	8	5/1	15	7/15-8/31	15	8/31		6	1,400

Reported by V. Carol Donner

Observed by: David E. Heffernan

INSTRUCTIONS (See Sec. 7532, Wildlife Refuges Field Manual)

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Arapaho For 12-month period ending August 31, 1970

Reported by V. Carrol Donner
Observed by David E. Heffernan

Title Refuge Manager

(1)	(2)			(3)	(4)	(5)
Area or Unit	Habitat				Breeding	
Designation	Type	Acreage		Use-days	Population	Production
Meadow -	Crops		Ducks	50,330	175	305
	Upland	1,518	Geese	315	- -	- -
	Marsh	2,900	Swans	- -	- -	- -
	Water	15	Coots	805	4	10
	Total	4,433	Total	51,450	179	315
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

- (1) Area or Unit: A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.
- (2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.
- (3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.
- (4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.
- (5) Production: Estimated total number of young raised to flight age.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Arapaho

Months of May to August, 1970

(1) Species	(2) Density		(3) Young Produced	(4) Sex Ratio	(5) Removals	(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'd. Estimated Total	Percentage	Hunting For Re- stocking For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Sage grouse	Sagebrush flats and draws, open meadows 3,000 acres	25	3	30	100:100	120	Refuge closed to hunting. Chick mortality high due to late spring snowstorms.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1750
Form 1
(Rev. March 1953)

WATERFOWL

REFUGE Case Tract (Arapaho Refuge)

MONTHS OF May TO August, 19 70

due for inclusion in project May, 1972

(2)

Weeks of reporting period

(1) Species	5/3-9 1	5/10-16 2	5/17-23 3	5/24-30 4	5/31-6/6 5	6/7-13 6	6/14-20 7	6/21-27 8	6/28-7/4 9	7/5-11 10
<u>Swans:</u>										
Whistling										
Trumpeter										
<u>Geese:</u>										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
<u>Ducks:</u>										
Mallard	250	250	300	325	275	200	200	200	200	200
Black										
Gadwall	450	475	575	600	300	150	100	110	100	100
Baldpate	300	350	400	400	250	200	180	175	170	170
Pintail	125	145	170	175	150	125	125	125	125	125
Green-winged teal	150	150	125	110	60	50	20	20	5	5
Blue-winged teal	50	40	25	25	10	5				
Cinnamon teal	75	60	50	40	20	10	10	15	10	10
Shoveler	15	15	15	10	10	10	10	10	10	10
Wood										
Redhead	90	100	120	100	40	25	5	5	5	5
Ring-necked	5									
Canvasback										
Scaup	175	200	225	175	75	50	30	30	30	25
Goldeneye										
Bufflehead										
Ruddy					10	5	5	5	5	5
Other										
Total Ducks	1685	1785	2005	1960	1200	830	685	695	660	655
<u>Coots:</u>	100	100	100	100	125	125	125	150	150	150

3-177a
Cont. M. 1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Case Tract (Arapaho Refuge)
due for inclusion in project May, 1972

MONTHS OF May TO August, 19 70

(1) Species	(2) Weeks of reporting period							(3) Estimated waterfowl days use		(4) Production Broods:Esti seen : to	
	7/12-18 : 11	7/19-25 : 12	7/26-8/1 : 13	8/2-8 : 14	8/9-15 : 15	8/16-22 : 16	8/23-29 : 17	18			
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada											
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard	175	150	150	150	150	175	180		24,710	12	125
Black											
Gadwall	100	90	85	85	85	100	110		25,305	7	75
Baldpate	175	175	175	160	160	175	180		26,565	14	150
Pintail	125	120	120	115	115	125	130		15,680	13	145
Green-winged teal	10	25	30	50	170	180	200		9,520	8	80
Blue-winged teal				5	15	30	50		1,785		
Cinnamon teal	15	10	10	10	6	25	50		2,982	2	25
Shoveler	10	10	15	15	15	20	20		1,540	4	45
Wood											
Redhead	5								3,500		
Ring-necked									35		
Canvasback											
Scaup	25	30	25	20	19	20	30		8,288	9	100
Goldeneye											
Bufflehead											
Ruddy	5	5	5	5	5	10	10		560	3	20
Other											
Total Ducks	645	615	615	615	740	860	960		120,470	72	765
Coot:	150	175	175	175	200	200	210		17,570	20	150
				(over)							

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans	- -	- -	- -
Geese	- -	- -	- -
Ducks	120,470	2,005	765
Coots	17,570	210	150

SUMMARY

Principal feeding areas Open ponds, marshes,
open meadows.

Principal nesting areas In meadows in vicinity of small
ponds, lakes, and marshes.

Reported by V. Carrol Donner
Observed by David E. Heffernan

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

May-August

Refuge Case Tract (Arapaho)

For ~~1970-1971~~ period ending August 31, 1970

Reported by V. Carol Donner

Title Refuge Manager

Observed by David E. Heffernan

(1)		(2)		(3)	(4)	(5)
Area or Unit		Habitat			Breeding	
Designation	Type	Acreage		Use-days	Population	Production
Section Incomplete pending actual acquisition	Crops		Ducks	120,470	400	765
	Upland		Geese	--	--	--
	Marsh		Swans	--	--	--
	Water		Coots	17,570	75	150
	Total		Total	138,040	475	915
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

- (1) **Area or Unit:** A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.
- (2) **Habitat:** Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.
- (3) **Use-days:** Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.
- (4) **Breeding Population:** An estimate of the total breeding population of each category of birds for each area or unit.
- (5) **Production:** Estimated total number of young raised to flight age.

Sept.-Dec.

WATERFOWL

REFUGE Arapaho

MONTHS OF September 1 TO December 31, 19 70

(1) Species	(2) Weeks of reporting period									
	8/30-9/5	9/6-12	9/13-19	9/20-26	9/27-10/3	10/4-10	10/11-17	10/18-24	10/25-31	11/1-7
<u>Swans:</u>										
Whistling										
Trumpeter										
<u>Geese:</u>										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
<u>Ducks:</u>										
Mallard	50	40	40	35	20	20	20	20	5	5
Black										
Gadwall	40	35	30	25	15	10	10	5		
Baldpate	60	50	50	50	30	25	20	15	5	5
Pintail	50	40	30	25	15	15	10	10	10	10
Green-winged teal	60	75	60	50	40	30	20	10	5	
Blue-winged teal	10	15	15	10	10	5				
Cinnamon teal	15	15	15	10	5	5				
Shoveler	10	10	10	5	5					
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup	20	15	15	15	15	10	10	10		
Goldeneye										
Bufflehead										
Ruddy										
Other										
XXXX C. Merg.			5	5	5					
Total Ducks:	315	295	270	230	160	120	90	70	25	20
Coot:	10	5	5	5	5					

3-1750a
Cont. N. 1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Arapaho

MONTHS OF September 1 TO December 31, 1970

(1) Species	(2) Weeks of reporting period (5 days)								(3) Estimated waterfowl days use	(4) Production Broods:Esti seen : to
	11/8-14	11/15-21	11/22-28	11/29-12/5	12/6-12	12/13-19	12/20-26	12/27-31		
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	----- Water Areas Frozen -----								1,785	
Black									1,190	
Gadwall									2,170	
Baldpate									1,505	
Pintail									2,450	
Green-winged teal									455	
Blue-winged teal									455	
Cinnamon teal									280	
Shoveler										
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup									770	
Goldeneye										
Bufflehead										
Ruddy										
Other									105	
Total Ducks:									11,165	
									210	
Coot:										

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production	SUMMARY
Swans	_____	_____	_____	Principal feeding areas Open meadows near water,
Geese	_____	_____	_____	temporary potholes.
Ducks	<u>11,165</u>	<u>315</u>	_____	Principal nesting areas Open meadows in sedges and
Coots	<u>210</u>	<u>10</u>	_____	grasses.
				Reported by <u>V. Carrol Donner</u>
				Observed by <u>David E. Heffernan</u>

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

(CONTINUATION SHEET)
WYDENECAT

Form -1A
(Aug. 1952)

MIGRATORY BIRD
(Other than Waterfowl)

Months of September 1 to December 31, 1970

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. <u>Water and Marsh Birds:</u>										
Great blue heron	5	9/1	5	9/1-15	1	9/26				100
Black-crowned night heron	9	9/1	10	9/10-30	2	10/10				350
American bittern	5	9/1	5	9/1-10	1	9/26				85
Virginia rail	10	9/1	10	9/1-30	2	10/10				350
Sora	150	9/1	150	9/1-20	10	10/15				4,250
II. <u>Shorebirds, Gulls and Terns:</u>										
Killdeer	15	9/1	30	9/5-30	3	10/30				1,200
Common snipe	15	9/1	25	9/10-10/10	1	11/5				1,150
Spotted sandpiper	5	9/1	15	9/10-30	2	10/10				500
Willet	1	9/1	5	9/10-10/10	1	10/15				200
American avocet	10	9/1	10	9/1-10/1	2	10/10				350
Wilson's phalarope	25	9/1	60	9/10-30	10	10/10				1,900

(over)

(1)	(2)		(3)		(4)		(5)		(6)
III. Doves and Pigeons:									
Mourning dove	60	9/1	150	9/10-30	15	11/15			6,000
White-winged dove									
IV. Predaceous Birds:									
Golden eagle	5	9/1	5	9/1-30	3	12/31			425
Duck hawk	1	10/1	1	10/1-30	1	10/30			30
Horned owl	10	9/1	10	9/1-10/15	6	12/31			1,000
Magpie	200	9/1	200	9/1-11/1	150	12/31			21,500
Raven									
Crow	50	9/1	50	9/1-30	5	12/31			2,500
Turkey vulture	2	9/1	2	9/1-12/31	2	12/31			214
Red-tailed hawk	1	9/26	1	9/26-10/30	1	10/30			35
Swainson's hawk	20	9/1	20	9/1-30	3	12/31			1,050
Rough-legged hawk	1	10/28	1	10/28-11/6	1	11/6			10
Ferruginous hawk	1	9/16	1	9/16-30	1	9/30			15
Marsh hawk	7	9/1	10	9/5-10/5	2	12/31			600
Osprey	1	9/25	1	9/25-27	1	9/27			3
Prairie falcon	5	9/1	5	9/1-30	2	12/31			340
Pigeon hawk	1	9/20	1	9/20-30	1	9/30			10
Sparrow hawk	15	9/1	15	9/1-30	3	12/31			800

Reported by V. Carrol Donner

Observed by: David E. Heffernan

INSTRUCTIONS (See Sec. 7532, Wildlife Refuges Field Manual)

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first migration record for the species for the reporting period.
- (3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1750c
Form NR-1
(Sept. 1960)

WATERFOWL HUNTER KILL SURVEY

Refuge Arapaho

Year 19670

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
			Refuge closed to hunting.					

(over)

INSTRUCTIONS

- (1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.
- (2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.
- (3) Record the total number of hours the hunters spent hunting on the refuge.
- (4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).
- (5) Record total numbers of waterfowl bagged.
- (6) Record total numbers of waterfowl reported knocked down but not recovered.
- (7) Total of Columns 5 and 6.
- (8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).
- (9) Kill sample projected to 100 percent. $\text{Column 9} = \frac{\text{Column 8}}{\text{Column 2}} \times \text{Column 7}.$

3-1752

Form NR-2

(April 1946)

UPLAND GAME BIRDS

Refuge ArapahoMonths of September 1 to December 31, 1970

(1) Species	(2) Density	(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs 'v' d. Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Sage grouse	Sagebrush flats and draws, open meadows. 2,500 acres	33.3		100:100				75	Refuge closed to hunting. Surrounding area season: Sept. 12-14, 2 birds/day, 4 in possession. Some utilization by hunters as birds move off refuge. Hunting pressure around refuge light, success good.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form 3-3
(June 1945)

BJC GAME

Refuge Arapaho

Calendar Year 1970

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover Types, Total Acreage of Habitat	Number	Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At Period of Greatest Use	As of Dec. 31	
Pronghorn	Sagebrush flats and draws, some meadow areas. 1,000 A.	1										10	5	20:100
Mule deer	Sagebrush draws, willow- choked meadows. 1,200 A.	2										200	40	20:100

Remarks:

Observed by David E. Heffernan
Reported by V. Carrol Donner

INSTRUCTIONS

Form NR-3 (Form-1753) - BIG GAME

- (1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated total number of young produced on refuge.
- (4) REMOVALS: Indicate total number in each category removed during the year.
- (5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.
- (7) TOTAL REFUGE POPULATION: Give the estimated population of each species on the refuge at period of its greatest abundance and also as of December 31.
- (8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

116008

3-1755

Form 5
6070.

DISE

Refuge ArapahoYear 19 70

Botulism

Lead Poisoning or other Disease

Period of outbreak None observed.

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) _____

Condition of vegetation and invertebrate life _____

Remarks _____

Kind of disease None observed.

Species affected _____

Number Affected

Species	Actual Count	Estimated
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

Refuge Arapaho Year 19 70

Collections and Receipts (Seeds, rootstocks, trees, shrubs)							Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Nothing to report.													

- (1) Report agronomic farm crops on Form NR-8
- (2) C = Collections and R = Receipts
- (3) Use "S" to denote surplus

Total acreage planted:

Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

3-1758
Form Nk-6
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Arapaho County Jackson State Colorado

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
			<u>Harvested</u>		<u>Unharvested</u>				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
None									
								Fallow Ag. Land	None

No. of Permittees: Agricultural Operations 0 Haying Operations 0 Grazing Operations 1

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
None				1. Cattle *	1453 6 horses	5,001	12,001.20	4,433
				2. Other				
				1. Total Refuge Acreage Under Cultivation				None
Hay - Wild				2. Acreage Cultivated as Service Operation				None

* Includes horses incidental to grazing operations.
Reporting period, January 1 - December 31, 1970.

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (4) A total of columns 2 and 3.
- (6) Column 4 less column 5.
- (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters granary," etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number

Reporting Year

1-70

1970

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7/13/70 to 8/4/70	Willow, spp.	Oklahoma #1 irrigation ditch banks.	Less than 5 acres.	2,4-D	7.5 gal.	4 lb. acid- equivalent per acre	Water, 1 part chemical 200 part H ₂ O	Pickup mounted gasoline engine powered sprayer with hand- gun.

10. Summary of results (continue on reverse side, if necessary)

Nearly 100% kill on treated willows.