

A BIOLOGICAL RECONNAISSANCE

National Elk Refuge

Summer- - 1958



July 6, 1958

Teton County, Wyoming

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Summer 1958

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## A BIOLOGICAL RECONNAISSANCE

### NATIONAL ELK REFUGE

SUMMER 1958

#### INTRODUCTION

The present detail is a continuation of the work started during the summer of 1957. The recent moves for inter-agency action concerning the Jackson Hole elk herd emphasize the need for the compilation of as much material as possible concerning that part of herd management that applies to the National Elk Refuge. The purpose of this compilation is to assemble as many facts as possible in an accessible form for efficient administrative use.

Field work was conducted on a number of projects. Noxious weeds were mapped in cooperation with the Soil Conservation Service. Summering elk were located and a count was made. A mammal list was made that is being submitted separately for consideration as one of the new "300" refuge leaflet series. Observations were made on the nesting trumpeter swans.

As indicated by the index, other data were secured and assembled for the record. Thirty-three days were spent on or in the vicinity of the refuge between June 4 and July 6.

#### ACKNOWLEDGEMENTS

The section on additions to the annotated mammal list is based upon a memorandum from Stanley P. Young, Director, Branch of Wildlife Research Bureau of Sport Fisheries and Wildlife.

The Yellow Jacket snow course data was secured through the courtesy of the Supervisor's office, Teton National Forest.

Field assistance in the noxious weed mapping was provided by SCS work unit conservationist Roy H. Buchmeier.

Literature citations are found in the report sections to which they apply.

A few profitable hours were spent with Dr. A. R. Beetle, University of Wyoming, on plant identification.

# YELLOW JACKET SNOW COURSE SUMMARIES

The Yellow Jacket snow course is located very close to the Goosewing Ranger Station on the Teton National Forest. The Ranger Station is on the Gros Ventre drainage northeast of the refuge.

This area was selected as a sample of annual snow depth as it might affect winter elk populations on the refuge. Through the courtesy of the U. S. Forest Service, a summary of this snow course data for the period 1944 through 1958 follows. As more data are accumulated it is thought that a definite correlation might be found between snow depth and elk wintering numbers:

## YELLOW JACKET SNOW COURSE SUMMARIES 1944-1958

YEAR	Feb. 1 Meas.			March 1 Meas.			April 1 Meas.			May 1 Meas.		
	Date taken	Snow depth	Water cont.	Date taken	Snow depth	Water cont.	Date taken	Snow depth	Water cont.	Date taken	Snow depth	Water cont.
1944				3/2	16.2	1	3/29	20	2			
1945												
1946							3/23	27.6	5.7			
1947				2/28	23.6	5.4	4/2	24.6	6.0			
1948				3/2	21.5	4.7	3/30	21.6	4.9			
1949				3/2	29.9	6.9	3/31	30.5	8.2	4/29	0	0
1950	2/16	23.8	5.2									
1951	2/5	35.1	7.3	3/6	38.5	8.0	3/27	38.3	9.7	4/30	07	0
1952				3/5	26.6	5.6	4/1	30.5	7.1			
1953	2/4	19.7	4.6	3/5	23.4	5.4	3/31	16	3.1			
1954				3/4	27.7	6.5	3/27	30.6	7.9	5/5	0	0
1955				2/25	19.4	3.5	3/30	22.3	4.9		0	0
1956	2/5	32	7.3	3/13	39	9.2	4/3	29.8	5.4			
1957	2/5	22	3.5	3/4	21.4	4.54	3/29	24.1	6.1	4/29	16	4.8
1958	1/29	23.5	3.0	2/26	27	4.7	4/3	27	7.7			



ELK FEEDING RECORD

1912-1958 inclusive

Following is a tabulation of elk feeding on the National Elk Refuge. In some years the State Game and Fish Department has produced feed that has been fed to the elk on the refuge. This tonnage, if recorded, is indicated in a separate column. The data for the years 1912 to 1928 inclusive was secured from table 8, page 32 of Cooperative Wild Life Conservation and Control in Wyoming under the leadership of the United States Biological Survey (1929) by Albert M. Day and Almer P. Nelson. This publication is found in the National Elk Refuge files. The years after 1928 have been assembled from refuge records. In 1925 and 1928 the Izaak Walton League supplied part of the hay listed under "FWS" in the following table. Although listed for both State and Federal the cottonseed and corn fed is not included in each year's total in the column "Total Tons Hay Fed".

Elk Feeding Record

National Elk Refuge

Year	Period of Feeding	State Hay Fed (tons)	FWS Hay Fed (tons)	Total Tons Hay Fed
1912	Jan. 14-Apr. 15		920	920
1913	Feb. 15-Apr. 21		500	500
1914	Jan. 30-Mar. 28		550	550
1915	No feeding			
1916	Jan. 12-Mar. 27			1,000
1917	Jan. 15-Apr. 5			1,060
1918	Feb. 7-Apr. 8			890
1919	Mar. 5-Apr. 27		164	164
1920	Dec. 27-Apr. 20			1,900
1921	Jan. 19-Mar. 18		225	225
1922	Jan. 4-Apr. 24			1,200
1923	Jan. 23-Apr. 25			955
1924	Feb. 4-Apr. 9			565
1925	Jan. 5-Mar. 28			1,189

Year	Period of Feeding	State Hay Fed (tons)	FMS Hay Fed (tons)	Total Tons Hay Fed
1926	No Feeding			
1927	Jan. 20-Apr. 27		3,006	3,006
1928	Jan. 12-Apr.		3,266	3,266
1929	Feb. 5-Mar. 18	370	550	920
1930	Feb. 8-Mar. 26	510	315	825
1931	No Feeding			
1932	Jan. 3-Apr. 5	640	2,755	3,395
1933	Jan. 6-Apr. 16	250 cottonseed	2,200	2,200
1934	No Feeding			
1935	Jan. 1-Apr. 20	170 cottonseed 50 corn	3,261 32 cottonseed	3,261
1936	Feb. 5-Apr. 19	40 cottonseed	1,380	1,380
1937	Mar. 3-Apr. 12		510	510
1938	Feb. 12-Apr. 16		1,700	1,700
1939	Feb. 20-Mar. 21		992	992
1940	No Feeding			
1941	Jan. 22-Mar. 20		1,717 103 cottonseed	1,717
1942	Feb. 6-Apr. 4		1,804	1,804
1943	Jan. 4-Apr. 4	520 189 cottonseed	2,133 20 cottonseed	2,673
1944	No Feeding			
1945	Jan. 24-Apr. 7		1,072 15 grain hay 8 straw	1,072
1946	Jan. 15-Apr. 4		1,550 30 grain hay 75 straw	1,550
1947	Feb. 3-Feb. 19		203	203
1948	No Feeding			

Year	Period of Feeding	State Hay Fed (tons)	FWS Hay Fed (tons)	Total Tons Hay Fed
1949	Jan. 4-Apr. 7		2,900	2,900
1950	Feb. 6-Apr. 7		1,317	1,317
1951	Jan. 24-Apr. 1		1,470	1,470
1952	Jan. 14-Apr. 11		2,670	2,670
1953	Mar. 3-Mar. 13 Mar. 20-Mar. 25		360	360
1954	Feb. 2-Apr. 4		1,781	1,781
1955	Feb. 10-Apr. 1		1,354	1,354
1956	Jan. 25-Mar. 30		3,300	3,300
1957	Jan. 30-Feb. 27		612	612
1958	Jan. 7-Mar. 28		2,007	2,007

#### ELK FEEDING PROGRAM

Reference to the table on the elk feeding record in this report indicates the dates that feeding has been started during the period from 1912 to 1958.

During the past two seasons there has been another phase of this program that has been of benefit. This has been the harvesting of hay in rolled bales that are left in the field. This fodder is available to the elk as soon as they come into the refuge in the fall. In other words a form of prepared feed is ready whenever the elk wish to eat it.

The feeding program therefore includes two phases at the present time:

1. Rolled bales (w/o string or wire) left in the field for late fall consumption when the elk first come into the refuge.
2. The regular feeding of baled hay from the sleighs during the mid-winter period.

This improved system insures more feed, and at the same time takes pressure off of the natural forage of the refuge.

# ELK FALL MIGRATION RECORD

A search of refuge records revealed the data in the following listing. Of late years a summer resident elk herd has complicated this matter. This herd summers in the upper reaches of the refuge and suddenly appears at the lower levels before the main migration from the Teton National Forest and nearby park areas occurs.

It is suggested that each fall this record be continued. The accumulation of this data will help provide information for the formulation of a constantly improving feeding program.

## FIRST ELK FALL MIGRATION DATES Into National Elk Refuge Jackson, Wyoming

1915-1957 inclusive

Year	Date
1915	Dec. 10
1916	Dec. 15
1917	not found
1918	not found
1919	Nov. 2
1920	Nov. 27
1921	Nov. 28
1922	not found
1923	Dec. 11
1924	Nov. 5
1925	Oct. 12
1926	Oct. 30
1927	Nov. 13
1928	Nov. 15
1929	Oct. 28
1930	Oct. 26
1931	Oct. 20
1932	Oct. 15
1933	Oct. 16
1934	not found
1935	Nov. 15
1936	Dec. 10
1937	Nov. 17
1938	Nov. 4
1939	Jan. 4 (winter of 39-40)
1940	Oct. 30
1941	Nov. 6
1942	Nov. 1
1943	Oct. 22
1944	Nov. 7
1945	Nov. 10
1946	Oct. 21
1947	Nov. 9



Year	Date
1948	Oct. 12
1949	Oct. 16
1950	Oct. 9
1951	Oct. 19
1952	Oct. 13
1953	Oct. 15
1954	Oct. 4
1955	Oct. 3
1956	Oct. 26
1957	Oct. 7

HERD COMPOSITION  
FEED GROUND COUNTS

National Elk Refuge  
Selected Years  
1927-1956 inclusive

These refuge feed ground counts do not include the elk on the refuge that are not on the feed grounds at the time of the count. The main value of these figures is to secure a sample indicating herd composition.

Year	Bulls	Cows	Calves	Spikes (long yearlings)	Total
1927	450	3670	1143	258	5521
1931	131	2425	513	41	3110
1932	1160	4305	1214	194	6873
1935	646	6142	1860	315	8963
1936	631	3020	432		4083
1938	768	4552	1071	264	6655
1941	1182	5876	2216	530	9804
1942	1177	5947	2187	530	9841
1946	833	3929	1168	311	6241
1949	1070	3639	1572	588	6869
1952	1221	4403	1148	479	7251
1956	1712	5557 est.	1815	528	9612

The above figures were found on a typed sheet in the refuge files. They are believed to be the same figures (see exception below) referred to by Anderson and Wilson (Wyo. Proj. No. W-27-R-9, Work Plan No. 6, Job No. 2. 4-15-56).

Anderson and Wilson (ibid. 1956) state (p. 106), "twelve classified counts made on the Federal Elk Refuge in Jackson since 1927 show an average herd composition of 17.4% bulls, 63.5% cows and 19.1% calves, and a cow-calf ratio of 333-100. Spike bulls comprised 4.7% of the herd. -- An average of 24.6% of the estimated population had been killed by hunters each year since 1948".

Evidently there was more than one feed ground count in 1956. The one noted in the table above totals 9,612 elk. Anderson and Wilson (ibid, 1956, p. 108) refer to a National Elk Refuge March trend count totaling 11,017 elk. Their breakdown of this count follows:

<u>Bulls</u>	<u>Spikes</u>	<u>Cows</u>	<u>Calves</u>	<u>Total</u>
1489	447	7362	1719	11,017
<u>Bulls</u>	<u>Spikes</u>	<u>Cows</u>	<u>Calves</u>	<u>Cow-Calf</u>
<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>Ratio</u>
13.5	4.1	66.8	15.6	428-100

The average of previous classifications was worked out by Anderson and Wilson as:

<u>Bull</u>	<u>Spike</u>	<u>Cow</u>	<u>Calf</u>	<u>Cow-Calf</u>
<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>Ratio</u>
12.6	4.8	63.6	19.0	333-100

100:30 Calves.

#### ANNUAL ELK KILL

On page 18, Table V of the 1957 report, the annual kill of the Jackson Hole herd was listed from 1944 to 1956 inclusive.

During the present detail, further work was done on this subject. A table of elk data was found in the files that had been assembled in 1956. This data included the kill records for certain years from 1935 to 1943. These are found below. The 1957 kill of the Jackson Hole Management Unit (see 1957 report) was 3,061 elk.

#### ANNUAL ELK KILL

##### JACKSON HOLE ELK HERD

<u>Year</u>	<u>Number Legally Killed</u>
1935	4925
1936	6292
1937	
1938	
1939	1405

Year	Number Legally Killed
1940	3822
1941	
1942	5500
1943 Fall	5542

# CURRENT GAME RECORDS SHEET

In order to better record current observations of refuge personnel it is suggested that a field game record sheet be posted on the shop bulletin board. A sample sheet follows this paragraph. It is hoped that this method may better preserve sight records seen during each narrative report period.

## FIELD GAME RECORD National Elk Refuge Jackson, Wyoming

KIND	INITIALS	WHERE SEEN	DATE	NUMBER SEEN & NOTES
Bear				
Badger				
Mt. Sheep				
Bobcat				
Fox				
Otter				
Red Squirrel				
Flying Squirrel				
Porcupine				
Sage Grouse				
Ruffed Grouse				

### UINTA GROUND SQUIRREL INDEX COUNT

During the summers of 1957 and 1958 Uinta ground squirrels (Citellus armatus) were numerous. These rodents inhabit the fringe area between the refuge hills and the marshlands. In order to secure a population index for future comparisons an index count line was established.

The count line is ~~along the road~~ from the refuge entrance just east of headquarters along the road and past the shop area. It ends at the road forks at the base of the NE corner of Miller Butte. The length is 2.9 miles. All "chiselers" (local name) seen in the immediate vicinity of the road are counted from a car which is driven between 15 and 20 miles per hour.

It was learned that the highest number of squirrels was found on warm, sunny mornings, that were partly cloudy with little or no wind. When the sun was cloud-obscured, smaller counts were the rule. As sunset time approaches the chiselers scurry to their dens for the night. Few are seen above ground during rainstorms.

The best count of twelve runs was 54. This count was made between 7 and 8 a.m., on a warm, partly cloudy day with little wind.

It was noted on these runs that no cottontails, jackrabbits or snowshoe hares were seen. As a matter of record, no hares or rabbits were seen on the refuge during the entire 1958 detail.

### NOTES AND ADDITIONS TO ANNOTATED MAMMAL LIST

Under date of August 23, 1957 a report entitled "A Biological Reconnaissance, National Elk Refuge, Summer, 1957" was submitted.

This report included an annotated mammal list. The following notes are additions to this list. Much of the information found in the following is abstracted from a memorandum dated 5/26/58 from Stanley P. Young, Director, Bird and Mammal Laboratories, Branch of Wildlife Research and designated, "National Elk Refuge Specimens".

#### White-tailed Jack Rabbit:

(Lepus townsendii companius)

O. J. Murie collected a male June 18, 1929. The specimen is now No. 249313 in the U. S. Biol. Survey's Coll. (USBC).

#### Snowshoe Rabbit:

(Lepus americanus bairdii)

O. J. Murie collected a male and a female of this species in

the fall of 1933. The specimens consist of the skeletons. These are found in the USBSC in Washington, D. C. They constitute the most positive evidence of occurrence on record.

Yellow-bellied Marmot: (Marmota flaviventris nesophora)

O. J. Murie collected three marmots on the refuge in 1929 (May 2, one; May 17, two). These three males are found in the USBSC

A fourth specimen in the same collection was secured 8/27/39 by F. M. Fryzell.

Least Chipmunk: (Eutamias minimus consobrinus)

The USBSC contains a refuge-taken female of this species. It was secured 8/1/32 by O. J. Murie.

Uinta Ground Squirrel: (Citellus armatus)

Three specimens of this species including an immature male taken June 22, 1931 were secured by O. J. Murie (USBSC).

Golden-mantled Ground Squirrel (Citellus lateralis castanurus)

The only records found for this species are two specimens (USBSC): No. 24845; female; 8/21/27; O. J. Murie. No. 24899; male; 6/20/28; Adolph Murie.

Northern Pocket Gopher: (Thomomys talpoides)

In the 1957 list the subspecies was listed as tenellus. This was done on the basis of a typed mammal list of the adjacent Grand Teton National Park by the naturalist, Dr. Adolph Murie.

In Stanley Young's letter of May 26, 1958 referred to in the introduction of this list, a female northern pocket gopher, taken June 19, 1931 by O. J. Murie is listed as T. t. fuscus.

It therefore appears that there could be two forms of this gopher on the refuge. However, no specimen is recorded for a refuge-taken tenellus.

Reference to U. S. Nat'l. Mus. Bull. 205, "List of North American Recent Mammals" (page 317) does not specifically mention this record from Teton County, Wyoming.

Meadow Vole: (Microtus pennsylvanicus modestus)

Adolph Murie secured a meadow vole June 18, 1928 (USBSC).



Long-tailed Vole:

(Microtus longicaudus mordex)

On June 15, 1928 Adolph Murie secured a male of this species. (USBSC).

Sagebrush Vole:

(Lagurus curtatus pauperrimus)

O. J. Murie secured a male of this vole on December 3, 1928 (USBSC). The presence of this form is of interest as O. J. Murie also caught a specimen of L. c. levidensis in Jackson Hole. A full series of this rare species might reveal much of interest. As the common name suggests, this vole inhabits the sagebrush.

Black Bear:

(Euarctos sp.)

The 1957 report refers to recorded sight records of bears on the refuge. Stanley Young's letter of May 26, 1958, previously referred to in this report, includes two records of Euarctos. Evidently the specimens have not been studied for specific identity. They were collected by Sn N. Leek on April 23, 1914. One specimen is the cranium only while the other includes the skin (USBSC).

Badger:

(Taxidea taxus)

O. J. Murie collected a male on the refuge August 14, 1938. (USBSC).

Wapiti or Elk:

(Cervus canadensis nelsoni)

A total of twenty elk were collected on the refuge between 1928 and 1935 by O. J. Murie (USBSC). One of these (USBSC #251054 male) is a skeleton.

Mule Deer:

(Odocoileus hemionus)

The mule deer were collected by O. J. Murie in 1941. Both specimens are skeletons (USBSC). Evidently the specimens have not been subspeciated.

Moose:

(Alces alces shirasi)

O. J. Murie collected two moose on the refuge. A male secured 4/4/41 is represented by a skeleton (USBSC #272846). A female represented by a skull was collected October 5, 1938.

Bison:

(Bison bison)

A large bison skull was found on the refuge during the summer of 1957. It was found while digging out Petersen springs above the FWS fish hatchery. The skull measures twenty-four inches from tip to tip of the horn cores. This specimen is now (6/10/58) found on the porch of the refuge manager's quarters. As mentioned in the 1957 report buffalo do not now occur on the refuge.

SUMMER BIRD NOTES

The increasing public interest in birds is evidenced by the number of calls received by refuge managers for ornithological information.

Photographers and others often ask of specific locations and nesting dates. The following information accumulated during June, 1958, is offered as a start.

A new fresh water pond NW of Miller Butte has recently been developed. This addition has concentrated birds that otherwise would be scattered over a much larger area. The following birds were seen at this location on June 7, 1958: Spotted Sandpiper, Western Willet, Long-billed Curlew, Wilson Phalarope, Mallard, Gadwall, Meadowlark, Bobolink and Yellow-throat.

Many birds seen during the month are not herein listed as they are rather common and no facts were added that cannot be found in the refuge bird list.

<u>Species</u>	<u>Notes</u>
Trumpeter Swan	Blanchard noted a cygnet w/two adult birds 6/20, SW of Miller Butte A cygnet was seen 6/21 with an adult at the Flat Creek Bridge at N. end of Jackson (possibly the one seen 6/20)
Canada Goose	On 6/7 a pair of geese w/3 goslings was seen on Flat Creek from Miller Butte
Mallard	On 6/11 three broods (10,10,9) seen in pond at Flat Creek bridge just north of Jackson
Common Goldeneye	On 6/16 noted a female goldeneye w/8 young in beaver pond on Gros Ventre
Marsh Hawk	One seen over power house 6/19
Sage Hen	6/27. Female w/6 young by E.J.G.
Sandhill Crane	6/27. Four on Miller Butte

#14-

Species	Notes
American Coot	6/24. One on pond at S. end Miller Butte
Long-billed Curlew	6/17. Fair w/one young
Mourning Dove	6/19. One at McBride place 7/1 . Four at NE corner Mormon Row area
Great Horned Owl	6/17. One in aspens above Gros Ventre
Common Nighthawk	6/18. Two over Gros Ventre area
Common Raven	6/17. Three young in nest at twin sheds. One young on ground by nest
Clark's Nutcracker	6/17. In Douglas Fir edge just above Gros Ventre
Sage Thrasher	6/7. N side Miller Butte
Robin	6/19. With young in nest at power house
Mountain Bluebird	6/16. With young
Starling	6/13. Nest at refuge shop
Yellow-throat	6/7. At pond NW of Miller Butte
Yellow Warbler	6/24. Three eggs in nest in low bush
Bobolink	6/7. At pond NW Miller Butte
Yellow-headed Blackbird	6/24. Colony of at least 40 apparently nesting in reeds on Flat Creek $\frac{1}{2}$ mile N of bridge at N end of Jackson
Brewer's Blackbird	6/15. Young just off nest
Western Tanager	6/19. Power house
Lazuli Bunting	6/19. Power house
Green-tailed Towhee	6/7. Miller Butte
Vesper Sparrow	6/18. In sagebrush N. end of refuge

### NOXIOUS WEED MAPPING

The noxious weeds of the refuge were mapped as part of a county-wide cooperative program to learn the extent of the problem in Teton County. The field work was done with Roy H. Buchmeier, Work Unit Conservationist, Soil Conservation Service, Jackson.

Maps are 1" to the mile scale. Two sets were completed: one for refuge files and one for the County Agent. Standard colors, indicated below, were used. Weeds found were in disturbed areas such as roadsides. Areas around hay sheds also were centers of weed occurrence. Quackgrass (Agropyron repens) is quite common along the refuge irrigation ditches.

The eight weeds that were to be mapped, together with the standard colors, are listed below:

<u>Weed Name</u>	<u>Color</u>
1. Field Bindweed	Purple
2. Canada Thistle	Red
3. Leafy Spurge	Yellow
4. Perennial Sow Thistle	Pink
5. Quackgrass	Green
6. White Top	Blue
7. White-leaved Franceria	Brown
8. Russian Knapweed	Orange

Of the above, only two were found on the refuge:

1. Quackgrass (Agropyron repens)
2. White Top (Lepidium draba or repens)

A few plants of Canada Thistle (Cirsium arvense) were found in the Mormon Row area.

### SUMMER BIG GAME NOTES

Sedentary Elk Herd: Several days were spent in the field checking on the number of elk in the refuge. A map showing the range of the sedentary herd is found in the appendix of this report.

The State people drove out some of the elk in May.

Trips afoot and by car over the range in June netted sight records of 156 elk. One hundred ten of these were seen in one group. It is estimated that there is now a minimum of 160 elk summering on the refuge. When disturbed in the higher reaches of their summer range, the elk stream out of the aspen groves on the north slopes and disappear into the poplar trees along the Gros Ventre river.

Antelope: On June 19 a female pronghorn was sighted between the Petersen place and the beginning of the Curtis Canyon road. This is the first antelope that has been seen on the refuge since 1953.

The State Game Department reports that as many as 46 pronghorns have been seen on the upper Gros Ventre drainage. These animals are believed to be drifting over the Continental Divide from the ~~Sand~~ <sup>Gardiner</sup> River country. Just previous to the June 19 sighting there were several local reports of antelope being seen in the Jackson Hole area.

Mule Deer: A doe was seen at the eastern edge of Miller Butte on June 26.

Dr. A. R. Beetle, of the University of Wyoming pointed out that the "Plimsoll Line" on the junipers on Miller Butte was but six feet high. This contrasts with the eight foot line found in areas of heavy elk use.

For many years Miller Butte has been a favorite wintering ground of the local mule deer. The record, which goes back to 1932, varies between a count of three for that year and 62 in 1953. Last winter 60 deer wintered on the butte. The record, with some gaps, is found on page 13 of the 1957 reconnaissance.

#### MISCELLANEOUS

A series of miscellaneous matters included in the detail are listed:

1. The SCS work was discussed with both the refuge manager and the local Work Unit Conservationist, Mr. Buchmeier. A conference on the program and a field trip was had with SCS biologist Louis Moos.
2. A meeting on elk feeding with the Wyoming Game and Fish Department was attended with Messrs. Barclay, Greenwalt and Blanchard.
3. Colored photographs were taken of refuge work and left with the refuge manager.
4. A "spare-time" activity was the collection and cleaning of local owl pellets as a supplement to literature work on the local mammals.
5. Field time was devoted to observations on nesting trumpeter swans and related water level observations.
6. Observations and records were made of all duck broods seen. These



data are incorporated in the June waterfowl reports for the refuge. An estimated minimum of 250 ducks were produced.

7. The presence of alfalfa weevil and Downy Mildew in the Mormon Row area was checked in the field on June 30 with T. R. Robb, Extension Entomologist, A. D. Davison, Survey Specialist in Entomology, both of the University of Wyoming and Assistant Manager Blanchard. A survey of the sprayed area was made, 7/1 and a report submitted.
8. A trip by boat through the Flat Creek marsh was made 7/2 with Mr. Blanchard. Four eggs were found in a swan nest.
9. Mammal census figures as well as swan and elk management data found in the lists and tables of the 1957 report were abstracted from current narrative reports, and brought to date in the refuge copy of the 1957 reconnaissance.
10. A refuge tour for members of the Student Conservation Program was conducted with the refuge manager on July 4. This selected college group is sponsored by the National Parks Association and other prominent conservation groups.
11. Many of the records found in this and the 1957 reports will become more valuable as data from coming years ~~is~~<sup>are</sup> added to them. In line with the refuge manual and discussion with the refuge manager, the following joint suggestion is made. Refuge personnel can transfer pertinent game and related tables to ledger sheets. Then, each year current data can be abstracted from the narrative reports and added to the permanent refuge record.

#### SUMMARY

The index is probably the best summary that can be concisely written. The various facets of this reconnaissance reflect the several phases of refuge management on which facts were accumulated for more efficient management. A suggestion is made to transfer pertinent game tables to ledger sheets so that current records may be more easily maintained.

Respectfully submitted,

  
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Reviewed by:

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