

ANNUAL REPORT
CRESCENT LAKE REFUGE
Garden County in
NEBRASKA

Fiscal year ending
June 30, 1937

Submitted July 29, 1937

DEPARTMENT OF AGRICULTURE
BUREAU OF BIOLOGICAL SURVEY
I. H. GABRIELSON, CHIEF

By Walter W. Bennett
Asst. Refuge Manager

ANNUAL 1937



NE-CRL-084

GENERAL VIEW OF HEADQUARTERS.

The above shows Ginlet Lake, and the headquarters grove in which the refuge's main buildings are located.

Photo by W.W. Bennett

I. INTRODUCTION

A. PROGRESS

Considerable progress in game management programs was achieved on the Crescent Lake Refuge, during the Fiscal Year ending June 30, 1937. A large number of facilitating improvements were installed and substantial influences were made to apply upon the factors effecting wild life. The aim of the years work was to control important forms of wild life and increase the desired species.

B. EMPLOYEES

The management of the 70 sections of land, or 43,000 acres, that comprise the Refuge was carried on by the Refuge Manager without an assistant or a stenographer, with the use of WPA force varying from 15 to 65, no one of whom remained on the rolls for more than a short period. It has been necessary to continually train new men, and to make up for deficit in ability of various employees. The Refuge has had about 3 times the amount of work to be done by the writer as by his predecessor.

C. VALUE OF THE REFUGE

During the period the Crescent Lake Refuge has proved of very important usefulness to such fine game species as the Long-Billed Curlew, Avocet, Willet, Whistling Swan, wild geese, wild ducks, shore birds, Coot, grebes, hawks, owls and song birds. Some antelope also used the Refuge.

II. WILD LIFE ON THE REFUGE

A. KINDS AND NUMBERS OF BIRDS

1. Monthly Census

When the writer first took charge of this Refuge, he worked out a system of making a monthly census of its bird life. After 12 months trial no changes yet seem advisable in the method used. The Refuge is divided into 2 kinds of habitat areas. An actual count is made of certain species on 28 divisions of one kind of habitat, while the strip count method was used on the other. The aim is to count as nearly as possible each bird on the Refuge. The census is always taken the same way, over the same identical routes and a series of them are very reliable for comparative purposes. A sample of a monthly census is given on the next page.

2. Species Using the Refuge for the First Time

13 new species visited the Refuge during the year are as

Follows:

	First observed
<u>Gavia immer immer</u>	Oct. 14 (3)
<u>Anas rubripes rubripes</u>	Mar. 16 (1 pair)
<u>Querquedula cyanoptera</u>	June 10 (nest)

This is the first authoritative nest recorded for the state.

APRIL 20-22, 1937

	No. of individuals		
	Male	Female	Total
37 Branta c.c.			1
49 Chen h.h.			40
TOTAL GEESE			41
43 Anas p.p.	270	220	490
45 Chaulelasmus strep.	823	769	1592
46 Mareca am.	561	538	1099
48 Querquedula discors	9	8	17
49 Dafila s.t.	35	20	55
47 Nettion carolinense	616	414	1029
49 Spatula c.	2474	2236	4710
50 Nyroca americana	574	497	1071
50 Nyroca collaris	3	2	5
51 Nyroca vallis	197	280	477
54 Charitonetta a.	45	53	98
51 Nyroca affinis	382	378	760
59 Brismatura j.r.	247	246	493
Anatidae, unidentified			97
60 Mergus m. am.	110	26	136
TOTAL DUCKS			11,099
3 Colymbus auritus			20
19 Pelecanus c.			289
26 Ardea h.h.			9
68 Buteo swainsoni			8
72 Circus hudsonius			20
77 Falco s.s.			32
85 Tympanuchus c. am.			248
86 Pedicocetes p.c.			70
91 Phasianus c.t.			125
100 Fulica am. am.			1133
106 Oxyechus voc.v.			193
110 Capella delicata			2
111 Numenius a.a.			284
117 Tetanus flavipes			8
123 Brouzetes maurii			15
123 Brouzetes pusillus			49
126 Recurvirostra am.			73
127 Steganopus tri.			106
133 Larus del.			76
153 Zenaidura mac. marg.			48
165 Bubo virg. occid.			2
169 Speotyto c.h.			48
171 Asio flammeus fl.			8
187 Colaptes auratus luteus			24
188 Colaptes cafer collaris			16
197 Dryobatis pubescens			1
206 Sayornes saya saya			15
213 Otocoris ali.			2416
226 Carvus b.b.			1
255 Turdus m.m.			25
272 Lanius l. en.			8
287 Dendroica coronata			12

CENSUS OF CRESCENT LAKE REFUGEAPRIL 20-22, 1937

	No. of individuals		
	Male	Female	Total
301 <i>Sturnella magna magna</i>			104
302 <i>Sturnella neglecta</i>			1576
302 <i>Xanthocephalus x.</i>			118
304 <i>Agelaius ph. fortis</i>	627	21	648
306 <i>Zonotrichia q.a.</i>			34
340 <i>Poocetes g.c.</i>			328
346 <i>Junco ca.</i>			46
348 <i>Spizella arborea ochracea</i>			225
357 <i>Melospiza melodia</i>			48
361 <i>Rhyncophanes macowi</i>			490
362 <i>Calcarius ornatus</i>			360
	TOTAL ALL SPECIES		20,410

<u>Melanitta deglandi</u>	Sept. 23 (1 female)
<u>Falco peregrinus anatum</u>	Apr. 29 (3)
<u>Limosa fedoa</u>	Apr. 29 (2)
<u>Charadrius melodus</u>	June 24 (4)
<u>Larus philadelphia</u>	June 25 (1)
<u>Myiochanes virens</u>	May 31 (1)
<u>Buteo borealis</u>	June 6 (1)
<u>Iridoprocne bicolor</u>	June 4 (1)
<u>Piranga ludoviciana</u>	June 7 (4)
<u>Passerina amoena</u>	May 26 (3)

3. All Species of Birds Using Refuge

During the fiscal years total of 165 species of birds was observed using the Refuge. These are given on the following pages.

BIRDS OBSERVED ON CRESCENT LAKE REFUGE

From July 1, 1936 to
July 1, 1937.

By Walter W. Bennett.

showing date seen and number of individuals,
Underlined dates indicate census of entire refuge.

<u>Gavia immer immer</u>	Oct. 14(3).
<u>Colymbus auritus</u>	Oct. 14(9), Nov. 19(1), Apr. 22(20).
<u>Aechmophorus occidentalis</u>	July 24(120), May 28(56), June 17(74).
<u>Colymbus nigricollis californicus</u>	July 24(1068), May 24(6), May 28(357), June 17(452).
<u>Podilymbus podiceps podiceps</u>	July 24(103), Oct. 13(2), May 28(1).
<u>Pelecanus erythrorhynchos</u>	Oct. 6(19), Apr. 3(3), 4(227), 8(2087), 10(176), 13(567), 15(600), 20(250), 22(289), May 28(31), June 17(19).
<u>Phalacrocorax auritus auritus</u>	May 28(1).
<u>Ardea herodias herodias</u>	July 24(91), (ate grasshoppers on hillsides during summer), Oct. 13(2), 23(1), Apr. 8(1), 10(2), 14(1), 22(9), May 28(16), June 17(16).
<u>Nycticorax nycticorax hoactli</u>	July 24(131), Apr. 17(1), May 28(29), June 17(35), 25(nest 3 eggs in S. occidentalis.)
<u>Botaurus lentiginosus</u>	July 24(3), Apr. 19(1), May 24(1), 28(2), (nesting).
<u>Ixobrychus exilis exilis</u>	June 25(nest, 4 eggs).
<u>Cygnus columbianus</u>	Oct. 23(5), 29(6), Nov. 19(4).
<u>Branta canadensis canadensis</u>	Oct. 4(33), 13(13), 26(8), Nov. 19(162), Dec. 14(16), Feb. 21(30), Mar. 2(32), 20(92), 22(13), Apr. 4(7), 9(164), 12(2), 14(tame ones building), 20(1).
<u>Branta canadensis hatchinsii</u>	Mar. 13(2).
<u>Anser albifrons albifrons</u>	Mar. 13(5), 22(6).
<u>Chen hyperborea hyperborea</u>	Oct. 23(19), Mar. 7(6), 19(75), 16(26), 18((feeding on distichlis), 20(2058), 22(135), 26(16), 31(1559), Apr. 9 (272), 10(99), 16(6), 22(37).
<u>Anas platyrhynchos platyrhynchos</u>	July 10(3 yag), 24(416), Oct. 13(3700), 26(8646), Nov. 19(2834), Dec. 14(35), Jan. 16(6), Feb. 12(16), 13(36), 14(16), 9(0), 15(9), 16(264), 17(62), Mar. 1(67), 2(4000), 10(173M, 156F), 10(283M, 267F), 12(2400), 15(1), 20(2014M, 1874F), 26(75), 27(35), 30(545), 31(1004), Apr. 4(2275), 10(1st egg), 10(200), 11(44M, 41F).

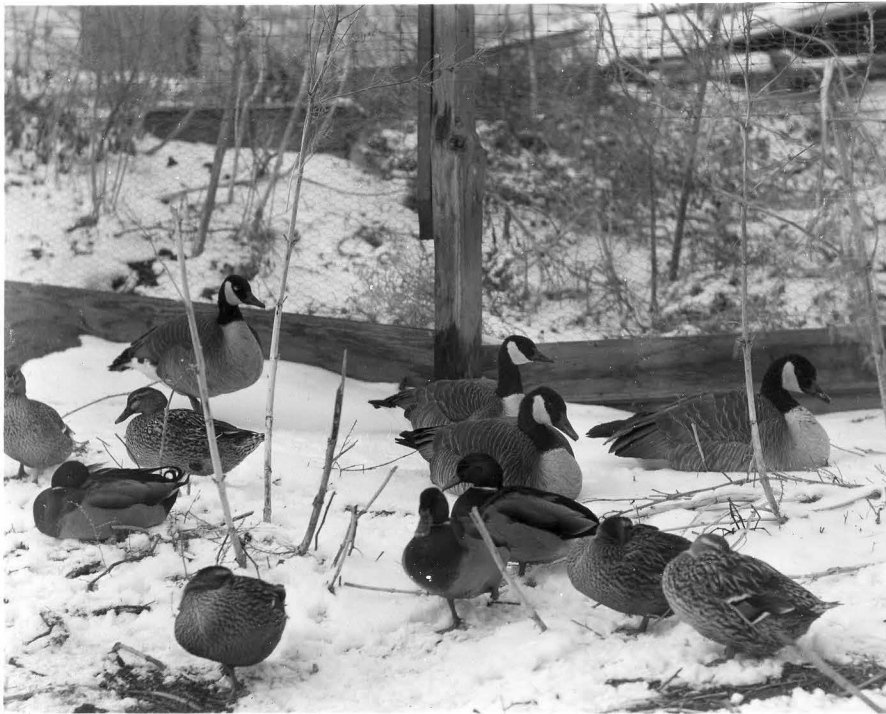
- 22(270M, 220F), 23(185M, 31F), June 17(197M, 69F).
- Anas rubripes rubripes*: Mar. 16(1 pair).
- Chaulelasmus streperus*: July 24(114), Oct. 13(575), 26(3986),
Nov. 19(11), Mar. 19(1M, 1F), 20(41M, 44F), 22(125), Apr. 4(77),
10(100M, 100F), 11(20M, 20F), 22(823M, 769F), May 26(121M, 89F),
June 17(144M, 88F).
- Mareca americana*: July 24(24), Oct. 23(221), Nov. 19(2), Mar. 10(1M, 1F),
23(8M, 9F), Apr. 4(15), 11(18M, 18F), 22(661M, 538F), May 28(9M, 5F),
June 17(24M, 9F).
- Dafila acuta tsitsihca*: July 24(685), Oct. 13(500), 26(761), Nov. 19(3),
Mar. 1(8), 5(250), 10(1M, 2F), 10(22M, 20F), 12(400), 13(see notes),
15(200), 20(1773M, 1759F), 30(25), 31(567), Apr. 4(570, 8M, 7F),
10(55), 11(38M, 26F), 12(1 egg), 22(35M, 20F), May 28(56M, 18F),
June 17(242M, 129F).
- Nettion carolinense*: July 24(45), Oct. 13(35), 26(112), Jan. 25(30),
Mar. 5(15), 9(5), 10(2M), 12(35), 20(91M, 113F), 30(6), 31(105),
Apr. 4(65, 61M, 15F), 10(36), 11(11M, 8F), 22(615M, 414F), May 28(21M, 9F),
June 17(7M, 4F).
- Querquedula discors*: July 24(597), Mar. 20(0), Apr. 2(10), 11(1M, 1F), 13(2M, 2F),
22(3M, 3F), May 28(225M, 204F), June 17(151M, 69F).
- Querquedula cyanoptera*: Mar. 20(0), Apr. 2(1), May 24(2M, 2F), 28(1 pair),
June 6(1 pair), 10(Nest, 8 eggs, FIRST NEST RECORD FOR THE
STATE OF NEBRASKA), 17(1 pair).
- Spatula clypeata*: July 24(112), Oct. 26(1659), Mar. 16(4M), 31(7),
Apr. 4(3), 10(38M, 35F), 13(200, common), 22(2474M, 2236F), May 28(529M, 398F),
June 4(considerable northward migration), 17(212M, 99F).
- Hydroca americana*: July 24(177), Oct. 23(300), Mar. 10(8M, 1F), 10(14M, 13F),
12(8), 20(152M, 167F), Apr. 4(215, 6M, 3F), 10(350), 11(18M, 15F),
22(574M, 497F), May 28(96M, 90F), June 17(90M, 64F).
- Hydroca collaris*: Oct. 14(1), Apr. 15(2M, 3F), 22(3M, 2F), May 28(0),
June 17(0).
- Hydroca valisineria*: July 24(9), Oct. 10(100), 26(8041), Mar. 15(12),
20(15M, 12F), Apr. 4(1M, 4F), 10(8M, 6F), 11(3M, 3F), 22(197M, 280F),
May 28(5M, 10F), June 10(1M, 1F), 17(12M, 12F).
- Hydroca affinis*: July 24(1), Oct. 26(375), Mar. 12(5), 20(0), 28(1F in
pen at headquarters), Apr. 4(17), 11(6M, 6F), 14(53M, 33F),
22(382M, 378F), May 24(2 pair), 28(23M, 17F), June 10(1M, 1F),
17(12M, 3F).
- Glaucionetta clangula americana*: Nov. 19(295), Jan. 23(1), Mar. 20(12M, 4F),
10(1M).
- Charitonetta albeola*: Oct. 23(274), 26(697), Mar. 20(5M), Apr. 4(1F),
19(1M, 1F), 22(45M, 53F), May 28(2M), June 7(1M), 10(1M), 17(1M).
- Melanitta deglandi*: Sept. 23(1F).
- Brismatura jamaicensis rubida*: July 24(103), Oct. 26(532), Nov. 19(2),
Mar. 10(1M, 1F), 12(2), 20(5M, 1F), Apr. 10(18), 14(30M, 12F), 19(13M, 5F),
22(247M, 246F), May 28(90M, 93F), June 17(75M, 94F).
- Mergus merganser americanus*: Oct. 26(53), Nov. 19(425), Mar. 5(40),
16(8), 20(395M, 72F), 31(5), Apr. 4(330), 22(110M, 25F), May 28(2M),
June 17(1M).
- Buteo borealis brideri*:
Oct. 6(1), 26(12).

- Buteo borealis calurus: Oct. 26(24), Nov. 19(7), Mar. 31(1), May 28(9), June 17(8).
- Buteo swainsoni: Oct. 26(36), Apr. 20(1), 22(8), May 28(8), June 17(8).
- Buteo lagopus st. johannis: Nov. 19(21), Dec. 14(28), Jan. 16(24), 26(6), Feb. 8(8), 15(1), 17(1), Mar. 10(2), 13(1), 20(10), Apr. 4(1).
- Buteo regalis: Oct. 13(10), 26(12), Nov. 19(14), Dec. 14(8), Jan. 16(8), Feb. 8(6).
- Aquila chrysaetos canadensis: Oct. 14(2), 26(66), Nov. 19(205), Dec. 14(60), Jan. 16(48), Feb. 8(36), 17(2), Mar. 13(1), 16(2), 20(14), Apr. 4(8).
- Haliaeetus leucocephalus(alascanus?): Nov. 11(2), 19(17), Dec. 14(8), Jan. 16(7), Feb. 23(1), Mar. 5(1), 17(2), 18(2).
- Circus hudsonius: July 24(50), Oct. 7(3), 13(18), 16(1), 26(49), Nov. 19(21), Dec. 14(10), Jan. 16(8), Feb. 8(12), 15(1), 17(1), Mar. 15(1), 20(15), Apr. 4(2), 11(3), 16(Mating flight of male), 22(20), May 28(20), June 17(20).
- Falco mexicanus: Oct. 16(1), Dec. 14(6), Jan. 17(killed Pheasant), 31(1), Feb. 9(12), 17(1), Mar. 20(4).
- Falco peregrinus anatum: Apr. 29(3).
- Falco sparverius sparverius: Mar. 22(1), Apr. 12(1).
- Tympanuchus cupido americanus: July 24(151), Oct. 10(1), Oct. 26(112), Feb. 15(1), 27(1), Mar. 20(4), Apr. 31(1), 22(248), May 28(240), June 17(240).
- Pediceptes phasianellus campestris: July 24(199), Oct. 26(216), Oct. 20(65), Nov. 19(98), Dec. 14(80), Jan. 16(48), Feb. 9(54), 17(4), Mar. 2(1), 17(3), 20(90), Apr. 22(70), May 28(70), June 17(70).
- Phasianus colchicus-torquatus: July 24(356), Oct. 7(9), 13(21), 19(100), Oct. 26(301), Nov. 19(58), Dec. 14(85), Jan. 16(70), Feb. 8(50), Mar. 1(11), 20(78), 27(24), Apr. 4(8), 11(38), 22(126), May 28(40), June 17(28).
- Grus canadensis tabida: Sept. 22(500), Oct. 10(75), Apr. 1(200), Apr. 2(10,000 concentrated between North Platte and Ogallala), 8(48), 9(31), 10(21). All were flying over.
- Rallus limicola limicola: July 24(3).
- Porsana carolina: June 10(1).
- Fulica americana americana: July 24(1147), Oct. 23(45), Mar. 18(2), Apr. 2(9), 4(20), 10(110, common), 22(1135), May 28(964), June 17(419).
- Charadrius melodus: June 24(4).
- Oxyechus vociferus vociferus: July 24(503), Sept. 23(550), Nov. 12(1), Mar. 13(1), 23(5), Apr. 4(2), 9(15, common), 10(33), 22(193), May 28(293), June 17(364).
- Capella delicata: July 24(2), Oct. 26(4), Apr. 22(2).
- Numenius americanus americanus: July 24(113), Aug. 3(42, 34, speed of flight 32, 33, 33 m.p.h.), Apr. 2(1), 4(1), 7(2), 10(15, common), 13(16), 22(264), May 28(640), June 7(yng), 9(yng), 17(640).
- Bartramia longicauda: July 24(36), May 28(80), June 17(60).
- Actitis macularia: July 24(9), June 17(2).
- Tringa solitaria solitaria: July 24(18).
- Cateptrophorus semipalmatus inornatus: July 24(23), Apr. 25(1), May 28(33), June 17(58).
- Totanus melanoleucus: July 24(2).
- Totanus flavipes: July 24(521), Oct. 13(4), Apr. 10(1), 22(3), June 22(4).
- Pisobia fuscicollis: May 28(329).
- Pisobia minutilla: July 24(316), May 28(13).

Limnodynastes griseus scolopaceus: July 24(476), May 3(12).
Micropalama himantopus: May 28(205).
Eremistes pusillus: Apr. 14(15), 22(49), May 28(78).
Eremistes maurii: Oct. 14(7), 20(27), Apr. 22(15).
Limosa fedoa: Apr. 29(2).
Recurvirostra americana: July 24(426), Aug. 7(500), Oct. 6(29),
 Oct. 23(104), Apr. 3(5), 4(30), 13(60), 22(73), May 28(177),
 June 17(156).
Steganopus tricolor: July 24(4237), Apr. 20(26), 22(116), May 28(422), J
 June 17(128).
Lobipes lobatus: May 28(1).
Larus argentatus smithsonianus: Nov. 19(207), Mar. 2(6), 10(66), 18(18), 31(4).
Larus delawarensis: Sept. 23(12), Oct. 26(94), Mar. 15(1), 20(293),
 31(4), Apr. 6(5), 22(76), May 28(2), June 17(6).
Larus pipixcan: Apr. 16(4), May 31(5).
Larus philadelphia: June 25(1).
Sterna forsteri: July 24(49), May 28(25), June 17(21).
Chlidonias nigra surinamensis: July 24(265), May 15(1), 24(10), May
 28(432), June 17(130).
Zenaidura macroura marginella: July 24(552), Oct. 7(6), Oct. 26(6),
 Apr. 15(1), 16(2), 22(48), May 24(6), 26(14), 28(640), June 17(800).
Otus asio (aikeni?): One caught in headquarters garage.
Bubo virginianus occidentalis: Oct. 12(1), Nov. 3(3), 19(9),
 Dec. 14(9), Jan. 16(12), Feb. 9(6), 17(3), 20(1), Apr. 8(1), 22(2).
Spectypte cucularia hypuga: July 24(18), Apr. 13(1), 19(1), 22(48),
 May 28(48), June 17(48).
Asio flammeus flammeus: Oct. 26(20), Dec. 14(6), Jan. 16(18),
 31(1), Feb. 8(3), Mar. 13(1), 28(1), 27(1), Apr. 11(2), 14(1),
 22(9), May 23(2), June 5(1), 7(2), 17(2).
Chordeiles minor sennetti: July 24(357), May 28(112), June 17(312).
Manicoryle aleyon aleyon: July 22(2).
Colaptes auratus luteus: Oct. 7(2), Apr. 9(1), 11(4), 22(24).
Colaptes cafer collaris: Oct. 7(1), Apr. 9(1), 11(2), 22(16).
Melanerpes erythrocephalus: Dec. 14(2), May 15(1), 28(8).
Dryobates pubescens leucurus: Oct. 7(2), 10(1), Nov. 3(1), 19(2).
 A pair remained in headquarters grove thru winter, attracted by
 suet placed in trees. Jan. 16(2), Feb. 8(2), 15(2), Mar. 2(specimen F)
 13(1M), 20(1M), 26(1M), 27(1M), 28(1M), 31(1M), Apr. 9(1M), 11(1M), 22(1M).
Tyrannus tyrannus: July 24(39), May 24(2), 26(4), 28(45), June 17(45).
Tyrannus verticalis: July 24(30), May 24(2), 26(6), 28(30), June 17(30).
Sayornis saya saya: Apr. 11(1), 12(1), 22(15), 26(1), 28(6), June 17(6).
Empidonax traillii brewsteri: May 27(1), 28(4), June 7(1), 17(6).
Empidonax minimus: Oct. 7(2), May 27(1).
Myiochanes virens: May 31(1).
Mutallornis mesoleucos: June 6(1), 16(1), 17(1).
Otocoris alpestris hoyti: Dec. 14(650), Jan. 15(720).
Otocoris alpestris leucolasma: July 24(1332), Oct. 13(6), 26(257),
 Nov. 19(490), Feb. 9(1158), 15(2700), 17(86), 18(1), Mar. 10(15),
 20(2250), 27(20 dead after snowstorm), 29(2), Apr. 4(12), 22(2416),
 May 25(2400), June 17(2400).
Iridoprocne bicolor: June 4(1), 5(1).
Riparia riparia riparia: July 24(30).
Stelgidopteryx ruficollis serripennis: June 17(2).

Hirundo erythrogaster: July 24(6), May 2(2), 26(2), 28(20),
 June 5(3), June 17(15).
Petrochelidon albifrons albifrons: June 5(3), 7(8).
Cyanocitta cristata cristata: Sept. 23(2), Oct. 7(2), May 24(2),
 28(4), June 17(2).
Pica pica hudsonia: Sept. 23(5), Oct. 7(7), 13(1), Nov. 4(2), 19(30),
 Dec. 14(40), Jan. 16(27), Feb. 9(15), Mar. 13(2), 15(2), 20(10), 27(2),
 31(4 in steel traps), Apr. 4(2).
Corvus brachyrhynchos brachyrhynchos: Sept. 23(1, this is first seen on
 refuge since last May), Oct. 14(5), 20(3), 23(11), Mar. 20(4),
 30(1), Apr. 4(2), 10(5), 22(1), June 17(1).
Cyanoccephalus cyanoccephalus: Sept. 23(6).
Penthestes atricapillus septentrionalis: Oct. 7(2), Nov. 19(2).
Sitta canadensis: Oct. 10(1).
Certhia familiaris americana: Seen in early December.
Talimacodytes palustris dissolutus: July 24(23), May 28(30), June 17(26).
Dumetella carolinensis: May 24(1), 26(3), 28(7), June 5(2), 7(2).
Turdus migratorius migratorius: Oct. 1(1) first seen since last spring,
 7(4), Feb. 14(2), Mar. 10(2), 13(2), 20(5), 26(1 died in blizzard),
 30(1), Apr. 1(6), 2(1), 11(15, common), 22(25). Probably the
 majority of these were *T. m. propinquus*.
Hylocichla ustulata swainsoni: Oct. 1(5), 7(4), 13(1), May 26(11), 28(30).
Hylocichla minima alioia: May 26(2), 28(12), June 17(4).
Sialia sialis sialis: Oct. 7(2), 23(1), May 1(8).
Sialia currucoides: Mar. 10(1 pair).
Certhya calandula calandula: Oct. 16(1).
Bombocilla cedrorum: May 26(2), 27(2), 28(2).
Lanius borealis invictus: Dec. 13(3), Feb. 9(3), 9(1 with dead mouse).
Lanius ludovicianus excubitorides: July 24(12), Apr. 9(1).
Vireo belli belli: June 2(1).
Vireo olivaceus: May 26(3), 28(2).
Vireo gilvus swainsoni: July 25(1).
Dendroica aestiva aestiva: May 24(3), 26(4), 28(15), June 17(2).
Dendroica coronata: Oct. 7(7), Apr. 19(4), 22(12), June 23(1M).
Dendroica auduboni auduboni: Oct. 13(1), May 26(27), June 6(5).
Dendroica striata: May 26(1), June 7(1).
Seiurus aurocapillus: May 24(3), June 6(2), 7(2).
Oothypis trichas occidentalis: July 24(75), May 24(6), 26(2),
 28(32), June 17(29M).
Acteria virens longicauda: May 27(1).
Setophaga ruticollis: May 24(2), 26(2), 28(20), June 7(3), nested.
Passer domesticus domesticus: Mar. 15(3, not noted on refuge during
 the winter), Apr. 4(3), 10(4).
Sturnella magna magna: July 24(42), Apr. 9(1), 11(5, common), 22(104)
 May 28(100), June 17(100).
Dolichonyx oryzivorus: July 24(18), May 26(2), 28(50), June 17(40).
Sturnella neglecta: July 24(1362), Oct. 13(23), 26(104), Mar. 10(1),
 20(3), 22(1), 23(1), 31(4), Apr. 4(6), 9(12, common), 11(8),
 22(1576), May 28(2024), June 17(4800).
Xanthocephalus xanthocephalus: July 24(141), Apr. 13(5), 14(1M),
 17(8), 22(118M, OF), May 28(211M, 3F), June 17(149M).

Agelaius phoeniceus artoleugus: Dec.14(13), Jan.26(15M), Feb.14(1M),
 15(19M), 17(4M), 18(1M), 19(5M), 20(22M).
Agelaius phoeniceus fortis: July 24(2212), Oct.7(11), 26(1992),
 Nov.19(7), Mar.10(10M), 18(15M), 20(307M, OF), 26(5M), 27(30M),
 28(5M), 31(17M, 1F, first seen this spring), 31(57M),
 Apr.4(18M), 9(15M), 10(4F, first since Mar.31), 11(25M, 1F),
 22(327M, 21F), May 28(689M), June 17(572M).
Icterus spurius: July 24(10), May 27(1), 28(2), June 17(2, nest in
 willow at headquarters).
Icterus galbula: May 28(2), June 17(2).
Quiscalus quiscula aeneus: July 24(29), Oct.7(14), 26(607), Apr.11(1),
 17(11, common), 19(3), 22(24), May 28(15), June 17(8).
Molothrus ater artemisiae: July 24(35), May 28(160), June 17(160).
Piranga ludoviciana: June 7(5M, 1F).
Hedymeles melanocephalus melanocephalus: May 26(1), 28(8).
Passerina amoena: May 28(8).
Spiza americana: July 24(3), June 22(2).
Spinus pinus pinus: Oct.7(3), 13(1), Dec.14(25), Jan.16(20).
Spinus tristis tristis: July 24(4), Oct.7(4), Jan.26(5), Mar.26(3).
Pipilo erythrophthalmus erythrophthalmus: Oct.7(3), 12(1).
Calamospiza melanocorys: July 24(228), May 7(5), 28(30), June 17(120).
Ammodramus savannarum binnaculatus: July 24(192), June 17(20).
Pooecetes gramineus confinis: July 24(64), Apr.14(1), 17(14), 22(328),
 May 28(120), June 17(80).
Chondestes grammacus strigatus: July 24(114), May 28(48), June 17(48).
Junco hyemalis hyemalis: Oct.7(8), 13(75), 26(215), Mar.10(5), 20(7).
Junco oreganus montana: Mar.31(2), Apr.11(5), 22(45).
Junco naevius: Mar.15(1), 20(11).
Spizella arborea ochracea: Oct.13(400), 26(1699), Nov.19(1165),
 Dec.14(650), Jan.16(380), Feb.8(48), 14(10), 15(10), 17(13), 14(1),
 19(50-first definite migration), Mar.20(273), 28(15),
 19(1), Apr.4(60), 11(18), 22(2259).
Spizella passerina passerina: July 28(4).
Spizella pallida: May 27(6).
Zonotrichia querula: Oct.7(11), 15(200), 26(180), May 24(3).
Melospiza georgiana: May 26(3), 28(6).
Melospiza melodia juddi: Nov.14(1), Jan.26(1), Mar.17(1), 27(1),
 Apr.11(3), 14(3), 22(48).
Rhynchophanes mocowii: Apr.15(85), 16(v.com.), 22(480).
Calcarius lapponicus alascensis: Feb.9(50), Mar.13(195), 26(7).
Calcarius ornatus: Apr.13(65), 15(55), 16(v.com.), 22(360).



NE-CRL-085

DECOYS.

Some of the decoys that are used to
attract others to the refuge.

Photo by W.W. Bennett

4. Use by Waterfowl

Drought conditions, which continued through the year, have kept water levels particularly low so that nesting of waterfowl is perhaps at its lowest peak. If a cycle of high water levels returns, this should increase very much.

In spite of conditions increasingly adverse, the production of waterfowl increased 177 percent during the year. For a complete explanation of waterfowl nesting, see report entitled "Studies in Game Management, Game Bird Nesting on Crescent Lake Refuge covering the period of April 14 to July 17, 1937.

The migration of all waterfowl reached its peak during the week prior to the hunting season, which opened November 1, 1936. The concentration included the following:

<u>Anas platyrhynchos platyrhynchos</u>	8646
<u>Anas rubripes rubripes</u>	2
<u>Chaulelasmus streperus</u>	3986
<u>Barca americana</u>	221
<u>Callifila acuta tsitsihon</u>	761
<u>Nettion carolinense</u>	112
<u>Spatula clypeata</u>	1659
<u>Byroca americana</u>	300
<u>Byroca collaris</u>	1
<u>Byroca vallianeria</u>	3841
<u>Byroca affinis</u>	373
<u>Charitonetta albeola</u>	697
<u>Erimatura hawaiiensis rubida</u>	532
Total	22,151

The spring migration of wild ducks is shown by graphs on the following pages.

During the same period a few Canada Geese, approximately 2,000 lesser snow geese and scattered numbers of Hutchins's and White-fronted Geese were noted.

5. Exceptional Concentrations

About 450 Ruddy Ducks spent the flightless period during August on Roundup Lake.

Nearly 5,000 Wilson's Phalarope spent most of July and August on Goose Lake.

Approximately 500 Long-Billed Dowitchers spent several weeks in July and August on Ginlet Lake. About 2,000 lesser snow geese remained on Roundup Lake during March.

2,087 White Pelicans appeared on Crane Lake April 8 and remained as late as June 17.

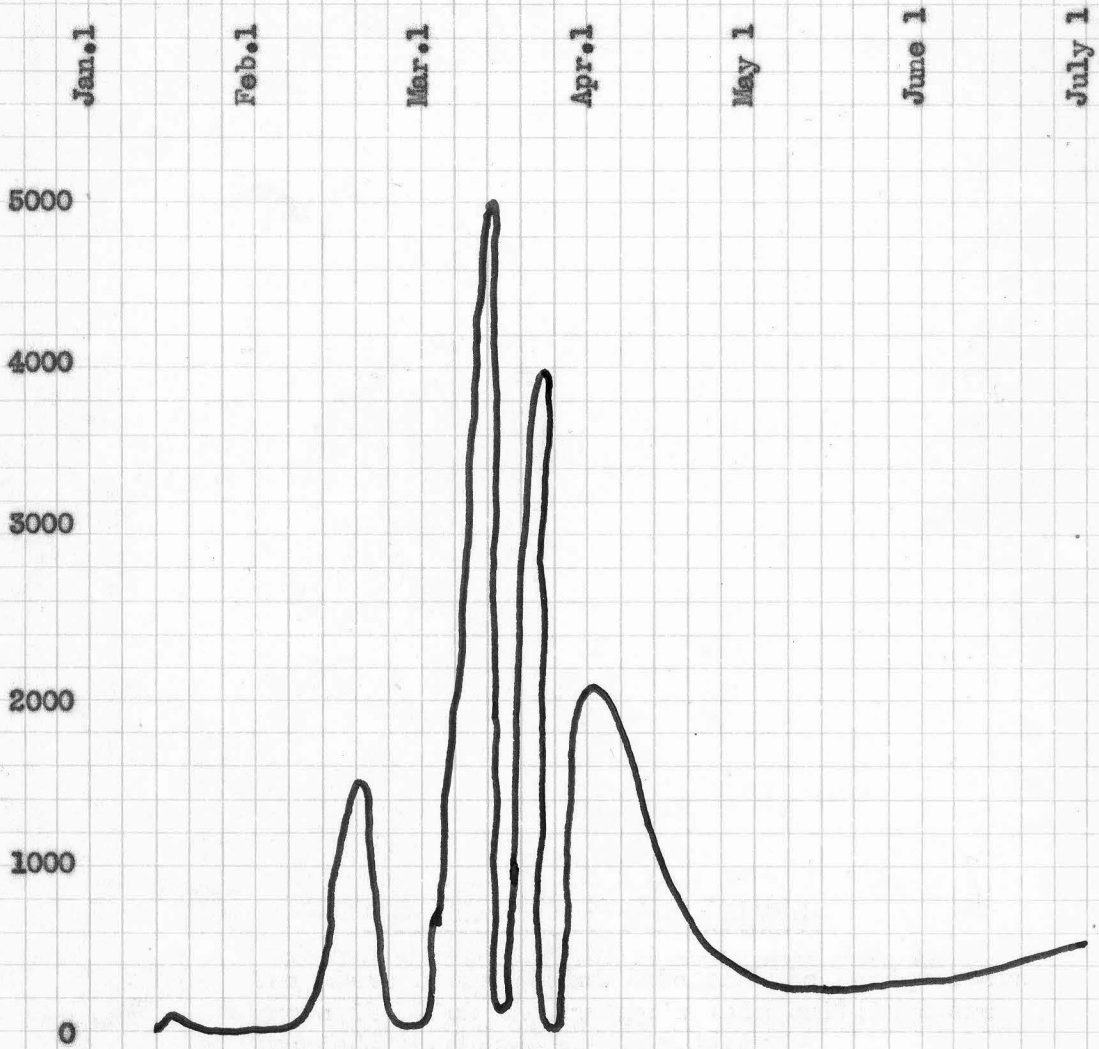
5 Whistling Swans appeared on Island lake October 23 and remained there and on Blue Lake until November 19.

One of the few colonies of Western Grebes in the middle west occupied Hackberry lake with a count of 120 on July 24.

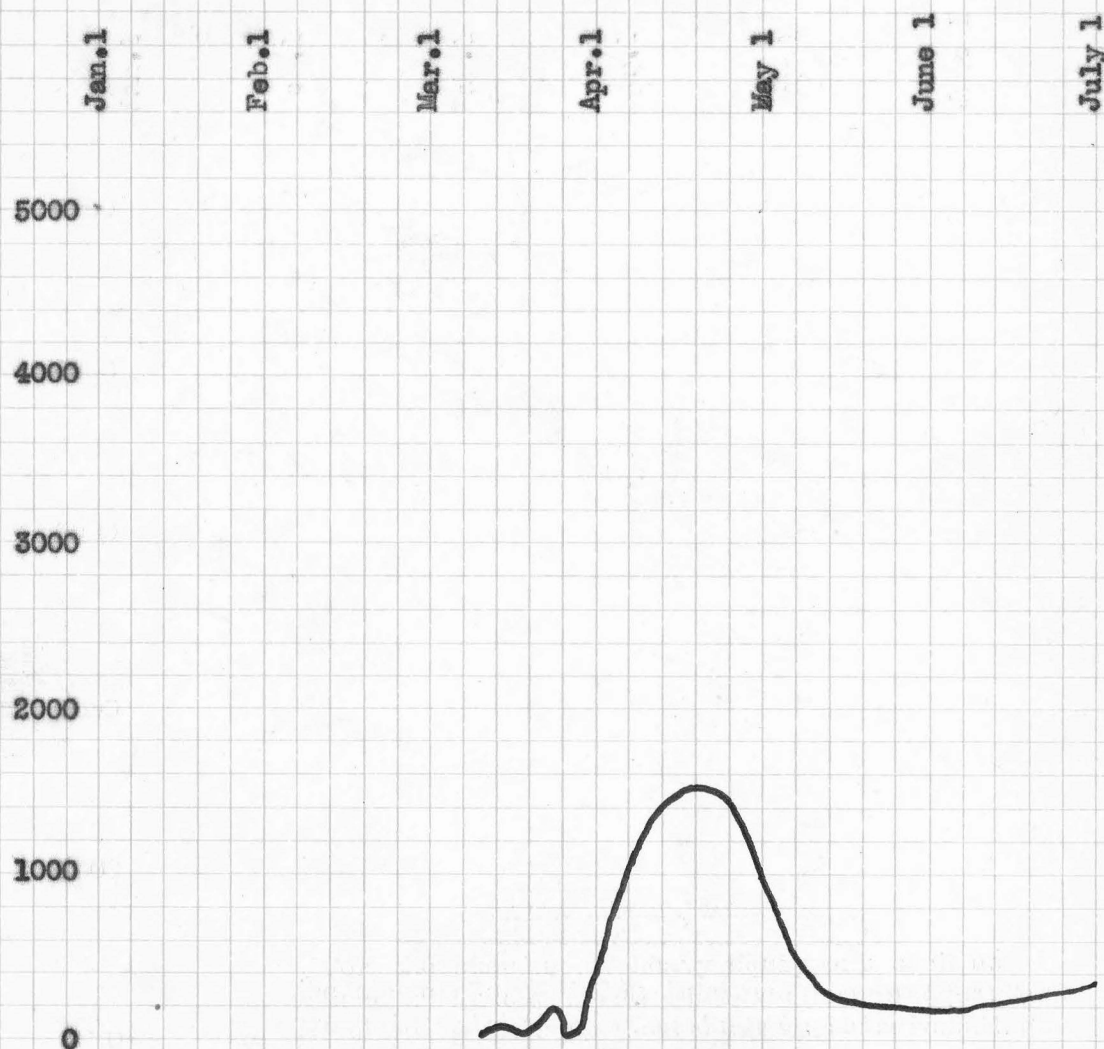
A count of 48 Golden Eagles was made on the Refuge January 16, 1937.

A flock of 104 young Avocets remained on Roundup lake as late as October 23.

ABUNDANCE ON CRESCENT LAKE REFUGE OF
ANAS PLATYRHYNCHOS PLATYRHYNCHOS
1937.



SPRING MIGRATION OF
CHAULELASMUS STREPERUS ON
CRESCENT LAKE REFUGE
1937

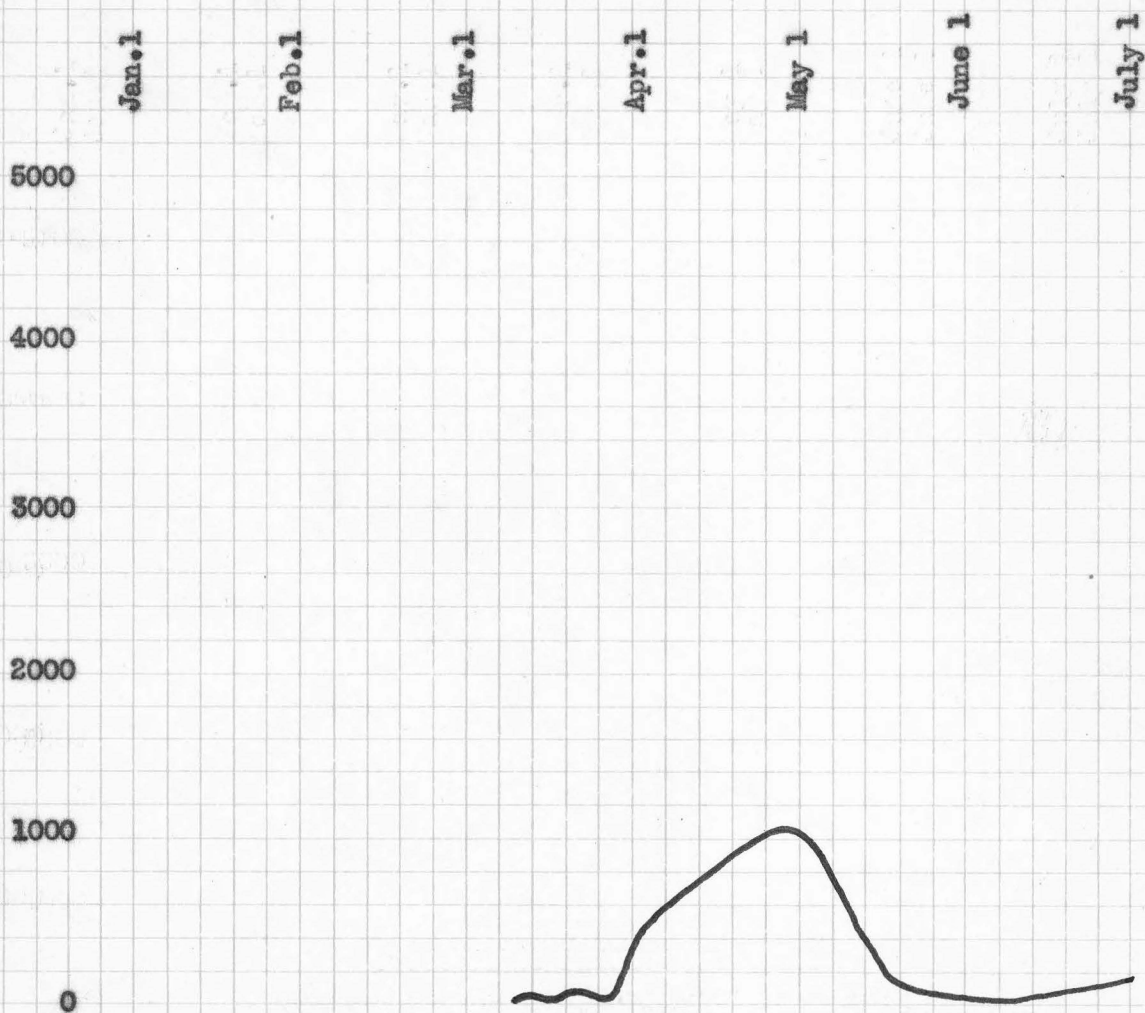


SPRING MIGRATION

1937

MARECA AMERICANA

Crescent Lake Refuge.

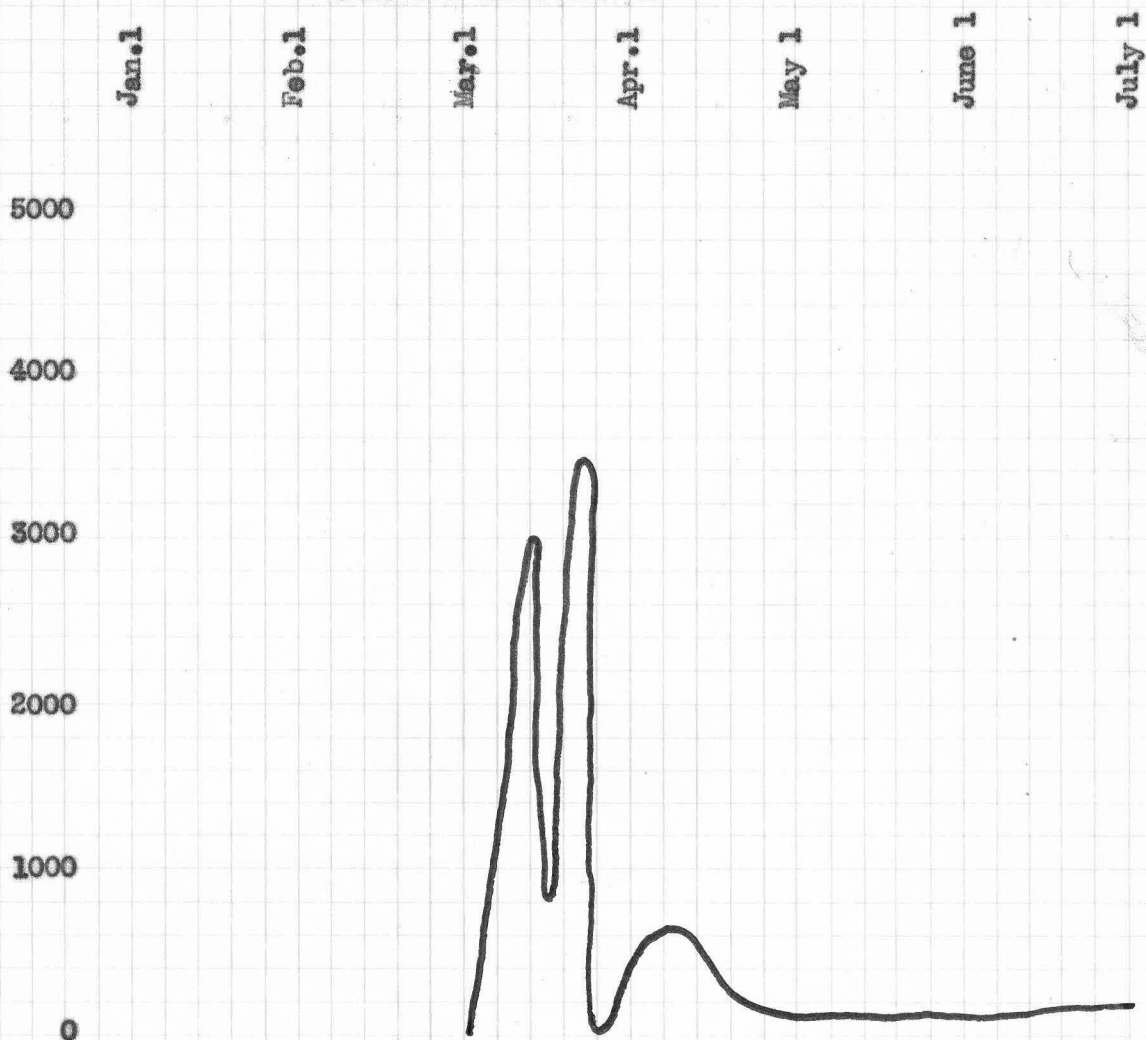


SPRING MIGRATION

1937

DAFILA ACUTA TZITZIOA

CRESCENT LAKE REFUGE

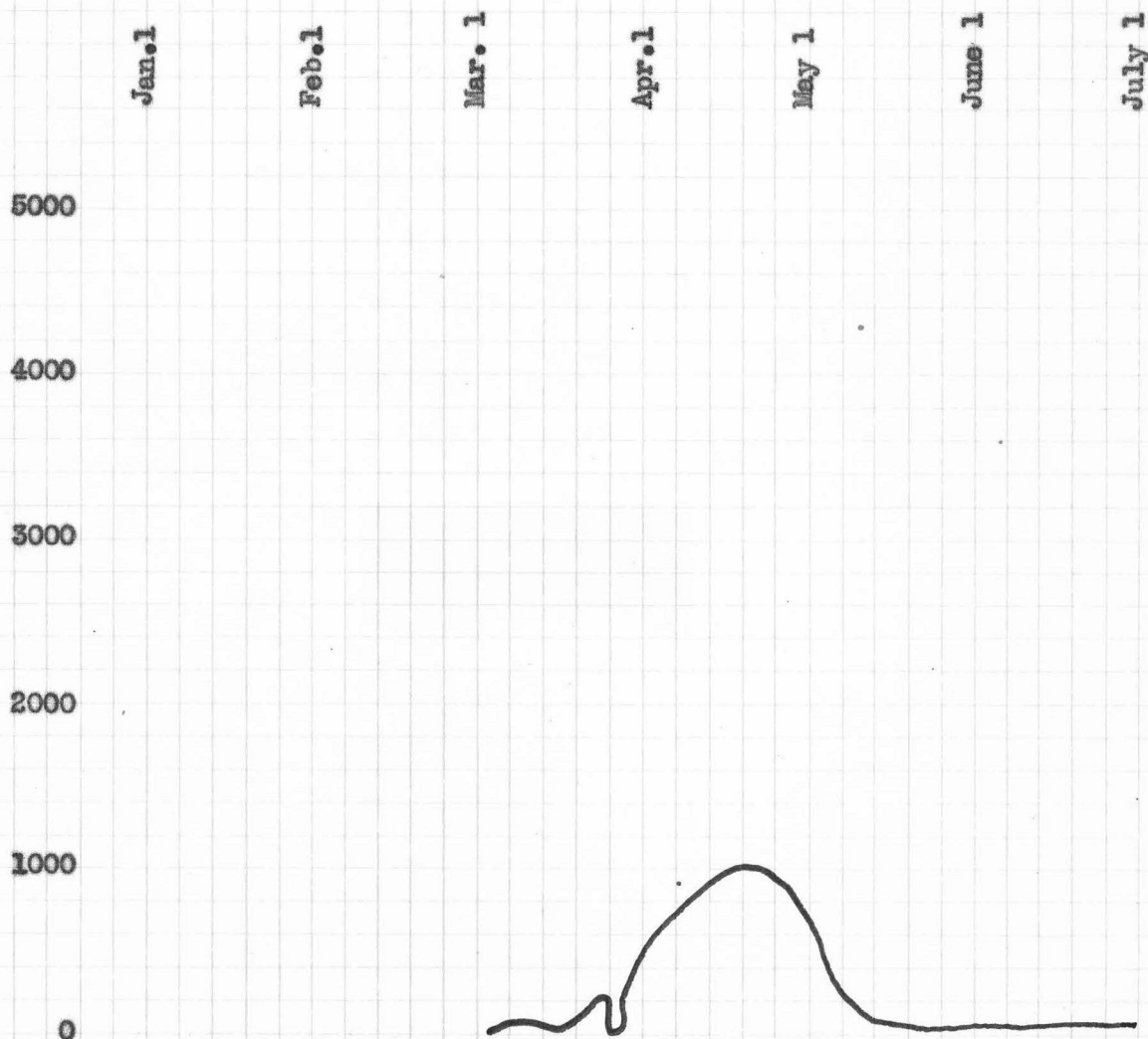


SPRING MIGRATION

1937

NETTION CAROLINENSE

Crescent Lake Refuge

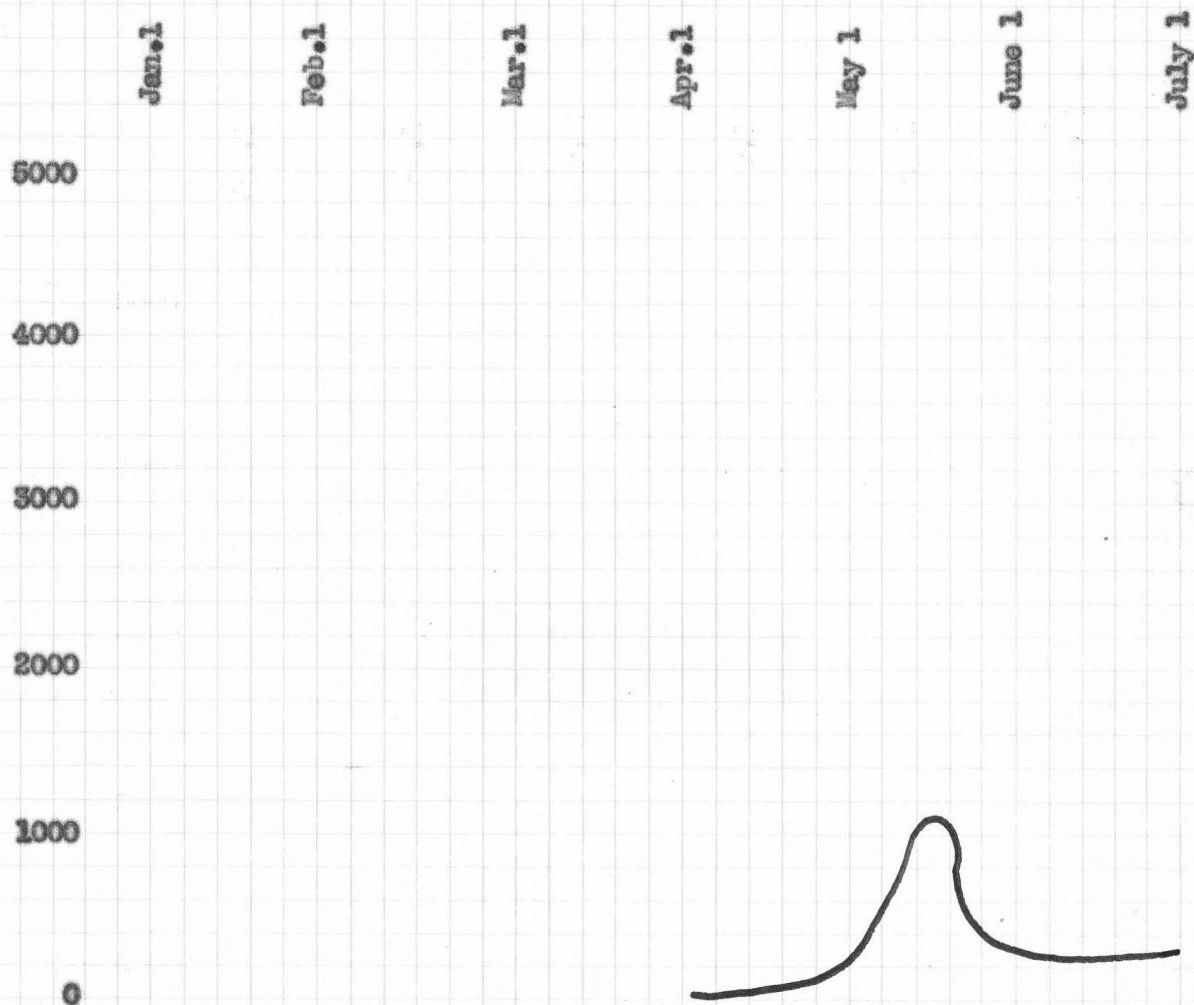


SPRING MIGRATION

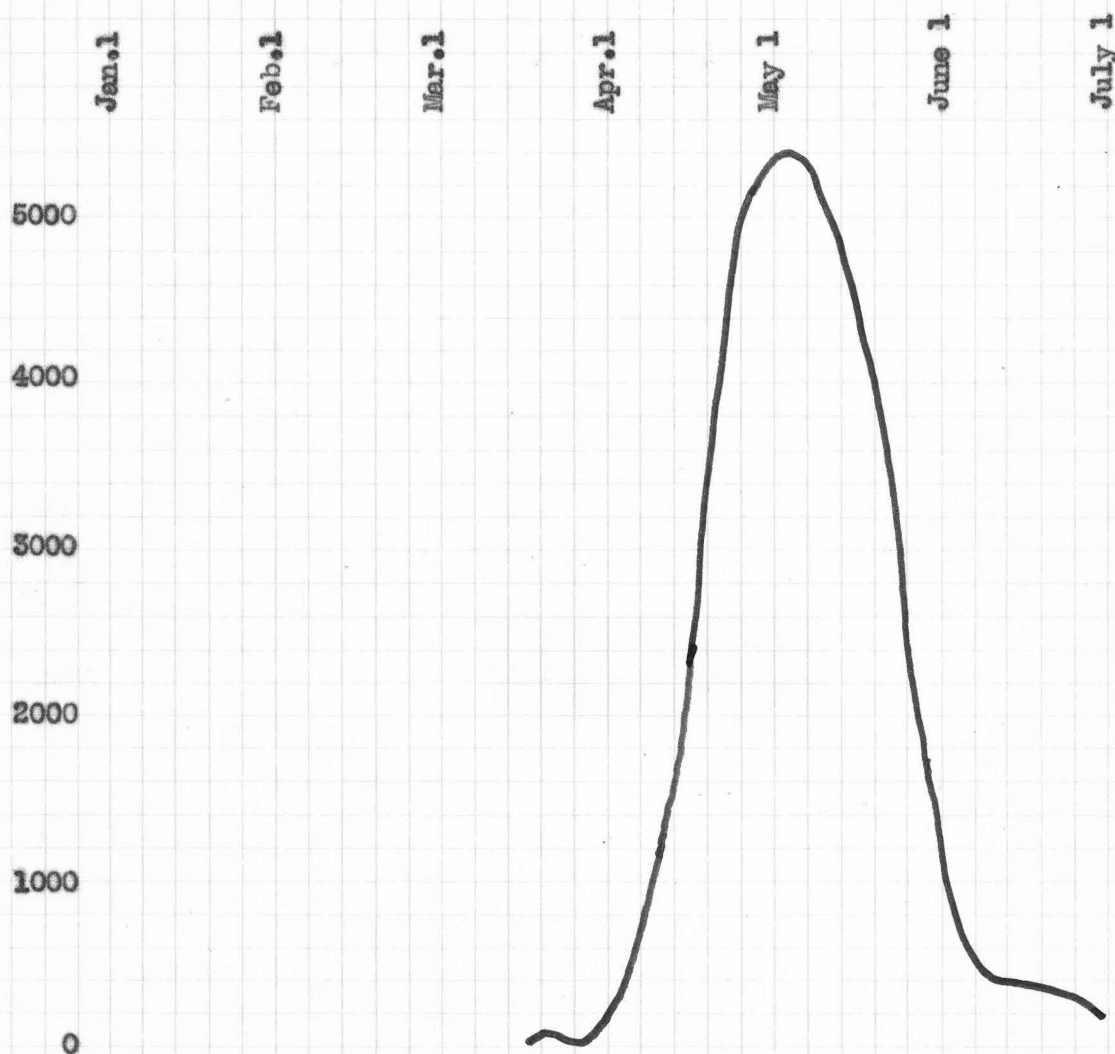
1937

QUERQUEDULA DISCORS

Crescent Lake Refuge.



SPRING MIGRATION
1937
CRESCENT LAKE REFUGE
SPATULA GLYPEATA

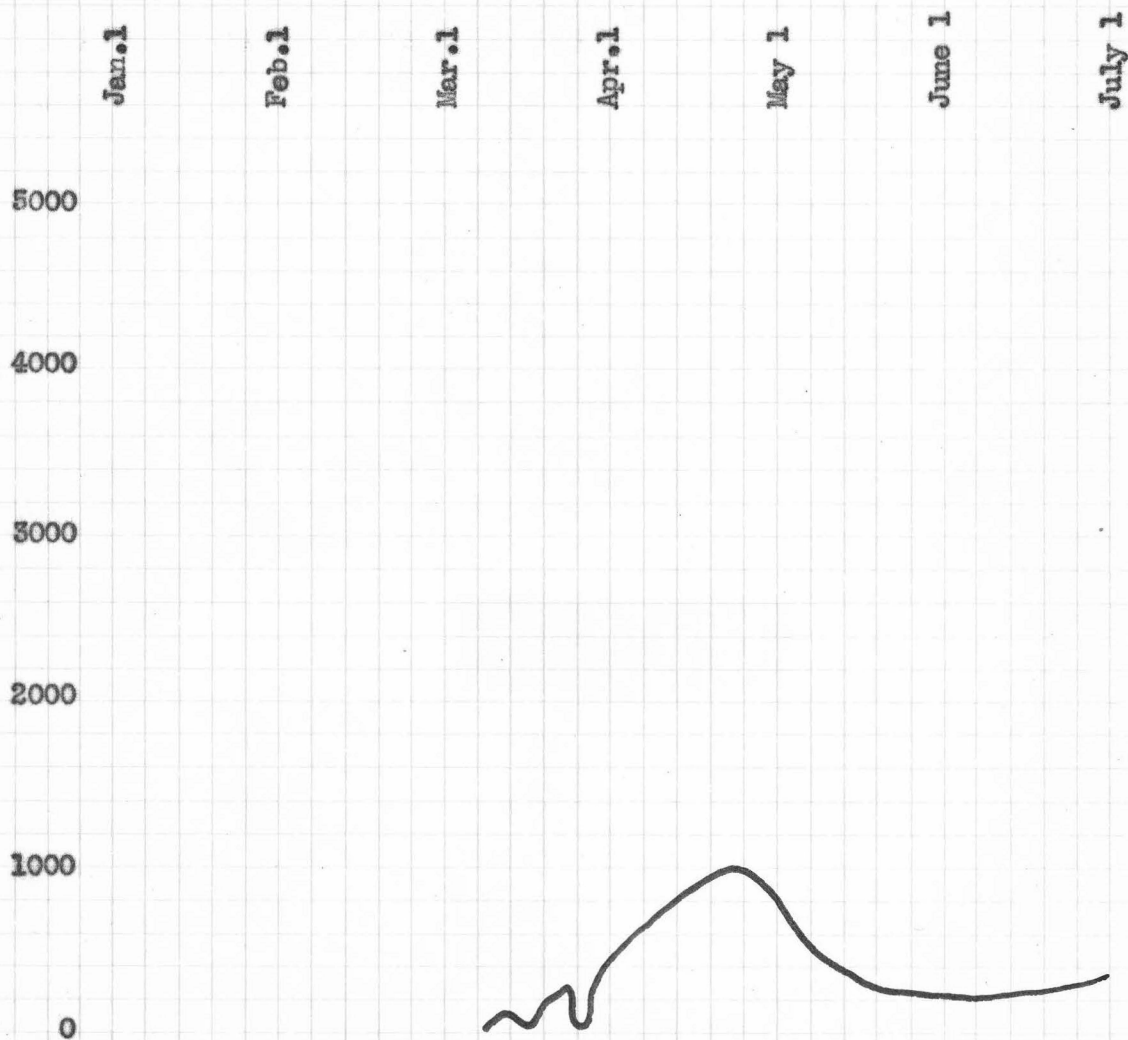


SPRING MIGRATION

1937

NYROCA AMERICANA

Crescent Lake Refuge



B. MAMMALS

A very large population of mammals is found on the Crescent Lake Refuge as per the following list:

Mustela longicauda longicauda, Bonaparte, abundant
Spilogale interrupta (Baird), abundant
Lepus (hudsonicus or Mesomelas varians), very abundant
Peromyscus leucopus (Schreber), uncommon
Canis nebrascensis nebrascensis Merriam, common
Citellus tridecemlineatus pallidus (Allen), abundant
Geomys lutescens (Merriam), common
Onychomys leucogaster (Hollister), common
Microtus pennsylvanicus pennsylvanicus (Ord), abundant
Mus musculus musculus Linnaeus, occasional
Lepus townsendii campbelli Hollister, abundant
Lepus californicus melanotis (Mearns), abundant
Sylvilagus floridanus similis Nelson, abundant
Antilocapra americana americana (Ord), uncommon
Peromyscus maniculatus nebrascensis (Cooper), abundant

C. INSECTS

An abundance of insects exist on the Refuge where it is difficult to grow gardens and many species of wild plants. A very great infestation of grass-hoppers came in during July 1936 and completely defoliated sweet-clover and some other plants.

III. USE MADE OF THE REFUGE

A. RESTING ISLANDS

Two islands constructed during 1936 were extensively used for resting by ducks, geese, shore birds and many others. They were occupied by nests of several species of ducks, Canada Geese, Avocets, and Killdeer.

B. PONDS

The smaller ponds maintained by two small flowing wells at Headquarters were commonly occupied by about 20 pairs of Mallards, Schovellers, Gadwalls, Blue-winged Teal, Cinnamon Teal and Baldpate, all of which nested in the vicinity.

C. WIRE BOXES OF SUET

Wire boxes of suet attracted a number of Woodpeckers through the fall and winter.

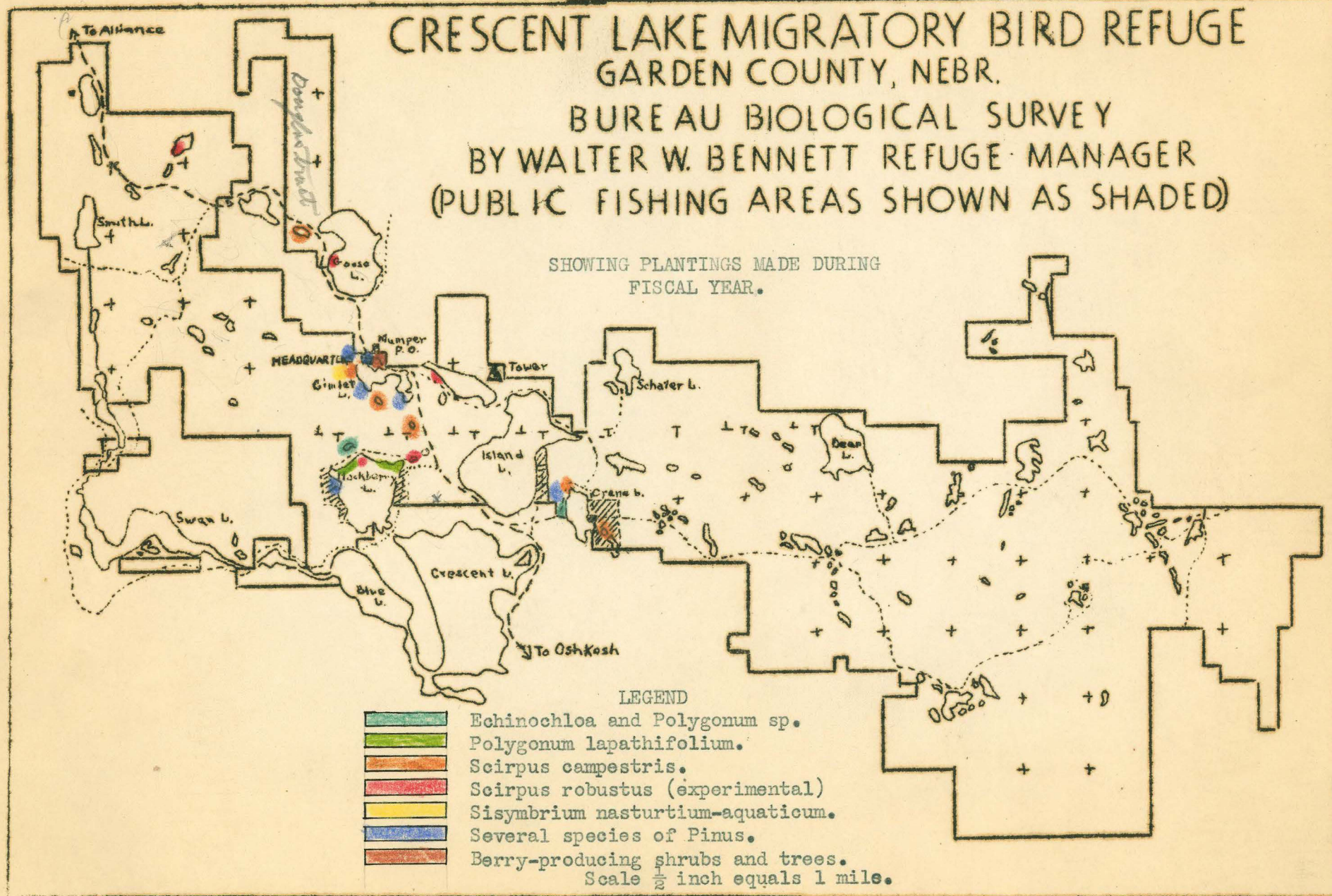
D. HAYING AND GRAZING

Grazing rights were continuously held by Boyd and Abbott; during the period no other permits were issued.

CRESCENT LAKE MIGRATORY BIRD REFUGE GARDEN COUNTY, NEBR.

BUREAU BIOLOGICAL SURVEY
BY WALTER W. BENNETT REFUGE MANAGER
(PUBLIC FISHING AREAS SHOWN AS SHADED)

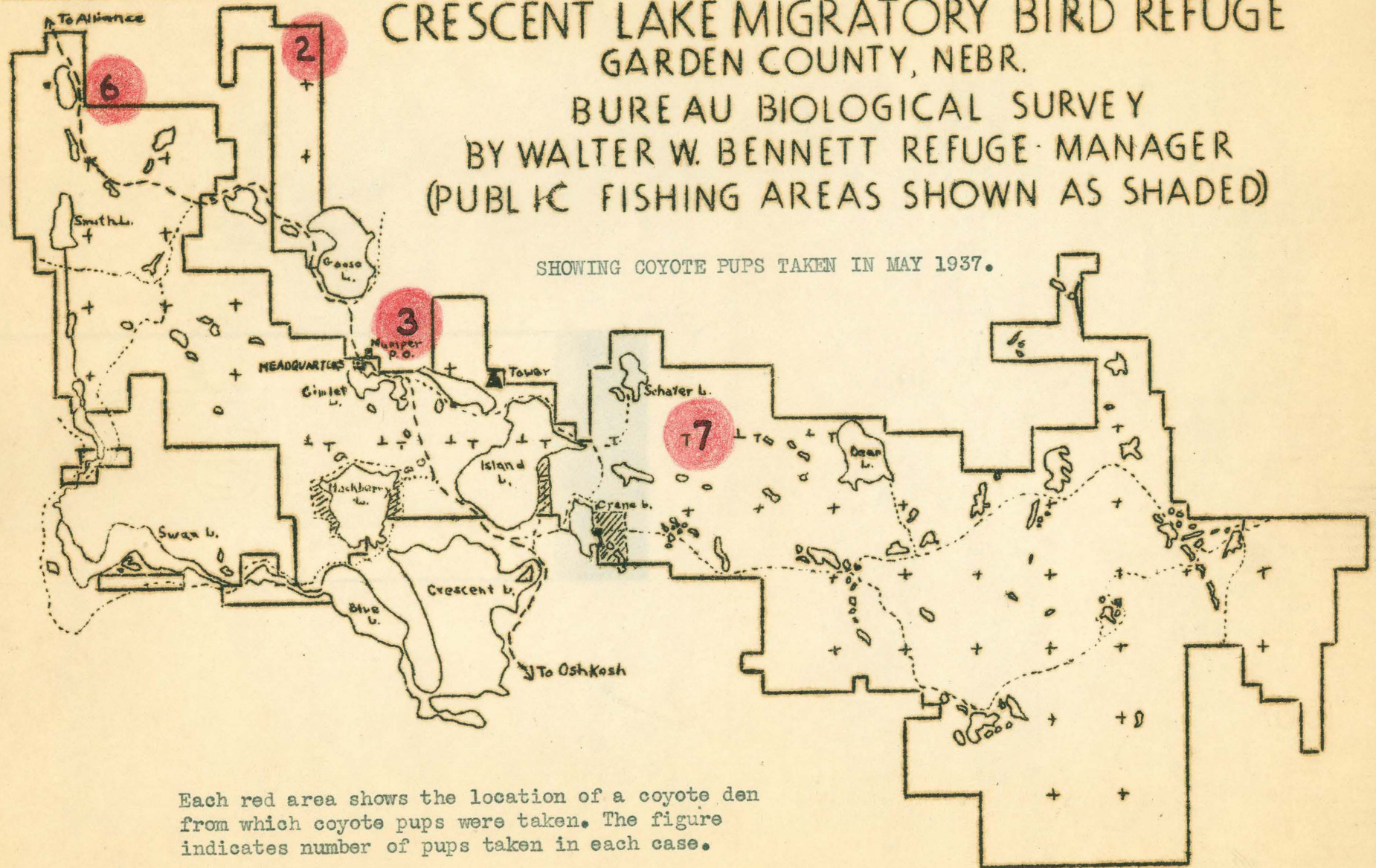
SHOWING PLANTINGS MADE DURING
FISCAL YEAR.



CRESCENT LAKE MIGRATORY BIRD REFUGE GARDEN COUNTY, NEBR.

BUREAU BIOLOGICAL SURVEY
BY WALTER W. BENNETT REFUGE MANAGER
(PUBLIC FISHING AREAS SHOWN AS SHADED)

SHOWING COYOTE PUPS TAKEN IN MAY 1937.



Each red area shows the location of a coyote den
from which coyote pups were taken. The figure
indicates number of pups taken in each case.

Scale $\frac{1}{2}$ inch equals 1 mile.

E. RECREATIONAL USE

There is a great demand in the region for good recreational areas. Approximately 2,000 man-days of fishing and camping were used by the public on the recreational areas of the Refuge. Fishing is a primary incentive and a decrease in the supply and quality kept this figure from being larger.

IV. PLANTINGS

The following were planted to supplement natural waterfowl food: Echinochloa crus-galli, 200 lbs; Polygonum sp., 200 lbs; P. lapathifolium, 100 lbs.; Scirpus campestris, 300 lbs.; and S. robustus, 4 lbs.

In the early spring of 1937 a large number of berry producing trees and shrubs were planted at headquarters. These include buffalo berry, russian olives, black currant, chokecherry, mountain ash, wild plum, woodbine, and juniper. Approximately 200 of all these species were planted.

V. PREDATOR CONTROL

Although predator control activities were started rather late, while waiting the announcement of policies as determined by the Washington committee, we made some progress with the type of labor available. The following list of predators was taken and these activities were practically responsible for an increased avian production on the Refuge.

PREDATORS TAKEN

On Crescent Lake Refuge

Nov. 1936 to June 1937

Striped Skunk	49
Spotted Skunk	25
Coyotes, adult	5
Coyotes, young	18
Weasels	21
Badger	1
Pullsnakes (Estimated)	40
Total	159

VI. REFUGE IMPROVEMENT

The most important Refuge improvements made during the year were as follows:

Tower, Observation, 100 ft. high overlooking 13 lakes; 58 yds. of excavation was required, about 80 yds of gravel hauled 6 miles, 8 loads cement



NE-CEL-006

TWO WAYS OF PLANTING SCIRPUS CAMPESTRIS.

The upper shows sowing and raking; the lower placing in mud balls which are dropped into the water.

hauled 28 miles from town, each of four piers of reinforced concrete under it weight about 19 tons

Machine Shed and Workshop, 28' x 64'6", four stalls for heavy equipment and winter workshop in one end with concrete drain pit, forge, benches, tool cabinets, etc. Required 300 yds. of excavating, built on foundation 2' below ground with piers 4' deep every 4' apart with 3' retaining wall in the rear; floor of 4" clay base, 1" of gravel well tamped, with 3 1/2" concrete slab on top, 2' approach full length, two 20' openings in garage with 2 doors to each opening, on track; shop has folding doors 12' wide. Much salvage lumber used.

Cave, Seed Storage, vermin proof, reinforced concrete, double doors. Size inside, 12' x 20' with 4' vestibule, 16' retaining wall in front 8" thick and 10' high, arch roof of concrete and steel, 9 ft. ceiling. About 100 yds of dirt and excavated for this cave and about 50 yds. had to be shovelled back to cover it up. Doors are wood, covered with sheet iron. Shelves installed inside. Cement hauled 28 miles from town and gravel hauled 8 miles. Salvage lumber used for forms.

Office building, remodelled old residence (Partly completed) one half will be office and one half biological laboratory. Includes new concrete foundation, moving partitions, windows to double lighting, new finish throughout inside, work bench and cabinets in laboratory, toilet and lavatory, storage closets, etc.

Painting buildings, Dwelling and Firehouse completed. Outside painting only. Materials on hand to paint rest of buildings, including two garages, barn, water tank house, office and laboratory.

Fencing, 4 strand barb wire, 30 miles, about Harris and McCready tracts and about 6 miles of public highway. Auto gates on mail highway to permit cattle pass, frame base, railroad steel floor. Two gates.

Tree Planting, 23,000 trees consisting of Ponderosa Pine, Scotch Pine, Jack Pine, Colorado Blue Spruce, Russian Olive, Honey Locust, Buffalo Berry, Juniper. Includes 3,000 pines planted in six selected groves, 1,000 pines and most of other trees in two nurseries.

Land scaping of Headquarters, planting lawns, sodding, hauling shrubbery 30 miles, gravel and clay 8 miles, area for truck turning 100' x 100' in front of new machine shed with 8 inches of clay tamped, and 1" gravel on top, decorative fence about driveway.



NE-CRL-087

HEADQUARTERS GROUNDS IN 1936.

Compare this with the next page to see improvements in planting of shrubbery, driveways, decorative fencing, etc.

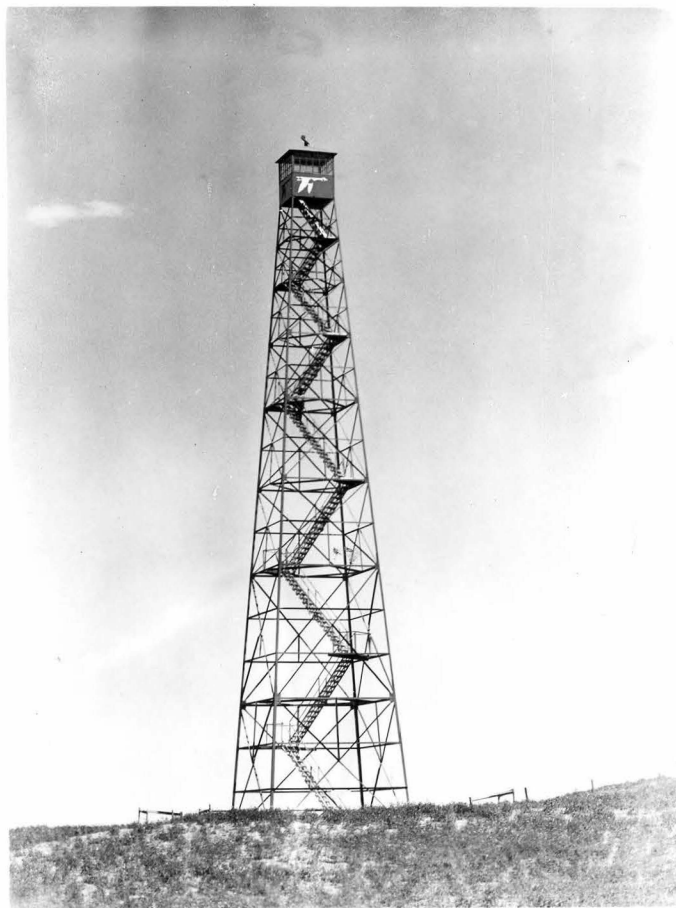
Photo by W.W.Bennett.



HEADQUARTERS GROUND IN 1937.

NE-CCL-008

Compare with the preceding pages to note
improvements in planting of shrubbery, driveways,
decorative fencing, etc.

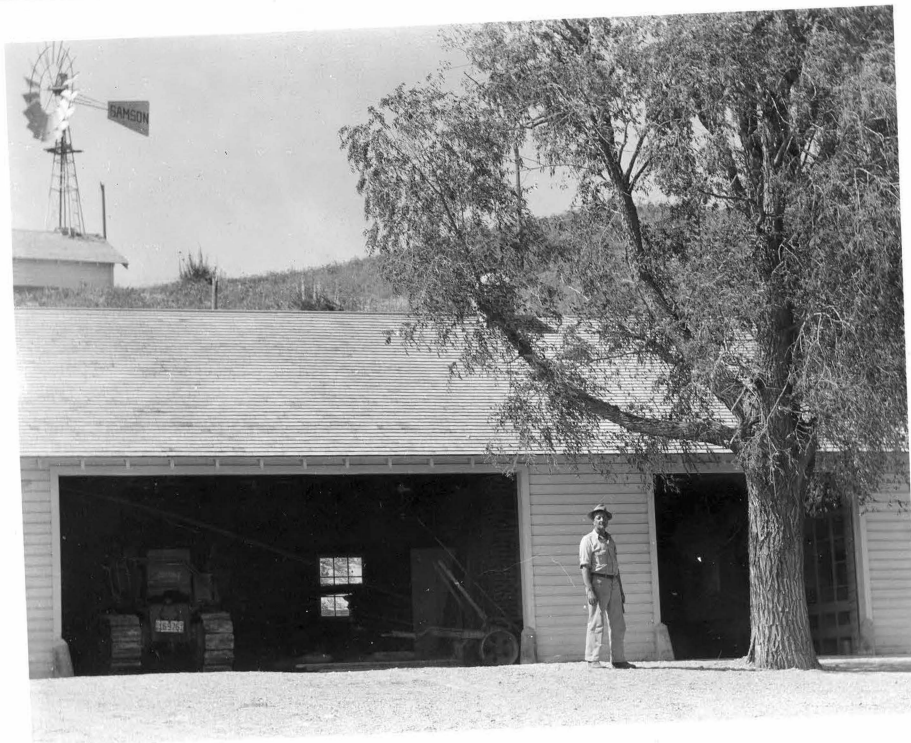


NE-CRL-089

NEW TOWER BUILT BY FARMERS.

With no experienced steel workers available in the vicinity, farmers came to the rescue as WPA employees and built this structure. It is placed on the highest hill on the refuge, measures 99 ft. 9 inches to the floor of the observation room, and overlooks thirteen of the larger refuge lakes.

Photo by W.W. Bennett



NE-CRL-090

NEW MACHINE SHED.

For the storing of heavy equipment such as trucks, tractors and road machinery, WPA men built this structure which measures 64 ft. long, has concrete floors, sliding doors and a fine winter workshop equipped with concrete drain pit, storage for tools, work benches and forge.

Photo by W.W. Bennett

There is still imperative need for several other improvements which were not completed, besides those mentioned in our letter of July 1 to the Migratory Waterfowl Division. These are, a house and double garage for a Refuge assistant, a lodge at Hackberry Lake for temporary employees, and fencing part of the boundary of the newly obtained Douglas land.

VII SCIENTIFIC PROGRESS

A. STUDY OF BIRD LIFE

A very careful investigation of the bird life of the Refuge was continually made during the year. Since the purpose of game management on the Crescent Lake Refuge has to do with bird life a continual study of the avian-flora and avian-mammalian relationship was made. These were altogether too numerous to note here but population figures are shown under II-A of this report.

B. FOOD OF SKUNKS

Although skunks proved the principal cause of losses to eggs of wild ducks during 1936 the writer recognized that the animals have considerable value for feeding upon forms of life. Consequently a continual check of the food was made through the year. During the summer of 1936, specimens were not taken but feces showed that food was principally of 3 items, insects, parts of plants and mice. From November 1936 to April 8, 1937 the contents of 34 stomachs or colons were examined and the number containing each kind of food is shown in the following table:

<u>NEPHITIS HUDSONICA</u>	
Stomachs or colons examined	No. of stomachs
Contained	28
Rice	12
Roots, stems and leaves of plants	21
Coleoptera	3
Carion	3
Nebraska cottontail (<i>Sylvilagus floridanus</i> <i>similis</i>)	9
Cattle or horses	2
Bits of feathers	3
Bullheads and Carp	1
Skunk hair	1
Undetermined	4
Parasitic worms	2
Unidentified mammal	1
Cotton cake (?)	1

SPIROGALE INTERRUPTA

	No. of stomachs
Stomachs or gillnets examined	6
Contained	
Mice	3
Stems, roots and leaves of plants	2
Empty	1
Parasitic worms	1
Carriion	2

In the above table of Nephtis hudsonica it will be noted that during the winter time mice, plant life and carrion constitute the principal part of the food. Seldom, however, would a very large portion of each meal consist of plant life, yet that item was more universally eaten than any other. The principal meal in each case seemed to be live mice, of which probably Peromyscus maniculatus nebraskensis was the more numerous, or carrion. One species taken at Island Lake where fish were dying, had the stomach about full, consisting of 80 percent fish bones, including 29 vertebra of small fish, about 8 inches long (probably bullheads) and 2 very large scales of Carp, 15 percent unidentified soft material, 5 percent stems and roots and 6 small bits of black hair, which may have come from the skunk itself. It should be noted that one of the principal foods during the summer was, likewise, found in the winter; 3 stomachs contained Coleoptera and 3 contained other Insecta. The taking of both mice and carrion is considered a value to the Refuge, while the plant life eaten makes very little difference. The principal summer foods of this species, such as mice and insects, likewise are considered beneficial to the Refuge.

C. EUSTOMA ANDREWSII

The aridity of the region and the great number of insects makes the growing of any species of garden flowers rather difficult. A survey was made of available wild flowers which could be used to beautify the headquarters grounds. A wild gentian, Eustoma Andrewsii, was selected as one of the most beautiful. This was particularly admired by Mr. J. C. Salyer, Director of the Migratory Waterfowl Division, on his visit to the Refuge in 1936. It has beautiful clusters of deep blue flowers, each blossom was found to persist for nearly 3 weeks, which is a rather long period of blooming. A careful study of the habits of this plant was made with the result that at the end of the fiscal year the headquarters was beautified by a circular bed consisting of a compact mass of these plants about 6 feet in diameter. These were expected to produce a mass effect of deep blue from the following July 15 to September 1.

D. PLANTINGS

In an effort to increase the food of bird life, a number of new shrubs and trees were experimentally introduced. About 40 buffalo berry trees, procured along the North Platte river, have grown with almost 100 percent success. About 10 russian olives, found growing wild along the North Platte river and planted at headquarters, have likewise all grown very well. Chokecherries have not survived very well. Plantings of trees about 3 feet high were made and it is believed that further plantings from seeds would be more successful. A part of the black currants have grown. Although plantings of this species are not as successful as those of other varieties, it is believed that further attempts should be made because, once established they do very well in the region. About 1,000 wild plum seedlings have done remarkably well, although they seem to be very choice food for rabbits. Native juniper plantings have been very successful in spite of the large sizes of the trees available. This species should do as well as any of the evergreens and produce excellent food for bird life. Osage orange seedlings were introduced for the first time in this region. Carelessness in the transporting of the seedlings resulted in a large number being destroyed but those which survived were apparently doing well. This tree when finally placed in patches about the Refuge should furnish excellent covert for wild life.

E. INSECT CONTROL ON TREES BY ENCOURAGING BIRD LIFE

During 1936 the excellent growth of Willow trees at headquarters was infested with scale insects, borers and other insects with resulting damage to foliage and branches. During the fall a number of wire boxes containing suet were placed in these trees to attract woodpeckers. The shortage of woodpeckers was somewhat eliminated by a pair of Batchelder's Woodpeckers, which were busy all winter eating some suet and a large amount of insects among these trees. Consequently, the foliage of these Willows in June 1937 was very luxuriant and beautiful.

F. STUDY OF RODENTIA

The large number of various species of mice on the Refuge offered a continual threat. They were found to do a great amount of damage by eating the seeds of legumes and other plants which are valuable food for bird life. A study of Short-eared owls and various hawks, in addition to the skunks, revealed their particular value in the controlling of mice.

During the late fall a considerable migration of rabbits and coyotes into the region from other sections was noted. It was commonly believed among residents of the western part of the Sand hills, where similar increases were noted, that these animals migrated from drought areas in Wyoming. The numerical relation of coyotes to rabbits, which furnish the principal food during the period, is shown by the graph on the next page.

VIII. LAW ENFORCEMENT

At the beginning of the hunting season, November 1, 1936, a sudden cold wave caused most of the ducks, using the Refuge, to leave. Hunting in the region was, therefore, so poor that very few men were active. No cases of hunting violations were noted during the period. Refuge laws were generally observed during the year and no arrests were made.

IX. IX. WATER CONDITIONS

The Crescent Lake Refuge, with its 116 lakes and ponds, is one of continually changing water levels. The majority of these totally drying up during 1936 but filling again in the early spring of 1937.

X. PUBLIC RELATIONS

There has been considerable demand from the public for the Refuge Manager to address meetings on the subject of bird life. Lectures were given before a District meeting of some 1200 school teachers at Alliance, a Rotary Club in Alliance, and the Nebraska Ornithologists Union in Hastings, Nebraska, and the North Platte Bird Club and Boy Scouts at North Platte, Nebraska. Several other requests could not be filled because of conflict in time with other duties. The writer was also asked to join the Commercial Club of Oshkosh, Nebraska, which he did and he worked on a number of common problems with the organization, among which was the final combination of plans to extend 5 miles of gravel highway from Oshkosh toward the Refuge.