

BRANCH OF WILDLIFE REFUGES NARRATIVE REPORTS

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REFUGE SHIAWASSEE FLATS

PERIOD May-August 1955

Shiawassee Flats Wildlife Management Area

Narrative Report

May 1 - August 31, 1955

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## Shiawassee Flats Wildlife Management Area

### Narrative Report

May 1 - August 1955

#### I GENERAL

##### A. Weather Conditions

The weather data presented were obtained from records reported from the official weather station at St. Charles, Michigan located at the southwest corner of the project.

Table No. 1 - Weather

<u>Month</u>	<u>Precipitation</u>		<u>Temperature</u>	
	<u>Snow</u>	<u>Rain</u>	<u>Max.</u>	<u>Min.</u>
May	T	2.35"	82°(21st)	29°(9th)
June	-	3.29	92 (19th)	45 (1st)
July	-	2.0	98	58
August	-	1.82	102 (2nd)	48
Total		9.46	Extremes 102°	29°

Spring temperatures were warmer than normal with the season advanced by approximately 7-10 days. July and August were characterized by successive periods of abnormally warm temperatures. The heat wave was finally broken by a cold front that moved in during the third week of August.

##### B. Water Conditions

Precipitation during April and early May was below normal thereby decreasing spring flood threats and permitted farmers to start spring farming operations a week or more ahead of schedule. All agricultural areas subject to annual flooding due to lack of suitable protective dikes were dried sufficiently by May 1-5 to permit cultivation. No serious flooding occurred during the period.

Rainfall during the period was received in ideal of quantities at proper intervals to provide the greatest benefit to farm crops in the vicinity of the project. Crops in adjacent counties have suffered from lack of moisture as well as excessive precipitation at other periods.

The various rivers, county drains and ditches within the project have been at very low levels the majority of the summer. The level

of the Shiawassee river at the Trinklein pumping station ranged 583.8 - 581.2 during the period. Highest levels occur when north-east winds force water from Saginaw Bay up the Saginaw river into the Shiawassee area.

### C. Fire

No serious fires occurred within the project during the period. Stricter interpretation and enforcement of State burning laws by State and County officials have been largely responsible for the reduction of grass and brush fires.

## II. WILDLIFE

### A. Migratory Birds

#### 1. Population and behavior

a. Geese. The last spring migrants left the area April 25-30. Small flocks of 12-18 Canada geese were observed on several occasions during late August. It is believed these birds may have come from the nesting population established in private lakes near Pontiac and Flint.

b. Ducks. Most spring migrants had passed through the Saginaw Valley by May 1. A small nesting population remained within the project and adjacent Saginaw river marshes. Blue-winged teal, black ducks, mallards and wood ducks are the dominant breeding species. The summer population remained at about 500 ducks until the last week of July when numbers began to increase. About 1000 ducks were on the area at the end of the period. The aerial census of September 2 showed an additional 3200 ducks in the Crow Island area.

Transects established during 1954 for breeding pair and brood counts were completed for record purposes. Observations were so few however, that the data are of little significance other than for future comparison. The following observations were recorded along the nine mile transect:

#### Breeding Pair Census - May 4, 1955

	<u>No. Pairs</u>	<u>Lone drakes</u>
Mallard	16	7
Black duck	7	3
Pintail *	12	-
Blue-winged teal **	6	-
Wood duck	4	-
Redhead	1	-
Scaup	7	-
	<u>48</u>	<u>10</u>



\* Pairs of pintails disappeared shortly after transect was run.

\*\* May 4 may have been a little early for teal as small flocks totaling 72 birds were observed.

Only one brood count was made on July 8, at which time six broods were recorded as follows: Mallard (7-IIb, 4-IIIa), black duck (5-IIIa), blue-winged teal (7-IIa), wood duck (4-IIa, 6-I).

c. Whistling swans. A group of eight swans remained on the project until June 10.

d. Coots, Gallinules and Rails. A number of coot broods were observed during the period, but data are not sufficient to estimate production. Two broods of Florida gallinules were observed. Numerous sora rails were observed, but no information was obtained on breeding activity.

e. Hérons, Egrets, Bitterns. Great blue herons and black-crowned night herons frequented the project throughout the period. Long periods of low river levels created ideal fishing conditions for these species. The first American egrets were observed April 17. Several were present throughout the summer with 45 observed along the river areas during the last week of August. Little green herons are common throughout the project. American bitterns are frequently observed and one definite record of a least bittern was established.

f. Shorebirds, Gulls, Terns. Killdeers, spotted sandpipers, lesser yellowlegs and ringed plovers were the common species observed throughout the summer. The first large concentration of about 160 greater and lesser yellowlegs was observed July 22. The returning shorebird migration increased markedly during the last week of July. Additional species observed were black-bellied plover, sanderling, semipalmated and least sandpipers; the latter two were identified from specimens collected for museums. Other species present at the end of the period included dowitchers and pectoral sandpipers. Common terns, black terns, herring gulls and ring-billed gulls were present throughout the period.

g. Mourning doves nest throughout the project. No study of size of breeding population has been made to date, but is scheduled as one of the future population studies to be made.

h. Woodcock were observed on two sections of the project during the last week of August.

i. Wilson's Snipe were first observed on August 28. Additional numbers appeared during the first week of September.

## 2. Food and Cover

Late migrants and breeding waterfowl populations fed on flooded agricultural lands until farming operations eliminated available food. Natural aquatics, annual weeds and insects provided ample summer food for the few birds remaining in the area. Mallards and black ducks started feeding on grain stubble during the last week of July following harvest operations.

The dense stands of emergent vegetation along rivers and adjacent marshes provide ample protection from weather and offer good brood cover. Dikes, ditches and field margins provide the only suitable nesting cover within the project. Very few grassland areas exist. Wood ducks apparently have no difficulty finding suitable nesting trees in the bottomland hardwoods, although most of the good basswood sites have been cut or burned out by raccoon hunters.

The 1955 growing season again produced excellent volunteer growth of wild millet and smartweed on uncultivated tracts and marsh fringes. Water levels remained lower than during 1954 and resulted in further encroachment of cattail in some interior marsh areas.

### B. Upland Game

#### 1. Population and Behavior

a. Ring-necked pheasant. The mild winter followed by a relatively dry spring with no severe flooding or heavy rainfall resulted in good survival of breeding populations and excellent nesting success. First broods were observed May 25. The peak hatch occurred during mid June. Brood observations recorded within the "Little Prairie" area were as follows:

		<u>Age Classes</u>			
		<u>1-2 weeks</u>	<u>3-4 weeks</u>	<u>4-6 weeks</u>	<u>6-8 weeks</u>
<del>1x</del>	No. Broods	3	7	11	5
<del>2x</del>	Total young	26	53	77	32
<del>3x</del>	Ave. brood size	8.6	7.6	7.0	6.4

State biologists anticipate a near record pheasant population and harvest for Michigan this year. They have predicted a harvest of approximately 1,250,000 male birds during the season October 20-November 10.

b. Bobwhite quail have been heard on the project but no broods observed. One brood of 12 was observed along the Curtis road east of the project.



## 2. Food and Cover

Pheasants and quail should have no difficulty finding sufficient food and cover on agricultural lands, dikes, ditch banks and wildland areas within the project during summer and fall months.

### C. Big Game Animals

There appears to be a gradual increase in white-tailed deer throughout the Saginaw Valley, especially in the vicinity of the project. Does with twin fawns have been observed in several sections of the project. A total of 37 deer were observed one morning on the Trinklein and Watson Tracts. It is estimated that the fall deer population within the entire project will exceed 200 animals.

### D. Fur Animals

The muskrat is the principal furbearer on the project. Survival of spring litters should have been good as no serious flooding occurred to drown litters as frequently happens. Lower water levels during the summer may have dispersed animals into adjacent river areas as there has been less sign of muskrat activity in interior marshes than during 1954. House building was evident at the end of the period. Due to relatively mild fall temperatures house building activity does not reach a peak until late October through November.

Raccoon continue to be abundant. Several damage complaints were received from commercial sweet corn growers. Damage to sweet corn as well as field corn is relatively light however, and is confined to field margins.

Mink have been observed periodically, but populations apparently remain at a low level. Red fox appear to be increasing in numbers. Skunks are also becoming more common.

### E. Predacious Birds

Common species observed include marsh hawk, Cooper's hawk, red-tailed hawk, red-shouldered hawk, rough-legged hawk, sparrow hawk, great-horned owl, short-eared owl, screech owl, crow, and bald eagle. Two bald eagles have been observed throughout the period.

### F. Fish

The principal species found in the river areas are carp, bull-head, catfish, suckers, perch, northern pike, small-mouthed bass, crappies and "sunfish". Fishermen, especially negroes and Mexican laborers, line the accessible river banks and larger drainage ditches



during the summer months. Catches consist of carp, suckers, bullheads, catfish and perch. Some fair sized catfish and northern pike have been reported taken along the Shiawassee, Bad and Cass rivers.

### III. REFUGE DEVELOPMENT AND MAINTENANCE

#### A. Physical Development

1. Levelled  $1\frac{1}{2}$  miles of old spoil banks along ditches on Trinklein Tract and seeded one rod strips along field margins to permanent grass to reduce erosion of adjacent ditch banks.
2. Completed leveling of new fill on 1.3 miles of center dike on Trinklein Tract and seeded top, slopes and ditch banks to permanent grass.
3. Constructed  $\frac{3}{4}$  mile of waterways for surface drainage on agricultural tracts.
4. Installed four sets of gate posts and guard cables at entrance roads to Watson and Peaphon tracts.
5. Repaired entrance ramps to Trinklein Tract and surfaced with crushed rock.
6. Repaired roof and siding on storage building at Trinklein Tract.
7. Filled erroded areas in low level dike near goose pen site and installed pump to drain south half of pool in preparation for construction of pen.
8. Refuge personnel assisted Mr. Wright, Branch of Engineering, with topographic surveys of goose pen, headquarters and secondary storage site.
9. S.C.S. engineers and refuge personnel completed topographic surveys on 200 acres of agricultural land in preparation for improvement of surface drainage and ditch construction.
10. Mr. Van Dyke, Branch of Engineering, and refuge personnel spent two weeks on engineering surveys of five miles of exterior protective dikes in preparation for rehabilitation of dikes and ditches.
11. Construction was started to raise  $\frac{1}{2}$  mile of entrance road on the Trinklein Tract and to improve related farm drainage system.
12. Approximately 10 miles of road and dike surface were sprayed with 2,4-D and 2,4,5-T, and mowed two times or more.

13. Farm trails on all tracts were graded periodically in cooperation with permittees.

14. Trips were made to Seney Refuge to pick up shipment of cable and to Wurtsmith Air Force Base, Oscoda, Michigan to pick up surplus property.

15. Miscellaneous:

Major equipment repairs completed by Mr. Robinson and crew included realignment and partial replacement of cutting blade and gate on LeTourneau scraper, painting of scraper, repairs to dump box on Dodge truck and painting of same.

A large set of mats for use with the dragline were made from native elm.

New equipment received:

Oliver industrial mower, 6 ft. with hydraulic lift.  
Rome disc plow.

Administration of the farming program, land acquisition problems and field work regarding development plans required much additional time.

The Development Plan for the project is in the process of being completed.

B. Planting

1. Planting operations were completed on schedule and the growing season was nearly ideal in all respects. As a result agricultural crops are in excellent condition. This will perhaps be the best year the farmers have had for some time. Grain crops harvested during July ranged from 35-45 bushels of barley per acre, while winter wheat on the Trinklein and Peaphon tracts averaged 55-60 bushels per acre.

Agricultural lands under entire or partial control of the Service during 1955 total 1414 acres. An increased portion of the Services share will be left for feeding purposes. The remainder will be disposed of by sale or transfer. We do not anticipate any major increase in fall waterfowl use until a larger closed area is established, but additional food can be used for spring migrants.

Approval of the Land Use Plan and the Soil and Moisture Plan were received during the period and proposed practices placed in operation insofar as possible this year.

## 2. Dike and ditch bank seeding

New fill on 1.3 miles of dike and ditch bank were seeded with a mixture of brome grass, alta fescue and Kentucky 31 fescue to establish permanent grass cover. An additional two miles of grass strips were planted along field margins adjacent to drainage ditches to stop ditch bank erosion. Seedings were made with a companion crop of barley. The fill leveled and seeded contained a large percentage of clay and dried rapidly which resulted in poor germination. Success of seedings was fair, but it may be necessary to reseed certain areas if fall rains don't improve germination of seed remaining.

## IV. ECONOMIC USES

No grazing, haying or cutting of timber occurred during the period on lands under control of the Service.

## VI. PUBLIC RELATIONS

### A. Recreational Uses

Boating and fishing are the major recreational activities on the project during summer months. Membership at boat clubs in Bay City, Saginaw and St. Charles continues to increase, the majority of which travel throughout the Saginaw river and its tributaries. Ownership of portable light outboard craft also continue to increase. Weekly average of public engaged in boating and fishing will perhaps exceed 400 man days this season.

### B. Refuge Visitors

<u>Name</u>	<u>Affiliation</u>	<u>Purpose</u>	<u>Date</u>
Bert Laugen	Administration, FWS	Adm. Inspection	5/2-3
Leo Von Wold	Ann Arbor, Mich, FWS	Courtesy call	5-3
Dr. Humphrys & 30 grad. students	Mich. State Univ. Div. Land & Water Cons.	Tour project	5/22
Tom Boyce	S.C.S. Soil Scientist	Soil reclassification	5/26-27
Wm. Anderson	Seney Refuge	Transfer grain	7/20
Wm. Colburn	Lands Div. MCD	Regional Meeting	7/30
J. D. Stephansky	"	of Soil Cons.	"
Paul Kay	"	Society & tour of	"
Elmer Taylor	S. C. S.	project	"
Russell Frazer	S. C. S.	"	"
W. G. Goelzer	Corps of Engineers	"	"
L. A. Davenport	Game Div., MCD	"	"
Joe Stephenson	Game Div., MCD	Information on	8/1
L.A. Davenport	"	land clearing	"
Marv Johnson	"	"	"



<u>Name</u>	<u>Affiliation</u>	<u>Purpose</u>	<u>Date</u>
E. B. Milam	Felco Corporation	Information on	8/1
H. T. Kranz	Caterpillar Co.	land clearing	"
Forrest Carpenter	Br. Refuges, FWS	Inspection &	8/3-6
Ray Wright	Br. Engineering, FWS	Engineering surveys	"
F. C. Gillett	Reg. Refuge Supv., FWS	Development Plans	8/6
Boyd Wiggins	Asst. County Agent	Tour project	8/8
Dr. R. Johnson	Bureau Animal Ind., USDA	"	"
Louis Wallo	County Committeeman, ASC	"	"
Gordon Bradford	" " "	"	"
Richard Kirch	Work Unit Cons., S.C.S.	"	"
Joe Smoke	Br. Lands, FWS	Acquisition	8/22-9/3
Hugh Van Dyke	Br. Engineering, FWS	Engineering surveys	8/23-9/1
Roger Ashley	Lands Div., MCD	Acquisition	Frequent
Marv Johnson	Game Div., MCD	Project Mgm't.	"
Marv Cooley	" "	"	"
C. McClarty	Cons. Officer, MCD	Enforcement	"
Ernie Spycher	" "	"	"
Chas. Hartman	Fire Officer, MCD	"	"
Steve Creech	GMA - FWS	"	"
Al Boelter	Forestry Div., MCD	Technical Info.	"
B. A. Meyers	S. C. S.	Land Use Problems	"
Dale Pasco	S. C. S.	"	"
Karl Klingelhofer	S. C. S.	"	"

Numerous others stopped by the office for information regarding farming program, employment, fall hunting plans, bird observations, game and fish regulations.

#### C. Refuge Participation

The refuge manager participated in the following activities:

- May 4 - Met with Conservation Education Committee of County Agricultural Council to plan assistance to scouting program in the Saginaw Valley.
- May 6 - Gave talk on refuge program and showed Sand Lake film to class of 40 at North Intermediate School, Saginaw.
- May 10 - Met with State Game Division personnel at Lansing,  
& July 12 Michigan to discuss development plans for project and Lake St. Clair.
- May 15 - Attended annual meeting of Midland Audubon Society.  
Discussed Shiawassee project as topic for program.



- May 15, 12 Attended evening seminars on Watershed Management  
 19, 26 - at Michigan State University. Participated in weekend tour of watershed problems in Michigan including tour of Shiawassee project.
- July 26 - Attended meeting of Saginaw Exchange Club to discuss development of the Shiawassee project.
- July 30 - Attended regional meeting of Michigan Chapter of Soil Conservation Society in Saginaw. Discussed Shiawassee project in panel discussion on the Saginaw Valley Flood Control Program.

In addition to the above activities the refuge manager attended monthly meetings of the County Agricultural Council and bi-weekly meetings of the Saginaw Junior Chamber of Commerce.

D. Hunting. No open seasons during the period.

## VII. OTHER ITEMS

### A. General

The Cooperative Agreement for the Shiawassee project was signed by the Director, Fish and Wildlife Service and the Director, Michigan Department of Conservation on July 19, 1955 and June 27, 1955.

As indicated in previous reports the Shiawassee Flats Wildlife Management Area will consist of two adjacent operating units; the Shiawassee National Wildlife Refuge administered by the Fish and Wildlife Service and the Shiawassee River State Game Area administered by the Michigan Department of Conservation. The Crow Island Sanctuary, located just north of the city of Saginaw, was tentatively purchased by the State as a third unit of the management area, but has now been dropped from the joint development and management provisions of the Cooperative Agreement. The sanctuary will be managed as such in its present condition.

For the time being it appears more desirable to report on the entire project as much of the activity is of mutual concern to the Service and State. Operation, development and maintenance data pertain only to the refuge area unless stated otherwise.

The State Game Division recently assigned Mr. Marvin Johnson, Game Biologist, as Area Manager to work on the State segment of the project. Mr. Johnson is stationed at St. Charles, Michigan.

B. Report of Activities - Lake St. Clair Waterfowl Refuges

The Lake St. Clair areas were not visited during the period. Arrangements have been made in cooperation with State personnel to prepare materials and post the refuge units during mid September.

Submitted by: Harvey K. Nelson  
Refuge Manager

September 19, 1955

Approved: *Lu Burdick*

W A T E R F O W L

REFUGE Shiawassee (Entire Project)

MONTHS OF May TO August, 1955

(1) Species	(2) Weeks of reporting period									
	1	2	3	4	5	6	7	8	9	10
<b>Swans:</b>										
Whistling										
Trumpeter	18	15	15	8	8	8	-			
<b>Geese:</b>										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
<b>Ducks:</b>										
Mallard	200	200	200	200	200	200	250	250	250	250
Black	100	100	100	100	100	100	150	150	150	150
Gadwall										
Baldpate	50	50	-							
Pintail	T	-	-							
Green-winged teal	T	T								
Blue-winged teal	100	100	150	150	150	150	150	150	150	150
Cinnamon teal										
Shoveler										
Wood	50	50	50	50	50	50	50	50	50	50
Redhead	T	-								
Ring-necked	T	-								
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
<b>Total Ducks</b>	500	500	500	500	500	500	600	600	600	600
<b>Coot:</b>	300	200	200	200	200	200	200	200	200	200



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(Rev. March 1953)

WATERFOWL  
(Continuation Sheet)

REFUGE Shiwassee (Entire Project)

DATE OF March TO August, 1955

(1) Species	(2) Period of reporting								(3) Estimated waterfowl days use	(4) Production Broods: Estimate Total
	11	12	1	2	3	4	5	6		
<u>Swans:</u>										
Whistling									500	33,000
<u>Geese:</u>										
<u>Canada</u>						12	18	18	300	
<u>Ducks:</u>										
Mallard	300	300	300	300	300	300	300	300	32,000	2
Black	200	200	200	200	300	300	400	400	25,900	1
Baldpate									700	
Pintail						T				
Green-winged teal										
Blue-winged teal	200	200	200	200	250	250	250	250	22,400	1
Shoveler										
Wood	100	100	100	100	100	100	100	100	9,500	2
Redhead										
Ring-necked										
Scaup										
<u>All Ducks</u>	800	800	800	800	950	950	1050	1050	91,000	
<u>Coots</u>	300	300	300	300	300	300	400	400	33,000	



(Continuation Sheet)

(5)	(6)	(7)
Total Days Use :	Peak Number :	Total Production :

marsh and Langschwager marsh.

Principal nesting areas Dikes, ditch banks and farmlands.

Reported by Harvey K. Nelson

Insufficient data on broods to estimate production, but very few ducks are raised within the project.

All Ducks

2002

Risky-necked

Redhead

book

Shover, J.

Blue-winged

Green-winged

Plata

Baldpate

Black

bref [sM]

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Farmlands.

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3-1751  
Form NR-1A  
(Nov. 1945)

MIGRATORY BIRDS  
(other than waterfowl)

Refuge Shiawassee

Months of May to August

1955

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. <u>Water and Marsh Birds:</u>										
Pied-billed grebes	)	Present throughout period.								
Great-blue herons		No definite population								
Black-crowned night heron		data has been compiled.								
Green heron										
American egret										
American bittern										
Least bittern	)									
II. <u>Shorebirds, Gulls and Terns:</u>										
Killdeer	Present throughout period									
Sanderling	15	7/22								
Spotted sandpiper	Present throughout period									
Lesser yellowlegs	130	7/22								
Greater yellowlegs	30	7/22								
Pectoral sandpiper	2	7/28								
Semi-palmated sandpiper	50	7/28								
Wilson's snipe	4	8/28								
Black-bellied plover	18	7/28								
Semi-palmated plover	Present throughout period									
Common tern	Present throughout period									
Herring gull	"	"	"	"						
Black tern	"	"	"	"						
Ring-billed gull	"	"	"	"						

(over)



(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u>					
Mourning dove	Present throughout period.				
White-winged dove	-				
IV. <u>Predaceous Birds:</u>					
Golden eagle	-				
Duck hawk	-				
Horned owl	Resident				
Magpie					
Raven					
Crow	Common throughout period				
Bald eagle		2	-		
Short-eared owl		4	May		
Rough-legged hawk	Observed during				
Red-shouldered hawk	period.				
Red-tailed hawk					
Marsh hawk					
Sparrow hawk					
Cooper's Hawk					
			Reported by _____		

#### INSTRUCTIONS

- (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 refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (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 total number of the species using the refuge during the period concerned.



Refuge ShiawasseeMonths of May to August, 1955

(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.
Ring-necked pheasant	Cultivated fields, bottom land hard- woods, herbacious growth on dikes & ditches, sedge mat & cattail marsh (8000 acres)	-	(See Narrative section)						?	Winter concentrations of about 3000 birds. No significant data avail- able on spring dispersal or remaining summer population.  Nesting season ideal, success high.
Bobwhite quail	Brush land, cul- tivated fields, herbacious growth on dikes and ditches, field margins and small grass meadows.	-							?	Birds heard but no coveys or broods observed.



# 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.