

WILDLIFE INVENTORY PLAN

Necedah National Wildlife Refuge
Necedah, Wisconsin
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WILDLIFE INVENTORY PLAN

Policy.

It is the policy of the Service to obtain useful parameters related to the distribution, abundance, and population dynamics of the species of wildlife inhabiting refuge lands. These data are required to develop management recommendations appropriate to the objectives of the National Wildlife Refuge System (7RM11.1).

Service Objectives (7RM11.2).

1. To obtain in accordance with acceptable wildlife management techniques the best possible estimates of wildlife population parameters commensurate with the objectives of such investigation and the time, resources, and personnel available.
2. To obtain concomitant data on the accuracy of estimates obtained, i. e., data on the sufficiency of assumptions and the effect of sampling error.
3. To record and make available such data for purposes of species, population, and refuge management and for other purposes.

Refuge Objectives.

The Necedah Migratory Waterfowl Refuge was established in 1939. The enabling legislation ordered that the land "...would be reserved and set apart as a refuge and breeding ground for migratory birds and other wildlife."

1. Refuge Goals

- a. To restore and maintain varied habitat types for all wildlife, with emphasis on habitat requirements of threatened and endangered species.
- b. To maintain nesting and migratory habitat for waterfowl.
- c. To encourage and manage for all compatible types of wildlife oriented recreation.
- d. To manage the timber resource consistent with wildlife, aesthetic, and economic values.

Wildlife Inventory Plan Objectives:

1. To standardize inventory procedures, thereby increasing the accuracy of data collected.
2. To provide guidelines specific to Necedah Refuge for the collection of wildlife population data.
3. To provide necessary information to evaluate habitat management practices designed to accomplish refuge objectives.
4. To determine the estimated time required and associated costs of each inventory procedure.

Individual inventory procedures are outlined in the following sections NCD-1 through NCD-10. They are designed to provide a systematic and consistent method of collecting data. However, changes in refuge staffing or improvements in inventory techniques may necessitate amending the plan. An outdated procedure should be appended to the plan to provide interpretation of previous population figures.

Each procedure is designated to one of four specific reliability classes in an attempt to categorize the accuracy of the data collected:

Reliability Class A: A 100% or total population count.

Reliability Class B: Accurate to $\pm 20\%$.

Reliability Class C: Accurate to $\pm 50\%$ (usual systematic survey).

Reliability Class D: An informal estimate of unknown accuracy.

CHRONOLOGICAL SYNOPSIS OF WILDLIFE INVENTORIES

INVENTORY TITLE	TIME TABLE	STAFF DAYS REQUIRED	PERSONNEL REQUIRED
Weekly Waterfowl Census	March 15 - November 30	30.0	Refuge Staff and/or Volunteers
Weekly Marsh & Waterbird Count	March 15 - November 30	Done in conjunction with weekly waterfowl census	Refuge Staff and/or Volunteers
Weekly Mammals, Raptors, etc.	March 15 - November 30	"	Refuge Staff and/or Volunteers
Sandhill Crane Breeding Pair Count	April 10 - 20	0.4	Refuge Staff and Volunteers
Woodcock Singing Ground Survey	April 25 - May 15	1.1	Refuge Staff and Volunteers
Waterfowl Breeding Pair Count	May 15 - 30	1.0	Regional Pilot and Refuge Staff
Mourning Dove Coo Count	May 20 - 31	0.5	Refuge Staff and/or Volunteers
Waterfowl Production Estimates	Based on Breeding Pair Counts	None	Refuge Staff
Goose-Crane Fall Fly- out Counts	September 25 - Novem- ber 20	7.8	Refuge Staff and Volunteers
Sandhill Crane fall Roost Count	October 25 - November 5	0.25	Refuge Staff or Volunteers

WILDLIFE INVENTORY PROCEDURE**Refuge:** Necedah NWR**Procedure No:** NCD-1**Species:** Waterfowl**Reliability Class:** C

(Ducks, Geese, Water, Marsh & Shorebirds)

Title: Weekly Waterfowl Census

I. Purpose

Major objectives of the refuge are (1) to provide a resting and feeding stop for migrating waterfowl and (2) to provide production habitat for waterfowl. Management of the area provides much public recreation and enjoyment. The refuge is one management unit in the Mississippi flyway. It is desirable to have a consistent census technique which will reflect:

1. Annual trends and changes in waterfowl populations for flyway management needs and to evaluate waterfowl responses to refuge habitat management techniques.
2. Weekly changes in waterfowl populations for recording migratorial chronology used in output reporting.

II. Procedure

The refuge manager, assistant refuge manager/biologist, or the biological technician will usually conduct the census. Refuge volunteers (Audubon society members) or temporarily employed wildlife students who are proficient in waterfowl identification may also conduct this census. Any of these personnel may conduct the entire census or the census areas may be divided among several persons. Other refuge personnel may assist by reporting unusual observations or concentrations when they have been missed during the regular census.

Weekly censuses will begin on the arrival of the first spring migrants, or about mid-March, and will usually continue until freeze-up in late November. However, the refuge manager may at his option, discontinue weekly censuses during the period from June 15 through August 15. Instead, bi-weekly or monthly censuses may be conducted during this less spectacular period of waterfowl concentrations.

Regular weekly counts will usually be conducted between 8 AM and 4 PM. Weekly counts may be substantiated or superceded by observations made earlier or later in the day during periods of heaviest waterfowl activity, such as early morning or evening feeding flights off the refuge or roost flight counts.

Counts are to be made when visibility is good, at least two miles. wind speed should be less than 20 miles per hour to avoid spotting scope jitters. Censusing a particular pool should be scheduled during a time

of day when back lighting is avoided so that the visibility of species coloration is maintained for identification. In other words, the sun should be at the observer's back rather than beyond the subject's. Early morning or late afternoon is best to avoid the problem of heat mirage and image distortion within the spotting scope. This is most troublesome during the heat of the day. Counts and observations are made from a pickup truck (cars or station wagons lack the road clearance required to pass over Dam #13 and Coaver Road bridges). Trucks are driven at slow speeds (10-20 MPH).

The census route and approximate observation points are shown on a map, in the back of this section. These census routes follow existing roads on pool dikes and along agricultural units. They were selected as they offer the best locations for viewing waterfowl and other waterbirds and cover the main concentration areas. Of the 4,667 acres of "waterfowl areas" checked, about 46% (or about 2,180 acres) are censused or sampled. These "waterfowl areas" are concentration points for waterfowl and at any given time support 90%+ of the refuge population. The sample represents 18% of the total waterfowl habitat (12,100 acres as listed in the "Land Type Inventory," and 5.0% of the total refuge acreage (43,656 acres).

Count all geese, ducks, waterbirds, and shorebirds visible from the census routes or observation points using the aid of binoculars and spotting scopes.

Sixteen refuge habitat units (pools and cropland units) will be sample counted and the results recorded separately while in the field on the "Field Worksheet," Data Form #1 at the end of this section.

Expanding sample count data, recorded on the field data sheet, to total estimated refuge populations is done back in the office using one of two methods of calculations. These two methods are explained on Data Forms #3 and #4 (attached at the end of this section).

Form #3 was developed to simplify the calculations during most of the year when most pool habitats are not changing radically because of prescribed water level manipulations. Form #3 is used during the period March through mid-September when current year moist soil plant production has no influence on observability of waterfowl populations.

On the other hand, Form #4 is used during the fall migration when implemented water level manipulations have a significant and annually changing effect on visibility of waterfowl for counting purposes. Reflooding of moist soil plants occurs in some pools obscuring waterfowl from view. Often water levels are lowered in October in other pools for invertebrate exposure. This improves waterfowl visibility. To complicate it further, these manipulations of water levels are rotated from pool to pool, year to year. For this reason the adjustment of expansion factors is required.

Weighted expansion factors used on Data Form #3 are not simply averages of individual pool expansion factors used in Data Form #4. Weighted

expansion factors used on Data Form #3 were determined as shown on Data Form #6 and were calculated by dividing, the total waterfowl group habitat acreage sampled, by the composite total waterfowl group habitat acreage determined to be visible and therefore countable in all pools sampled.

Use of the weighted expansion factor in determining total refuge populations is only appropriate if all pools listed on the field worksheet are actually surveyed and counted. Error in the use of the weighted expansion factor will vary, sometimes considerably, depending on the number of pools or which pool or pools are omitted from the field survey if for some reason the entire survey cannot be completed.

All census expansion factors were developed for two general classes or groups of waterfowl. One was developed for the goose-puddle duck group and the other was developed for the diving duck group. They were developed and classified in two groups mainly because each group has different visibility factors. Diving ducks are generally in open water areas and are more visible and therefore more likely to be counted. In comparison, the puddle ducks and geese are generally among emergent vegetation around the periphery of the pools, thus less visible from established census routes or observation points.

Weekly waterfowl population data is gathered by species and summarized by monthly peak population and date, and monthly averages necessary for output reporting on "Monthly Waterfowl Populations" Form 3-243. This data is summarized in Washington on quarterly "printout form" by fiscal year (October 1 through September 30) and filed in the refuge Narrative Report.

Recording populations data by fiscal year is confusing when the end of one fiscal year ends and the next fiscal year begins right in the middle of the fall migration season. This is the most important season of the year when habitat managers are trying to evaluate habitat management programs applied on refuges. It is for this reason that data forms 4 and 5 are included in this plan for inclusion in refuge files.

III. Reliability

Reliability of data varies with the waterfowl species and the visibility within the habitat unit or pool. On some habitat units where the percent visibility is high, such as agricultural units, the reliability will be high. Conversely, in a unit where 35% of the habitat is visible, the reliability is obviously lower.

A higher percent of diving ducks occurs within view and these can be counted with a higher degree of accuracy because they naturally occur in open water areas in the deeper portions of the pools. Emergent vegetation screens from view a significant portion of the geese and puddle ducks in nearly all pools, thus the expansion factor may be greatly reduced and the accuracy is diminished.

The problem of observing and counting puddle ducks and geese in flooded moist soil units is frustrating. This is especially true in late

September and early October, before frost has had a chance to knock down the 3 - 6 foot tall smartweed and beggar-tick vegetation. Thus the birds are obscured from vision.

Feeding or roost flight counts are not very useful in counting ducks on flooded moist soil units. Feeding or roosting cover conditions are both more than adequately provided by flooded moist soil units themselves. Once puddle ducks and geese find a unit like this, they stay put. Fly-out feeding and roost flights literally do not take place. Small groups of ducks may trade in and out and about these units at any time of day, but there is no great exodus or re-entry flights twice daily as that associated with the usual roost or feeding flights.

In order to get at least some indication of species and numbers of waterfowl on flooded moist soil units, a small portion of the unit may have to be waded with the purpose of flushing the birds for counting and identification of species. This data then must be expanded to cover the entire unit or units.

**MAGNITUDE OF POPULATIONS
OF MORE COMMON SPECIES INVENTORIED**

<u>Species</u>	<u>Normal Populations</u>		<u>High Populations</u>
Canada Geese	100	- 16,000	25,000
Blue and Snow Geese	0	- 1,000	5,000
Coot	10	- 6,000	30,000
Mallard	400	- 14,000	45,000
Black Duck	0	- 2,000	12,000
Pintail	0	- 2,000	12,000
Green Wing Teal	10	- 2,000	4,000
Blue Wing Teal	300	- 2,000	5,000
Widgeon	0	- 4,000	15,000
Wood Duck	400	- 2,000	2,500
Redhead	0	- 100	350
Ringneck	0	- 2,000	6,500
Canvasback	0	- 100	1,500
Lesser Scaup	0	- 1,000	3,500
Bufflehead	0	- 200	500
Ruddy	0	- 200	500
Hooded Merganser	50	- 300	500
Common Goldeneye	0	- 300	600

IV. Manpower and Costs

MANPOWER AND COSTS

1)	Thirty counts annually @ 8 hours each (Field work March - November)	=	240 Man Hours
	50% above man hours by GS-09 Biologist @ \$17.39/hr	=	\$2,086.80
	50% above man hours by GS-06 Bio Tech @ \$11.76/hr	=	\$1,411.20
2)	Thirty counts annually @ 3 hours each (Data processing and Recording)	=	90 Man Hours
	100% above man hours by GS-05 Secretary @ \$10.34/hr	=	\$930.60
3)	Gasoline and operating costs of vehicles @ .08/mile (10 MPG @ .80/gallon pickup truck) x 50 miles/count x 30 counts	=	\$120.00
	TOTAL COSTS	=	\$4,548.60

Note: Man days figured one count per week during periods March 15 through June 15 and from August 15 through November 30, and bi-weekly from June 15 to August 15.

NCD-1

Data Form #1: Weekly Waterfowl
Census

WEEKLY WATERFOWL CENSUS
NECEDAH NATIONAL WILDLIFE REFUGE
(Field Worksheet) (Actual Counts)

Calendar Week Ending Saturday, _____
(Date)

Pool #, Etc.	1	2	Coaver Rd.	Cropland (All)	33	31	30	29	13	9	19	18	27	28	Suk Cerney	Pahrm	TOTAL
Coot																	
Swans:																	
Tundra																	
Geese:																	
White-fronted																	
Snow-Blue																	
Canada																	
Giant Canada																	
TOTAL GEESE																	
Puddle Ducks																	
Mallard																	
Black																	
Gadwall																	
Pintail																	
Gr. Wing Teal																	
B. W. Teal																	
Am. Widgeon																	
Shoveler																	
Wood Duck **																	
TOTAL PUDDLERS																	
Diver Ducks																	
Redhead																	
Ringneck																	
Canvasback																	
Lesser Scaup																	
Bufflehead																	
Ruddy																	
Am. Merganser																	
Hd. Merganser																	
Cm. Goldeneye																	
TOTAL DIVERS																	
TOTAL ALL DUCKS																	

** Considerable wood duck use occurs in drainage ditches which are not included in this record.

WEEKLY WILDLIFE OBSERVATIONS - NECEDAH NWR

Date:

(Actual Observations - Not Expanded Populations - Noted During Waterfowl Counts)

[illegible]

DATA FORM #2

NCD-1

Data Form #2: Weekly Wildlife
Observations

WEEKLY WATERFOWL CENSUS

EXPANSION CALCULATIONS

(Use during period March through mid-September)

NECEDAH NATIONAL WILDLIFE REFUGE

Calendar week ending Saturday, _____
(Date)

Weighted Expansion Factor ***	Species	Actual Count Total *	Expanded Total **
.844	Coot		
.467	Swans: Tundra		
.467	Geese: White-fronted Snow-Blue Canada Giant Canada TOTAL GEESE		
.467	Puddle Ducks Mallard Black Gadwall Pintail Gr. Wing Teal B. W. Teal Am Widgeon Shoveler Wood Duck TOTAL PUDDLERS		
.844	Diver Ducks Redhead Ringneck Canvasback Lesser Scaup Bufflehead Ruddy Am.Merganser Hd.Merganser Cm.Goldeneye TOTAL DIVERS		
	TOTAL ALL DUCKS		

* Data transferred from "Field Worksheet" - Weekly Waterfowl Census.

** Expanded total = Actual count total divided by weighted expansion factor.

*** See Appendix for calculations to determine weighted expansion factors.

DATA FORM #3

NCD-1

Data Form #4: Weekly Waterfowl
Census Expansion Calculation

WEEKLY WATERFOWL CENSUS
NECEDAH NATIONAL WILDLIFE REFUGE
EXPANSION CALCULATIONS
(Use during period Mid-September through November)

Calendar Week Ending Saturday, _____
(Date)

Pool #, Etc.	1	2	Coaver Rd.	Cropland (All)	33	31	30	29	13	9	19	18	27	28	Suk Cerney	Pahrm	TOTAL
	.90	1.0	1.0	1.0	.90	.90	.75	.90	.75	.10	.40	.50	.50	.90	.90	.20	
Coot																	
Swans:	.75	.60	.75	1.0	.50	.35	.35	.35	.10	.10	.02	.02	.02	.02	.80	.20	
Tundra																	
Geese:	.75	.60	.75	1.0	.50	.35	.35	.35	.10	.10	.02	.02	.02	.02	.80	.20	
White-fronted																	
Snow-Blue																	
Canada																	
Giant Canada																	
TOTAL GEESE																	
Puddle Ducks	.75	.60	.60	1.0	.50	.35	.35	.35	.10	.10	.02	.02	.02	.02	.80	.20	
Mallard																	
Black																	
Gadwall																	
Pintail																	
Gr.Wing Teal																	
B.W.Teal																	
Am. Widgeon																	
Shoveler																	
Wood Duck **																	
TOTAL PUDDLERS																	
Diver Ducks	.90	1.0	1.0	1.0	.90	.90	.75	.90	.75	.10	.40	.50	.50	.90	.90	.20	
Redhead																	
Ringneck																	
Canvasback																	
Lesser Scaup																	
Bufflehead																	
Ruddy																	
Am.Merganser																	
Hd.Merganser																	
Cm.Goldeneye																	
TOTAL DIVERS																	
TOTAL ALL DUCKS																	

** Considerable wood duck use occurs in drainage ditches which are not included in this record.

Expansion factors listed above in each species group category is numerically the same as the approximate percentage of each pool that is visible, for census purposes, in average emergent vegetative cover conditions at full pool level, divided by 100. Taken into account is the fact that diving ducks by their nature are more visible in open water than are puddle ducks and geese in marsh edges.

In the fall, when this form is to be used (mid-September through November), when dense vegetation in reflooded moist soil pools obscure birds from view, disregard the expansion factors presented above and use another factor based on your best estimate.

Calculation Example: Expanded total estimated populations by species within a pool equals actual counts for that pool taken from the Field Worksheet divided by the species group expansion factor for that pool.

Expansion factors may be increased up to 1.0 on ducks, not geese, in those pools where surface water areas have shrunk because of low water levels to the point where it appears that 100% of the ducks using the pool are visible and thus are countable. Where these factors are adjusted it should be noted in red on this form.

DATA FORM #4

SUMMARY WEEKLY WATERFOWL CENSUS
NECEDAH NATIONAL WILDLIFE REFUGE

YEAR:

[illegible]

NCD-1

Data Form #5: Summary Weekly
Waterfowl Census

CALCULATIONS
FOR DETERMINING WEIGHTED EXPANSION FACTOR
USED IN WEEKLY WATERFOWL CENSUS

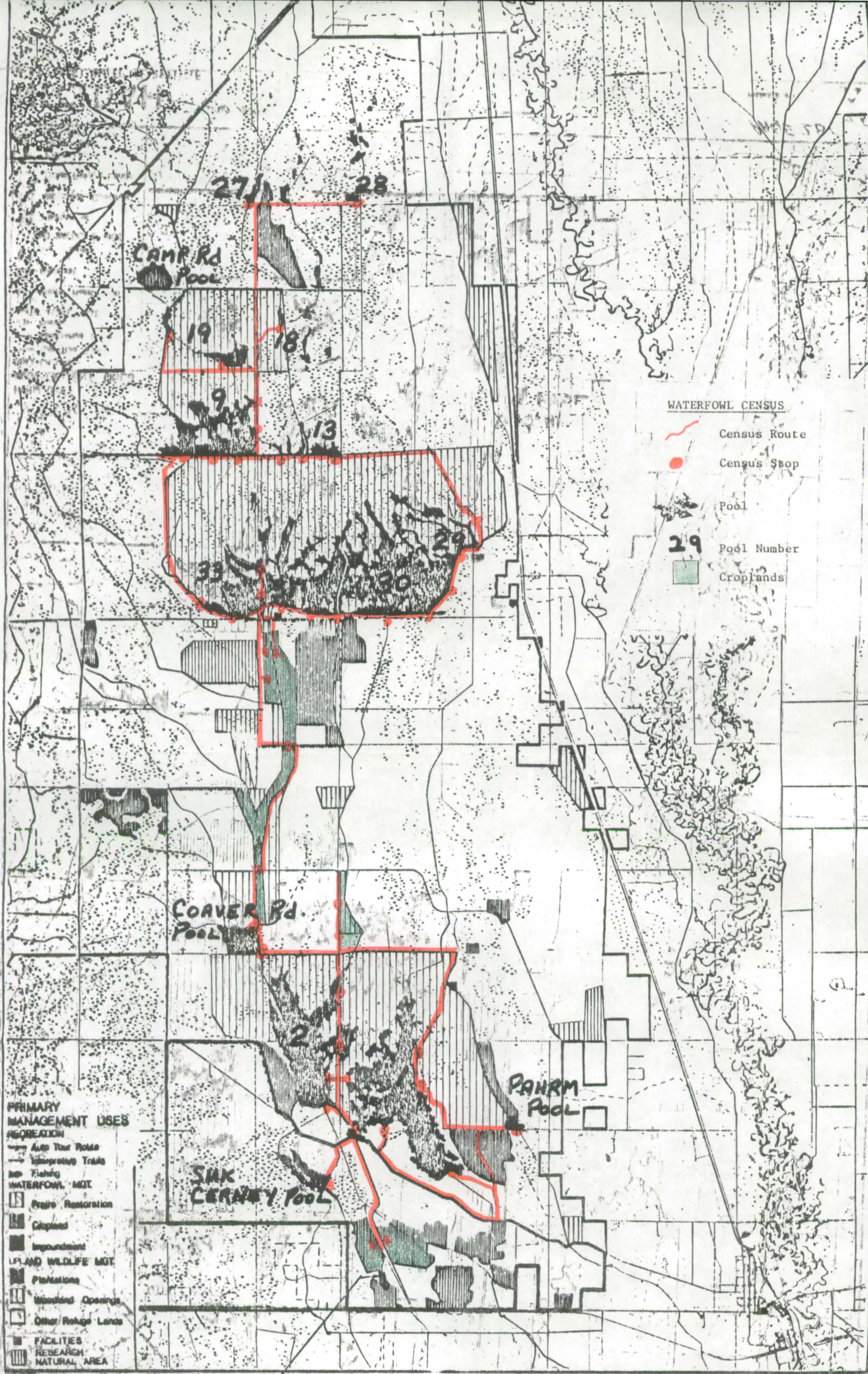
Waterfowl Habitat Units Pool, etc.	Estimated Goose and Puddle Duck Habitat Acreage at Full Pool	Percent of Goose and Puddle Duck Habitat Visible and Counted	Acreage of Goose and Puddle Duck Habitat Sampled or Counted	Estimate of Diving Duck Habitat Acreage at Full Pool	Percent of Diving Duck Habitat Visible and Counted	Acreage of Diving Duck Habitat Sampled or Counted
1	800	75	600	290	90	261
2	500	60	300	230	100	230
Coaver Road	80	60	48	5	100	5
Cropland (All)	320	100	320	-	100	0
33	300	50	150	80	90	72
31	453	35	159	10	90	9
30	1100	35	385	240	75	180
29	133	35	47	5	90	5
13	173	10	17	5	75	4
9	335	10	34	40	10	4
19	120	2	2	10	40	4
18	63	2	1	5	50	3
27	20	2	1	3	50	2
28	40	2	1	2	90	2
Suk Cerney	70	80	56	40	90	36
Pahrm	20	20	4	2	20	1
Canfield Pools	140	40	56	5	40	2
TOTALS	4667 AC.		2128 AC.	972 AC.		820 AC.



Total refuge goose and puddle duck Habitat visible and countable = 2128 acres ÷ 4667 acres = 46.7% = Weighted Expansion Factor .467
















Total refuge diving duck habitat visible and countable = 820 acres ÷ 972 acres = 84.4% = Weighted Expansion Factor .844

NCD-1

Waterfowl Census Map



- WATERFOWL CENSUS**
- Census Route
 - Census Stop
 -  Pool
 - 29** Pool Number
 -  Croplands

- PRIMARY MANAGEMENT USES**
-  RECREATION
 -  Auto Tour Route
 -  Interpretive Trails
 -  Fishing
 -  WATERFOWL MGT
 -  Prairie Restoration
 -  Cropland
 -  Impoundment
 -  UPLAND WILDLIFE MGT
 -  Plantations
 -  Woodland Openings
 -  Other Refuge Lands
 -  FACILITIES
 -  RESEARCH
 -  NATURAL AREA

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah NWR

Procedure No: NCD-2

Species: Waterfowl including Ducks,
Geese, and Coots

Reliability Class: B & D

Title: Breeding Pair Count

I. Purpose

The breeding pair count is based on the general behavior patterns of waterfowl during the early nesting period. This count should be made each spring to determine the refuge breeding population. Present population figures will form the basis for measuring the value of refuge waterfowl habitat management techniques and is used in determining annual waterfowl production estimates and breeding population trends.

II. Procedure

Duck, coot, and Canada goose breeding pair counts are explained in Hammon, M. C., Waterfowl Breeding Population and Production Surveys, Section 25.2 - 25.4, 1966. (See attachment.)

A) Time of season. The breeding pair counts (both the ground and aerial counts) should be made during the second or third week of May. It is during this period that most of the migrants nesting further north are gone and most local breeding pairs are on their territories.

B) Time of day. Both the aerial and ground counts are run concurrently between sunrise and 10:30 AM.

C) Counts.

Aerial counts are done to determine the total number of breeding pairs existing within the thirteen aerial transects. See the aerial transect maps at the back of this section. Each transect is flown at an elevation of about 200 feet following the section lines, or 1/4 section lines. These lines are 1/2 mile apart and the two observers, each on opposite sides of the plane, count out to a distance of 1/8 mile. This count is expanded by a factor of 2 (because the transects are designed to count a 50% sample) to determine total pairs.

Species composition is of no concern of the aerial observers. Species composition is determined by the ground observer, as the ground observer not only counts the pairs he observes, but also determines the species of each pair. The percentage species composition of the total number of pairs observed by the ground observer is then applied to the expanded total number of pairs determined by the aerial observers.

Ground counts are done to determine species composition, not air to ground ratios. A total of five ground observation routes in two pool complexes are sampled. The five routes, colored in red on the attached map, follow the dikes and are a sample of the pool habitat. Only the pool areas to the west and/or north of the dikes are counted. Counting only one side allowed a more complete observation of the areas being sampled. Only pool habitats are ground counted. Previously ground transects along the ditches between the pools were included in breeding pair counts, however, these were discontinued as they were considered inaccurate and too time consuming as they had to be done on foot.

Ground counts on the dikes are made from a pickup truck driven at slow speeds. One individual is sufficient to observe since there are not large concentrations of birds during the counting period. All birds within 1/8 mile, or 600 feet, are recorded on both aerial and ground counts.

Recording Data

All waterfowl observed from the ground are recorded by species and sex when possible, but only pairs and lone males are tabulated as representing breeding pairs.

Only pairs and lone birds (assuming lone birds are males) are counted from the air and are recorded as breeding pairs. Flocks are not counted. No species determination is attempted from the air. Species composition is determined from the ground count data.

Air-ground Ratio of 1:2.40 is now used each year. This ratio is used as a constant in recent years after being developed as an average found to be valid during the period 1971-78 here at Necedah NWR.

Calculations:

Refer to Table #2 - 1988 Breeding Pair Count Data

Pairs actually counted from the air (61) represent a 50% sample.

100% air count sample = (50% sample x 2) = 122 pairs.

Total Pairs (Expanded) = 100% sample pairs counted x air-ground ratio.

Total Pairs (Expanded) = 122 pairs x (1:2.4).

Total Pairs (Expanded) = 293 pairs.

Species percent composition is determined from only ground count data. The total number of pairs of an individual species, mallards for instance, is determined by dividing the total number of observed mallard pairs on all ground transects by the total number of pairs (all species) observed from all ground transects.

Example:

$$\begin{array}{l} \text{Species Percentage Composition} = \frac{\text{No. of Mallard Pairs counted}}{\text{on All Ground Transects}} \\ \text{Of Mallard Pairs} \quad \quad \quad \text{Total No. of Pairs (All} \\ \quad \quad \quad \quad \quad \quad \quad \quad \text{Species) Counted on All} \\ \quad \quad \quad \quad \quad \quad \quad \quad \text{Ground Transects} \end{array}$$

$$46\% \quad (\text{or } .46) \quad \quad \quad = \quad 23/50$$

Total number of pairs (expanded) by species is determined by multiplying the total pairs (expanded) (from aerial counts) by the species percent composition (from the ground counts).

Total No. of mallard Pairs =

$$293 \text{ (Total expanded pairs from air counts)} \times 46\% = 135$$

DUCK BREEDING PAIR COUNT - 1988

Necedah Refuge - May 18, 1989

Time: 9:25 AM to 10:45 AM - by Bob Foster and Jon Olson (Aerial)

8:00 AM to 11:00 AM - by Richard Nord (Ground)

Weather: Temperature 70 , clear skies, SE winds @ 4-6 mph

Data: 61 (Breeding pairs observed) X 2 (50% Sample) = 122 Pairs X 2.4 (Air-ground ratio) = 293 Breeding pairs (Ducks only)

Water Levels/Marsh Conditions:

Pool 1 - 921.9 (Reduced pool levels)

Pool 2 - 924.6 (Full pool)

Pools 9 and 13 - Full pool levels

Sprague Pool - Level near 939.0 (Full pool)

Goose Pool - 941.9 (Full pool)

All pools at normal full pool levels, except Pool #1, which was lowered 2 feet to reduce hydrostatic pressure on the water control structure which is leaking water around the wingwalls. Marsh acreage in this pool is reduced from about 800 acres to about 300 acres. These levels were the same in 1988 as last year.

Goose Pool was raised 2 feet higher than in the past ten years or so. Riprapping of the south and east dikes, completed in 1985, allowed this pool to be raised to designed full pool levels without wave action damage to the dike slopes. Thus, acreage of waterfowl breeding habitat in this pool was increased from about 80 acres to about 300 acres in 1986. These levels were the same in 1987 and in 1988.

TABLE NO. 1
Breakdown of Species, Breeding Pair Count, Necedah Refuge, May 18, 1988

<u>Species</u>	<u>No. of Pairs From Ground Transect</u>	<u>% of Total Pairs by Species</u>	<u>Total Pairs On Aerial Transects</u>	<u>Total Pairs By Species</u>
Mallard	23	46.0%	X 293	= 135
Blue Wing Teal	19	38.0%	X 293	= 111
Green Wing Teal	2	4.0%	X 293	= 12
Black Duck	0	0.0%	X	= 0
Shoveler	0	0.0%	X	= 0
Pintail	0	0.0%	X	= 0
Hooded Merganser	0	0.0%	X	= 0
Redhead	0	0.0%	X	= 0
Wood Duck*	0	0.0%	X	= 0
Widgeon	3	6.0%	X 293	= 18
Ringneck	3	6.0%	X 293	= 18
Ruddy Duck	0	0.0%	X	= 0
Goldeneye	0	0.0%	X	= 0
Bufflehead	<u>0</u>	<u>0.0%</u>		<u>0</u>
TOTAL DUCKS	50	100.0%		294
Canada geese	15			
Coot	4			
Sandhill Crane	10			
Cormorant	2			
Pied-billed Grebe	4			

* See Section III, "Special Considerations," regarding a bias against wood ducks in determining the species percentage with this census method.

TABLE NO. 2
Aerial Count **

<u>Species</u>	<u>Year</u>	<u>Air to Ground Ratios *</u>	<u>Pairs Counted From the Air</u>		<u>Expanded 100% X air to Ground Ratio</u>	<u>Pairs</u>
			<u>50%</u>	<u>100%</u>		
Ducks	1988	1:2.40	61	122	293	293
Canada Geese	1988	1:2.40	20	40	96	96
Sandhill Crane	1988	1:2.40	0	0	0	(Est.) 42

* Air-ground ratio based on constant air-ground ratio of 1:2.40 developed and used during the period 1971-78.

** NOTE: Actual aerial count did not cover refuge north of Turkey Track Road because military aircraft was using restricted aircraft zone around Williams Bombing Range and FWS pilot didn't want to enter area and cause an air safety problem. Estimate of 1/3 of the refuge breeding pair count transects were not run, so a 33.3% correction factor was added to the actual aerial count this year.

AERIAL BREEDING PAIR COUNT

TIME: _____ TEMPERATURE: _____ WIND: _____ DATE: _____

SKY CONDITIONS: _____

TRANS.#	DUCKS		GEESE		CRANES		DEER
	PAIRS	SINGLES	PAIRS	SINGLES	PAIRS	SINGLES	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
Subtotal							
TOTAL							

AERIAL BREEDING PAIR COUNT

TIME: 9:25AM TEMPERATURE: 70° WIND: SE 46mph DATE: 05/18/88SKY CONDITIONS: Clear

TRANS. #	DUCKS		GEESE		CRANES		DEER
	PAIRS	SINGLES	PAIRS	SINGLES	PAIRS	SINGLES	
1							
2							
3							
4	2, 2	1, 4, 2					
5		2, 2	2				
6	1, 1	3, 2	4				
7	1, 3, 1	2, 3, 2		6			
8	1, 2, 1	2, 6, 2	4	2			
9	1, 1	2, 1	2				
10	1	1, 2					
11	1	1, 2					
12							
13							
Subtotal	19	42	12	8			
TOTAL	61		20		0		0

III. Special Considerations

Wood duck breeding pairs are seldom noted on ground count transects as these transects are located overlooking refuge pools and open marshes where few wood ducks have been present. However, significant populations of wood ducks do exist on the refuge but they are found along some 55-60 miles of woods-shrouded ditches where the only means of ground censusing is on foot. Ground counts on foot along these ditches has been proved difficult in the past. Problems with difficult spoil bank terrain, non-navigable water, accumulative repeat counting of flushed birds as one travels along the ditches, and man-power constraints have resulted in abandoning attempts to include ditch transects in the refuge breeding pair ground counts for species percentage determination. It is estimated that there are about 100 wood duck breeding pairs on the refuge in recent years.

Although the refuge has considerable wetland habitat consisting of flooded sedge meadows at the time breeding pair counts are normally made, this habitat type has been excluded from ground transects for species determination because of their lack of use by waterfowl. Waterfowl shun these sedge meadow type marshes even in the fall when hunting pressure outside the refuge might be expected to increase their use inside the sanctuary. High water-acidity and poor invertebrate production is believed to be the cause for the lack of waterfowl utilization. Aerial transects over these areas should pick up the few breeding pairs that might be there, however. Aerial transects also should pick up some of the wood duck pairs along the ditches as well, however, by mid-May and later the leaf canopy on trees adjacent to the ditches effectively screen these pairs from view from the airplane.

WATERFOWL BREEDING POPULATION AND PRODUCTION SURVEYS

- 25.2) Groups/flocks of ducks. Record all groups and flocks, with size of flock but tabulate only those indicated as breeding birds:

Pairs...tabulate for all common species, unless in flocks. Gadwalls, etc., still not settled on home ranges appear as loose, scattered flocks...do not tabulate these. Include diving duck females in small courting parties.

Lone males...tabulate both dabblers and diving ducks.

Lone females...do not tabulate.

Exception, diving duck females, if males are not recorded on water bodies nearby (within $\frac{1}{4}$ mile).

Exception, special studies, e. g., artificial potholes, where location of female and waiting site may be wanted...male may be on large marsh.

Male groups and groups of males and females...Large study blocks--tabulate as breeders in numbers up to five (5); exclude those over 5. Small study areas, e. g., less than 640 acres---do not tabulate male groups of more than 2.

Exception, Baldpates and Shovelers: do not tabulate males other than lone males and pairs.

Exception, Large marshes and lakes where pre-molt gatherings appear...do not tabulate male groups of more than 2...do not tabulate females and pairs in flocks of males (refers to dabbling ducks).

Diving duck courting parties...tabulate females only.

Dabbler courting (pursuit) flights...males involved (up to 10-12 at times) may be with females. Care is needed to avoid counting those coming off the sample or transect. May need to wait until males disperse.

Ducks in field or nesting cover...tabulate, following rules above.

Ducks flying overhead (passing over sample or transect)...do not record or tabulate.

Ducks flying in and landing within sample or transect from outside sample boundary...so not record or tabulate.

Unidentified ducks...enter both as unidentified and also your best guess as to species in body of form. Follow rules above.

- 25.3) Groups/flocks of coots. Record all groups and flocks, with size of flock but tabulate only those indicated below as breeding birds:

Pairs in nesting habitat...tabulate.

Singles in nesting habitat, mate believed to be hidden in cover...tabulate as a pair.

Flocks (and pairs not associated with nesting habitat...do not tabulate. Later observation may be needed to determine if they nest.

- 25.4) Canada geese. Tabulate pairs or singles if nest or indicated nest is present. Record all others.

WATERFOWL
BREEDING PAIR COUNT
AERIAL TRANSECTS

PRIMARY
MANAGEMENT USES

- RECREATION
 - Auto Tour Route
 - Interpretive Trails
 - Fishing
 WATERFOWL MDT
 - Pair Restoration
 - Cropland
 - Impoundment
 UPLAND WILDLIFE MDT
 - Plantations
 - Woodland Openings
 - Other Refuge Lands
 FACILITIES
 - RESEARCH
 - NATURAL AREA

NECEDAH
NATIONAL WILDLIFE REFUGE

PAGE 28

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NCD-2

Waterfowl Breeding Pair Count
Aerial Transects Map

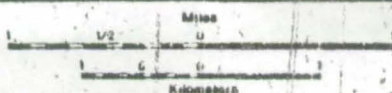
WATERFOWL
BREEDING PAIR COUNT
GROUND TRANSECTS

PRIMARY
MANAGEMENT USES

- RECREATION
--- Auto Tour Route
--- Interpretive Trails
--- Fishing
WATERFOWL MGT.
--- Prairie Restoration
--- Cropland
--- Impoundment
UPLAND WILDLIFE MGT.
--- Plantations
--- Woodland Openings
--- Other Refuge Lands
FACILITIES
RESEARCH
NATURAL AREA

NECEDAH
NATIONAL WILDLIFE REFUGE

Pond ADDED



PAGE 2B

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25

NCD-2

Waterfowl Breeding Pair Count
Ground transects Map

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah NWR

Procedure No: NCD-3

Species: Canada Geese and Sandhill Cranes

Reliability Class: B

Title: Goose - Crane Fly-out Count

I. Purpose

The purpose of this combination species count is to gather sufficient data to support the Refuge Weekly Waterfowl Census and to provide refuge goose population data to the Wisconsin Department of Natural Resources as part of the state-wide weekly aerial goose count.

Crane counts are included in this procedure because the crane data is considered necessary to record populations data on a species of considerable local significance and public interest. Also, crane population trend data is conveniently obtained during the process of gathering population data while running the goose fly-out count.

Goose fly-out counts are considered second only to aerial goose counts for accuracy here at Necedah NWR. If aerial counts can not be made because of weather conditions or for administrative reasons, the fly-out procedure can account for many birds that are present but out of view from most ground count observation points. Fly-out counts can be made where the observers can make counts approaching actual head counts of overhead flying birds. Otherwise, it is sometimes difficult to count large groups of birds rafted on the water or resting on mudflats from an oblique angle of view from ground observation points. Large numbers of birds resting in inaccessible hinterland portions of major pools may be completely missed on ground counts because they are obscured from view by ground cover.

II. Procedure

At least four, and sometimes five, persons are required to run this census simultaneously. Each person is assigned to count birds leaving the refuge from one of four or five observation points. See map "Goose-Crane Fly-out Count."

Each observation point was chosen so that census takers could remain in a vehicle, out of the weather, and still observe and count the birds from a convenient roadside location.

Observation point #1 is located near the south end of the east dike of Pool #1, under a large red oak tree having a refuge sign imbedded in the bark. Only birds leaving Pool #1 are counted as they leave in a southerly or easterly direction. Do not count birds heading west or south if they are west of the Williams Road, as these will be counted by the person covering Pool #2.

Observation point #2 is located on the south dike of Pool #2 anywhere east of the water control structure. Only birds leaving Pool #2 are counted as they leave in a southerly and westerly direction. Do not count birds leaving in a southerly or easterly direction if their flight path is east of the Williams Road as they will be counted by the counter covering Pool #1.

Observation point #3 is located on the Bewick Road at the junction of the Sprague Pool dike. Only birds leaving Goose Pool, West Sprague Pool, and the western portion of the Main Sprague Pool are counted as they leave in a southerly direction. Do not count birds heading east as they will be counted by another person covering the east end of the Sprague Pool.

Observation point #4 is located on the east dike of the Main Sprague Pool at the junction of the cross dike which separates Pool 29 from the Main Sprague Pool. Only birds leaving the Main Sprague Pool and Pool 29 are counted as they leave in an easterly direction. Most will travel in a northeasterly direction, while fewer will travel east or southeast.

Observation point #5 is located along a trail at a point about in the middle of the south edge of an old field off the Grand Dike Road. Access to this field is gained by following a trail south from the Grand Dike Road along the west bank of the Spencer-Robinson ditch (see map). This observation point is used only when it is known that a large number of geese are leaving the Pool #1 area from the extreme south end of the pool where they would be out of sight from observation point #1. If this is the case, observer #1 should be instructed to count only birds heading easterly and are north of the Laske Road. All birds heading southeast and south are then counted from observation point #5.

Counts will begin at one-half hour before sunrise, on a morning with visibility of at least two miles, and continue until the end of the flight, or about 9:15 AM. Each observer will report to the count coordinator the estimated number of geese and/or cranes remaining in their respective pool areas after the end of this fly-out count.

Counts may not be run weekly or even bi-weekly, but will be determined by the refuge manager depending on when there is need for this information and when the required number of personnel is available. Generally these counts are run during the month of October prior to the opening of the local goose hunting season, the Monday or Tuesday immediately following the opening of the local goose hunting season, and possibly after the opening of the local goose hunting season when it is known that the state-wide cooperative aerial goose count with the DNR will not include the refuge. In this case, state waterfowl biologists will phone the refuge requesting refuge goose population information.

GOOSE - CRANE FLY-OUT COUNT

(FIELD DATA SHEET)

REFUGE: _____

DATE: _____

OBSERVATION SITE NO: _____

OBSERVER'S NAME: _____

TIME/START OF COUNT: _____

TIME/END OF COUNT _____

[illegible]

GOOSE - CRANE FLY-OUT COUNT
(FIELD DATA SHEET)

REFUGE: Necedah NWR

DATE:

OBSERVATION SITE NO:

OBSERVER'S NAME:

TIME/START OF COUNT:

TIME/END OF COUNT

TIME	GEESE	CRANES
7:01	4	2
7:06	2, 5, 5, 20	10, 15
7:12	10, 20, 15, 30, 45, 100	20, 50, 100
7:20	100, 100, 300, 300	50, 50, 200
7:25	300, 400, 400, 400	5, 100
7:30	400, 300, 10, 5	10
7:35	25, 10, 7, 10, 3	5
SAMPLE		
TOTALS	3, 326	617

III. Special Considerations - None

IV. Manpower and Costs

MANPOWER AND COSTS

Any of four or five members of the 8-man refuge staff may be called upon to complete this count, depending on their availability on the count date. This crew is made up of one GS-12 refuge manager, two GS-11's (one assistant manager, one forester), one GS-9 assistant manager-biologist, one GS-6 biological technician, two maintenance people WG-5 and WG-9, and one GS-5 secretary. Because each of these staff people are not used on every count, an average of the salary rate (\$14.89/hour) is used to calculate costs.

- | | | | |
|----|--|---|------------|
| 1) | Five weekly counts - Manpower costs: | | |
| | 2.5 hours x 5 persons each count | = | 62.5 hours |
| | 62.5 hours X \$14.89/hour (average refuge cost) | = | \$930.63 |
| 2) | Five weekly counts - Vehicle costs: | | |
| | Gasoline @ \$.07/mile (12 mpg @ \$.80/gallon) | | |
| | Total miles driven (all 5 vehicles) 44 miles x 5 | = | \$15.40 |
| | TOTAL COSTS | = | \$946.03 |

NCD-3

Goose & Crane Fly-out Count Map

22

- PRIMARY MANAGEMENT USES**
- RECREATION
 - Auto Tour Route
 - Interpretive Trails
 - Fishing
 - WATERFOWL MGT.
 - Prairie Restoration
 - Cropland
 - Impoundment
 - UPLAND WILDLIFE MGT.
 - Plantations
 - Woodland Openings
 - Other Refuge Lands
 - FACILITIES
 - RESEARCH
 - NATURAL AREA

NECEDAH
NATIONAL WILDLIFE REFUGE

Part Added



GOOSE AND CRANE FLY-OUT COUNTS

Observation Points
Flight Paths

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah NWR

Procedure No: NCD-4

Species: Sandhill Crane

Reliability Class: B

Title: Fall Roost Count

I. Purpose

The fall roost count of sandhill cranes is done once annually in cooperation with the School of Natural Resources, University of Wisconsin-Stevens Point and the International Crane Foundation, Baraboo, Wisconsin. It is done along with other counts on off-refuge sites to monitor statewide population trends.

II. Procedure

A wildlife student count coordinator usually contacts the refuge to coordinate a count on a Saturday on or about October 30. Rather than paying refuge staff members overtime to run the count on the designated Saturday or arrange for and coordinate a group of students to cover the refuge, it is felt that one refuge staff member can acquire most of the data required by these agencies far more economically by running a roost flight count on the Friday evening immediately prior to the scheduled Saturday morning count. Since there is presently only one major crane roost area on the refuge, one observer is able to adequately count a high percentage of birds using the locality from just one observation point.

The count begins at 3:00 PM CST and continues until 20 minutes after sundown (approximately 5 PM CST). The observer (only one is required) stations himself in a vehicle parked facing north on top of the south dike of Pool #2 at a point about 50 feet or so east of the water control structure. Birds are counted in the air, using a spotting scope if necessary, as they approach the north and east shores of Pool #2. Most birds will be arriving from the southwest, south, and west respectively. It is best to count the birds on a fair to partly cloudy day as they are flying high over the woods along the west shore of the pool when they are silhouetted against the setting sun. An evening roost count is much better from this location than an early morning fly-out count as far as lighting is concerned.

This count is essentially a head count. No calculations or expansion factors are used. Currently this roost area is the only roost area for these birds known in the locality and is believed to account for about 95% of the birds using the refuge at this time of the year. Counts in recent years have been 500 to over a thousand birds.

The results of the count are given to the student count coordinator at University of Wisconsin - Stevens Point by telephone on the Monday following the count date. A note with the results of the count is also placed in the refuge files and is usually recorded as the peak population in the refuge Narrative Report.

III. Special Considerations - None

IV. Manpower and Costs

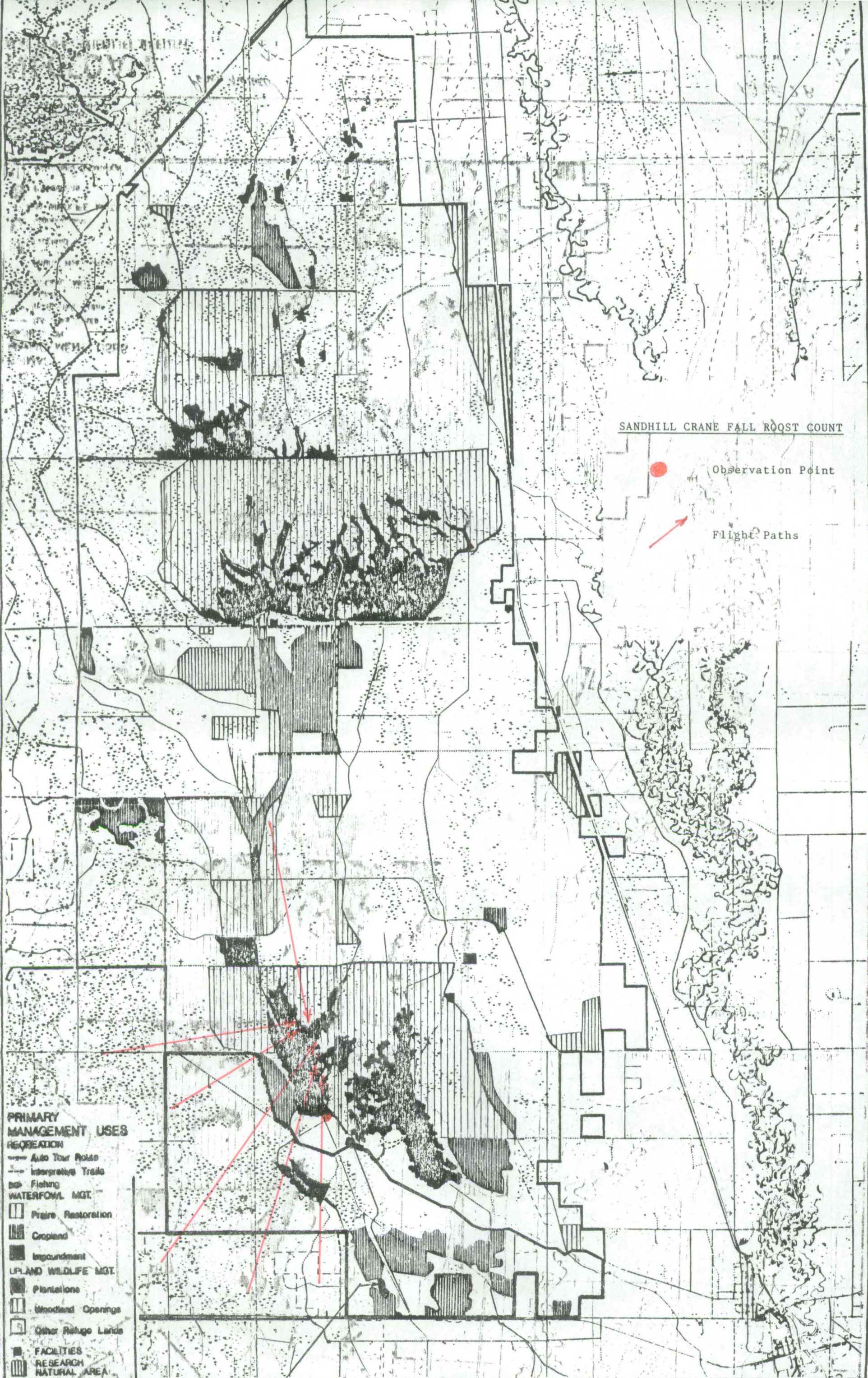
1) One GS-9 Biologist @ \$17.39/hour X 2 hours	=	\$34.78
or		
One GS-6 Bio Tech @ \$11.76/hour X 2 hours	=	\$23.52
or		
One Volunteer @ no cost	=	\$0.00
2) Gasoline (Observation point is less than one mile from headquarters)	=	\$0.00
TOTAL COSTS	=	\$0.00 to \$34.78

NCD-4

Sandhill Crane Fall Roost Count Map

22

22



SANDHILL CRANE FALL ROOST COUNT

Observation Point

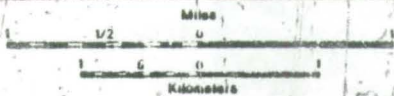
Flight Paths

PRIMARY MANAGEMENT USES

- RECREATION
 - Auto Tour Route
 - Interpretive Trails
- WATERFOWL MGT.
 - Prairie Restoration
 - Cropland
 - Impoundment
- UPLAND WILDLIFE MGT.
 - Plantations
 - Woodland Openings
 - Other Refuge Lands
- FACILITIES
 - RESEARCH
 - NATURAL AREA

NECEDAH
NATIONAL WILDLIFE REFUGE

Pond ADDED



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PREPARED BY

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WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah NWR

Procedure No: NCD-5

Species: Woodcock

Reliability Class: D

Title: Woodcock Singing Ground Survey

I. Purpose

The U. S. Fish and Wildlife Service and the Canadian Wildlife Service conducts the annual woodcock singing-ground survey each spring to obtain information on the status of the woodcock breeding population. The data will assist these agencies in furthering the understanding, management, and utilization of woodcock in North America.

II. Procedure

There are 3 off-refuge survey routes (Numbers 78, 79, and 87) in Juneau and Adams Counties. Instructions and survey forms, (see attached), are supplied annually in the spring from the U. S. fish and Wildlife Service, Wildlife Assistance Office, Madison, Wisconsin. Each route takes about four hours to complete.

III. Special Considerations

This count is completely dependent on the observer's ability to hear the "peent" of woodcock. Some people who may be unaware of their slight hearing impairment may run the count and come up with erroneous data compared to another person with normal hearing. Therefore, it becomes especially important that new observers run the count with old observers so that they can check one another in this respect.

IV. Manpower and Costs

1) Route #78, Adams County:

One annual census @ 3 hours each	=	3 man hours
One GS-6 Bio Tech @ \$11.76/hour X 3 hours	=	\$35.28
Gasoline @ \$.05/mile (15 mpg @ .80/gallon) X 64 miles	=	\$3.20

2) Route #87, Adams County:

One annual census @ 4 hours each	=	4 man hours
One GS-6 Bio Tech @ \$11.76/hour X 4 hours	=	\$47.04
Gasoline @ \$.05/mile (15 mpg @ .80/gallon) X 94 miles	=	\$4.70

3) Route #78, Southeast Juneau County:

One annual census @ 2 hours each	=	2 man hours
One GS-6 Bio Tech @ \$11.76/hour X 2 hours	=	\$23.52
Gasoline @ \$.05/mile (15 mpg @ .80/gallon) X 16 miles	=	\$.80

TOTAL MANPOWER, ALL 3 COUNTS: 9 man hours (18 if new counter is included)

TOTAL ANNUAL COSTS: \$114.54 (\$229.08 if new counter is included)

SURVEY BACKGROUND AND INSTRUCTIONS

The singing-ground survey provides an index to the relative size of the woodcock breeding population in North America. It is the most important source of data used to guide federal, state and provincial woodcock programs. As part of their courtship behavior, male woodcock exhibit aerial and vocal displays each evening. They begin by giving calls described as "peents" shortly after sunset. From openings called singing-grounds birds alternately "peent" and make flight songs. New survey participants should become thoroughly familiar with these woodcock sounds before running routes.

Originally, survey routes were run in areas of prime habitat where woodcock were known to be present, but subsequent studies showed that these counts did not accurately reflect overall woodcock densities. Consequently, new routes were selected randomly so that all habitat types would be surveyed and results would better reflect the status of the overall woodcock population. A normal characteristic of such random surveys is that some routes will fall in unfavorable habitat, so do not become disheartened if you do not hear birds on your route. Your results are still valuable.

Please follow the below instructions closely so that data from your route will be of maximum value. The quality of the survey depends on you.

OBSERVER

It is preferable that the same observer run the same route each year. When this is not possible, it is desirable for both observers (old and new) to run the survey together once so that there is a smooth transition with the new observer becoming thoroughly familiar with survey procedures and local route conditions. Both observers should record their results independently.

SEASONAL AND DAILY TIMING

Timing is very important. See the survey map for survey dates in your area. When spring is early or late, routes conducted up to 5 days outside the survey period will be accepted. Plan to arrive at the start of your route at or shortly after local sunset. If a time card accompanies this form use it to determine sunset. Otherwise, consult local news media. If the sky is clear or up to and including 3/4 overcast, add 22 minutes to the sunset time to determine the starting time. Add 15 minutes if the sky is more than 3/4 overcast. If your judgment dictates variation from this timing, as in the case of deep valleys, state the facts under "Remarks." Timing is very important! Do not use military time.

PROCEDURE

At stop no. 1 shut off your vehicle's engine, step several feet away and record the time you begin listening. Listen for 2 minutes and record the number of different woodcock heard "peenting." Then proceed rapidly 0.4 mi (0.6 km) to the next stop and repeat the procedure. Continue to do so until all 10 stops have been covered. If a bad traffic hazard prevents stopping within 100 ft. of the 0.4 mi. mark, proceed to the next stop and note "no stop-hazardous" in the space for the stop omitted. Be sure to check the survey form's box that indicates if your odometer readings are in mi. or km.

RECORDING COUNTS

Record the number of different "peenting" woodcock. Do not record birds you hear performing only the flight song, and do not record the number of "peents" heard. When no birds are peenting, record "0" in the appropriate column. When disturbances at a particular stop make a count absolutely impossible, note the type of disturbance and proceed to the next stop. Upon completion of the route, record the total number of birds heard.

DISTURBANCE

Disturbance	Description	Example
NO	No appreciable effect on count.	Occasional crow calling.
LO	Slightly affecting count.	Distant tractor noise.
MOD	Moderately affecting count.	Intermittent traffic.
HI	Seriously affecting count.	Heavy-continuous traffic.

THINGS TO AVOID

Do not run routes when the temperature is below 40°F, in heavy precipitation or strong wind.

NUMBER OF TIMES TO COUNT

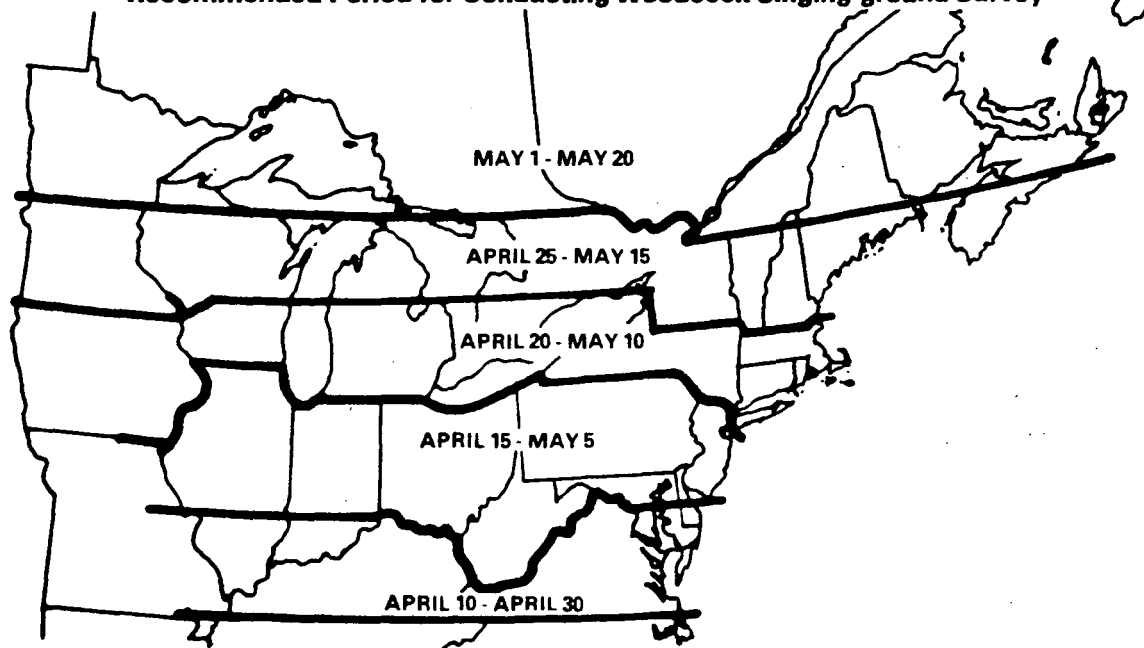
Normally, conduct a route only once during the specified period. However, if weather or other factors cause invalid counts at five or more stops the route should be rerun another evening.

REPORTING

Immediately after running your route, mail an original copy of the form to: Woodcock Surveys, U.S. Fish and Wildlife Service, Laurel, Maryland 20708-9619, and mail 2 copies to your coordinator.

Your cooperation in this important survey is appreciated greatly. As soon as it is available, we will send you a report on the results of this year's singing-ground survey.

Recommended Period for Conducting Woodcock Singing-ground Survey

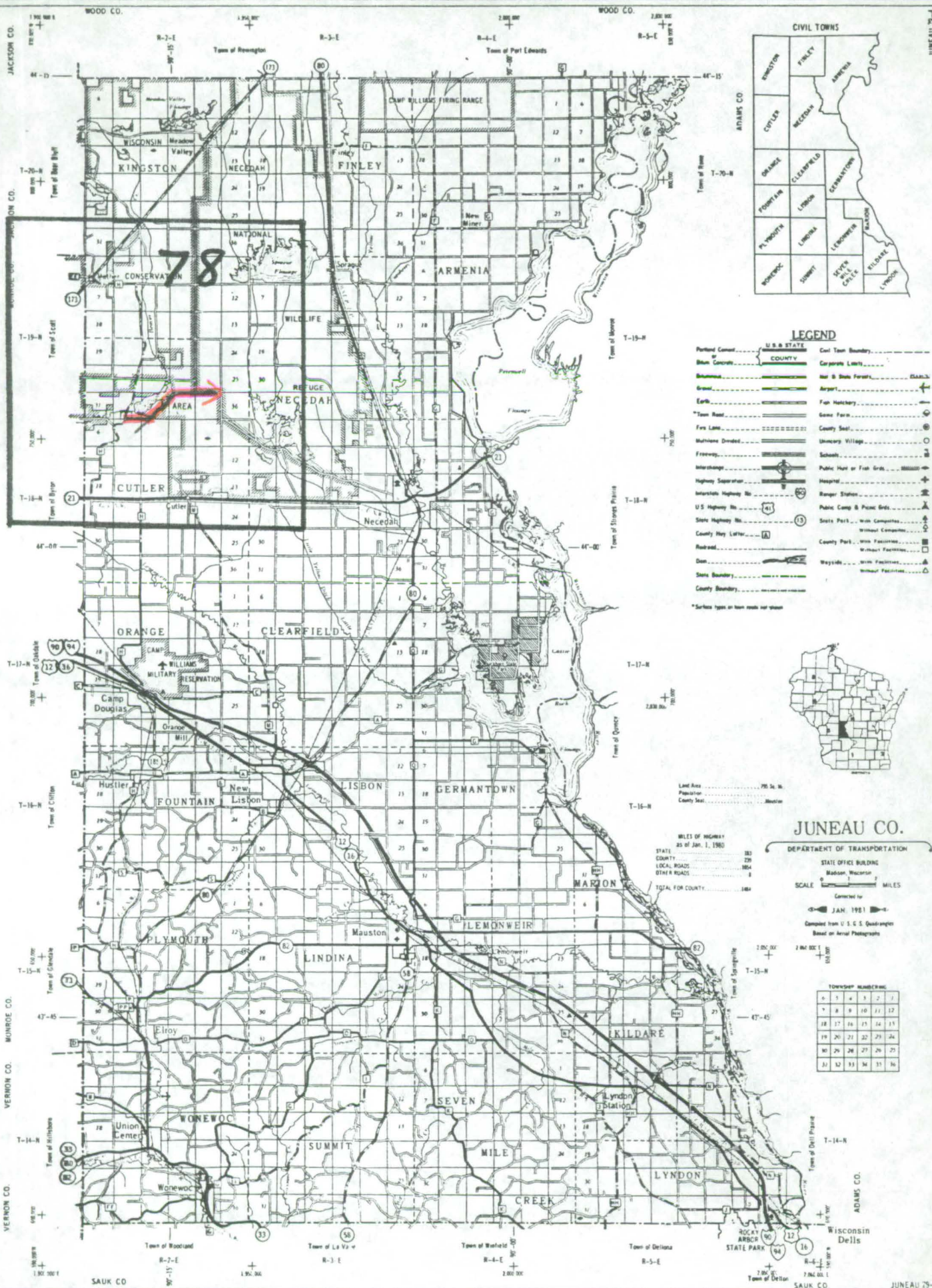


NOTICE

In accordance with the Privacy Act of 1974 (PL 93-579), please be advised that:

1. The gathering of information on migratory birds and their uses is authorized by the Migratory Bird Treaty Act (16 U.S.C. 703-711) and the Fish and Wildlife Act of 1956 (16 U.S.C. 742d).
2. Information from this survey will be used to further the understanding, management, and utilization of the North American migratory bird resource by Federal, State, and private conservation organizations, and the Canadian Wildlife Service.
3. Your participation in this survey is voluntary.

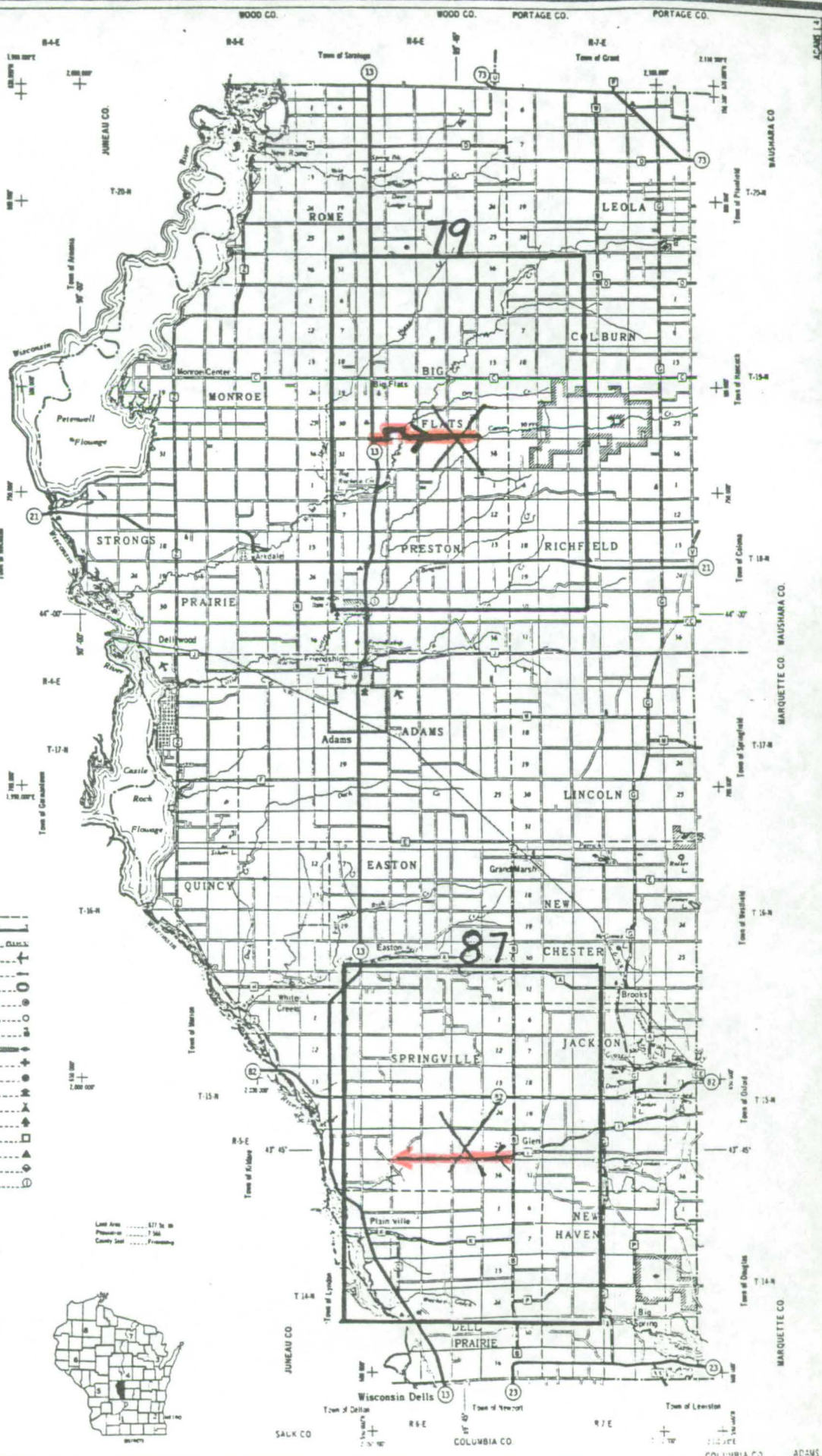
78-SE



JUNEAU 75-1

JUNEAU 75-4

29



NORTH AMERICAN WOODCOCK SINGING GROUND SURVEY

U.S. FISH AND WILDLIFE SERVICE,
OFFICE OF MIGRATORY BIRD MANAGEMENT, LAUREL, MARYLAND USA 20708-9619

EXAMPLE
CANADIAN WILDLIFE SERVICE, DEPARTMENT OF THE ENVIRONMENT
OTTAWA, ONTARIO, CANADA K1A 0H3

SURVEY YEAR

1988

STATE OR PROVINCE

44

COUNTY

003

ROUTE NUMBER

007

DATE OF SURVEY

88 05 05
YEAR MONTH DAY

OBSERVER'S NAME (PRINT)

J. B. BORTNER

AGENCY 1 STATE 3 PROV. 5 FED. 7 OTHER

WAS THIS ROUTE RUN
BY YOU LAST YEAR?

1 YES

3 NO

W ROBERTSON

MAILING STREET MBMD, U.S. Fish and Wildlife CITY Laurel
ADDRESS STATE/PROVINCE Maryland ZIP CODE 21758

OFFICIAL SUNSET

7:49 PM

ROUTE NAME

SKY CONDITION

0 CLEAR

1 1/4 OVERCAST

3 1/2 OVERCAST

5 3/4 OVERCAST

7 >3/4 OVERCAST - ADD 15 MIN

ADD 22 MIN.
TO SUNSET
FOR STARTING
TIME

TEMPERATURE

°F 31 °C 24

35-39 41 5-9

40-49 51 10-15

50-59 60 16+

60+ 16+

WIND

1 CALM

2 GENTLE (1-3 mph)

3 LIGHT (4-7 mph)

4 MODERATE (8-12 mph)

5 STRONG (>12 mph)

PRECIPITATION

0 NONE

1 MIST

3 SNOW, HEAVY RAIN

5 FOG

7 LIGHT RAIN

STOP NUMBER	ODOMETER READING 1 X MILES OR 3 KM	TIME	NUMBER HEARD PEENTING	DISTURBANCE <small>(SEE BACK)</small>				REMARKS
				NO ⁰	LOW ¹	MOD ³	HI ⁵	
1	03.6	8:11	00	X				
2	04.0	8:14	01	X				
3	04.4	8:17	00	X				
4	04.8	8:20	00				X	tractor plowing
5	05.2	8:23	06	X				
6	05.6	8:27	01	X				
7	06.0	8:30	00	X				
8	06.4	8:34	00	X				
9	06.8	8:37	02	X				
10	07.2	8:40	00	X				
TOTAL WOODCOCK HEARD PEENTING			10					

DO NOT
WRITE IN
THIS LINE

TOTAL STOPS

ACCEPTABLE STOPS

TOTAL WOODCOCK
ON ACC. STOPS

ROUTE STATUS

SUNSET TIMES FOR THIS ROUTE:

DATE	APR 25	APR 30	MAY 5	MAY 10	MAY 15	MAY 20
DAYLIGHT SAVINGS TIME	7 35	7 42	7 45	7 55	8 02	8 08
STANDARD TIME	6 35	6 42	6 45	6 55	7 02	7 08

STATE/PROVINCIAL COORDINATOR:

GREG SEPEK

207-454-3521

PLEASE READ INSTRUCTIONS ON REVERSE SIDE CAREFULLY AND COMPLETELY.

Main Points to consider are listed below.

- (1) Conduct survey within dates shown on map (see reverse).
- (2) Make sure to conduct survey at proper time for sky condition.
- (3) Stops should be at 0.4 mi (0.6 km) intervals, listen for exactly 2 minutes at each stop.
- (4) Do not conduct survey if temperature is below 40°F (4°C), in strong wind, or in heavy precipitation.
- (5) Contact your state coordinator promptly if unable to run your route within the designated dates.
- (6) Fill out all sections of this form and immediately mail form.

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah NWR

Procedure No: NCD-6

Species: Mourning Dove

Reliability Class: D

Title: Coo Count

I. Purpose

The U. S. Fish and Wildlife Service, Office of Migratory Bird Management, Washington, D. C., coordinates the random mourning dove call count survey each spring. Goals are to obtain information on the status of the mourning dove breeding population in Wisconsin and in the United States. This survey provides the most reliable mourning dove population data available. Each route is an important part of the census, which is designed to measure annual changes in dove populations at the state and management unit levels. This information is used by the U. S. Fish and Wildlife Service and state conservation agencies in establishing dove hunting seasons. It is also valuable in the analysis and interpretation of mourning dove banding information.

II. Procedure

Currently, refuge personnel are responsible for running one off-refuge survey route, #0370. See the attached instructions and survey forms which are supplied annually by the U. S. Fish & Wildlife Service, Wildlife Assistance Office, Madison, Wisconsin. The route takes one person about four hours to complete.

III. Special Considerations

Because of the time constraints and the difficulty one may have in following the census route through hilly, wooded terrain, it is suggested that the census taker run the route prior to the count date for familiarization.

IV. Manpower and Costs

One annual census @ 4 hours each	=	4 man hours
One GS-6 Bio Tech @ \$11.76/hour X 4 hours	=	\$47.04
Gasoline @ \$.05 (15 mpg @ .80/gallon) X 52 miles	=	\$2.60
TOTAL COSTS	=	\$49.64

INSTRUCTIONS FOR MOURNING DOVE CALL - COUNT SURVEY

DATES OF SURVEY	Routes should be completed between May 20 and May 31 , inclusive. <i>When unavoidable, the survey period will be extended to June 5.</i>		
WEATHER CONDITIONS	Do not conduct survey when (1) wind velocities exceed Beaufort 3 (12 mph), (2) rain or snow is falling.		
STARTING TIME	Start routes exactly 1/2 hour before sunrise . Determine sunrise time from an official source adjusted to route locality.		
OBSERVER	When possible, the observer should run the same route in successive years. <i>The vehicle driver is the sole observer.</i> Persons accompanying the driver are not to participate in the collection of dove data. When observer changes are being made and both observers are running the route, each person should record the data independently on separate forms without conferring.		
SURVEY ROUTE	Routes are 20 miles in length, with 20 stops (listening stations) at 1-mile intervals. The route begins at Stop # 1 and ends 1-mile <i>past</i> Stop #20.		
PROCEDURE	Special Note	Survey requires about 2 hours to complete. Allow exactly 3 minutes for counts at each stop and an average of 3 minutes for recording and travel time between stops.	
	At Stop # 1	Record weather and vehicle mileage. Record wind velocity as B-0, B-1, B-2, or B-3, using Beaufort scale.	
	At Each Stop	Stop vehicle, turn off ignition, leave vehicle. Listen and observe for exactly 3 minutes , standing away from vehicle. Record: (1) Time of <i>arrival</i> at stop. (2) Total number of <i>individual</i> doves heard calling. (3) Total number of calls. (<i>1 call usually consists of a preliminary note and 3 coos</i>). (4) Number of doves seen while stopped. <i>If 3 pairs are seen, enter numeral 6 in column "IN PAIRS".</i> (5) Disturbance affecting count at each stop. (6) Remarks, if applicable to survey.	
	Between Stops	Maintain driving speed of about 25-35 miles/hour between stops. Record: (1) Number of doves seen while driving. Enter data on same line as previous stop number.	
	At Finish	Record: (1) Weather conditions and vehicle mileage. (2) Total all columns for doves heard and doves seen.	
	Check form for completeness and accuracy.		

REPORTING	Immediately after the completion of each route:		
	(1) Mail the original form directly to Dove Survey, Office of Migratory Bird Management, Patuxent Wildlife Research Center, Laurel, Maryland, 20708-9619.		
	(2) Mail 1 copy to the State coordinator.		
	(3) Mail 1 copy of the form, plus the survey route map, to the U.S. Fish and Wildlife Service survey coordinator in the State or Regional Office as indicated in the cover letter.		
	(4) Retain 1 copy for your personal file.		
	(5) Use 1 copy as a field form, if preferred.		

WIND VELOCITY	Beaufort Number	Velocity (mph)	Suggestions for Estimating Wind Velocity
	0	less than 1	Smoke rises vertically.
	1	1 to 3	Direction of wind shown by smoke drift, but not by wind vanes.
	2	4 to 7	Wind felt on face, leaves rustle, ordinary wind vane moves.
	3	8 to 12	Leaves and small twigs in constant motion; wind extends light flag.
DISTURBANCE	Disturbance	Description	Example
	NO	No appreciable effect on count.	Occasional crow calling.
	LO	Slightly affecting count.	Distant tractor noise.
	MOD	Moderately affecting count.	Intermittent traffic.
	HI	Seriously affecting count.	Heavy-continuous traffic.

MOURNING DOVE CALL - COUNT SURVEY

U.S. FISH AND WILDLIFE SERVICE

OFFICE OF MIGRATORY BIRD MANAGEMENT, LAUREL, MD 20708-9619

SURVEY YEAR 1987

STATE

WIS.

ROUTE NUMBER

0370

COUNTY

MCNECE-JUNEAU

PHYSIOGRAPHIC

REGION 123

DATE OF SURVEY

05

28

MONTH

DATE

WAS THIS ROUTE RUN BY YOU LAST YEAR?

1586 CLSON

☒ YES

☐ NO

LOCAL OFFICIAL
SUNRISE TIME

5.26 A.M.

CENTRAL DAYLIGHT

LOCATION OF ROUTE

S. OF HUSTLER, N 8 1/2 TO GYEVILLE

AT START - STOP NO. 1

AT FINISH - MILE 20.0

WIND VELOCITY

1

TEMPERATURE

66 °F

% SKY CLOUDED

5 %

VEHICLE MILEAGE

34560

WIND VELOCITY

1

TEMPERATURE

74 °F

% SKY CLOUDED

0 %

VEHICLE MILEAGE

34581

OBSERVER'S NAME (Print)

Jonathan Olson

MAILING ADDRESS

Necedah NWR, Box 386 Necedah, WI ZIP CODE 54646

AGENCY

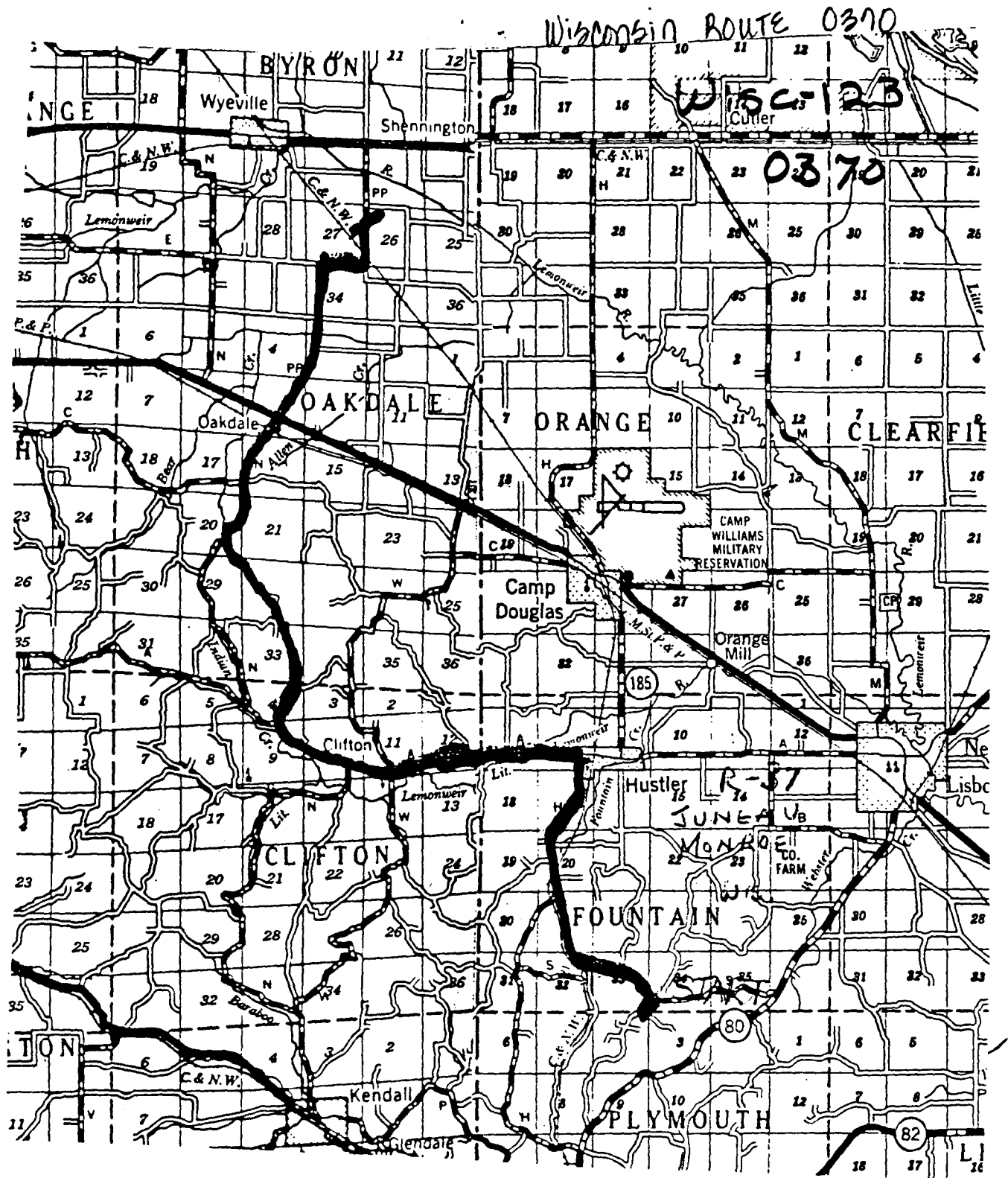
State ☐

Federal ☒

Other ☐

Telephone (AC 608) 565-2651

STOP NUMBER	TIME AT STOP	DOVES HEARD		DOVES SEEN						DISTURBANCE				REMARKS
		NO. OF DOVES	TOTAL CALLS	WHILE STOPPED			WHILE DRIVING			NO	LO	MOD	HI	
				SINGLES	IN PAIRS	IN FLOCKS	SINGLES	IN PAIRS	IN FLOCKS					
1	4.58	2	8							X				
2	5.02	0					2			X				
3	5.08	0					1			X				
4	5.14	1	6							X				
5	5.20	1	4							X				
6	5.28	2	9							X				
7	5.32	2	7							X				
8	5.38	1	7							X				
9	5.44	0										X		traffic
10	5.50	2	8							X				
11	5.58	0									X			Dog Barking
12	6.02	0								X				
13	6.08	0								X				
14	6.14	0								X				
15	6.20	1	5							X				
16	6.28	1	3							X				
17	6.32	1	4								X			traffic
18	6.38	0										X		traffic
19	6.44	0								X				
20	6.50	1	3				1			X				
TOTALS		15	64				3			TOTAL DOVES SEEN				



WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah NWR

Procedure No: NCD-7

Species: Waterfowl

Reliability Class: C

Title: Waterfowl Production Estimates

I. Purpose

Waterfowl production information is essential for the preservation, maintenance, and the evaluation of efforts aimed at improving waterfowl habitat. These estimates are based on a species group having: local significance, public interest, and includes those species where there are mandatory (RMIS) output reporting requirements.

II. Procedure

Historically waterfowl production for all species, except the wood duck, has been based upon breeding pair counts using the following formula:

$$\begin{aligned} \text{Production} &= \text{Estimated breeding pairs} \times 7.2 \text{ average young/brood} \\ &\quad \times 25\% \text{ (nest success rate)}. \end{aligned}$$

III. Special Considerations

Refer to "Discussion," under the Waterfowl Breeding Pair Count procedure NCD-2, for an explanation regarding the bias against the wood duck in determining estimated production.

III. Manpower and Costs

None. These costs are essentially included in the Breeding Pair Count Procedure, NCD-2.

WILDLIFE INVENTORY PROCEDURE**Refuge:** Necedah NWR**Procedure No:** NCD-8**Species:** Eastern Sandhill Crane**Reliability Class:** C**Title:** Sandhill Crane - Breeding Pair Count

I. Purpose

It is essential to inventory breeding populations of sandhill cranes, to better understand their distribution and numbers, and to generate public awareness about the importance of cranes and their wetland habitats. This count is done once annually in cooperation with the International Crane Foundation (ICF), Baraboo, Wisconsin. Breeding pairs as well as members of flocks (usually non-breeders) are counted to determine total spring populations on the breeding grounds.

II. Procedure

Each year instructions and survey forms are distributed by the local county count coordinator, samples of which are attached. The county coordinator holds a meeting each spring to assign each volunteer cooperator a specific count area.

Refuge staff and/or refuge volunteers who count on the refuge are assigned to count specific areas by the refuge biologist. All refuge counts are summarized by the refuge biologist and the data is forwarded to the Juneau County crane count coordinator who then forwards the data on to the ICF at Baraboo.

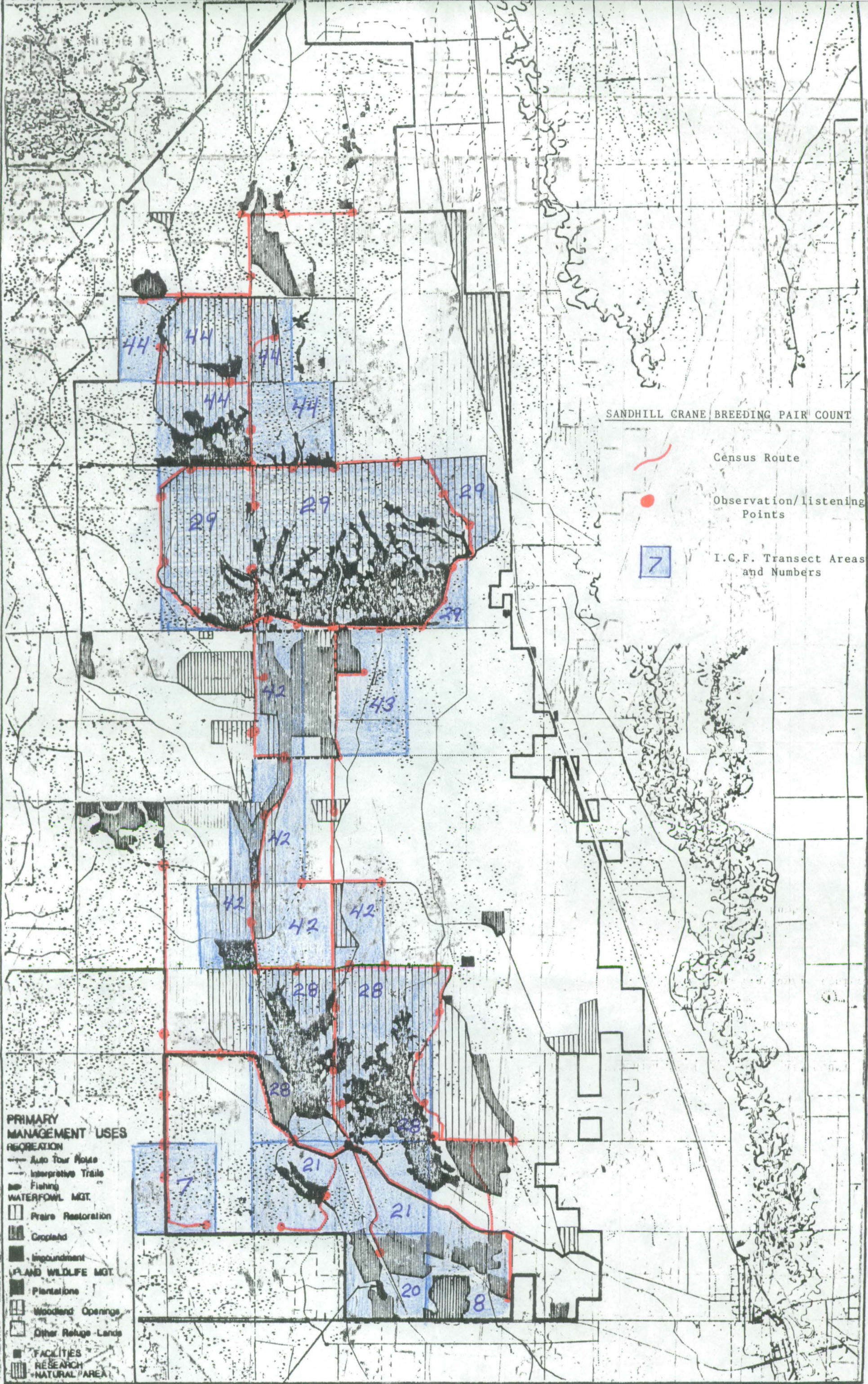
III. Special Considerations

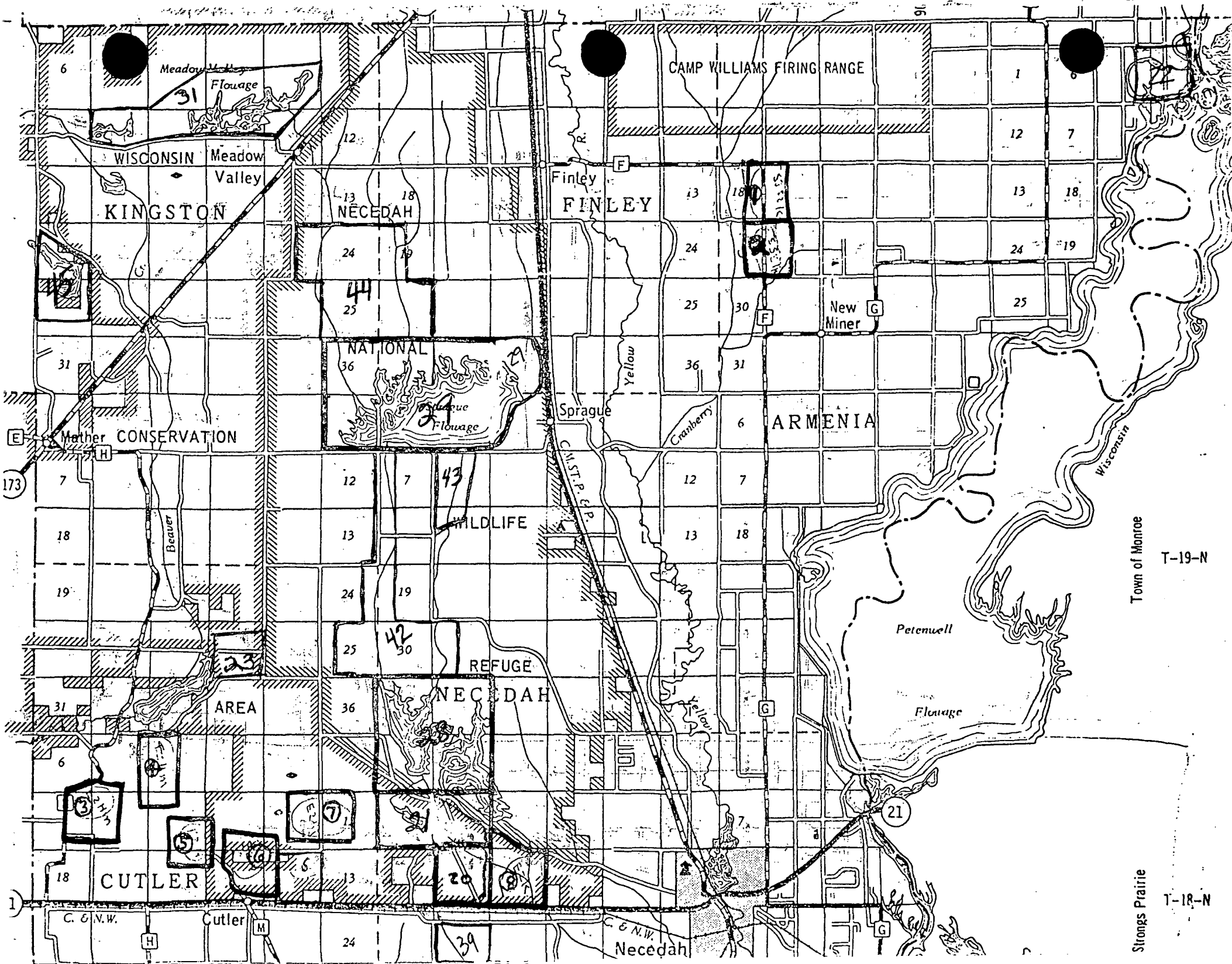
Best conditions for counting cranes is on calm mornings when unison calls of breeding pairs can be heard up to two miles, especially if the observer is downwind with very light breeze. Most pairs are tallied because they are heard, not seen. Many pairs are heard each year in ICF transect areas #28 (Pools 1 and 2) and #29 (Sprague-Goose Pools). Since most cannot be observed for counting purposes, a system of cross-triangulation must be used to isolate individual pairs in the vast hinterland in these two areas.

Thus, in areas #28 and #29, the observer remains at each listening point for ten minutes in area #29 and fifteen minutes in #28. The observer then plots on a map a bearing line from his listening point in the direction of the vocalizing cranes, noting whether the sound appears to be far away or relatively close. The observer moves to the next listening point(s) and plots on the map the lines of direction from which he hears vocalizing cranes. It will become apparent on the map then the number and location of the pairs at points where these lines cross on the map.

NCD-8

Sandhill Crane Breeding Pair Count
Map





Crane Count Data Sheet

Site #

No. of Observers		OBSERVERS		LANDOWNER	
Name		Name		Name	
Address		Address		Address	
Zip		Zip		Zip	
Phone ()		Phone ()		Permission to Survey?	
County:		Time: Start		Finish	
Crane Observations					
INTERNATIONAL CRANE FOUNDATION Route 1 Box 230C Shady Lane Road Baraboo, WI 53913 (608)356-9462					

Time of observation	Number of cranes	New or Repeat sightings	Behavior			Vocalizations			Habitat		COMMENTS
			Flying	Feeding/Walking	Dancing	Silent	Unison	Guard	Wetlands - marsh, sedge meadow, etc.	Dry fields, uplands, agricultural lands	
5:25	3			3					3		three cranes feeding in corn field
6:09							2		2		pair unison call in marsh

Other Wildlife Observed

Comments

The long outstretched neck and trailing legs of a crane in flight are unmistakable. Most mis-identifications occur during flight observations. Don't mistake the following two species for a crane. Great Blue Herons fly with their necks tucked in or in a S shape. Canada Geese are rapid flyers with chunky bodies and no trailing legs.

Yes/No	Use of Site Area	Comments
	Dump or fill in area?	
	Drainage or ditches?	
	Is area threatened by agriculture or development?	

COUNT INSTRUCTIONS

1. Conduct the survey on Saturday, April 20, 1985, from 4:30 to 7:00 A.M. CST.
2. Be as accurate and complete as possible in recording your crane observations, but limit your recorded observations to within your site boundaries. This will help you accurately estimate the total number of cranes on your site.
3. Please list all sightings or calls of cranes. In the column on the left of the form, mark New or Repeat. We realize this is difficult to determine in some cases - please use your best judgement. Remember, the totals at the bottom of the form just indicate the number of different cranes you observed.
4. **IMPORTANT:** Return all survey materials to your county coordinator immediately after the survey. Thank you for the help, and we look forward to seeing you again next year!!!

LEGEND

River, stream,
waterway, ditch

Observation Point - *

Crane Sighting - C

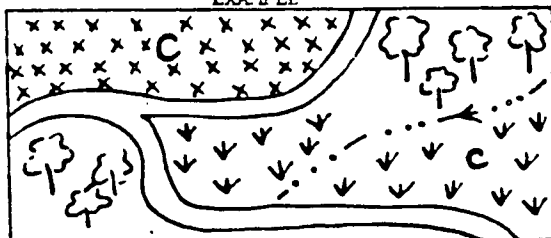
Road

Woodland

Open fields, pasture,
cropland, muck farm

Wetland: marshes, sedge
meadows, shrub swamps

EXAMPLE



MAP INSTRUCTIONS

1. Using the feature symbols to the left, draw a map of your site area. Make sure to include observation points and the location of cranes seen or heard. Also, be sure to include the wetland habitats suitable for nesting cranes. See the example to the left.
2. Please draw your map on the back of the site map you received at the county crane count meeting, or on a sheet of blank paper.
3. Return the maps to the coordinator with the data sheet immediately after the survey. They will be passed on to the counter at this site the following year. Thank you.

COUNTY COORDINATOR'S NAME: _____

ADDRESS: _____

PHONE: () _____

If you were to survey this area again next year, what would your method be? (where to park, observation points, etc.)

The counts are to be done during the period 4:30 AM to 7:00 AM CST (or 5:30 AM to 8:00 AM DST). This is a $2\frac{1}{2}$ hour long count period or 150 minutes. Each ICF transect area has a varying number of listening points depending on the area size and degree of access. The observer can determine the length of time he should remain at each listening point in minutes by dividing 150 minutes by the number of listening points available in each transect area he intends to count.

IV. Manpower and Costs

One annual count @ $3\frac{1}{2}$ hours each (including travel time) =	3.5 hrs
One GS-9 Biologist @ \$17.39/hour X $3\frac{1}{2}$ hours =	\$60.87
One to six volunteers (Audubon Society Members) @ \$.00 =	-0-
Three gov't. vehicles, 54 total miles @ .07/mile =	\$3.78
TOTAL COSTS =	\$64.65

Site #

County:

Time: Start

Finish

INTERNATIONAL CRANE FOUNDATION
E-11376 Shady Lane Rd.
Baraboo, WI 53913
(608) 356-9462

PLEASE HAVE NO MORE THAN FOUR OBSERVERS ON ONE SITE.

LIST ALL NAMES AND ADDRESSES OF OBSERVERS,
AND ENCLOSE WITH DATA SHEET.

Total number of cranes
(This requires your judgement since
you may be seeing or hearing 1 pair

Total number of breeding pairs
(Estimated number of pairs 'trison'
(Remember, 2 cranes = 1 pair)

SUMMARY GRANE COUNT

4/11/87

LOCATION	PAIRS	NON-BREEDERS (FLOCKED)	TOTAL
SPRAGUE POOL AREA	32	6	70
POOL #1, SE QUADRANT	15	-	30
POOL #2, SW QUADRANT	9	19	37
<hr/>			
TOTAL FOR REFUGIE	56	25	137
MEADOW VALLEY FLOWAGE	9	10	28
TOTAL	65	35	165

SANDHILL CRANE COUNT

"Example of cross-triangulation
to determine number and location
of individual breeding pairs."



WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah NWR

Procedure No: NCD-9

Species: Marsh and Water Birds, Shorebirds,
Gulls, Terns, and Eagles

Reliability Class: C

Title: Weekly Count

I. Purpose

This survey provides an estimate of populations and species using the refuge. Data is used to complete quarterly Refuge Management Information System (RMIS) reports. Trends in species use and abundance can be observed from year to year.

II. Procedure

Observations are made in conjunction with Weekly Waterfowl Census (Procedure No. NCD-1). Notes are recorded on Data Form #2, "Weekly Wildlife Observations," attached. In addition, notes taken in conjunction with routine work activities by all refuge personnel are recorded on a sheet of general observations maintained on a bulletin board in the refuge office.

III. Special Considerations - None

IV. Manpower and Costs

Since this survey is taken concurrently with the general waterfowl survey, there are no additional costs or manpower necessary.

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah NWR

Procedure No: NCD-10

Species: Miscellaneous Wildlife, including: Reliability Class: D
Raptors (other than eagles),
Owls, Game Birds, and Mammals

Title: Weekly Count

I. Purpose

This survey provides an estimate of populations and species using the refuge. Data is used to complete quarterly Refuge Management Information System (RMIS) reports. Trends in species use and abundance can be observed from year to year.

II. Procedure

Observations are made in conjunction with Weekly Waterfowl Census (Procedure No. NCD-1). Notes are recorded on Data Form #2, "Weekly Wildlife Observations," attached. In addition, notes taken in conjunction with routine work activities by all refuge personnel are recorded on a sheet of general observations maintained on a bulletin board in the refuge office.

III. Special Considerations - None

IV. Manpower and Costs

Since this survey is taken concurrently with the general waterfowl survey, there are no additional costs or manpower necessary.

WILDLIFE INVENTORY PLAN

Part I

Refuge Objectives Statement

Necedah National Wildlife Refuge comprises 39,607 acres located in westcentral Wisconsin. It is one of three federal refuges in Wisconsin and lies in the Mississippi Flyway. The refuge is important to waterfowl management in the flyway because it provides a major production and migration area in the central portion of Wisconsin.

The primary refuge objective is to preserve, restore and manage the wildlife resource for the enjoyment and benefit of the American people.

Specifically, refuge goals are:

- Restore and maintain optimum nesting habitat for duck and goose production.

- To attract and hold a larger segment of the Mississippi Flyway Canada goose population that migrates through Wisconsin during the fall.

- Improve migration habitat for waterfowl.

- To encourage and manage for all compatible forms of wildlife-oriented recreation.

- To manage the timber resource consistent with wildlife, aesthetic and economic values.

Reliable waterfowl population data are needed to give purpose and direction to refuge management objectives. Data from the Wildlife Inventory Plan will assist in management and development programs and will dictate needed changes to fulfill our objectives.

WILDLIFE INVENTORY PLAN

Part II

Policy on Wildlife Inventory Procedures

All Wildlife Inventory Procedures are presently sufficient for inventorying wildlife species on this refuge. The need for intensive surveys for key species is apparent since the surveys are an important part of the evaluation of refuge management and development activities. Present procedures are suitable, but future management needs may warrant changes. The four habitat or census units will not be changed so that comparisons can be made between the units.

Variations and changes in inventory procedures through the years has provided data which is difficult to compare. The procedure in this Wildlife Inventory Plan will give continuity so that valid year to year comparisons can be made.

If the procedures fail to provide suitable population data they will be amended immediately with the obsolete part appended to the procedure. The amended portion will enable future employees to see how previous data was obtained. Thus, interpretation of past population data will allow comparisons to be made with present data.

The refuge manager will have the responsibility of co-ordinating activities for the inventory procedures. Generally all of the procedures described herein are conducted by refuge personnel. Some wildlife population information, particularly regarding deer, will be obtained from the state through the manager of Meadow Valley Wildlife Area and deer registration stations in Necedah. The regional pilot-biologist and the area refuge biologist provide valuable assistance in conducting the breeding pair count and the fall aerial censuses. The area biologist will also be called upon to review and evaluate proposed changes in inventory procedures.

WILDLIFE INVENTORY PLAN

Part III

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WILDLIFE INVENTORY PLAN

Part IV

HABITAT UNITS

The refuge is divided into four habitat or census units. Only the weekly waterfowl census and fall aerial census, Procedures 2a-1, 2a-2, and 3a will be conducted and reported by habitat units.

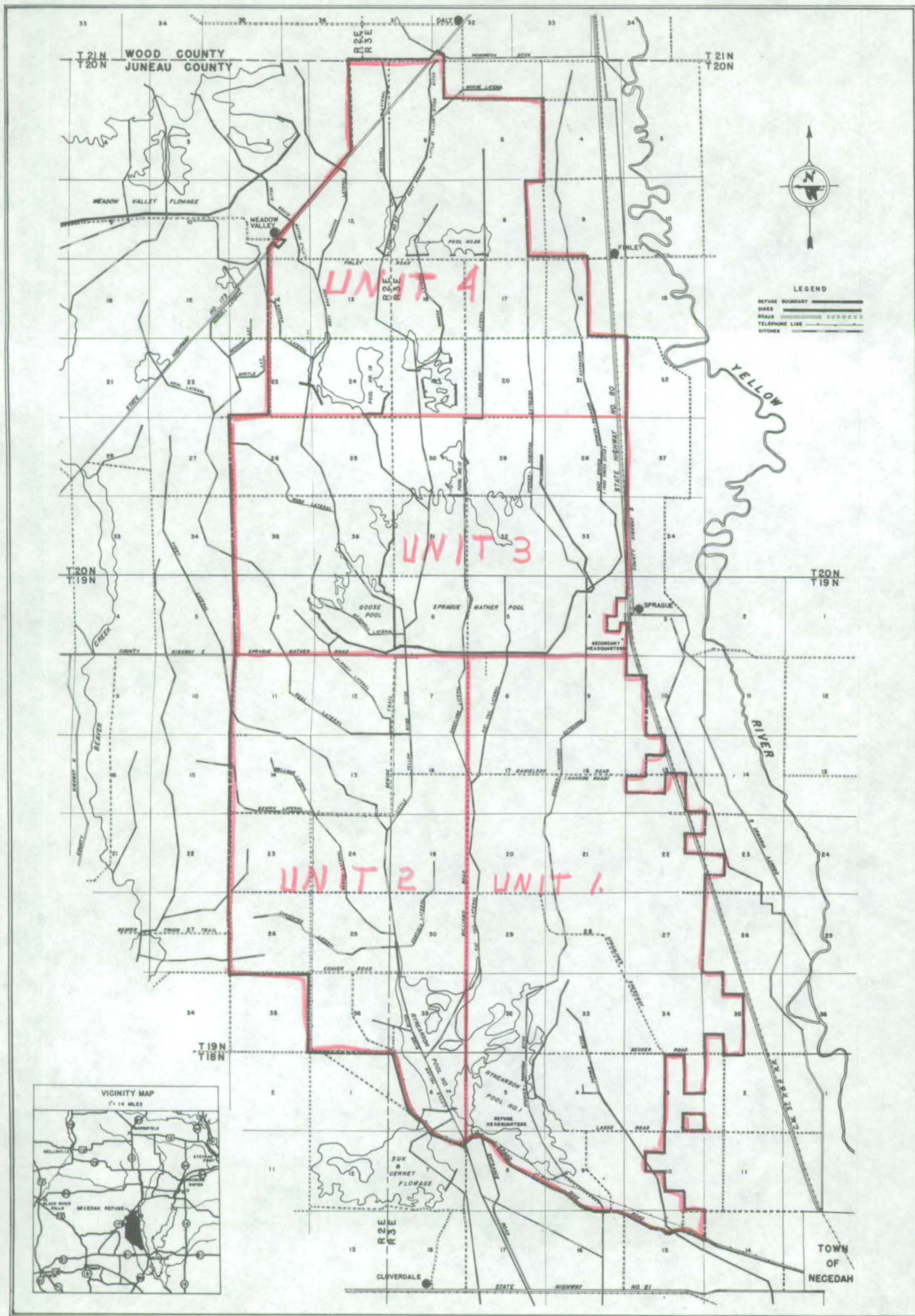
The following table shows the acreage breakdown for each unit by habitat type:

	<u>Crops</u>	<u>Upland</u>	<u>Marsh</u>	<u>Water</u>	<u>Total</u>
Unit 1	130	8,805	1,500	1,000	11,435
Unit 2	292	7,488	1,000	700	9,480
Unit 3	0	4,540	2,000	3,000	9,540
Unit 4	<u>0</u>	<u>7,052</u>	<u>1,300</u>	<u>800</u>	<u>9,152</u>
TOTALS:	422	27,885	5,800	5,500	39,607

NECEDAH NATIONAL WILDLIFE REFUGE
JUNEAU COUNTY, WISCONSIN

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



WILDLIFE INVENTORY PLAN

Part V

PHYSICAL FACILITY NEEDS

Accomplishment of the Wildlife Inventory Procedures in this plan is dependent upon a system of roads, trails and dikes. The existing system is adequate.

All equipment will be maintained in operating order to facilitate accomplishment of Wildlife Inventory Procedures.

Most procedures can be accomplished with the use of one vehicle, usually a 4-wheel drive pickup truck. However, the breeding pair survey will require 3 vehicles. Travel by vehicle is the primary mode of transportation and approximately 1500 - 2000 miles are driven annually to conduct wildlife inventories. At least one vehicle will be used during each of 9 months of the year.

A boat and a small horsepower outboard motor will be needed to accomplish inventory procedure 4b. Use of the equipment once annually for 2 hours will suffice.

Spotting scopes (20x) and 7x50 binoculars will be used to facilitate observations for most inventory procedures. Two of each will be used throughout most months of the year by the manager and assistant manager. Other binoculars will be used periodically by other personnel who assist in certain inventories.

Miscellaneous equipment needs include hipboots for running transects on the breeding pair count. Four pair may be used once annually to accomplish this inventory procedure.

The Bureau aircraft from Minneapolis will be scheduled each year to accomplish inventory procedures 2a-2 and 3b. Generally six flights will be required to complete the inventories.

WILDLIFE INVENTORY PLAN

Part VI

MANPOWER AND OPERATING COSTS

One or two qualified personnel will be required to conduct all wildlife inventory procedures except the breeding pair count. Presently six Bureau personnel will be needed to conduct the pair count. Inventory activities will be organized and coordinated by the refuge manager.

The following table shows the breakdown of manpower in man-days and operating costs for each procedure (rounded to nearest dollar).

Procedure	Man-days	Manpower Cost	Vehicle Costs	Aircraft	Misc.	Total
1	-	-	-	-	-	-
2a-1	31.0	\$956.00	\$68.00	-	\$6.00	\$1,030.00
2a-2	5.0	230.00	-	\$325.00	-	555.00
2b	-	-	-	-	-	-
3a	Part of Procedure 2a-1					
3b	5.5	193.00	5.00	104.00	-	302.00
3c	0.625	16.00	3.00	-	-	19.00
3d	1.625	42.00	3.00	-	-	45.00
4	-	-	-	-	-	-
4a	Part of Procedure 2a-1					
4b	0.5	10.00	1.00	-	1.00	12.00
5	-	-	-	-	-	-
5a	0.75	20.00	5.00	-	-	25.00
6	-	-	-	-	-	-
7	-	-	-	-	-	-
8a	0.75	20.00	2.00	-	-	22.00
8b	-	-	-	-	-	-
8c	0.75	20.00	2.00	-	-	22.00
8d	-	-	-	-	-	-
9	-	-	-	-	-	-
10	-	-	-	-	-	-
11	-	-	-	-	-	-
TOTALS:	46.5	\$1,507.00	\$89.00	\$429.00	\$7.00	\$2,032.00

Wildlife Inventory Plan

Part VII

Wildlife Inventory Procedures

WILDLIFE INVENTORY PROCEDURE

Refuge: Neccdah

Procedure No. 1

Species: Swans

Data Class: BTitle: Whistling Swan CensusPurpose

Same as Procedure 2a-1 (Weekly Waterfowl Census)

Procedure

The inventory for swans will be the same as for geese (see Procedures 2a-1 and 2a-2). Present censuses need only be conducted on Ryneerson Pools 1 and 2 and the Sprague Pool where swans concentrate. Other census areas will be added as swans start using them.

Reliability

Whistling swans generally occur in small numbers and can readily be inventoried. The present ground census is believed to account for approximately 80% of the refuge population on the day of the census. The fall aerial census for geese (Procedure 2a-2) results in essentially a head-count of swans.

Magnitude of Population Inventoried:

Normal Population

0 - 100

High Population

800

Manpower and Costs

Inventory costs are part of Procedures 2a-1 and 2a-2.

SIGNATURE PAGE

Procedure 1 Swans

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: Oct 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: Feb. 12, 1968

Approved by: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 2a-1

Species: Canada Geese

Data Class: CTitle: Weekly Waterfowl CensusPurpose

Major objectives of the refuge are (1) to provide nesting and feeding stops for migrating waterfowl and (2) to provide production habitat for waterfowl. Management of the area provides much public recreation and enjoyment. The refuge is one management unit in the Mississippi Flyway. It is desirable to have a census technique which will reflect trends and changes in waterfowl populations from week to week for refuge management and from year to year for flyway management needs.

Procedure

The manager and assistant manager will conduct the censuses; however, other refuge personnel may assist. Unusual observations or concentrations reported by all personnel will be incorporated into the count when they have been missed during the regular census.

Censuses will begin when the first migrants arrive early in March and continue until freeze-up in late November. Conduct censuses a week apart between 9 AM and 5 PM. The regular weekly counts will be substantiated by observations made during periods of heaviest waterfowl activity, i.e.; early morning and evening feeding flights off the refuge, periods before, and after climatic disturbances such as cold fronts, storms, etc.

Make counts and observations from a pickup truck driven at slow speeds

(10-20 mph). There are no specified stopping points; however, make steps to count large concentrations. In addition, make observations from two towers, one located on Rynearson 1 and one on Rynearson 2. Counts made from the Rynearson 1 tower will be used to substantiate counts made from the ground for that area. Counts from the Rynearson 2 tower provide the most reliable data for Pool 2 and it is thought that approximately 60% of the waterfowl are accounted for. For this reason only a tower count is made and expanded to obtain population data for that "area" (see example-page 4). Count all geese visible from the census routes or points.

Censuses will be conducted with the aid of binoculars and spotting scope. Additional equipment required includes two 4x4 pickup trucks.

The four refuge habitat units will be censused and recorded separately. The habitat units and census routes and points are shown on the attached map. These census routes follow existing roads on pool dikes and along agricultural units. They were selected as they offer the best locations for viewing waterfowl and cover the main concentration areas. During the period June 1 through September 1, when the refuge waterfowl breeding population is stable, conduct the weekly census only on routes bordering refuge pools.

Of the 5,607 acres of "waterfowl areas" checked, about 41% or 2,304 acres are censused or sampled. These "waterfowl areas" are concentration points for waterfowl and at any given time support 90%+ of the refuge population. The sample represents 19% of the total waterfowl habitat (12,150 acres as listed in the "Land Inventory, Wetland Inventory and Waterfowl Habitat Questionnaire" of 1965" and 5.8% of the total refuge acreage (39,607 acres).

Census Areas by Habitat Units:

	<u>Waterfowl Areas</u>	<u>Acreage</u>	<u>% of Area Sampled</u> <u>% of Waterfowl Counted</u>
Unit 1 - Data Class <u>C</u>	Rynearson Pool 1	600	75
	Parham-Becker Unit	85	100
	Williams Unit	29	100
	Laske Unit	<u>32</u>	<u>100</u>
	Sub-total:	746	80%
Unit 2 - Data Class <u>C</u>	Rynearson Pool 2	500	60
	Canfield Units	205	100
	Hanson Unit	16	100
	Carpenter Unit	20	100
	Iron-top Unit	32	100
	Yates Unit	8	100
	Field 1 Unit	<u>40</u>	<u>100</u>
	Sub-total:	821	75%
Unit 3 - Data Class <u>D</u>	Sprague-Mather Pool	2,300	35
	Goose Pool	250	50
	Pools 9 & 13	<u>850</u>	<u>10</u>
	Sub-total:	3,400	30%
Unit 4 - Data Class <u>D</u>	Pools 18,19,27 & 28	600	02
	Blair Unit	<u>40</u>	<u>100</u>
	Sub-total:	640	8%
	Grand Total:	5,607	41% (2,304 acres)

Data Analysis

To project sample counts to a total count each "waterfowl area" will be considered separately, i.e.; Rynearson 1, Canfield Unit, Goose Pool, etc. Counts for each "area" will be expanded to a total estimated population for that area. For Rynearson Pool 2 only the expanded tower count will be used. See example on the following page:

Example:

	Waterfowl Area	% Sampled	Observed Count		Total
<u>Unit 1</u>	Rynearson Pool 1	75	150	÷ .75	200
	Williams Unit	100	500	" 1	500
	Sub-total:				700
<u>Unit 2</u>	Rynearson Pool 2 (tower count)	60	600	÷ .60	1,000
	Canfield Units	100	1,000	" 1	1,000
	Carpenter Unit	100	300	" 1	300
	Sub-total:				2,300
<u>Unit 3</u>	Sprague-Mather Pool	35	700	÷ .35	2,000
	Goose Pool	50	200	" .5	400
	Pools 9 & 13	10	10	" .1	100
	Sub-total:				2,500
<u>Unit 4</u>	Pools 18,19,27 & 28	2	0	÷ .02	0
	Sub-total:				0
	Grand Total:				5,500

Data will be totaled by species, by habitat unit and recorded on refuge forms.

Transpose data to a Weekly Waterfowl Population Survey Form 3-1867. Samples of the forms used are attached. Weekly waterfowl summaries will be filed in the waterfowl section of the refuge files by year, September 1 through August 31. Data will be summarized and reported in the refuge narrative and on NR Forms 1 and 1B.

Reliability

Reliability of data varies with the "waterfowl area" and therefore the habitat unit. On "areas" or units where the percent of areas sampled is high such as the agricultural units, correspondingly the reliability of the census for those areas will be high. For example, in Units 1 and 2 where 80% and 75% respectively of the habitat is sampled the reliability is thought to be high with an estimated 80% of the waterfowl population

accounted for. In Unit 3 where access is limited and only 30% of the habitat is sampled the reliability is lower. Reliability of censuses on Unit 4 is low because of the small size of the pools and their inaccessibility. Approximately 10% of the Unit 4 waterfowl habitat is sampled.

Magnitude of Populations Inventoried:

	<u>Normal Population</u>	<u>High Population</u>
Geese	100 - 16,000	32,700

No difficulty will be encountered in locating and inventorying geese because of mobility in their feeding habits.

Manpower and Costs

	<u>Annual Cost</u>
Man-days (census) - 25 @\$32.00*	\$ 800.00
Man-days (recording & reporting) - 6 @ \$26.00**	156.00
Operate 2 vehicles - 1000 miles @6.8¢	68.00
Material costs (forms, etc.)	6.00
No depreciation of census aids or office equipment	-
	\$1,030.00

* Average of manager and assistant managers wages/day

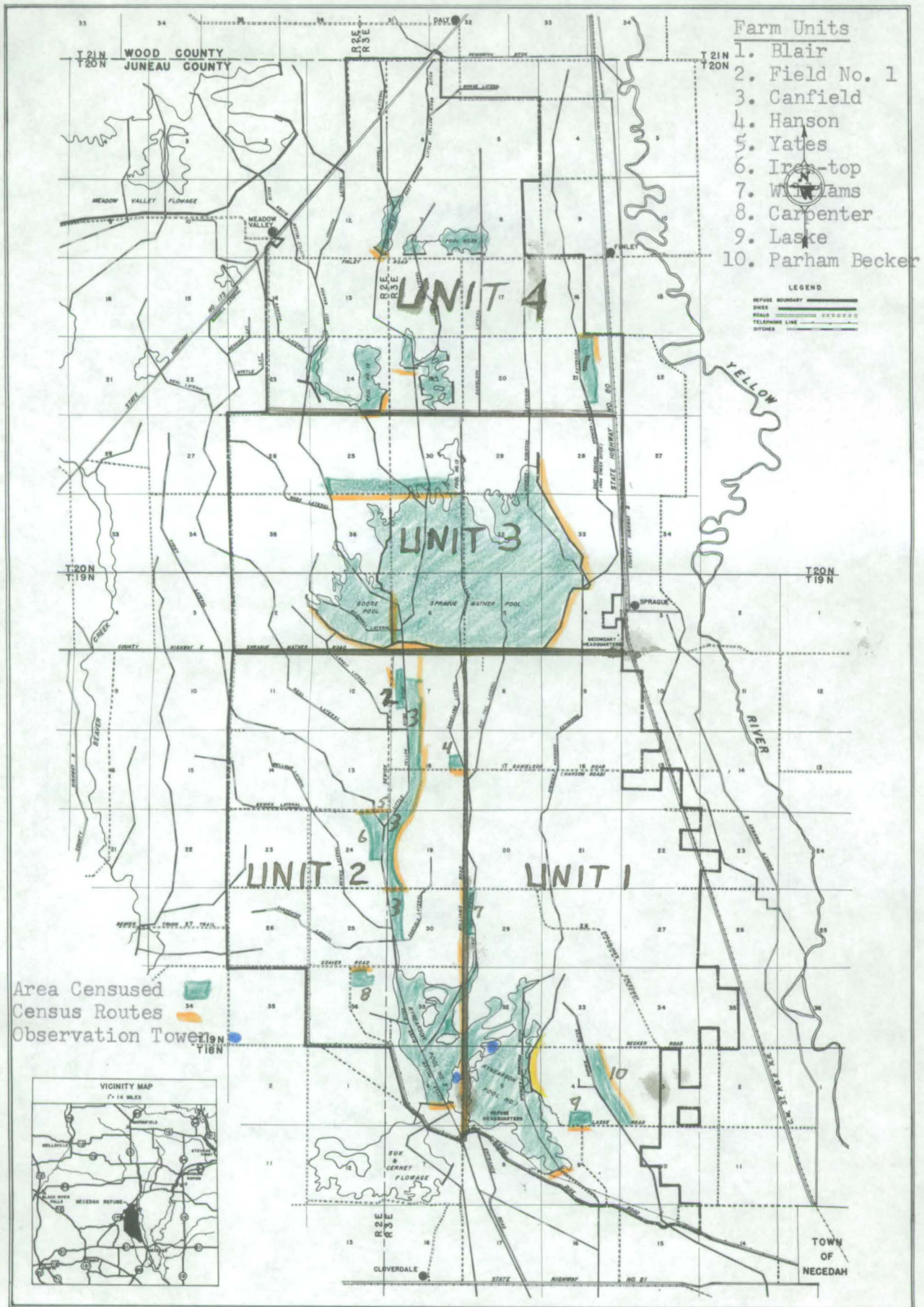
** Assistant managers wages/day

WEEKLY WATERFOWL CENSUS (CENSUS UNITS, ROUTES & POINTS)

NECEDAH NATIONAL WILDLIFE REFUGE JUNEAU COUNTY, WISCONSIN

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



COMPILED IN THE BRANCH OF ENGINEERING

MINNEAPOLIS, MINNESOTA

JANUARY, 1960

30 DEC 274 405

United States
Department of the Interior
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
Division of Wildlife Refuges

WEEKLY WATERFOWL POPULATION SURVEY

Refuge _____	_____, 19____
	Calendar Week (Sunday - Saturday)
Whistling swan	Redhead
Trumpeter swan	Ring-necked duck.
Can. goose (large ssp.).	Canvasback.
Can. goose (Cack, Rich).	_____ scaup.
_____ brant	Common goldeneye.
White-fronted goose.	Barrow's goldeneye.
Snow goose	Bufflehead.
Blue goose	Old-squaw
_____ goose	_____ eider.
_____ tree duck	White-winged scoter
Mallard.	Surf scoter
Black duck	Common scoter
Mottled duck	Ruddy duck.
Gadwall.	Hooded merganser.
Pintail.	Common merganser.
Green-winged teal.	Red-breasted merganser.
Blue-winged teal	Other ducks:
Cinnamon teal.	_____
American widgeon	_____
Shoveler	_____
Wood duck.	American coot.

Total: Swans _____ Geese _____ Ducks _____ Coots _____

SUPPLEMENTARY INFORMATION

Census technique: Was census complete _____ or a sample _____ ?
If a sample, show percentage of population covered _____ %.
Were observations based on ground _____ or aerial _____
counts? Actual census dates (s): _____

Waterfowl Activity: Summarize noteworthy waterfowl population movements,
peak periods, refuge distribution, and disease losses. _____

Hunting pressure and success: Brief statement on progress of local waterfowl
harvest and principal species bagges. _____

Weather: Information on weather during the week which may have had important
bearing on the preceding category, such as storms, snow depth, ice
formation or breakup on water areas, relative temperatures, floods,
and drought.

Habitat: List those habitat features which may have influenced waterfowl
activity including water levels and inundated acreage trends, abun-
dance and utilization of water food resources.

Reported by _____ Title _____

WEEKLY WATERFOWL INVENTORY
NECEDAH REFUGE

Date: _____

SPECIES

UNIT NUMBERS

SWANS:	1.	2.	3.	4.	TOTAL:
Whistling					
GESE:					
Canada (large)					
Canada (small)					
Snow					
Blue					
Other					
TOTAL:					
DUCKS					
Mallard					
Black					
Cadwall					
Widgeon					
Pintail					
Green-winged Teal					
Blue-winged Teal					
Shoveler					
Wood					
Bufflehead					
Ring-Necked					
Canvasback					
Scaup					
Goldeneye					
Bufflehead					
Ruddy					
Merganser (common)					
Merganser (Red-breasted)					
Merganser (Hooded)					
TOTAL:					
NOTS:					

SIGNATURE PAGE

Procedure 2a-1 Weekly Waterfowl Census

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

APPROVED BY: Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 2a-2

Species: Canada Geese

Data Class: BTitle: Fall Aerial CensusPurpose

Major objectives of the refuge are (1) to provide nesting and feeding stops for migrating waterfowl and (2) to provide production habitat for waterfowl. Management of the area provides much public recreation and enjoyment. The refuge is one management unit in the Mississippi Flyway. It is desirable to have a census technique which will reflect trends and changes in waterfowl populations from week to week for refuge management and from year to year for flyway management needs.

Procedure

In addition to the regular weekly waterfowl census (see Procedure 2a-1) the refuge goose population will be counted bi-weekly from the air beginning October 1 and continuing until freeze-up, about December 1. If an early migration is apparent the aerial counts should be initiated before October 1.

The aerial census will be conducted by the Region III biologist stationed at Winona, Minnesota in the Bureau aircraft. The count will be conducted between 10 AM and 3 PM when most of the geese are present on refuge lands. Census conditions correspond to favorable flight conditions with good visibility.

The areas censused include:

1. Ryneerson Pool 1
2. Ryneerson Pool 2
3. Sprague and Goose Pools
4. Pools 9, 13, 18, and 19
5. Canfield, Hanson, Carpenter, Parham-Becker, Williams and Laske farm units.

See the map in Procedure 2a-1 for the location of the census areas.

The area censused represents 44% of the total refuge waterfowl habitat and 13% of the total refuge acreage.

New pools and farm units will be included as they become concentration points for portions of the refuge goose population. Other non-refuge areas which should be censused by air are Wisconsin Conservation Department operated Sandhill and Meadow Valley Wildlife Areas since they constitute a part of the overall goose use complex in the Necedah area.

Record data on the same dittoed form and Weekly Waterfowl Population Survey Form 3-1867 used for Procedure 2a-1. Data will be summarized and reported in the refuge narrative report and NR Forms 1 and 1B.

Reliability

Reliability of the aerial census is thought to be high. The time the census is conducted corresponds to the time when the geese are concentrated on refuge units readily counted from the air. The present census probably accounts for approximately 90% of the refuge goose population on the day of the census.

Aerial counts and weekly waterfowl censuses are independent of each other and serve as cross-checks which provide reliable population estimates.

Manpower and Costs

An average of five aerial counts are conducted during the fall period.

Since Horicon and Necedah counts are made during the same flight, one-half the total cost is listed.

	Annual Cost (5 counts)
Man-days (census) - 5 @ \$46.00*	\$ 230.00
Aircraft - 25 hours flight time @ \$13.00	<u>325.00</u>
	\$ 555.00

*Average salary of area biologist and Bureau pilot.

SIGNATURE PAGE

Procedure 2a-2 Fall Aerial Census

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 2b

Species: Blue and Snow Geese

Data Class: C

Title: Blue and Snow Goose Census

Purpose

Same as Procedure 2a-1 (Weekly Waterfowl Census) and 2a-2 (Fall Aerial Census).

Procedure

The inventory for blue and snow geese will be the same as for Canada geese (See Procedures 2a-1 and 2a-2).

Reliability

Blue and snow geese are generally present in small numbers and can be readily inventoried. The present weekly waterfowl census (Procedure 2a-1) is believed to account for approximately 80% of the population on the day of the census. For the fall aerial census (Procedure 2a-2) about 90% of the population is counted.

Magnitude of Population Inventoried:

Normal Population

High Population

0 - 3,000

5,000

Manpower and Costs

Inventory costs are part of Procedures 2a-1 and 2a-2.

SIGNATURE PAGE

Procedure 2b Blue and Snow Goose Census

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William B. Green
William B. Green
Area Biologist

Date: February 12, 1968

Approved by: Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 3a

Species: Ducks and Coots

Data Class: CTitle: Weekly Waterfowl CensusPurpose

Same as Procedure 2a-1

Procedure

Same as Procedure 2a-1

Reliability

Same as Procedure 2a-1

Magnitude of Population Inventoried:

	<u>Normal Population</u>	<u>High Population</u>
Ducks	4,000 - 35,000	43,365
Coots	500 - 8,000	10,000

Ducks and coots will be more difficult to census because these waterfowl species are less mobil in their feeding habits.

Manpower and Costs

Inventory costs are part of Procedure 2a-1.

SIGNATURE PAGE

Procedure 3a Weekly Waterfowl Census

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 3b

Species: Ducks

Data Class: B

Title: Breeding Pair Count

Purpose

A primary objective of the refuge is to produce waterfowl which will provide public recreation throughout the flyway. Though not an important production area at present, demands for increased production will grow as more important breeding grounds are lost. The need for a systematic sampling procedure is apparent since present production figures will form the basis for measuring the value of future refuge development projects.

Procedure

Conduct the breeding pair count during the second or third week of May after the breeding population stabilizes. The census employs observations from the ground and air to establish a ground/air ratio which is applied to a 50% aerial sample.

Conduct the count between sunrise and 10 AM. Favorable census conditions include, mornings of good visibility, and low wind velocity (under 10 mph). The aerial portion, flown in the Bureau aircraft, will be conducted by the Region III biologist from Winona, Minnesota and the manager or assistant manager as observers. The Bureau pilot-biologist may serve as an observer and other qualified individuals may take the place of the manager or assistant. The ground portion will be conducted by four qualified members of the refuge staff. Qualified observers must be able to identify waterfowl by species and sex; both on the wing and on the water.

A total of nine transects in two habitat types will be sampled from both the air and ground to obtain the ground/air ratio. The aerial count precedes the ground count for each of the transects. Five of the transects, colored red on the attached map, follow the dikes and are a sample of the pool habitat. Only waterfowl within 1/8 mile or 600 feet to the west and/or north of the dikes will be counted for the ground/air ratio. The remaining four transects, colored blue, are a representative sample of the ditch habitat found on the refuge and only birds within the ditches will be counted. On the nine transects used for the ground/air ratio only the observer counts from the air.

Ground counts on the dikes will be made by a single observer from a pickup driven at slow speeds (10 mph). Ditch counts will be made on foot by a single observer. On the ground segment a shuttle system speeds up the count considerably; i.e., two men census one ditch, one man runs a portion of a ditch while the other drives the truck to the middle and proceeds to count the remaining portion; then the first man picks up the second.

Upon completion of the nine transects a 50% aerial sample will be made by counting 1/8 mile on either side of thirteen north-south transects along the section and half-section lines. The pilot or one observer counts one side while the second observer counts the other. The transects are green on the attached map.

All waterfowl observed will be recorded by species and sex when possible, but only pairs and males numbering 1 - 3 will be tabulated as representing a breeding pair. A group of 3 males will be counted as 3 breeding pairs.

Unknowns will be recorded as such. All aerial observations will be recorded by transect on two tape recorders. Waterfowl observed in ditches on the 50% aerial sample will be excluded since they will be picked up in the expanded ditch sample.

Equipment needs for the census include: two 4x4 pickup trucks, 4 pairs of binoculars and a vehicle for transportation to the Necedah airstrip. The Bureau aircraft used for the aerial segment is equipped with tape recorders for recording data.

Data Analysis

Summarize data separately for ditch habitat and "other" habitat.

Ditch

There will be no ground/air ratio applied to the ditch sample. The total ground count on the 11 miles of ditches will be expanded for 55 miles of ditches which lie outside the refuge pools ($\frac{55}{11} \times \text{count on 11 miles of ditches}$).

Example:	Pairs on 11 miles of ditches	30	
	Total miles ditches outside pools (55)		
	Total ditch pairs $\frac{55}{11} \times 30 = 150$		Sub-total <u>150</u>

Other

Establish a ground/air ratio using data from both the ditch and dike samples. These data will include air and ground observations from the nine transects colored red and blue on the attached map. Total pairs for "other" habitat will be obtained by:

Ground/air ratio \times 50% sample (excluding birds in ditches) \times 2

Example:	Pairs counted from the ground	50
	Pairs counted from the air	25
	Ground to air ratio $\frac{50}{25} = 2.0 : 1$	

50% aerial sample excluding ditches 100

"Other" pairs (excluding ditch sample) $2.0 \times 100 \times 2 = 400$ Sub-total 400

For total refuge breeding pairs add:

Total ditch pairs	Sub-total	150
"Other" pairs (excluding ditch sample)	Sub-total	400
		<u>550</u>

The species composition of the refuge breeding population will be based on data from the ground counts because the identification of some species from the air is impractical. The percentage of the total by species times the total refuge breeding population gives the total for individual species, for example:

Mallard pairs counted from ground	20
Total duck pairs counted from ground	50
Percentage of mallards $\frac{20}{50} =$	40%

Total mallard pairs = $.40 \times 550 =$ 220

Total Mallard Pairs: 220

All pair count data will be transposed from field notes and tape recorders onto plain sheet paper in table form. Summarize the data in the breeding pair count report, a copy of which is sent to the biologist at Winona, Minnesota and to the Region III office, Minneapolis. Field data and a copy of the report will be filed in the "waterfowl section" of the refuge files. Report data in the refuge narrative report.

Reliability

Reliability of the count is good with data believed to be within 20% for the "total breeding pairs" figure. Species composition figures are less reliable since many species (ring-necked duck, lesser scaup, green-winged teal, black duck and wood duck are present in low numbers. More reliable figures are obtained for mallard and blue-winged teal which generally account for 75 - 95% of the breeding pairs.

Some species, particularly the wood duck, are difficult to observe with the present census technique and future management needs may warrant changes.

Magnitude of population inventoried: 300 - 1000 pairs.

Manpower and Costs

Man-days (census) - 5 @ \$36.00*	\$ 180.00
Man-days (reporting) - $\frac{1}{2}$ @ \$26.00	13.00
Aircraft - 8 hrs flight time @ \$13.00	104.00
Vehicle operation - 80 miles @ 6.8¢	<u>5.44</u>
	\$ 302.44

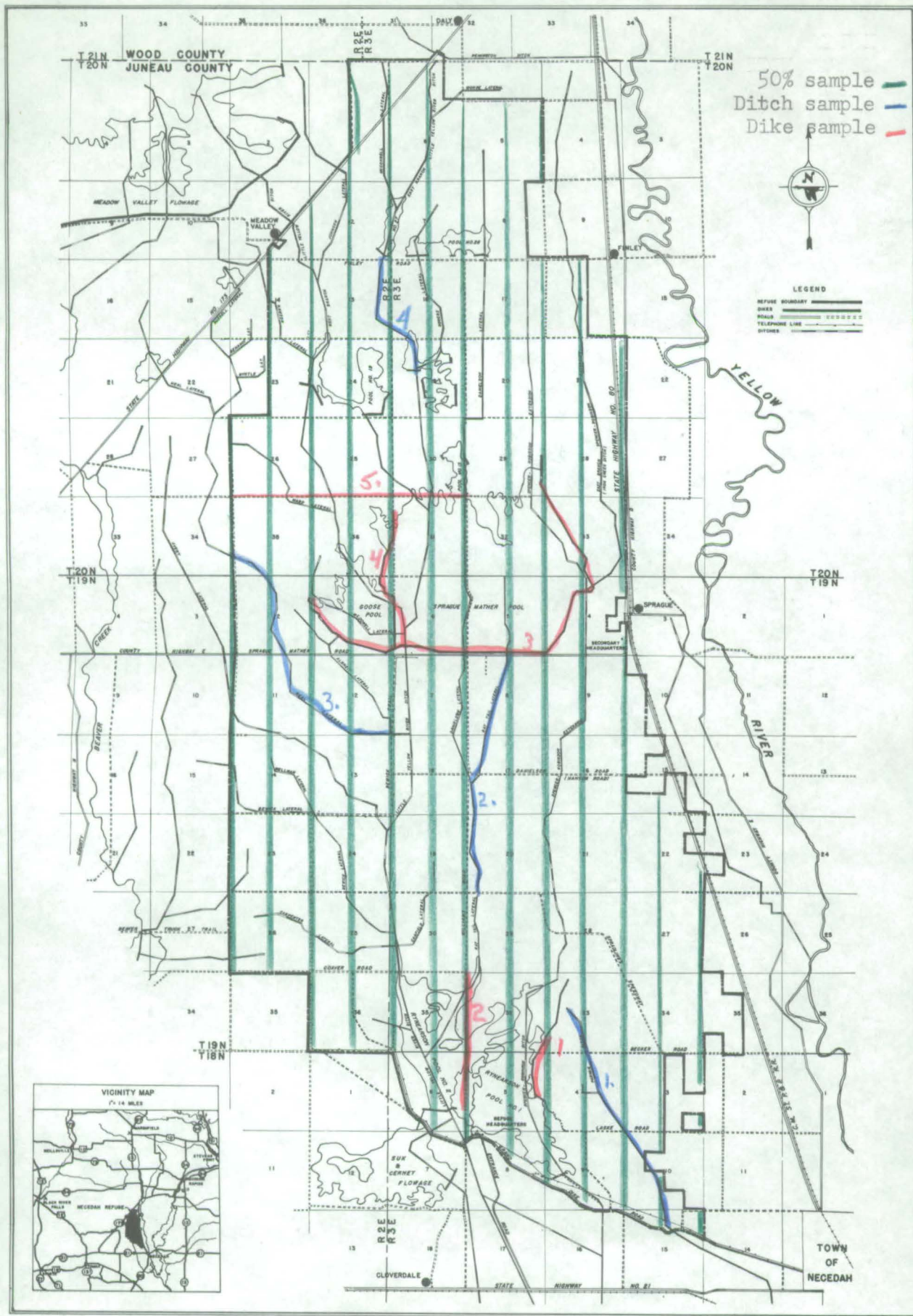
*Average salary of all personnel assisting

BREEDING PAIR COUNT - 1966

NECEDAH NATIONAL WILDLIFE REFUGE JUNEAU COUNTY, WISCONSIN

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



SIGNATURE PAGE

Procedure 3b Breeding Pair Count

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 3c

Species: Ducks

Data Class: DTitle: Brood CountPurpose

A primary objective of the refuge is to produce waterfowl which will provide public recreation throughout the flyway. Though not an impressive production area at present, demands for increased production will grow as more important breeding grounds are lost. The need for a systematic sampling procedure is apparent since present production figures will form the basis for measuring the value of future refuge development projects.

Procedure

A systematic brood count will be conducted once during the last week of July or the first week of August. The count will be made by one observer from a pickup driven between 5 and 10 m.p.h. There will be no specified stopping points on the routes, however, make stops to identify broods. Observers may include the manager, assistant manager or wildlife aid.

The count will be made between sunrise and 8 AM on a morning of good visibility and low wind (under 5 m.p.h.). The area sampled includes 1/8 mile or 600 feet on either side of the same dike transects used for the breeding pair count. The transects are colored red on the attached map. The area censused represents approximately 13% of the refuge brood habitat.

Random observations will be recorded during routine refuge travels. Use these observations together with data from the systematic brood count to make informed estimates of hatching rate and average brood sizes. Renesting (second nesting attempt) will be determined by observations of Class I broods in late July and early August.

Broods will be recorded by species, number of young, and age class. Age classes used are described on the attached brood classification sheet. Observations of the same broods will be recorded as often as the class and/or number changes. Record all field data on plain paper and file in the "brood count" file of the waterfowl section.

Census aids include binoculars and a spotting scope. A pickup truck will be used to conduct the census.

Data Analysis

Brood counts will not be projected to obtain refuge production. Total refuge production will be determined as follows:

Breeding pairs x Hatching rate x Average brood size = Refuge production.

1. Number of breeding pairs (breeding pair count).
2. Hatching rate (strictly an informed estimate based on observations of broods related to the pair count).
3. Average brood size (based on records of Class IIIb and flight stage broods).

Example:

1. 550 breeding pair
2. Estimated hatching rate - 40%
3. Total number of young (IIIb and flight stage broods) $\frac{180}{30} = 6$ (brood size)

Total number broods (" " ")

$$550 \times .40 \times 6 = 1,320$$

There is no direct correlation between the breeding pair count and brood count on the same transects since in many instances pair and brood habitat do not occur together.

Presently refuge production estimates are reported for all species combined; however, production by species may be determined by multiplying the percent by species, as shown in the breeding pair count, times the total refuge production.

Example:

Percent mallards (from pair count data)	=	40%
Total refuge production	=	1320
Mallard production = .40 x 1320	=	528

Brood data and production figures recorded on plain paper will be filed in the "waterfowl section" of the refuge files. Report production estimates by habitat units on Form NR 1B and summarize data in the refuge narrative report.

Reliability

Reliability of the count for accurately estimating refuge production is low since the hatching rate is nothing more than an informed estimate. The breeding pair count and average brood size figures are more reliable; therefore, production estimates are believed to be within 30%.

Magnitude of population inventoried will be 800 - 2500.

Combined data from the breeding pair count and brood count provides satisfactory production figures to establish trends in production from year to year. Presently there is no need for a more intensive survey, however, future management may result in increased waterfowl production which may warrant changes in the census.

Manpower and Costs

Systematic brood count:

Man-days (census) - $\frac{1}{2}$ @ \$26.00*	\$13.00
Man-days (reporting) - $\frac{1}{8}$ @ \$26.00	3.25
Vehicle operation - 45 miles @ 6.8¢	3.06
	<hr/> 19.31

*No additional costs are incurred for the random observations made during routine refuge travels.

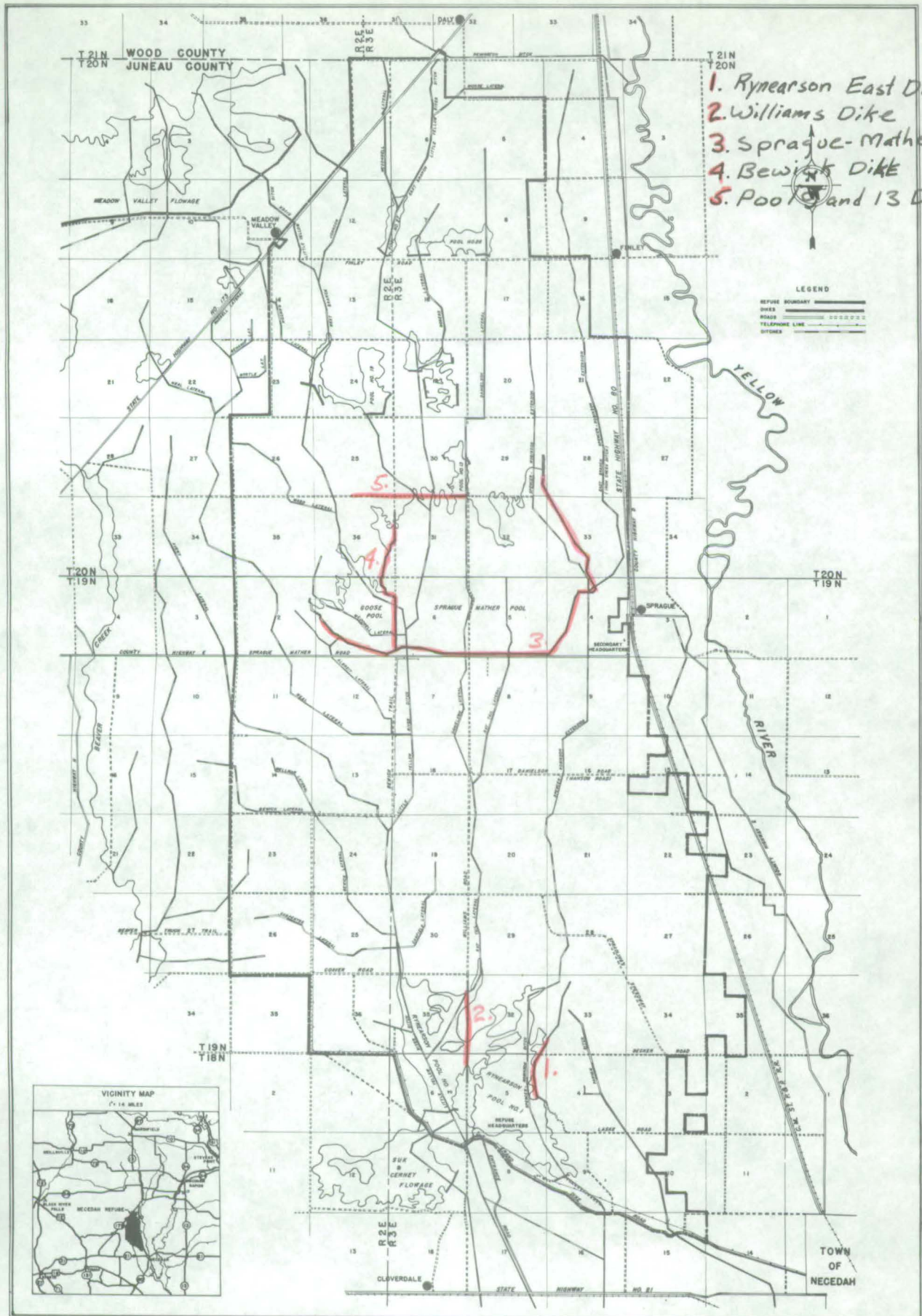
BROOD COUNT ROUTES

NECEDAH NATIONAL WILDLIFE REFUGE

JUNEAU COUNTY, WISCONSIN

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



COMPILED BY THE BRANCH OF ENGINEERING

MINNEAPOLIS, MINNESOTA

JANUARY, 1960

FOURTH PRINCIPAL MERIDIAN

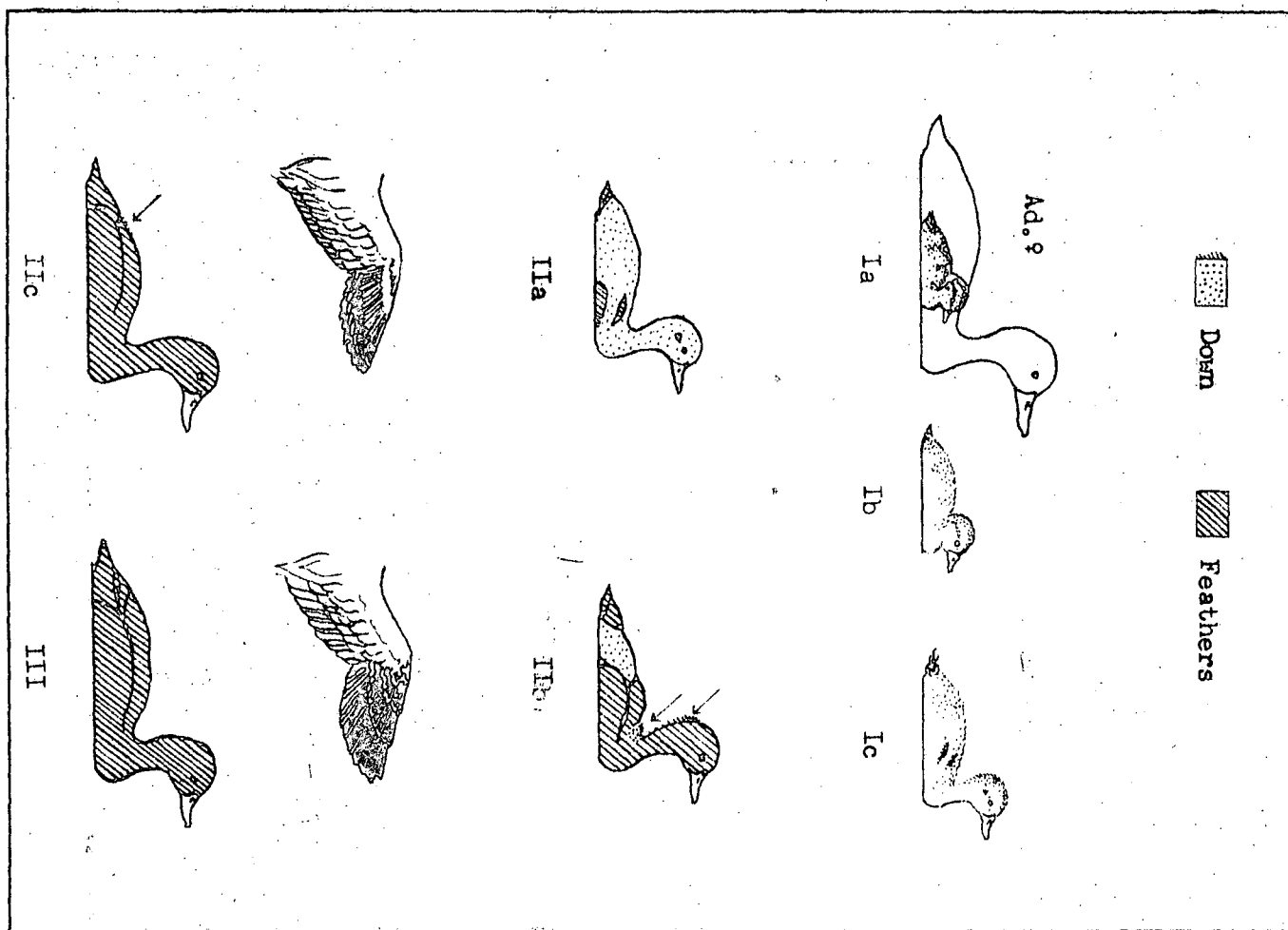
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Table III - Approximate Midpoint Age (in days) of Each Subclass and Supplementary Data

	Ia	Ib	Ic	IIa	IIb	IIc	III	Primaries Break From Sheaths	Areas of Last Visible Down
Hallard	4	10	16	22	31	41	51	35	Rump
Black Duck	3	9	16	22	30	39	52	--	--
Gadwall	4	11	17	23	33	42	48	31	Nape and Back
Baldpate	4	10	16	23	31	39	46	30	Nape and Rump
Pintail	3	9	16	21	29	39	48	31	Back
Blue-wgd Teal	3	8	12	18	26	34	39	30	Nape and Rump
Shoveller	4	10	16	23	32	40	48	33	Nape and Back
Redhead	4	13	22	29	39	50	58	43	Rump and Back
Ring-neck	3	8	14	21	28	35	44	--	--
Canvasback	5	14	21	27	35	46	56	40	Rump and Back
Lesser Scaup	3	10	17	25	31	38	47	--	--

Table I - Development of a Wild Duckling as Viewed Under Ideal Conditions

Plumage Class	Sub- Class	Description
I	a	" <u>Bright ball of fluff</u> ". Down bright. Patterns distinct (except diving ducks). Body rounded; neck and tail are not prominent.
Downy Young	b	" <u>Fading ball of fluff</u> ". Down colour fading, patterns less distinct. Body still rounded; neck and tail are not yet prominent.
No feathers visible	c	" <u>Gawky-downy</u> ". Down colour and patterns faded. Neck and tail becomes prominent. Body itself becomes long and oval.
II	a	" <u>First feathers</u> ". First feathers show on side under ideal field conditions. Stays in this class until side view shows one-half of side and flank feathered.
Partly Feathered as viewed from the side.	b	" <u>Mostly feathered</u> ". Side view shows one-half of side and flank feathered. Primaries break from sheaths. Stays in this class until side view shows down in one or two areas only (nape, back or upper rump).
	c	" <u>Last down</u> ". Side view shows down in one or two areas only (nape, back or upper rump). Sheaths visible on erupted primaries through this class. Stays in this class until profile shows no down.
I Fully Feathered in profile		" <u>Feathered-flightless</u> ". No down visible. Primaries completely out of sheaths but not fully developed. Stays in this class until capable of flight.



*Class I: Eyeline in dabblers only (except baldpate)

Table II - Approximate Age Span (in days) For Each Plumage Subclass by Species

	Ia	Ib	Ic	IIa	IIb	IIc	III	Flying
Mallard	1- 6	7-12	13-18	19-25	26-35	36-45	46-55	52-60
Black Duck	1- 5	6-12	13-18	19-25	26-33	34-43	44-60	58-63
Gadwall	1- 6	7-14	15-18	19-27	28-38	39-44	45-50	48-52
Baldpate	1- 7	8-12	13-18	19-26	27-35	36-41	42-50	47+
Pintail	1- 5	6-12	13-18	19-23	24-33	34-43	44-51	46-57
Blue-wgd Teal	1- 5	6- 9	10-13	14-21	22-30	31-36	37-40	35-44
Shoveller	1- 6	7-13	14-17	18-27	28-35	36-44	45-50	47-54
Redhead	1- 6	7-18	19-24	25-32	33-45	46-54	55-60	60-63
Ring-neck	1- 5	6-10	11-16	17-24	25-30	31-38	39-49	49
Canvasback	1- 9	10-17	18-23	24-29	30-40	41-50	51-60	57-68
Lesser Scaup	1- 6	7-13	14-20	21-28	29-33	34-42	43-50	47+

SIGNATURE PAGE

Procedure 3c Brood Count

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 3d

Species: Wood duck

Data Class: DTitle: Roosting Flight SurveyPurpose

A major objective of the refuge is to provide a nesting and feeding stop for migrating waterfowl and to provide production habitat for ducks and geese. The refuge is also the primary molting and staging area for the wood duck population of this area. The refuge is one management unit of many in the Mississippi Flyway, and it is necessary to have a census technique which will reflect trends and changes in wood duck populations from week to week for refuge management and from year to year for flyway management needs.

Procedure

A special census will be conducted in August to count wood duck roosting flights into the Sprague and Ryneerson 1 pools. The census will be conducted by the manager, assistant manager or summer wildlife aid. Make the counts between one hour before sunset and dark on evenings of good visibility during the second or third week of August. Make the counts from stationary observation points on the main dike areas which are focal points for the roosting flights. The dikes include:

1. Sprague east dike
2. Sprague south dike near the radial gate
3. Ryneerson 1 east dike
4. Williams dike between Ryneerson 1 and 2 pools

The census points and roosting sites are marked on the attached map. There is no fixed observation point and counts will be made from any point on the portion of the dikes designated on the map. Other roosting flights will be censused as they are located.

The counts will be conducted with the aid of binoculars. Other equipment needs include a pickup truck.

Record data separately for each roosting flight on a plain sheet of paper and file in the wood duck section of the refuge "waterfowl" files.

Data will be reported in the refuge narrative report.

Data Analysis

Do not use the counts to estimate the total refuge population. The counts merely indicate area population trends from one year to the next.

Reliability

The survey provides a reliable count of wood ducks flying to known roosting sites from areas outside the pools. For each individual flight it is believed that approximately 80% of the wood ducks are counted. The survey should not be used for estimating total refuge population since the percentage of roosting flights counted is unknown.

Manpower and Costs

	Annual Cost
Man-days (census) - $1\frac{1}{2}$ @ \$26.00	\$ 39.00
Man-days (reporting) - $1/8$ @ \$26.00	3.25
Operate 1 vehicle - 50 miles @ 6.8¢	3.40
	<u>45.65</u>

NECEDAH NATIONAL WILDLIFE REFUGE
JUNEAU COUNTY, WISCONSIN

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



SIGNATURE PAGE

Procedure 3d Roosting Flight Survey

Prepared by:

Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by:

David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by:

William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by:

Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 4

Species: Water and Marsh Birds

Data Class: DTitle: Bird Migration SurveyPurpose

A secondary objective of the refuge is to provide a variety of wildlife for public enjoyment. Management and development of the refuge for waterfowl migration and production habitat will also provide habitat for a variety of "other" bird species. Public interest in these birds is increasing and already there are requests for information on the abundance and variety of the species available and when and where to see them.

Procedure

Conduct special inventories for sandhill cranes and great blue herons (see Procedures 4a and 4b).

No separate refuge surveys will be conducted or are contemplated for other species. Identification of species, dates of spring arrival and peak numbers will be recorded during routine refuge travels. All personnel will participate in the survey and will record observations on a posted Wisconsin Society for Ornithology Field Note Report, a copy of which is sent to the society each year (sample attached).

Data are reported on NR-1a. Unusual migrations or concentrations will be recorded in a field diary and reported in the refuge narrative report.

Binoculars, spotting scopes and bird identification books are available at headquarters for making and identifying observations.

Reliability

Reliability of population will be low but migration arrival dates should be within one week of being correct.

Manpower and Costs

No additional refuge costs occur.

WISCONSIN SOCIETY FOR ORNITHOLOGY
FIELD NOTE REPORT

Observer _____

4-3

SEASON	INCLUSIVE DATES	NOTES DUE BY:
Spring	Mar. 1-May 31	June 10
Summer	June 1-Aug. 15	Aug. 25
Autumn	Aug. 16-Nov. 30	Dec. 10
Winter	Dec. 1-Feb. 28	Mar. 10

County _____

Season _____

Year _____

SPECIES	Arr.	Peak	Dep.	SPECIES	Arr.	Peak	Dep.
Common Loon				Ruddy Turnstone			
Red-throated Loon				Woodcock			
Horned Grebe				Common Snipe			
Pied-billed Grebe				Upland Plover			
2-cr. Cormorant				Spotted Sandpiper			
Great Blue Heron				Solitary Sandpiper			
Common Egret				Gr. Yellowlegs			
Little Blue Heron				Les. Yellowlegs			
Green Heron				Pectoral Sandpiper			
1-cr Night Heron				White-rumped Sand.			
American Bittern				Baird's Sandpiper			
Least Bittern				Least Sandpiper			
Histling Swan				Dunlin (Red-back)			
Canada Goose				Dowitcher			
Snow Goose				Stilt Sandpiper			
Blue Goose				Semipal. Sandpiper			
Gallard				Sanderling			
Black Duck				Wilson's Phalarope			
Adwall				Northern Phalarope			
Intail				Herring Gull			
Green-winged Teal				Ring-billed Gull			
Blue-winged Teal				Franklin's Gull			
n. Widgeon (Blpe)				Bonaparte's Gull			
Noveler				Forster's Tern			
Wood Duck				Common Tern			
Redhead				Caspian Tern			
Ring-necked Duck				Black Tern			
Canvasback				Rock Dove			
Greater Scaup				Mourning Dove			
Lesser Scaup				Yel-billed Cuckoo			
Common Goldeneye				Black-billed Cuckoo			
Rufflehead				Screech Owl			
Oldsquaw				Great Horned Owl			
White-w. Scoter				Snowy Owl			
Ruddy Duck				Barred Owl			
Flooded Merganser				Long-eared Owl			
Common Merganser				Short-eared Owl			
Red-br. Merganser				Whip-poor-will			
Turkey Vulture				Nighthawk			
Coshawk				Chimney Swift			
Sharp-shin Hawk				Hummingbird			
Cooper's Hawk				Belted Kingfisher			
Red-tailed Hawk				Flicker			
Red-shoulder Hawk				Pileated Woodpecker			
Broad-winged Hawk				Red-bellied Wdpkr.			
Cough-legged Hawk				Red-headed Wdpkr.			
Bald Eagle				Yel-b. Sapsucker			
Marsh Hawk				Hairy Woodpecker			
Spreey				Downy Woodpecker			
Mergrine Falcon				Eastern Kingbird			
Pigeon Hawk				Crested Flycatcher			
Parrow Hawk				Phoebe			
Ruffed Grouse				Yellow-bellied Fly.			
Prairie Chicken				Acadian Flycatcher			
Sharp-tail Grouse				Traill's (Alder) Fly			
Gray (Hun) Partridge				Least Flycatcher			
Bobwhite				Wood Pewee			
Pheasant				Olive-sided Fly.			
Sandhill Crane				Horned Lark			
King Rail				Tree Swallow			
Virginia Rail				Bank Swallow			
Sora				Rough-wing Swallow			
Common Gallinule				Barn Swallow			
Coot				Cliff Swallow			
Semipal. Plover				Purple Martin			
Killdeer				Gray (Canada) Jay			
Golden Plover				Blue Jay			
Black-belly Plo.				Raven			

Species	Arr.	Peak	Dep.	Species	Arr.	Peak	Dep.
Crow				No. Waterthrush			
Black-cap Chickadee				La. Waterthrush			
Tufted Titmouse				Kentucky Warbler			
White-br. Nuthatch				Connecticut Warb.			
Red-br. Nuthatch				Mourning Warbler			
Brown Creeper				Yellowthroat			
House Wren				Wilson's Warbler			
Winter Wren				Canada Warbler			
Bewick's Wren				Redstart			
Long-bill Marsh W.				House Sparrow			
Short-bill Marsh W.				Bobolink			
Catbird				East. Meadowlark			
Brown Thrasher				West. Meadowlark			
Robin				Yellow-head Blkba			
Wood Thrush				Red-winged Blkba			
Hermit Thrush				Chard Oriole			
Swainson's Thrush				Baltimore Oriole			
Gray-cheeked Thr.				Hasty Blackbird			
Veery				Brewer's Blackbird			
Bluebird				Common Grackle			
Blue-g Gnatcatcher				Brown-head Cowbird			
Golden-cr. Kinglet				Scarlet Tanager			
Ruby-cr. Kinglet				Cardinal			
Water Pipit				Rose-cr. Grosbeak			
Cedar Waxwing				Indigo Bunting			
Northern Shrike				Dickcissel			
Loggerhead Shrike				Evening Grosbeak			
Starling				Purple Finch			
Yellow-thr. Vireo				Pine Grosbeak			
Solitary Vireo				Common Redpoll			
Red-eyed Vireo				Pine Siskin			
Philadelphia Vireo				Goldfinch			
Warbling Vireo				Red Crossbill			
Black-& White Warb.				White-w. Crossbill			
Prothonotary Warb.				Towhee			
Golden-winged Warb.				Savannah Sparrow			
Blue-winged Warb.				Grasshopper Sp.			
Tennessee Warbler				Henslow's Sparrow			
Orange-crowned				Vesper Sparrow			
Ashtville Warbler				Lark Sparrow			
Parula Warbler				Slate-col. Junco			
Yellow Warbler				Oregon Junco			
Magnolia Warbler				Tree Sparrow			
Peep May Warbler				Chipping Sparrow			
Lack-thr. Blue				Clay-colored Sp.			
Myrtle Warbler				Field Sparrow			
Lack-thr. Green				Harris Sparrow			
Scarlet Warbler				White-crowned Sp.			
Lackburnian Warb.				White-throated Sp.			
Nestnut-sided				Fox Sparrow			
Gray-breasted Warb.				Lincoln's Sparrow			
Lackpoll Warbler				Swamp Sparrow			
Pine Warbler				Song Sparrow			
Palm Warbler				Lapland Longspur			
Ovenbird				Snow Bunting			

Send all notes to:

Rev. Sam Robbins
Roberts, Wisconsin

If you see a species that is not included in the above list, it is almost certain to be a real rarity, and it should be accompanied by a detailed report. Some of the species listed in this form will also be rare in your locality. In reporting such rarities, give as complete a description as possible—including date, time of day, conditions of observation, habitat, size, shape, plumage characteristics, behavior, voice, etc. Ideally this report would be taken from notes that have been jotted down in the field at the time of observation. Also please make special mention of out-of-the-ordinary dates of common species.

SIGNATURE PAGE

Procedure 4 Water and Marsh Birds

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved: David J. Brown
David J. Brown
Refuge Manager

Date: Feb 9, 1968

Approved: William E. Green
William E. Green
Area Biologist

Date: Feb. 12, 1968

Approved: Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 4a

Species: Sandhill Crane

Data Class: CTitle: Sandhill Crane CensusPurpose

Same as Procedure 4 (Bird Migration Survey)

Procedure

The inventory for sandhill cranes will be the same as for geese (see Procedure 2a-1). Make a population estimate for the entire refuge and record it on a Weekly Waterfowl Population Survey Form 3-1867. This population estimate for the entire refuge is made by projecting the count in the same manner used for geese, see 2a-1-4. Data will be reported on NR Form 1A and in the narrative report.

Reliability

Sandhill cranes are generally present in small numbers and are easily censused since they frequent the same habitat as geese. The present census is believed to account for about 80% of the crane population on the day of the census.

Magnitude of Population Inventoried

Normal Population

30 - 150

High Population

300

Manpower and Costs

Inventory costs are part of Procedure 2a-1

SIGNATURE PAGE

Procedure 4a Sandhill Crane Census

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 4b

Species: Great Blue Heron

Data Class: BTitle: Heron Rookery SurveyPurpose

A secondary objective of the refuge is to provide a variety of wildlife for public enjoyment. Management and development of the refuge for waterfowl migration and production habitat will also provide habitat for a variety of "other" bird species. Public interest in these birds is increasing and already there are requests for information on the abundance and variety of the species available and when and where to see them.

Procedure

A great blue heron rookery survey will be conducted annually on the Sprague-Mather Pool. The location of the lone rookery is plotted on the attached map. Active nests and young will be counted from a boat by the student wildlife aid once during the last two weeks of June.

Data will be reported in the wildlife aid's summer report and will be summarized in the refuge narrative report.

Reliability

Reliability of the survey is high since it is an actual count of nests and young. The rookery is readily censused because of its exposed location. The survey is thought to be accurate to within 80%. Other rookeries will be censused as they become established.

Manpower and Costs

Man-days (census) - $\frac{1}{2}$ @ \$20.48*
Vehicle operation - 20 miles @ 6.8¢
Miscellaneous

Annual Cost

10.24
1.36
1.00
12.60

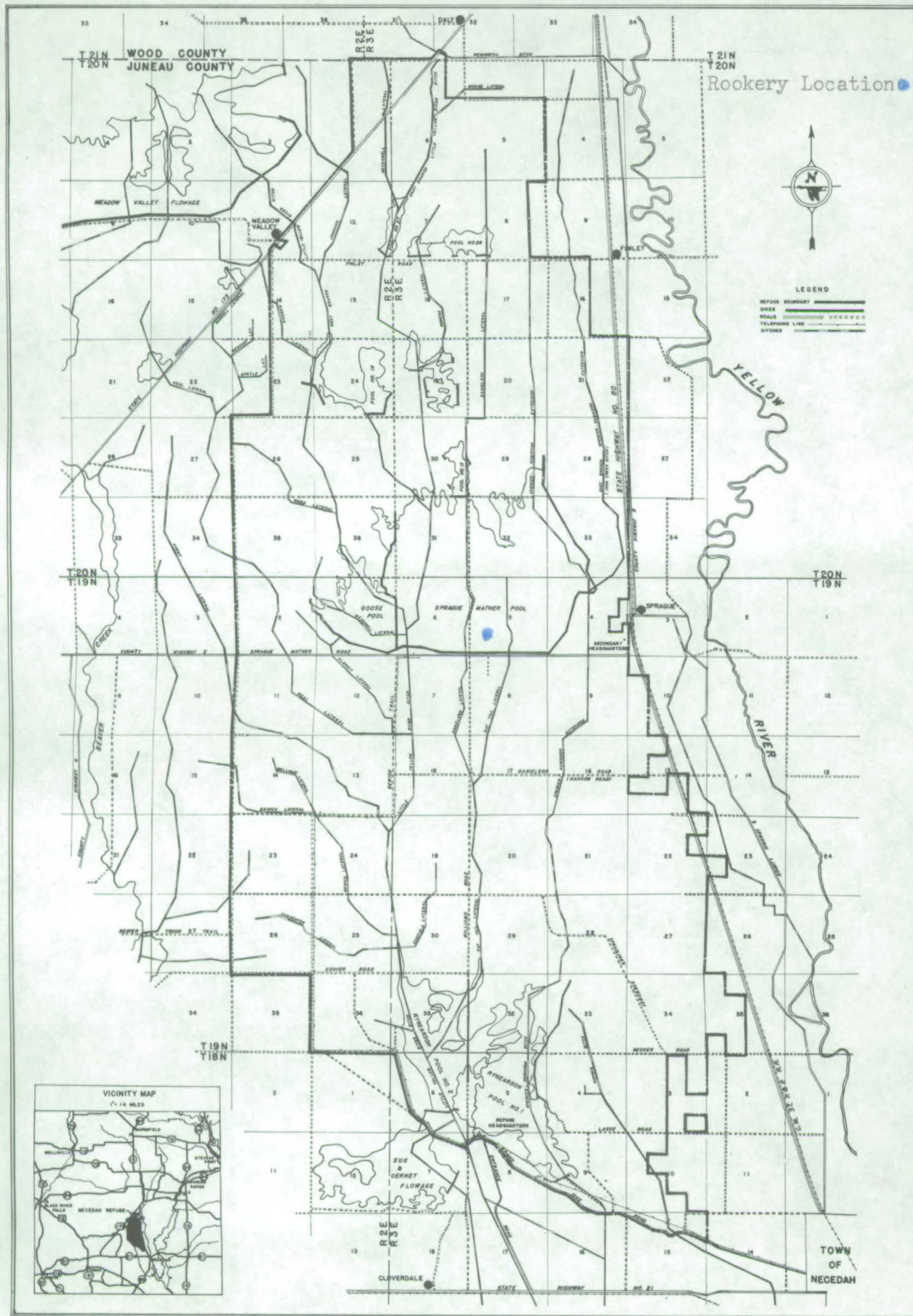
*GS-5

GREAT BLUE HERON ROOKERY

NECEDAH NATIONAL WILDLIFE REFUGE JUNEAU COUNTY, WISCONSIN

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



COMPILED IN THE BRANCH OF ENGINEERING

MINNEAPOLIS, MINNESOTA

JANUARY, 1960

38 WIS 274 405

SIGNATURE PAGE

Procedure 4b Heron Rookery Survey

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 5Species: Shorebirds, Gulls, Terns and Rails Data Class: DTitle: Bird Migration SurveyPurpose

Same as Procedure 4

Procedure

Same as Procedure 4. No separate surveys will be conducted or are contemplated for shorebirds, gulls, terns and rails on the refuge. Three woodcock singing ground counts are conducted by refuge personnel outside the refuge (see Procedure 5a).

Reliability

Same as Procedure 4.

Manpower and Costs

No additional refuge costs occur.

SIGNATURE PAGE

Procedure 5 Shorebirds, Gulls, Terns and Rails

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved: David J. Brown
David J. Brown
Refuge Manager

Date: Feb 7, 1968

Approved: William E. Green
William E. Green
Area Biologist

Date: Feb. 12, 1968

Approved: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 5a

Species: Woodcock

Data Class:
For Trends BTitle: Woodcock Singing Ground SurveyPurpose

Same as Procedure 4.

Procedure

No surveys will be conducted to estimate numbers of woodcock. Trends in the population will be based on three woodcock singing ground counts on routes bordering the refuge. The routes, Remington-Wood County, Grand Dike, and Yellow-River-Juneau County, will be censused in May by the manager or assistant manager. The survey will be conducted in accordance with the guidelines set forth by the BSWF for the nation-wide woodcock survey. Instructions are sent to the refuge each year prior to the survey. Maps showing route locations will be retained in the woodcock section of the refuge files.

Random observations and fall hunting success on lands adjacent to the refuge substantiate population trends.

A copy of the annual woodcock singing ground survey will be retained in the woodcock section of the refuge files (sample attached).

Summarize data on NR-1A, NR-2 and in the refuge narrative report.

Reliability

The value of the survey stems from the establishment of area trends in the population. Since the survey routes are located close to the refuge the data provides a reliable indicator of refuge population trends.

Manpower and Costs

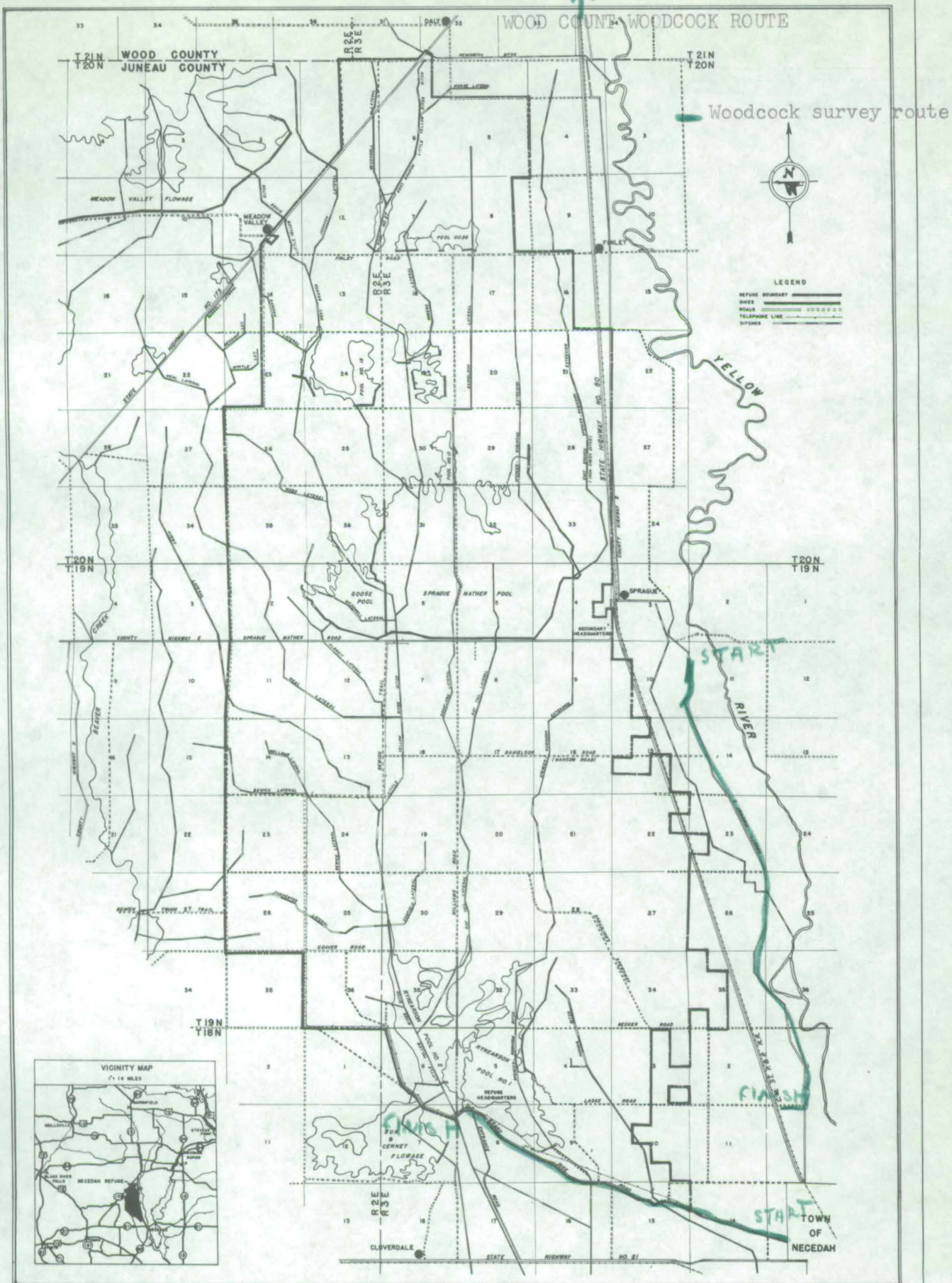
Annual Cost

Man-days (census) - 3/4 @ \$26.00
Vehicle operation - 80 miles @ 6.8¢

19.50
5.44
24.94

NECEDAH NATIONAL WILDLIFE REFUGE
JUNEAU COUNTY, WISCONSIN

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



FOURTH PRINCIPAL MERIDIAN

Scale 

TOWNSHIP
DIAGRAM

MEAN
DECLINATION
1980



SAMPLE

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
Washington, D. C. 20240

Budget Bureau NO 42-R1402
Approval Expires 3/31/70
5a-3

WOODCOCK SINGING GROUND SURVEY

State or Province PENNSYLVANIA		Survey Year 1966
County CENTRE	Town —	Township FERGUSON
Route Number 99	Route Name GRASS LAKE SWAMP ROAD	Same Route Used Last Year <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Details of Route
SAME AS LAST YEAR (1965)

Observer's Name ROBERT HOBERT	Address FORESTRY BUILDING SCHOOL OF FOREST RESOURCES UNIVERSITY PARK, PENNSYLVANIA
---	--

Date recorded APRIL 22, 1966	Stop Number	Mileage from Previous Stop	Speedometer Reading	Number of birds Recorded
Time at sunset 6:58 <input checked="" type="checkbox"/> Standard Time <input type="checkbox"/> Daylight Saving Time	1	0.0	19.2	0
	2	0.4	19.6	1
Time at start 7:13 P.M.	3	0.4	20.0	FROGS *
	4	0.5	20.5	2
Time at finish 7:48 P.M.	5	0.6	21.1	1
	6	1.0	22.1	TRAFFIC *
Sky <input type="checkbox"/> Clear <input type="checkbox"/> 2/3 overcast <input type="checkbox"/> 1/3 overcast <input checked="" type="checkbox"/> Overcast	7	0.4	22.5	KIDS + DOGS *
	8	0.4	22.9	0
Temperature (Deg. F.) <input type="checkbox"/> 40 - 50 <input type="checkbox"/> 61+ <input checked="" type="checkbox"/> 51 - 60	9	0.4	23.3	1
	10	0.4	23.7	TIME LIMITATION
Wind <input checked="" type="checkbox"/> Calm <input type="checkbox"/> Moderate <input type="checkbox"/> Gentle	11	0.5	24.2	TIME LIMITATION
	12			
Moon <input type="checkbox"/> None <input type="checkbox"/> 1/2 <input type="checkbox"/> Full <input type="checkbox"/> 1/4 <input checked="" type="checkbox"/> 3/4	13			
	14			
Precipitation <input checked="" type="checkbox"/> None <input type="checkbox"/> Snow <input type="checkbox"/> Rain <input type="checkbox"/> Fog	TOTAL			5

SIGNATURE PAGE

Procedure 5a Woodcock Singing Ground Survey

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 6

Species: Other Migratory Birds

Data Class: DTitle: Bird Migration Survey

Same as Procedure 4.

SIGNATURE PAGE

Procedure 6 Other Migratory Birds

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved: David J. Brown
David J. Brown
Refuge Manager

Date: Feb 9, 1968

Approved: William E. Green
William E. Green
Area Biologist

Date: Feb. 12, 1968

Approved: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 7

Species: Podaceous Birds

Data Class: DTitle: Bird Migration SurveyPurpose

Same as Procedure 4.

Procedure

Same as Procedure 4. Eagles are also counted and reported during the weekly waterfowl census (Procedure 2a-1). Record observations on the Weekly Waterfowl Population Survey Form 3-1867.

Reliability

Same as Procedure 4.

Manpower and Costs

No additional refuge costs occur.

SIGNATURE PAGE

Procedure 7 Predaceous Birds

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date October 10, 1967

Approved: David J. Brown
David J. Brown
Refuge Manager

Date: Feb 9, 1968

Approved: William E. Green
William E. Green
Area Biologist

Date: Feb. 12, 1968

Approved: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 8a

Species: Turkey

Data Class: DTitle: Upland Game Bird SurveyPurpose

Providing a variety of upland game species for public enjoyment is a secondary benefit of the management practices carried out on refuge lands. An important part of the evaluation of refuge management and development is the response of upland game species to habitat changes in addition to those of waterfowl species. Upland game birds such as turkey, ruffed grouse and sharp-tailed grouse are of particular interest to the public who wish to obtain information about them and know when and where to see them.

Procedure

Population estimates will be based primarily on counts at two refuge winter feeders maintained by the Wisconsin Conservation Department. Make counts during January or February when the birds are concentrated at the feeders. These counts are made in the morning or evening by driving near the feeder, stopping the truck, and counting the birds as they leave. If the truck is not driven too fast and the driver doesn't open the door or make any unusual noise the birds will walk off fairly slow permitting a good count to be made. Several of the most heavily used feeders have blinds constructed near them from which observations can also be made. The attached map shows their location.

Also incorporate into the estimates random observations of adult birds and broods. The location of broods and the number of young in each will be recorded on a refuge map.

Data from the feeder counts and random observations are use used to make an informed population estimate. Presently the Wisconsin Conservation Department bases its total flock estimates on the same type data. Refuge population figures are related to total flock estimates and it is believed that the refuge population represents approximately 20 - 30 percent of the total flock population.

All personnel participate in the survey and report their observations to the assistant manager who records the data and files it in the turkey section of the refuge files. Summarize data on NR-2 and in the refuge narrative report.

Reliability

Reliability of the survey is Class D data, however, population estimates are believed to account for 80 percent of the population. The survey provides Class D data since basically the estimates are only informed estimates. The refuge population probably numbers between 500 and 700.

Manpower and Costs

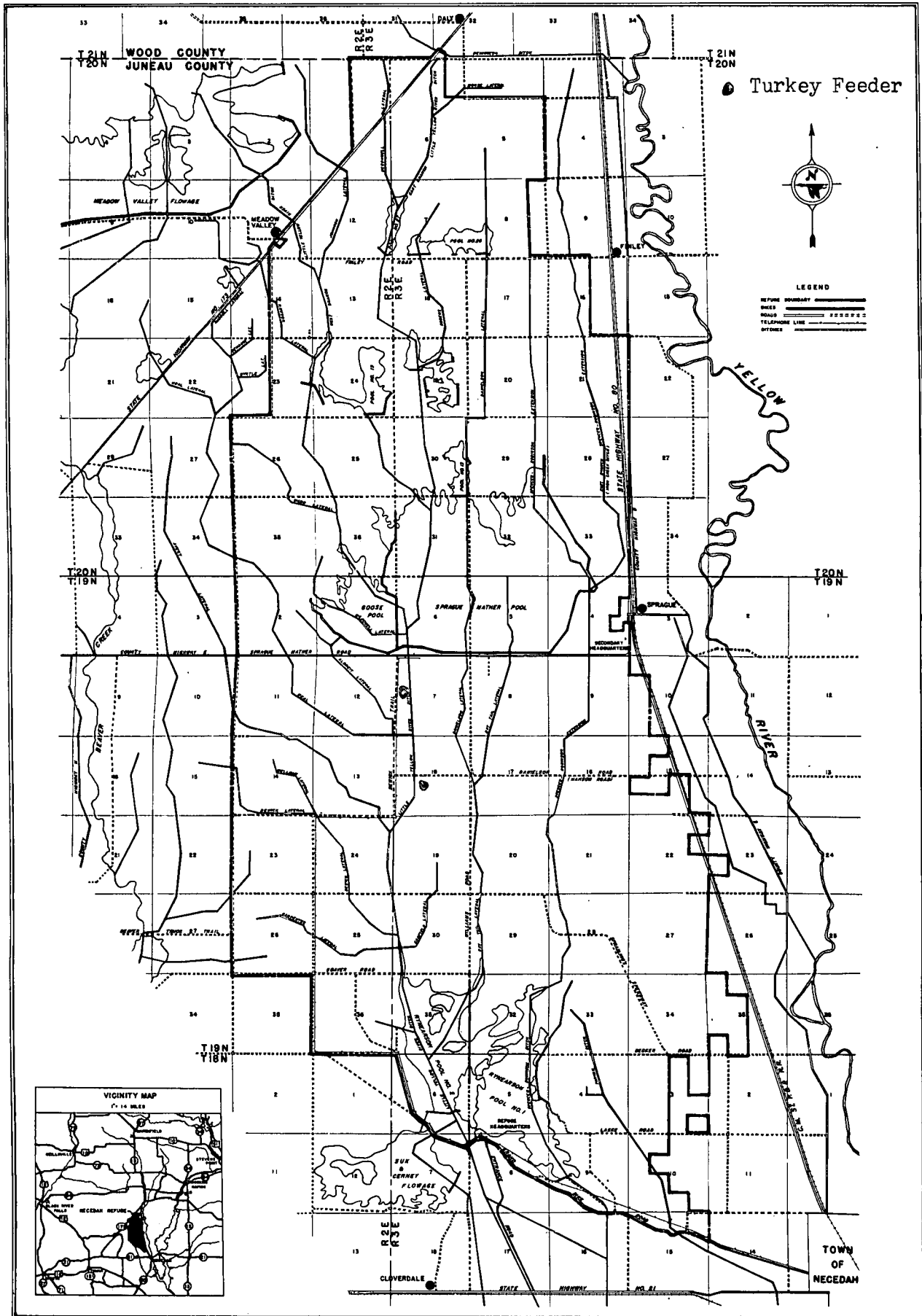
	Annual Cost
Man-days (census) 3/4 @ \$ 26.00	\$ 19.50
Vehicle operation - 30 miles @ 6.8¢	2.04
	<u>21.54</u>

TURKEY FEEDER LOCATIONS

NECEDAH NATIONAL WILDLIFE REFUGE JUNEAU COUNTY, WISCONSIN

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



COMPILED IN THE BRANCH OF ENGINEERING

MIDKEAPOLIS, MINNESOTA

JANUARY, 1960

SIGNATURE PAGE

Procedure 3a Upland Game Bird Survey - Turkey

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 8b

Species: Ruffed Grouse

Data Class: DTitle: Upland Game Bird SurveyPurpose

Same as Procedure 8a.

Procedure

No population estimate is made in numbers; trends will be established based on:

1. Spring male drumming activity (no systematic survey)
2. Random brood observations
3. Fall hunting success on land adjacent to the refuge

All personnel assist in the survey. Brood observations will be reported to the assistant manager for recording. Summarize data on NR-2 and in refuge narrative report.

Reliability

Reliability is low for number estimates. The value in the survey lies in expressing population trends in relative terms, i.e., increase, decrease or no change in the population. Population changes will be based on recall of refuge personnel. An intensive survey cannot be justified at this time.

Manpower and Costs

No additional refuge costs occur.

SIGNATURE PAGE

Procedure 8b Upland Game Bird Survey - Ruffed Grouse

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 8c

Species: Sharp-tailed Grouse

Data Class: CTitle: Sharp-tailed Grouse SurveyPurpose

Same as Procedure 8a.

Procedure

A dancing ground survey will be conducted on the Blair Unit which supports a remnant sharp-tailed grouse population. A head count of dancing males will be made from an observation blind from $\frac{1}{2}$ hour before to 1 - 2 hours after sunrise. Make the count once during the first three weeks of April when dancing males are at the peak of their activity.

Additional dancing grounds will be censused as they are located. Potential sites where grounds are likely to become established are plotted on the attached map along with the existing dancing ground.

Random observations by all personnel will be recorded by the assistant manager and will be considered when making the population estimate. Estimates of numbers will be made: 1-10, 10-20, 20-30, etc. Data are recorded on NR-2 and summarized in the narrative report.

Reliability

Reliability will be low since the population is small and observations are limited; estimates are thought to be accurate to within approximately

70 percent. Magnitude of population inventoried 30 - 80 birds.

Manpower and Costs

Annual Cost

Man-days (census) - 3/4 @ \$26.00
Vehicle operation - 25 miles @ 6.8¢

19.50
1.70
21.20

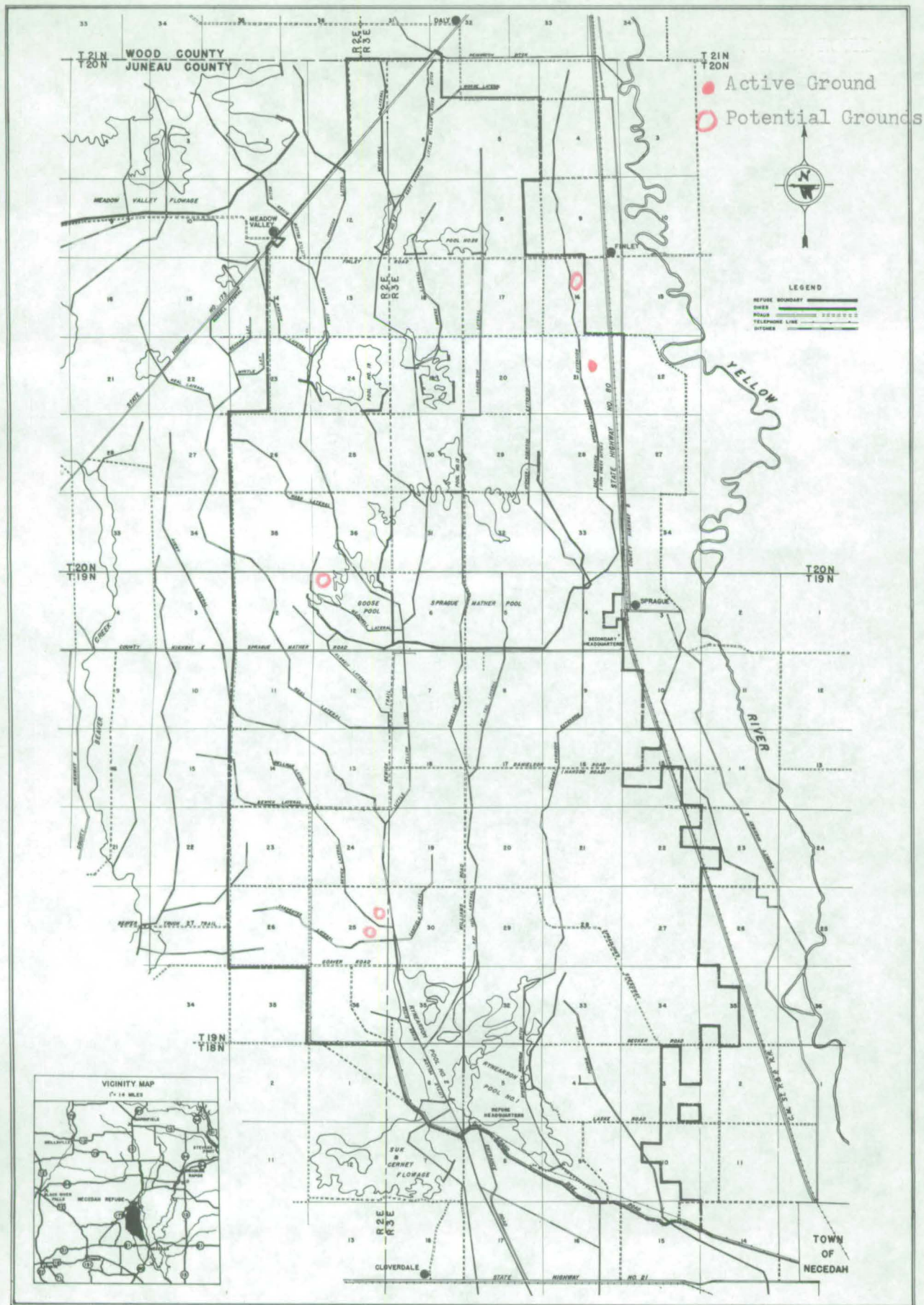
SHARP-TAILED GROUSE GROUNDS

NECEDAH NATIONAL WILDLIFE REFUGE

JUNEAU COUNTY, WISCONSIN

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



COMPILED IN THE BRANCH OF ENGINEERING

MINNEAPOLIS, MINNESOTA

JANUARY, 1960

30 WIS 274 405

SIGNATURE PAGE

Procedure 8c Sharp-tailed Grouse Survey

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William E. Green
William E. Green
Area Biologist

Date: February 12, 1968

Approved by: Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 8dSpecies: Ring-necked Pheasant, Bobwhite Quail Data Class: DTitle: Upland Game Bird SurveyPurpose

Same as Procedure 8a.

Procedure

No separate surveys for pheasant and quail will be conducted or are contemplated. Species, dates of observations and numbers will be recorded during routine refuge travels. All personnel report observations to the assistant manager who will record the information on plain sheet paper.

Reliability

Reliability of population data will be low. A systematic sampling procedure cannot be justified at this time.

Manpower and Costs

No additional refuge costs occur.

SIGNATURE PAGE

Procedure 8d Upland Game Bird Survey - Ring-necked pheasant,
Bobwhite Quail

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved by: David J. Brown
David J. Brown
Refuge Manager

Date: February 9, 1968

Approved by: William F. Green
William F. Green
Area Biologist

Date: February 12, 1968

Approved by: _____
Regional Office

Date: _____

Refuge: Necedah

Procedure No. 9

Species: Big Game - Deer

Data Class: CTitle: Deer SurveyPurpose

A secondary objective of the refuge is to maintain big game animal populations at a level consistent with refuge management objectives. The refuge deer population annually provides much public recreation and enjoyment through hunting and wildlife observation. Requests by the public for information about the refuge deer herd are frequent and population data should be available. The need for harvesting excess deer from a population warrants a reliable survey for estimating their abundance.

Procedure

Refuge deer population estimates will be based on density figures derived by the Wisconsin Conservation Department for similar deer habitat in this locality. This information is gathered by personnel of the Meadow Valley Wildlife Area and can be obtained from the manager at Meadow Valley. The Wisconsin Conservation Department establishes figures for the number of deer per unit of habitat based on three surveys:

1. Winter deer yard counts
2. Pellet counts
3. Browse surveys

Density figures will be applied to the acreage of refuge deer habitat (30,000 acres). For example:

1. WCD density figure of (.1 deer/acre)
2. Deer/acre x acres of deer habitat = refuge population (.1 x 30,000 = 3,000)

These population figures will be supplemented by observations made by the refuge staff during routine refuge travels. Record fawn observations on a refuge map showing location and number of young. Summarize at the end of the year. The number of twin fawn observations gives some insight into the condition of deer range.

Fall deer harvest figures from the three refuge deer seasons substantiates population estimates. Accurate harvest figures will be obtained from registration and check stations operated by the Wisconsin Conservation Department.

Report and summarize data in the refuge narrative report and on NR-3. Field observation data and harvest data recorded on plain paper and refuge maps will be filed in the deer section of the refuge files.

Reliability

Reliability of the survey is believed to be good and population estimates are thought to be within 80%. The refuge deer population during periods of maximum use numbers between 2000 and 3000 animals.

Manpower and Costs

No additional refuge costs occur.

SIGNATURE PAGE

Procedure 9 Big Game - Deer

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved: David J. Brown
David J. Brown
Refuge Manager

Date: Feb 9, 1968

Approved: William E. Green
William E. Green
Area Biologist

Date: Feb. 12, 1968

Approved: Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 10

Species: Beaver, Otter, Mink, Muskrat, Weasel, Data Class: D
Opposum, Skunk, Raccoon, Red Fox Gray Fox,
Badger and Coyote

Title: Furbearer SurveyPurpose

Small mammal populations are a part of the refuge fauna and add to the variety of wildlife species which are enjoyed by the public. The presence of some species such as beaver and muskrat create and improve waterfowl habitat and must be considered beneficial. Also, the potential for trapping seasons on beaver, mink and muskrats exists and warrants knowledge of their abundance and trends in population.

Procedure

No separate surveys or censuses for furbearers will be conducted. Estimates of populations will be based on observations made during routine refuge travels. Observations which provide the information for population estimates include:

1. Observation of individual animals (adult and young)
2. Observation of dwellings
 - a. Muskrat - houses and bank runs
 - b. Beaver - lodges, dams
 - c. Other - dens, nests
3. Observations of sign, i.e., tracks, slides, trails, feces, remains of prey species, etc.

Additional information substantiating beaver, muskrat and mink population estimates is obtained from fur harvest figures when refuge trapping is allowed.

All personnel will report observations. Active beaver colonies when located will be plotted on a refuge map to provide information when formulating refuge trapping recommendations.

Record small mammal data on NR-4 and summarize in the narrative report.

Reliability

Reliability of population data is low, and at best is only a crude estimate.

Manpower and Costs

No additional refuge costs occur.

SIGNATURE PAGE

Procedure 10 Purbearers

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved: David J. Brown
David J. Brown
Refuge Manager

Date: Feb. 9, 1968

Approved: William E. Green
William E. Green
Area Biologist

Date: Feb. 12, 1968

Approved: _____
Regional Office

Date: _____

WILDLIFE INVENTORY PROCEDURE

Refuge: Necedah

Procedure No. 11Species: Red, Gray and Fox Squirrels,
Ground Squirrel, Ground Hog,
other Small MammalsData Class: DTitle: Small Mammal SurveyPurpose

Small mammal populations are a part of the refuge fauna and add to the variety of wildlife species which are enjoyed by the public. Some knowledge of their existence is necessary to provide information to the public.

Procedure

No separate surveys or censuses for small mammals will be conducted. Small mammal information will be based on observations made during routine refuge travels. Observations which provide useful information include:

1. Observations of individual animals (adults and young)
2. Observation of dwellings, dens, nests
3. Observation of sign, i.e., tracks, trails, feces, remains of prey species, etc.

Small mammal observations will be reported in the narrative report.

Reliability

Reliability of data will of necessity be low.

Manpower and Costs

No additional refuge costs occur.

SIGNATURE PAGE

Procedure 11 Small Mammals

Prepared by: Howard A. Lipke
Howard A. Lipke
Assistant Refuge Manager

Date: October 10, 1967

Approved: David J. Brown
David J. Brown
Refuge Manager

Date: Feb 9, 1968

Approved: William E. Green
William E. Green
Area Biologist

Date: Feb. 12, 1968

Approved: Harold G. Dell
Regional Office

Date: 3-6-68

All procedures noted.