WILDLIFE INVENTORY PLAN

Horicon National Wildlife Refuge
Mayville, Wisconsin

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WILDLIFE INVENTORY PLAN
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The remainder of the survey units for east central Wisconsin are divided up into lakes or wildlife management areas. These areas include Eldorado Marsh, Grand River Marsh, Lake Puckaway, Rush Lake, Theresa Marsh, Lake Sinissippi, Green Lake, Walkers, Lake Emily, Lake Marias, Fox Lake, Beaver Dam Lake and northwest Rosendale. Sandhill Wildlife Area, Collins Marsh, Pine Island, and Necedah National Wildlife Refuge have been dropped from the survey because of the time required to cover these outlying areas.

D. Equipment

A tally counter for each observer is needed for the census.

E. Inventory Procedures

The inventory is divided up into survey units with no definite census route. The technique or census route used to cover each survey unit is left up to the pilot depending upon roosting areas within each unit on the day of the count. In most cases, these roosting areas do not change significantly so similar routes are flown each week. The count generally starts to the northwest of the refuge at first light and proceeds to the southeast covering Rush Lake, Walker Pond, Green Lake, Lake Puckaway, Grand River Marsh, Little Green Lake, Lake Maria, Lake Emily, and Fox Lake before reaching the refuge. At Horicon refuge, the count starts on the northend of the refuge and proceeds to the south. The exact method of coverage is left up to the pilot depending upon goose concentration and roosting sites.

F. Recordkeeping

Geese counted will be recorded according to the survey unit they are concentrated in or near. These units are listed in Part C. and exhibit 1-A. A copy of each Wisconsin Canada goose census will be kept in the refuge files.

III. Special Conditions

Aerial counts are the only practical method of surveying the geese because of several reasons. First the refuge is not accessible by ground to all areas where geese concentrate and it would be difficult to count without disturbing them to other areas. Secondly, there are a number of nearby lakes and State Wildlife Management Areas used by migrating geese. Since the birds readily move from one area to another

it is desirable to count them with as little of movement as possible. This is most efficient with aerial counts.

IV. Staffpower and costs

Staffpower	96 Staff hours	$ 1800.00
Vehicle	100 Miles	23.00
Administration	15 Staff hours	170.00
Total		$ 1993.00

Exhibit 1-A

Date _____

Wisconsin Canada Goose Census Form

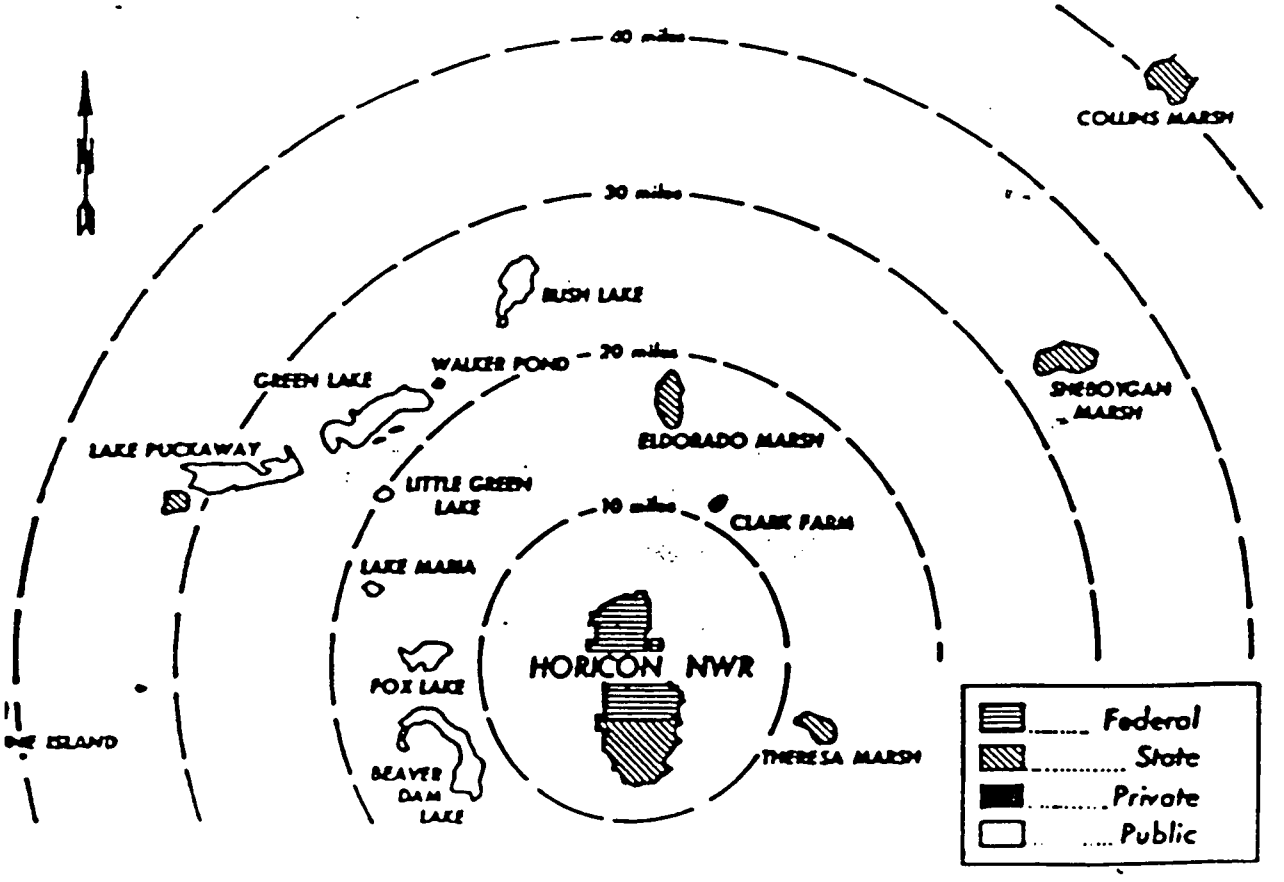
	Canada Geese	Snows & Blues
Horicon NWR		
State Portion		
Peat Land N. 49		
Peat Land S. 49		
N. of Refuge		
S. of Refuge		
E. of Refuge		
W. of Refuge		
Clark Farm (P)		
Horicon Refuge Total		
Eldorado (S)		
Grand River (S)		
Puckoway (P)		
Rush Lake (P)		
Theresa (S)		
Sinissippi (P)		
Green Lake (P)		
Walkers (P)		
Lake Emily (P)		
Lake Marias (P)		
Fox Lake (P)		
Beaver Dam Lake (P)		
N.W. Rosendale (P)		
Other Areas E.C. Wisconsin		
Sub-Total E. C. Wisconsin		
Total Horicon & E.C. Wisconsin		
Sand Hills (S)		
Collins (S)		
Pine Island (S)		
Necedah NWR		
Sub-Total		
Total State Count		

Weather Conditions:

Comments:

Exhibit 1-B

Geographical relationship
of goose concentrations
in east central Wisconsin



Refuge: Horicon National Wildlife Refuge Procedure No: #2

Species: All Refuge Wildlife

Title: Migratory Bird Survey

I. Purpose

This census is utilized to survey all major forms of wildlife using the refuge. This includes waterfowl, and marsh and shorebirds. This includes the species of special emphasis found on the refuge. At Horicon Refuge this would include the Canada goose, mallard, black duck, redhead, canvasback, wood duck, sandhill crane, woodcock and great blue heron.

II. A. Personnel

One person is needed to conduct each wildlife survey.

B. Date, Time, Weather

The survey will be conducted weekly or as needed to determine monthly migratory bird population changes. The surveys will begin in March when spring waterfowl migrants arrive and continue until December or when all fall waterfowl migrants have left.

The road count will begin at 7:30 a.m. and run for approximately four hours or until the route has been completed. The airboat count will begin at approximately 11:00 a.m. and run for about two hours or until the survey is completed. Both counts should be conducted on the same day.

The survey will not be conducted during fog, strong winds, or rainy weather.

C. Survey Units or Census Routes

The wildlife census consists of two census routes, (exhibit 2-A), a road transect and an airboat transect. Each route is approximately twelve miles long. Both census routes for the wildlife survey are the same as those used for the brood survey so the two surveys can be conducted simultaneously.

D. Equipment

The following equipment is needed to conduct the

wildlife survey; binoculars, spotting scope, tally counter, and cassette tape recorder.

E. Inventory Procedure

The road count is conducted using a pickup truck driving along the designated route at 10-15 miles per hour. The vehicle should be stopped only to make positive identification of a wildlife species or to obtain a count on large groups of birds. Wildlife species observed within a predetermined boundary along the road, approximately 1/8 of a mile on either side of the road, are recorded. The exact boundaries for the count are delineated on aerial photos found in the refuge files. If a wildlife species is noted flying, swimming, or walking across one of the transects well ahead of the vehicle and it is identifiable, it is counted.

The following information is recorded on a cassette tape player for wildlife species observed; located by impoundment, species and number. After the survey is completed, the information is recorded on the weekly survey form (exhibit 2-B).

The airboat transects are run after 11:00 a.m. to minimize glare from early morning sun which makes waterbird identification difficult. The six airboat transects, which are the same transects for the pair count, brood count, and wildlife survey, are delineated in detail on aerial photos in the refuge files. the airboat is driven along the transects at approximately 10 mph. Wildlife species observed within 150 feet on either side of the transect line are recorded on a cassette tape recorder. All wildlife species observed within the 300 foot count area are recorded even though they may be more than 150 feet ahead of the boat. If a bird flies across the transect well in front of the airboat and it is identifiable, it is counted. The following information is recorded on a cassette tape player for wildlife species observed; transect number, species, and number of individuals. This information is then recorded on the weekly survey form (exhibit 2-C).

To assist in running the airboat transects the center line of the route is marked with 2" x 2" stakes as needed with 2" x 2" stakes placed 150 feet on either side of the center stake at a limited number of · locations to aid in estimating the 150 foot distances.

F. Recordkeeping

The methods and formulas for this survey were derived from a three year graduate study by Karen West on waterbird inventory procedures for Horicon Refuge. The general formulas used to calculate the total population of each wildlife species using the refuge are as follows:

- airboat count + road count x 8.7 x species correction factor.
- airboat count only x 18.9 x species correction factor.
- road count only x 16.0 x species correction factor.

The species correction factor is used in the formula only during the period of May-August when the aquatic vegetation restricts visibility and while migrants are not using the refuge. During the migration period the road count alone is used to determine wildlife populations and the species correction factor is not used in the formula. The species correction factors are listed in the following table.

Species	Factor
Herons-Egrets	1.6
Coots-Gallinules	4.5
Blackbirds	3.0
Black Terns	4.0 airboat/2.0 road
Teal	6.0
Waterfowl (except teal)	4.0

Correction factors are used only for those species listed above. For those species not listed the population calculation is determined using the formula listed previously omitting the species correction factor.

III. Special Consideration

Both the airboat and road counts are used in the survey during the May through August period to arrive at a reliable species composition figure for the entire refuge. The road count alone is more reliable during the migration periods because of the large number of birds dispersed by the airboat thus significantly affecting the survey. If it is felt that the road count is underestimating migrant populations, the airboat can be utilized to survey high concentration areas on the marsh with no set transect used. The number of birds counted can be used as a reference in determining total refuge populations.

The location of the airboat transect for the May through August period may have to change somewhat from

year to year depending upon water conditions. During low water years, portions of the transects may have to be changed slightly to facilitate airboat travel.

Also, since the waterfowl survey was in the process of refinement at the same time that new staff started at Horicon (fall of 1989), the survey will be continued to be refined until the staff is comfortable with it. Proposed final date is in the beginning of 1992.

IV. Staffpower and Costs

Staffpower	180 staff hours	$ 2,750.00
Vehicle	750 miles	170.00
Airboat	60 hours	900.00
Administration	30 staff hours	335.00
Total		$ 3,975.00

Exhibit 2-A

Road and Airboat Transects

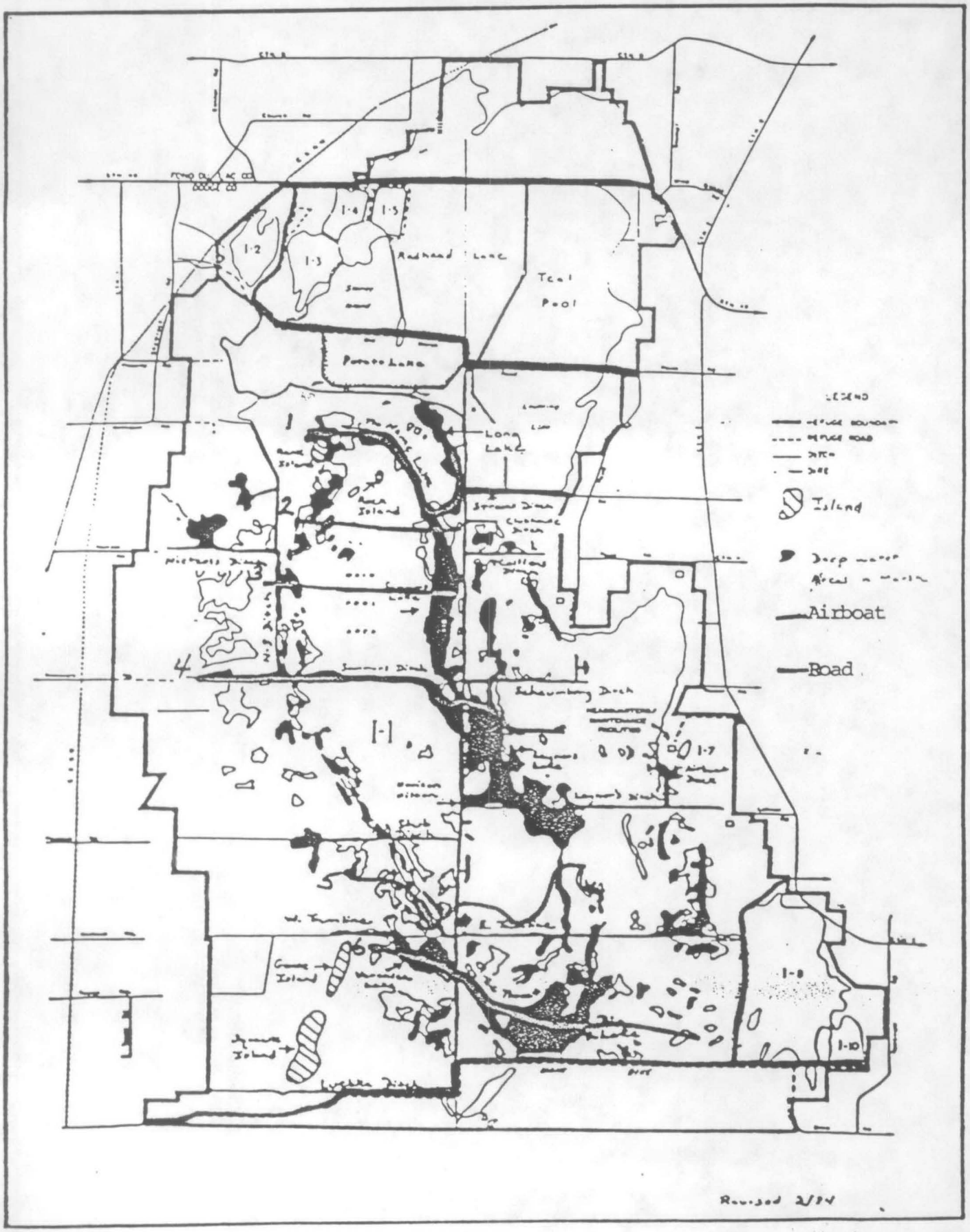


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EXHIBIT 2-B

WILDLIFE SURVEY FORM - ROAD

Page _____

Date _____ Time Began _____ Time End _____ Weather _____

Comments _____

Species	N. Hwy. 49	Teal Pool	Rdhd. Lake	Stny. Island	Pot. Lake	Lhrg. Lake	Strk. Ditch	I-2	I-3	I-4	I-5	I-8	I-9	I-10	Sterr Road	E.Mn. Dike	W.Mn. Dike		TOTAL
Wh. Swan																			
Can. Goose																			
Bl/Sn. Gse																			
Mallard																			
Black																			
Gadwall																			
Pintail																			
GW Teal																			
BW Teal																			
Widgeon																			
Shoveler																			
Wood Duck																			
Redhead																			
Ringneck																			
Canvasback																			
Scaup																			
Goldeneye																			
Bufflehead																			
Ruddy																			
H. Merg.																			
C. Merg.																			
Coot																			
Gallinule																			
PB Grebe																			

WILDLIFE SURVEY FORM - ROAD

Page _____

Date _____ Time Began _____ Time End _____ Weather _____

Comments _____

pecies	N. Hwy. 49	Teal Pool	Rdhd. Lake	Stny. Island	Pot. Lake	Lhrg. Lake	Strk. Ditch	I-2	I-3	I-4	I-5	I-8	I-9	I-10	Sterr Road	E.Mn. Dike	W.Mn. Dike		TOTAL
B Heron																			
rt. Egret																			
CN Heron																			
lack Tern																			
rstr. Trn.																			
H Blckbd.																			
T Hawk																			
arsh Hawk																			
L Hawk																			

te _____ Time Began _____ Time End _____ Weather _____

mments _____

ecies	1	2	3	4	5	6	TOTAL		Species	1	2	3	4	5	6	TOTAL
. Swan									GB Heron							
n. Goose									Grt. Egret							
/Sn Goose									BCN Heron							
llard									Black Tern							
ack									Frstr. Tern							
dwall									YH Blackbird							
ntail									RT Hawk							
Teal									Marsh Hawk							
Teal									RL Hawk							
dgeon																
oveler																
od Duck																
dhead																
ngneck																
nvasback																
aup																
ldeneye																
fflehead																
ddy																
Merg.																
Merg.																
ot																
llinule																
Grebe																

Refuge: Horicon National Wildlife Refuge Procedure No. 3

Species: Ducks, Coots, and Canada geese

Title: Breeding Population Survey

I. Purpose

Waterfowl production is one of the major objectives of Horicon National Wildlife Refuge. This survey is designed to count the breeding population of waterfowl and coots on the refuge and in the area immediately surrounding the refuge. Information obtained from this survey will be later used to calculate annual production.

II. Procedure

A. Personnel

The breeding population survey consists of an aerial survey in which set transects are flown; a ground survey conducted plus a vehicle samples a portion of the refuge available by roads; and an optional airboat survey that is designed to sample a percentage of the marsh transects. The ground and airboat counts are used to "truth" the aerial count and provide visibility rates.

Because of the difficulty in accurately identifying waterfowl from a moving airboat, the airboat count is optional. If time, and more importantly, and an experienced operator with good identification skills is on staff, then the count should be conducted. If an individual with these still is not available, then do not proceed with this survey.

Two counters, plus the pilot, are needed for the aerial survey. The personnel involved in this survey should have experience in low-level survey work and be able to identify waterfowl accurately. In addition, two counters are needed for the ground survey from the vehicle. For the optional airboat survey, two staff members are required if the new airboat are used - an operator and an observer. If an old airboat is used, only one person is needed to conduct the survey.

B. Date, Time, Weather

If at all possible, the breeding population survey should be conducted each spring: once in late April or early May to sample the breeding mallard population, and a second time in mid-May to sample all other

species. As a gauge, the first survey should be initiated before early nesting mallard drakes are commonly observed in post-breeding flocks of three and four birds.

If for some reason only one aerial survey can be flown, then the breeding population survey should be scheduled to later in May.

The aerial and road counts should start at sunrise or as close to sunrise as possible. If the airboat survey is done, the starting time should be mid-morning in order to optimize conditions for identifying waterfowl.

Neither the aerial, ground, or airboat counts should be initiated when winds consistently exceed 15 mph, if adverse weather conditions exist (snow, rain, or excessively rough air), or if visibility is poor for other reasons. The aerial count should be discontinued when winds exceed 25 mph, turbulence is excessive, or if other adverse weather develops.

C. Survey Routes

Three census routes are involved in the breeding population survey. One-half the marsh is sampled during the aerial count, while the results of the road and airboat counts are used in determining the visibility rates. Based on past experience, it appears the road count is biased toward puddle ducks and the airboat count is biased toward diving ducks. If the airboat count is done, then the results of this count and the road counts shall be combined to help determine the visibility rate.

D. Equipment

The following equipment is needed to conduct the breeding population survey:

1. For the aerial crew, a tape recorder and microphone for each of the two observers. A copy of the transect location map should (Exhibit 3-A) also be included.

2. For the ground count, each observer should have a forms and binoculars; a spotting scope should also be in the vehicle. A copy of the transect location map should also be included (Exhibit 3-A).

3. For the airboat count, the operator should

   have a tape recorder and microphone, transect

location map (Exhibit 3-B); binoculars are optional.

Prior to conducting any of these counts, it is important that all participants are familiar with the location of all transects, know the procedures, and can operate all the required equipment.

E. Inventory Procedure

The following method is used for determining what constitutes a breeding pair for waterfowl observed on the three census routes:

1. Pair - male and female of the same species in close association. Recorded as one pair by species.

2. Lone drake - single isolated drake without a visible associated hen (lone hens are not recorded). Recorded as a single male by species. Lone males are considered a pair in the final breeding pair determination.

3. Flocked drakes - two to four drakes in close association recorded as a group of males by species. The number of drakes in the flock is recorded and circled to denote a flock. Each of the males are considered as one pair in the final breeding pair determination.

4. Group - four or more of a mixed sex grouping of the same species in close association which cannot be separated into singles and pairs. A hen and two drakes are recorded as a pair and a lone drake, the lone drake also considered a pair in the breeding pair determination. Five or more flocked drakes are recorded as a flock but not used in the breeding pair determination.

There is an excess of males in most species of waterfowl which may vary from year to year. The extra males of ruddy ducks and scaup are recorded but not included in the breeding population tabulation. These species usually nest after the pair count is made and therefore pairs plus females are used to obtain breeding populations. Lone females, except for ruddy ducks and scaup, also are not used in breeding pair tabulations as it is considered they are represented by lone males counted elsewhere.

Coots are recorded as a total number for each observation. Geese observed on transects are recorded in the same manner as ducks. Only those ducks, coots,

pied-billed grebes, or geese within the transect boundaries are recorded. Unidentified ducks are not recorded. Identified ducks in flight over the transect are recorded if they are associated with the transect (e.g. suspected of flushing ahead of the survey vehicle from within the transect).

The three census routes, road, aerial, and airboat are used to arrive at an air-ground ratio. The air-ground ratio takes into account birds not seen from the air but seen from the ground. The count begins with the aerial crew surveying the road transects associated with the air-ground ratio first. Waterfowl within 1/8 mile of the north side of the plane are recorded by transect. The order in which the transects are surveyed is as follows; Townline Ditch, Main Dike, Ledge Road, Old Marsh Road, and Highway 49. The road count begins when the airplane passes over the road count vehicle at Townline ditch. The airboat transects, numbers 8, 10, 12, and 14, associated with the air-ground ratio are the same as transects 8, 10, 12, and 14 for the aerial survey and therefore surveyed by the aerial crew during the regular aerial survey. No special flights or records other than the ones normally done for the aerial survey are needed.

The aerial count surveys one-half of the marsh habitat. The survey begins with transect one, the northern most transect, and proceeds to the south on east-west transects at one-half mile intervals. A total of seventeen transects are surveyed. The count boundaries for each transect include the area within 1/8 mile of either side of the plane. All coots and ducks within the count boundaries are recorded by transect on tape recorders as they are observed according to the guidelines previously discussed under section E, Inventory Procedures.

The road count is made using a pickup truck giving a higher vantage point over the tall vegetation. The vehicle is driven along the transect route at less than 10 mph. The vehicle should not stop except when large concentrations of waterfowl exist and cannot be counted or identified while moving. All waterfowl within 1/8 mile on the north side of the vehicle are recorded according to the guidelines previously described. This information is recorded on the field breeding pair count form (exhibit 3-C). For the airboat count, all waterfowl within 1/8 mile of either side of the boat are recorded by transect on a tape recorder according to the guidelines for breeding pair determination previously described.

F. Recordkeeping

Information obtained from the three breeding pair counts is recorded on the air-ground count summary sheet (exhibit 3-D). The refuge's waterfowl breeding population estimate will be arrived at by determining and air-ground ratio and breeding population estimate for each species of waterfowl counted on the refuge using all three of the survey transects. The refuges breeding population estimate will be the sum of all of the species breeding population estimates. The following formula will be used to determine species breeding population estimates for the refuge.

$$\frac{A_1 + B_1}{C_1 + D_1} = E_1 \times F_1 = G_1 \times 2 = H_1$$

Ex: A_1 represents mallards, A_2 represents redheads, etc

A_1, A_2, A_3, etc. - Species pair count from road survey

B_1, B_2, B_3, etc. - Species pair count from airboat survey.

C_1, C_2, C_3, etc. - Aerial species pair count of road transects.

D_1, D_2, D_3, etc. - Aerial species pair count of airboat transects.

E_1, E_2, E_3, etc. - Species air-ground ratio.

F_1, F_2, F_3, etc. - Species pair count from aerial survey (50% sample).

G_1, G_2, G_3, etc. - Pairs by species (50% sample).

H_1, H_2, H_3, etc. - Estimated refuge breeding population by species.

The aerial survey census 50% of the refuge so the pairs by species (G) is multiplied by two to arrive at a 100% sample size.

III. Special Conditions

Because of the observability differences between species of waterfowl, an air-ground ratio is calculated for each species thereby producing a more representative refuge waterfowl breeding population. To reduce the margin of error, two ground truthing routes, road and airboat, are utilized to increase the sample size and reduce biases in the survey. The road transects census the ditches and areas close to the shoreline

which are utilized heavily by mallards and blue-winged teal, thus biasing the count towards these two species. The interior of the marsh, which is censused by airboat, is utilized mainly by redheads and ruddy ducks. This route biases the count toward these two species. By conducting census routes of similar length for both the road and airboat counts and combining the figures, these biases can be corrected and a more representative sample of refuge species composition is attained.

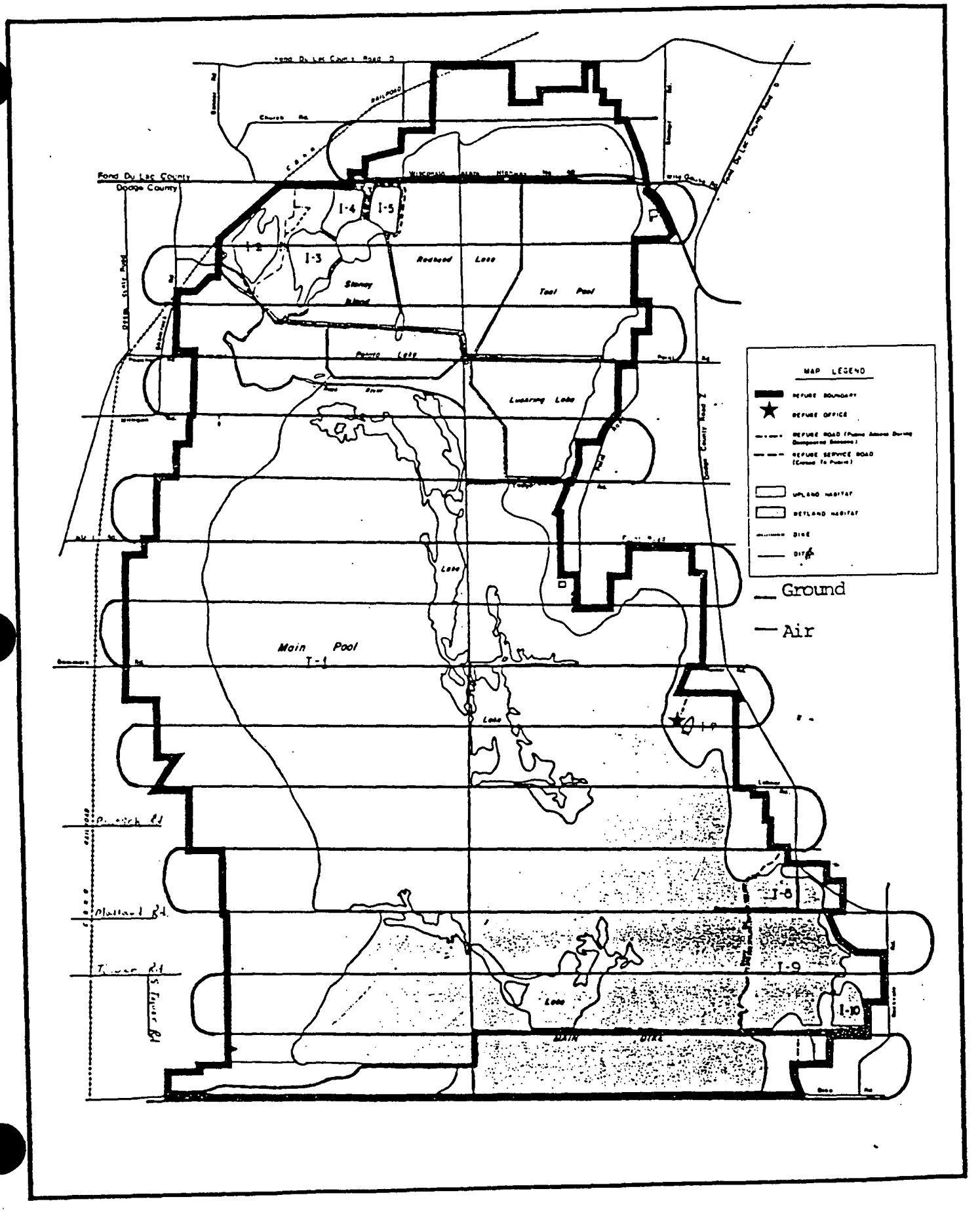
Due to recent staff changes and the fact that this survey is still being modified, amendments will be made.

IV. Staffpower and Costs

Staffpower		
Air	8 staff hours	$ 115.00
Ground	20 staff hours	285.00
Vehicle	60 miles	15.00
Airplane	4 hours	240.00
Airboat	4 hours	60.00
Administration	6 staff hours	85.00
Total		$ 800.00

Exhibit 3-A

Breeding Pair Transects



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DEPARTMENT OF THE INTERIOR

N

SCALE
0 1/2 1 1 1/2 MILES
0 1 2 KILOMETER

JULY 1983

DODGE AND FOND DU LAC COUNTIES, WISCONSIN

Exhibit 3-B Breeding Pair Transects (Airboat)

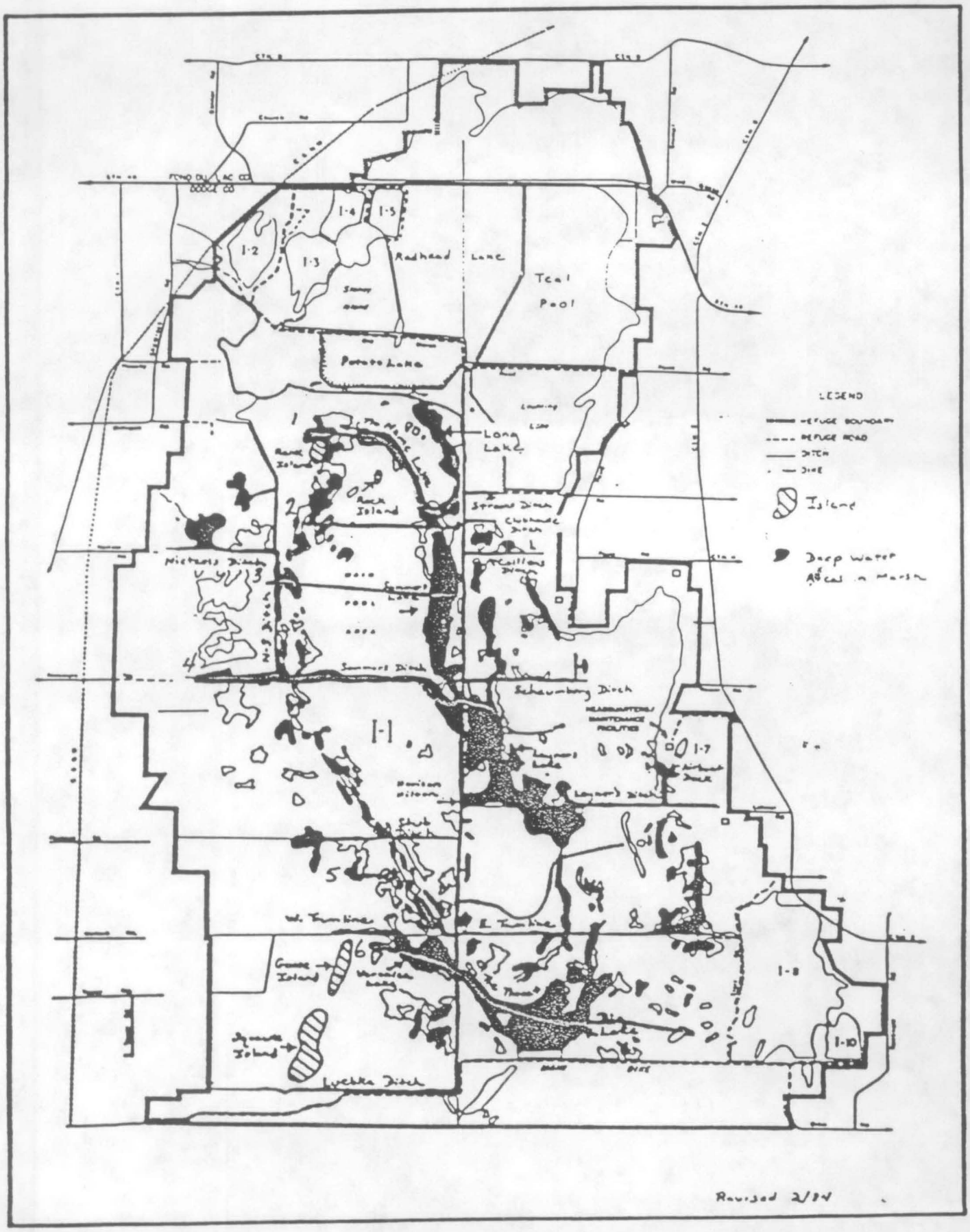

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Exhibit 3-C

BREEDING PAIR COUNTS

Date_____ Weather_____ Observers_____

MALLARD	P	
	P	
	M	
	M	
	F	
BLACK	P	
	M	
	F	
BWT	P	
	P	
	P	
	M	
	M	
	M	
	F	
GWT	P	
	M	
	F	
PINTAIL	P	
	M	
	F	
SHOVELER	P	
	M	
	F	
GADWALL	P	
	M	
	F	
BALDPATE	P	
	M	
	F	
WOOD DUCK	P	
	M	
	F	
RUDDY	P	
	M	
	F	
REDHEAD	P	
	M	
	F	
SCAUP	P	
	M	
	F	
RINGNECK	P	
	M	
	F	
BUFFLEHEAD	P	
	M	
	F	
UNIDENTIFIED		

Exhibit 3-D

Air-Ground Count Summary

Date _____ Weather _____ Observers (Air) _____
(Ground) _____

	A Pairs Ground Cnt. No.	B Pairs Airboat Count	A & B	Percent Species Comp.	Percent Species Comp.	X	Total Refuge Pairs	=	Total estimated Breeding Pairs by Species
Mallard						X		=	
Black duck						X		=	
Gadwall						X		=	
Pintail						X		=	
GWT						X		=	
BWT						X		=	
Widgeon						X		=	
Shoveler						X		=	
Wood Duck						X		=	
Redhead						X		=	
Ringneck duck						X		=	
Scaup						X		=	
Ruddy duck						X		=	
Unknown						X		=	
Other						X		=	
Total						X		=	
Coot						X		=	
Gallinule						X		=	

$$\frac{\text{(Pairs on ground/No.)}}{\text{(Pairs in Air/No.)}} = \text{(Air-ground ratio)}$$

(50% Air count) X 2 X (Air-ground ratio) = (Total estimated breeding pairs on refuge)

Refuge: Horicon National Wildlife Refuge Procedure No.: #4

Species: Waterfowl

Title: Brood Survey

I. Purpose

Waterfowl production is one of the main objectives of the refuge. The brood survey is designed to measure the overall waterfowl production by species for the refuge. This includes mallards and redheads, which are special recognition species.

II. Procedure

A. Personnel

One person could conduct the brood survey, however, the survey could be conducted more efficiently with three to five people.

B. Date, Time, Weather

Brood counts will be conducted after all or most waterfowl nests have hatched and before any early hatched broods have started flying. At Horicon the last week in June or the first week in July would be the optimal time period. the observation periods will be the first two hours of daylight starting approximately one-half hour before sunrise and/or the last hour before dark starting approximately fifteen minutes before sunset. Whenever possible, the brood counts will be conducted during the morning period using the evening count period only when additional counts are needed for the brood survey. Brood counts will not be conducted during fog, strong winds (7-10 mph) or rainy weather.

C. Survey Units or Census Routes

The brood count will be conducted through quiet observation points. A sufficient number of quiet observation points will be setup around or within each refuge impoundment to survey at least ten percent of the available waterfowl habitat within the impoundment. The observation points should be situated so that as much marsh acreage (50-100 acres) as possible can be observed from each point so as to limit the number of observation points necessary to complete the survey. Approximately fifteen to twenty-five observation points will be needed to complete the survey. Observation

points may change from year to year depending on habitat conditions and water levels. Acreages of waterfowl habitat within each impoundment can be determined from tables relating water levels to acres flooded in the refuge files.

D. Equipment

The following equipment is needed to conduct the brood survey; binoculars, spotting scope, pickup truck, duckling classification chart, and data sheets.

E. Inventory Procedure

The inventory procedure consists of quiet observation from a predetermined ground or vehicle observation point that will have limited waterfowl disturbance in the area being observed. At each observation point, all broods including coots and pied-billed grebes, will be tabulated according to species, age, (except coots and grebes) and number of young during a thirty-five minute observation period. After the thirty-five minute observation period, the observer will proceed to the next observation point as quietly as possible reducing waterfowl disturbance at the next observation point as much as possible. The same information as was recorded at the previous point will be tabulated at the new observation point for a thirty-five minute period. The observer will then proceed to the next observation point covering as many areas as possible within the daily time frame established for the survey. The area observed at each observation point will be marked on a map and the acreage determined at the completion of the survey. Repeat observation of broods at an observation point will be noted and counted as one brood in the final tabulation.

F. Recordkeeping

The number of broods by species will be determined per acre of observed habitat for each refuge impoundment. This figure will then be extrapolated to cover the entire impoundment providing total brood numbers by species for each refuge impoundment.

Production by impoundment will be determined by multiplying the average class III brood size of each species times the total number of broods of that species calculated for the impoundment. The average class III brood size for each species will be calculated from all class III broods of the species observed during the survey. Total refuge production by species would be the sum of all duckling of each

species produced in each impoundment.

III. Special Considerations

Portions of the Main Pool can be surveyed through quiet observation using an airboat however, special care must be taken to reduce disturbance to waterfowl using the area to be surveyed. Arriving at the observation point before daylight and extending the observation period to forty-five minutes may make up for the initial disturbance caused by the airboat. Extending the observation period will not affect the results as the intent of the survey is to observe all broods using a particular observation area. Surveying the interior of the marsh would provide more reliable information on redheads and ruddy ducks and reduce the number of observation points necessary to complete the survey because of the larger acreages that could be observed from a single point.

This survey technique has not been field tested on the refuge. It is based on two research projects using similar techniques in Michigan and Maine. Good results were received using this method for these two projects. An alternative and/or check to this survey would be utilizing a helicopter flying the pair count transects. This technique would survey fifty percent of the refuge and assume that all broods within the survey area are seen. Finding a helicopter service within the vicinity of the refuge qualified to transport refuge personnel and rental costs may be a problem to this alternative.

IV. Staffpower and Costs

Staffpower	15 staff hours	$ 215.00
Vehicle	100 miles	23.00
Airboat	5 hours	75.00
Administration	10 staff hours	143.00
Total		$ 456.00

Refuge: Horicon National Wildlife Refuge Procedure No.: #5

Species: Sora
Virginia Rail
King Rail
American Bittern
Least Bittern
Sedge Wren
Marsh Wren
Red-winged Blackbird
Yellow Headed Blackbird

Title: Playback Call Survey

I. Purpose

This survey is utilized to arrive at a population index for inconspicuous marsh birds. The index can be used to evaluate population fluctuations and habitat changes of the refuge.

II. Procedure

A. Personnel

One person is needed to conduct the survey.

B. Date, Time Weather

The survey will begin the last week of April and continue on a weekly basis until the last week of June or until the response from rails drops off for two consecutive weeks. The surveys will begin a 7:30 a.m. and will continue until the survey has been completed, which will take approximately four hours. The survey will not be conducted on days of high winds (>15 mph), rain, or fog.

C. Survey Units or Census Route

Survey units consist of eighteen semicircular, one hectare (2.47 acres) plots set-up along Old Marsh Road, Sterr Road, and the Main Dike. A colored flag will be placed along the road marking the center of each plot with two more flags of another color placed along the road shoulder at 80 meters (262 feet) on each side of the center flag. These flags mark the outside boundary of the semicircular plot. The plot will extend in a semicircle out into the marsh on only one side of the road. If possible, plots should not be established where ditches will be contained within the plot. The

eighteen semicircular plots will be set up in the following habitats; five plots in dry cattail (no water present), five plots in medium water depth cattail (water depth less than one foot), five plots in deep water cattail (water depth greater than one foot), two plots in carex, and one plot in burreed. The location of these plots may change from year to year depending upon habitat and water conditions.

D. Equipment

A portable cassette tape player will be needed to playback the calls.

E. Inventory Procedure

A cassette recording of calls is used to elicit responses from both sexes of rails and from males of bitterns and wrens. The playback cassette recordings are set up with two minutes of blank tape followed by three sequences of each species' calls with a five to ten second pause separating difference species. Two minutes of blank tape follows with a signal ending the count for that plot.

At each plot the following procedure is used for recording the number of individual birds:

1. Stop the vehicle at the center of the plot's baseline marked with a colored flag.

2. Set the tape player at the marker and set to play.

3. Before the playback begins (two minutes) record the initial calls of each individual bird (rails, bitterns or wrens) heard within the plot. Also record any of these bird species which may be seen. Also record all male red-winged blackbirds and yellow-headed blackbirds seen within the semicircular plot during the first thirty seconds of the stop.

4. During the playback (three minutes) record the initial call of each individual bird (rails, bitterns, or wrens) heard within the plot at any time during the three minutes playback period.

5. After playback (two minutes) record each individual bird heard calling within the plot.

6. Rewind the tape and proceed to the next plot where the procedure is repeated.

F. Recordkeeping

Results of each weekly survey is recorded on the form shown in exhibit 5-A. Codes used on the form are listed below.

Habitat Type

- L - Dry cattail
- F - Medium water cattail
- G - Deep water cattail
- Q - Burreed
- Z - Carex

Species Codes

- KR - King rail
- SR - Sora
- VR - Virginia rail
- MW - Marsh wren
- SW - Sedge wren
- LB - Least bittern
- AB - American bittern
- RWBB - Red-winged blackbird
- YHBB - Yellow-headed blackbird

Call

- B - Before playback
- D - During playback
- A - After playback

The following procedure is used for recording birds heard during the seven minute census at each plot.

1. Male red-winged and yellow-headed blackbirds are listed as either RWBB or YHBB in the species code column with the total number of each species counted within the plot listed in the number column.

2. Each individual rail, bittern, or wren calling in each plot is listed only once in the species code column with the proper code or codes listed in the call column. Additional birds of the same species calling in the same plot are listed on another line.

The plot number and habitat type, which may change during the survey period, are recorded immediately upon arriving at the plot so that all birds heard or seen are listed as to plot number and habitat type. At the

completion of the survey period, bird numbers are expressed as total individuals seen or heard. This would be the total of the peak number of each species heard or seen at each plot. A population density index (total individuals heard on plot/ha of habitat) is calculated for each species during the first four weeks (always consecutive) of highest numbers heard.

Population density indices of sora, Virginia rails, marsh wrens, red-winged blackbirds, and yellow headed blackbirds can be used to calculate an index to the total population of each species at the refuge. The area of each habitat type censused on the call survey was calculated from 1981 infrared photos. Overlays of each habitat type for each photo were delineated. By using these overlays, percent change of each habitat type from year to year can be determined. Basing the population index on the total habitat available by acre a population estimate can be arrived at.

III. Special Consideration

Volunteers will be solicited to run the weekly surveys to reduce the amount of staff time spent on this survey.

The counts for bitterns might be improved by semiweekly counts after initial calls are heard. Peak calling occurs the week of, or after initial calls are heard. Calling drops off sharply after this period.

Bulrush habitat are not included in the survey because no dense stands (greater than one hectare, 2.47 acres) of bulrush exist along the road sides. If it is felt that it is important to census this habitat type two plots will have to be set up in the interior of the marsh and censused by boat.

IV. Staffpower and Costs

Staffpower	40 staff hours (4 hr/10 surveys)	$ 571.00
Vehicle	800 miles	180.00
Administration	10 staff hours	143.00
Total		$ 894.00

Exhibit 5-A

Playback Call Survey

Date_____

Time Begin_____

Time End_____

Plot	Habitat Type	Species Code	Number	Call B,D,or A	Comments

Refuge: Horicon National Wildlife Refuge Procedure No.: #6

Species: Black Tern
Forster's Tern
Black-crowned Night Heron
Green Heron
Double-crested Cormorant

Type: Colonial Bird Nesting Survey

I. Purpose

The purpose of this survey is to monitor changes in the colonial bird nesting species on the refuge. The double-crested cormorant was on the State of Wisconsin's threatened species list and was just recently delisted so is a species of special interest. Also the Forster's tern is on the State's endangered species list. Forster's tern populations are decreasing in the State because of water pollution in some of their traditional nesting areas.

II. Procedure

A. Personnel

One person is needed at various times of the summer to accurately census colonial nesting birds.

B. Date, Time, Weather

The survey is conducted during the peak of the nesting season which is normally in early June. The survey can be conducted during any part of the day but daylight hours may be the most desirable. The survey should be conducted during sunny warm weather to minimize losses of young and eggs from exposure should the adults be frightened off their nest.

C. Survey Units or Census Route

No survey units or census routes have been established. Marsh areas are randomly searched for nesting colonies.

D. Equipment

The marsh is searched for nesting colonies with an airboat. A spotting scope with a homemade bracket for mounting on the airboat is needed to census the double-crested cormorant rookery. Binoculars are useful for censusing the other colonial nesting birds.

E. Inventory Procedure

Black terns and Forester's terns construct their nests on mudflats, muskrat houses, or at the base of bulrush or cattail stands. Colonies can be found by randomly searching the marsh paying particular attention to preferred habitat areas. Colony locations can be determined by watching the terns behavior. Terns within a colony will defend the nesting site by mobbing and/or diving at the airboat while terns feeding within the marsh will ignore the airboat.

Black-crowned night herons and green heron rookeries can be found searching scrub willow areas within the marsh for nests or by following the herons back to their rookery from feeding flights. Generally, large concentrations of herons will be seen within the vicinity of a rookery.

Double-crested cormorant rookeries can easily be found by searching the tall mature trees located within the marsh for nests.

The best means to obtain breeding populations of colonial birds on the refuge is to make a total bird count during the peak of the nesting season (early June) at the nest site. Total nests can also be estimated by a direct count of all nests or by establishing a bird:nest ratio in an isolated section of the colony and applying it to the entire colony. Reproductive success can be estimated by counting the birds present in the colony near the end of the nesting season (mid-July).

F. Recordkeeping

Data obtained from surveys should be recorded on standardized forms to ensure comparability with other colonies and with future censuses. The Colonial Bird Register at Cornell University has developed a form (exhibit 6-A) which is used for computerized collection of waterbirds nesting in the United States. One copy of the completed forms should be kept in the refuge files with the original sent to the Colonial Bird Register, 159 Sapsucker Woods Road, Ithaca, New York, 14850.

IV. Staffpower Costs

Staffhours	10 staff hours	$ 100.00
Vehicle	40 miles	8.00
Airboat	8 hours ($15/hr)	120.00
Administration	4 staff hours	40.00
Total		$ 268.00

Exhibit 6-A

Mo. Day	Time Started	Latitude	Longitude	Colony Size (ha)

Visit No. _____ to this colony for current nesting season.

Colony Name:

Subcolony

SPECIES Common or Scientific Name	Total Population	Total Active Nests	Nesting Stage	Census Technique

Nearest Town:

County:

State/Province/Territory:

Country:

DISTURBANCE		GENERAL COLONY HABITAT
Human Technology	☐	
Human Habitation	☐	
Human Recreation	☐	_____
Vehicular Use	☐	
Scientific Invest.	☐	

OBSERVER: Last name, two initials.

OBSERVER'S ADDRESS:

LAND OWNER'S NAME AND ADDRESS:

REMARKS:

GENERAL COLONY SKETCH:

Refuge: Horicon National Wildlife Refuge Procedure No.: #7

Species: Waterfowl
Eagle

Title: Mid-Winter Waterfowl and Eagle Survey

I. Purpose

The objectives of this survey are to measure habitat use and to determine the number and distribution of waterfowl and eagles during the winter months.

II. Procedure

A. Personnel

One person is needed to conduct the survey.

B. Date, Time, Weather

The survey is normally conducted around January 5. The specific date is furnished annually by the State coordinator, who is located at the Wildlife Assistance Office in Madison, Wisconsin. The survey can be conducted anytime during working hours when weather conditions permit. The survey should not be conducted during inclement weather (snow or high winds) which would significantly affect waterfowl or eagle behavior or observer visibility.

C. Survey Unit or Census Rout

The entire refuge and immediate vicinity of the refuge is censused. No specific census routes are established.

D. Equipment

Equipment needed for the survey includes binoculars and spotting scopes. If large concentrations of waterfowl are present, a tally counter may also be useful.

E. Inventory Procedure

Waterfowl and eagles are counted only in the area assigned by the coordinator. Waterfowl numbers are reported to the nearest hundred birds on the Waterfowl Survey Form and all eagle observations on Midwinter Eagle Inventory Form C (forms provided by Wildlife Assistance Office). Both forms will be completed even

if no birds are observed.

F. Recordkeeping

All information obtained from the mid-winter survey will be recorded on the Waterfowl Survey Form and the Midwinter Eagle Inventory, From C, with the originals submitted to the State coordinator and one copy of each retained for the refuge files.

III. Special Considerations

The areas to be censused will vary from year to year depending upon winter weather conditions and the Wisconsin Department of Natural Resources participation in the survey.

IV. Staffpower and Costs

Staffpower	3 staff hours	$ 43.00
Vehicle	40 miles	9.00
Administration	2 staff hours	29.00
Total		81.00

Refuge: Horicon National Wildlife Refuge Procedure No.: #8

Species: Birds

Type: Christmas Bird Count

I. Purpose

This general bird survey is conducted annually in cooperation with National Audubon Society's nationwide Christmas Bird Census. This census is important in order to document the status of songbirds, raptors, waterfowl, etc. on a continuous basis. Population trends can be related to weather conditions, habitat conditions, environmental hazards, etc.

II. Procedure

National Audubon Society (950 Third Avenue, New York, New York) coordinates the Christmas Bird Count nationwide. The refuge has been assigned a count area of the standard size - a 15 mile diameter circle. This count area does not overlap any neighboring circles.

A. Personnel

A refuge manager is assigned the responsibility of bird count coordinator. The number of actual participants varies from year to year as the majority of them are area birdwatchers volunteering their time. Past counts have included anywhere from four to twenty-five bird-watchers. Members of area Audubon Clubs (Kettle Moraine, Fond du Lac and Oconomowoc) normally participate each year. The number of participants determines how the count area is to be divided up, i.e. half, thirds, quarters, etc. All participants are required to pay a fee for this count, payable to National Audubon Society ($2.00 in 1983).

B. Date, Time, Weather

Christmas Bird Count dates are determined by the National Audubon Society and include a two week period from the latter part of December to early January. The count date for Horicon is generally the first day of the count period, falling on a Saturday. Maintaining this traditional Saturday has made the count an annual event for a number of area birdwatchers.

A requirement of this bird survey is that it occur over an eight hour period. Hours of daylight in December restrict the count from between 7:30 a.m. to 4:30 p.m.

Weather conditions that are unacceptable and would postpone the count include a heavy snowstorm or torrential rains. The two-week count period provides the flexibility to reschedule the survey.

C. Survey Unit

The refuge has been assigned a 15-mile diameter circle count area by National Audubon Society (exhibit 8-A). The description of the area reads as follows: the center of the 15-mile diameter circle is the intersection of the Main Ditch and Main Dike. This circle has been delineated on a county map. The number of participants determines if the count area is to be divided in half, thirds, quarters, etc., depending on the number of small parties of birdwatchers that are formed.

D. Equipment

Binoculars, field guide, report form, pencil, cold weather clothing and a vehicle are necessary. The refuge will provide a county map with the count area delineated, gate keys for access into the refuge, report forms, bird lists and return envelopes for each group.

E. Inventory Procedure

Refuge coordinator sends out a letter of invitation to all past participants during the third week of November.

All participants meet at refuge headquarters at 7:00 a.m. on the count day for brief orientation and group assignments. The individuals normally come in small groups and are assigned to portions of the count area in this manner. Usually 2 to 6 people are joined as a group. If there are four or less the entire group may count together. With greater than four there may be two or three groups formed. it is a loosely structured count in that respect. The only requirement is that the entire count area is covered without overlap. A participation fee is collected at this orientation meeting, which is submitted to National Audubon Society to offset costs for printing the census report.

Participants use a combination of walking and driving to conduct the census, recording number of hours and miles the group has driven a vehicle and the number of hours and miles the group has walked.

F. Recordkeeping

Information to be recorded includes all bird species observed and/or heard in the assigned count area during the eight-hour period. Total numbers of individuals for each species are also recorded. Uncommon and rare species must be well documented by writing up the supporting details of the sighting (exhibit 8-B). Each group is responsible for turning in the completed count report form (exhibit 8-C) to the refuge coordinator in person or by mail within several days of the count.

A final report is prepared by the refuge coordinator on the standard National Audubon Society report form (exhibit 8-D). In addition, a second report is submitted to the Wisconsin Society of Ornithology (WSO) on a special form provided by the WSO (exhibit 8-C). A copy of each report is placed in the refuge files as well. Each participant receives a copy of the final WSO report along with a letter of thanks from the refuge coordinator.

III. Special Considerations

Places to cover on Christmas Bird Count within 15-mile diameter count area:

Open water habitat (waterfowl, kingfisher)

- -Radial gate on Main Dike
- -Springbrook Farm on County B west of Burnett
- -Rock River DNR gates in Horicon off S. Hubbard St.
- -Rock River below sewer plant in Mayville

Conifer habitat (winter finches, owls, etc.)

- -Small white pine plantation at east end of Main Dike near I-10
- -Mayville cemetery (off Hwy 67, south of town)
- -Horicon cemetery (South Main St.)
- -DNR property on Swan Road of Hwy 26

Hardwood habitat (woodpeckers, owls, cardinals, nuthatch)

- -Squawk Island at west end of Main Dike
- -Woods an shrubbery at DNR headquarters
- -Brummonds Woods
- -Stoney Island
- -Northern Road along Rock River south of Main Dike

Grassland habitat (pheasants, goldfinches, sparrows)

- Switchgrass stands, i.e. headquarters, Milligan, Neitzel Roads

Marsh habitat

- Teal Pool off Highway 49 (short-eared owls, snow geese, if geese are present)
- East end of the Old Marsh Road

IV. Staffpower and Costs

Refuge coordinator	8 hours	$ 114.00
Vehicle	200 miles	45.00
Administration	10 hours	143.00
Total		$ 302.00

Exhibit 8-A

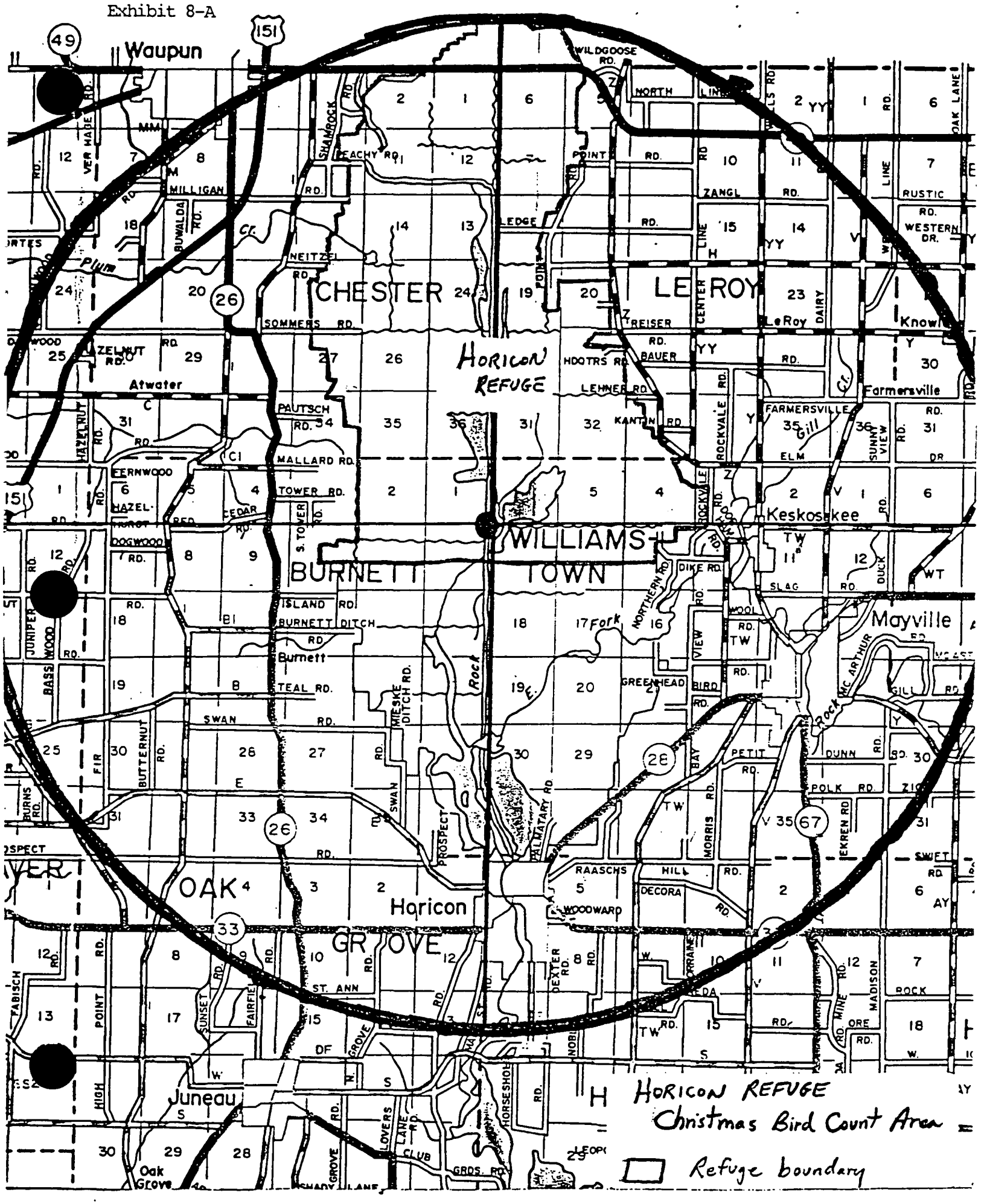

Waupun
CHESTER
LE ROY
HORICON REFUGE
Atwater
Farmersville
Keskosekee
WILLIAMS TOWN
BURNETT
Mayville
Burnett
OAK GROVE
Horicon
Juneau
Oak Grove
HORICON REFUGE
Christmas Bird Count Area
Refuge boundary

Exhibit 8-B

WISCONSIN SOCIETY FOR ORNITHOLOGY
EXCEPTIONAL RECORD DOCUMENTATION FORM

1. SPECIES _____

2. DATE _____ 3. TIME BIRD SEEN _____ to _____

4. LOCATION _____

5. NARRATIVE ACCOUNT OF SIGHTING In your own words describe the actual event. Be certain to incorporate into your narrative a complete description of distinguishing features that you observed including shape, size, body markings--head, bill, eye, legs, wings, tail, etc., behavior in flight, position and behavior when perched and other movements. Your description should include identification marks recorded in the field, not after consulting a bird book. (Remember this part, if approved by the W.S.O. Records Committee, will be published in the "By The Wayside" column of the Passenger Pigeon.)

6. VOICE DESCRIPTION (if heard) _____

_____

7. HABITAT _____

8. COMPARISON WITH SIMILAR APPEARING SPECIES (include distinguishing points)

_____

_____

_____

_____

9. DISTANCE _____ 10. OPTICAL EQUIPMENT _____

11. WEATHER (sky condition, wind, visibility) _____

_____

12. PREVIOUS EXPERIENCE WITH SPECIES _____

_____

13. OTHER MEMBERS OF OBSERVATION PARTY _____

_____

_____

14. OTHER OBSERVERS KNOWN TO HAVE INDEPENDENTLY IDENTIFIED THIS BIRD

NAME	DATE

15. BOOKS, ILLUSTRATIONS, ADVICE CONSULTED _____

_____

_____

16. SIGNATURE _____ DATE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

This form should be used with all rare and accidental (capitalized and unlisted) species on the seasonal report forms, plus sightings representing unusual arrival/departure dates.

Send to:
Daryl D. Tessen
Associate Editor
2 Pioneer Park Place
Elgin, Illinois 60120

Exhibit 8-C

WISCONSIN SOCIETY FOR ORNITHOLOGY

CHRISTMAS BIRD COUNT REPORT FORM

Name of Count:_____ Date:_____ Hours:_____A.M. to_____P.M.

Center of 15-mile diameter circle:_____

County:_____

Sky Conditions A.M.:_____ P.M.:_____ Snow Cover (in.)_____

Wind Direction:_____ Wind Velocity (mph):_____

Temperature °F:_____ to _____
low high

Number of observers watching feeders from a house:_____ (limit of one per house)

Number of observers in the field:_____ Number of parties in the field:_____

Total party hours:_____(On foot:_____: By car:_____) Hours Owl listening:_____

Total party miles:_____(On foot:_____: By car:_____) Miles Owl listening:_____

(A party consists of one or more observers working together in the field. Total party hours is the sum of hours worked by the various parties in the field and does not include observation time by feeder observers or hours spent listening for owls.)

Name and Address of compiler:_____

_____

Observers in the field (list alphabetically) and only at feeders (mark with asterisk):

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

List the number of each species observed on the other side.

Record the number of each species seen or heard on the day of the count. Indicate with an "X" (no numbers) any species seen or heard within 3 days before or after the count day but not on the count day.

COMMON BIRDS

Canada Goose	____	Belted Kingfisher	____	European Starling	____
American Black Duck	____	Red-head. Woodpecker	____	Northern Cardinal	____
Mallard	____	Red-bel. Woodpecker	____	Amer. Tree Sparrow	____
Common Goldeneye	____	Downy Woodpecker	____	Song Sparrow	____
Common Merganser	____	Hairy Woodpecker	____	Swamp Sparrow	____
Bald Eagle	____	Northern Flicker	____	White-thr. Sparrow	____
Northern Harrier	____	Pileated Woodpecker	____	Dark-eyed Junco	____
Sharp-shinned Hawk	____	Horned Lark	____	Snow Bunting	____
Red-tailed Hawk	____	Blue Jay	____	Red-wing. Blackbird	____
Rough-legged Hawk	____	American Crow	____	Common Grackle	____
American Kestrel	____	Common Raven	____	Brown-h. Cowbird	____
Gray Partridge	____	Black-c. Chickadee	____	Pine Grosbeak	____
Ring-n. Pheasant	____	Tufted Titmouse	____	Purple Finch	____
Ruffed Grouse	____	Red-br. Nuthatch	____	Red Crossbill	____
Herring Gull	____	White-br. Nuthatch	____	Common Redpoll	____
Rock Dove	____	Brown Creeper	____	Pine Siskin	____
Mourning Dove	____	Golden-cr. Kinglet	____	American Goldfinch	____
E. Screech Owl	____	American Robin	____	Evening Grosbeak	____
Great Horned Owl	____	Cedar Waxwing	____	House Sparrow	____
Barred Owl	____	Northern Shrike	____		

UNCOMMON BIRDS

Pied-billed Grebe	____	Ruddy Duck	____	Brown Thrasher	____
Great Blue Heron	____	Cooper's Hawk	____	Bohemian Waxwing	____
Tundra Swan	____	Northern Goshawk	____	Yel.-rumped Warbler	____
Mute Swan	____	Red-shouldered Hawk	____	Rufous-sided Towhee	____
Snow Goose	____	Northern Bobwhite	____	Field Sparrow	____
Wood Duck	____	American Coot	____	Fox Sparrow	____
Green-winged Teal	____	Killdeer	____	Wh.-crowned Sparrow*	____
Northern Pintail	____	Common Snipe	____	Lapland Longspur	____
Northern Shoveler	____	Bonaparte's Gull	____	Meadowlark spp.	____
Gadwall	____	Glaucous Gull	____	Rusty Blackbird	____
American Wigeon	____	Ring-billed Gull	____	Brewer's Blackbird*	____
Canvasback	____	Snowy Owl	____	White-w. Crossbill	____
Redhead	____	Long-eared Owl	____	----------	____
Ring-necked Duck	____	Short-eared Owl	____	----------	____
Greater Scaup*	____	Yel.-bel. Sapsucker	____	----------	____
Lesser Scaup*	____	Gray Jay	____	----------	____
Oldsquaw	____	Boreal Chickadee	____	----------	____
Bufflehead	____	Winter Wren	____	----------	____
Hooded Merganser	____	Ruby Cr. Kinglet	____	----------	____
Red-br. Merganser	____	Hermit Thrush*	____	----------	____

Total Species (on day of count):_____ Total Individuals:_____

Provide documentation for species marked with an asterisk or not listed above. Document only Greater Scaup away from the Great Lakes and Lesser Scaup on the Great Lakes. Record the correct species for meadowlarks identified by voice.

Return completed form by January 10 to: Daryl Tessen
2 Pioneer Park Place
Elgin, Il. 60120

Exhibit 8-D

Total, 34 species (plus ____ additional races, ____ forms, ____ hybrids, ____ intergrades, ____ exotics); 2010 individuals

(In count area count week but not seen count day: ____
[3 days before and 3 days after count day]

[Below list participants alphabetically. No addresses except compiler's, which follows dash after compiler's name.]

Sue Andrews, Bob Armstrong, John Braasted, Bruce Braden, Ron Gutschow, Karen Hale, Nancy Hall, Marlin Johnson, Gladis Kaufman, Craig Schwartz, Dave Seloff, Dottie Thompson (compiler Rt. 2, Mayville, Wisconsin 53050), Cindy Weix, Dave Winters

(additional names on attached sheet)

BEFORE MAILING PLEASE RECHECK to make sure (1) date is correct (2) totals for habitat coverage, party miles and hours, no. of observers, species and individuals are correct(3) participants are listed in alphabetical order (4) compiler's address in correct place (5) details for all unusual observations are submitted on a separate sheet.
THANKS FOR YOUR COOPERATION.

Return to American Birds, 950 Third Avenue, New York, N.Y. 10022
DEADLINE JANUARY 15, 1984.

Compiler's Name Dottie Thompson
Telephone 414 387 2658

DO NOT fill out this form until you have carefully read the ne enclosed instructions. Print in ink or type; use no pencil. Leav untouched species not seen. In multi-choice weather sectio below, DRAW LINE THROUGH inappropriate words, leav others untouched.

Horicon National Wildlife Refu
(Count name, state or province) Wisc

43 ° 32 ' N 88 ° 39 ' W, center Intersecti of Main Ditch and Main Dike, as described 1977

as described 1977
your description published

elevation 850 (low ↓) to 1035 (high ↑) ft.

habitat coverage: farmland 30%, deciduous forest 30%, marsh 20%, cont windbreaks 10%, residential 10%

as described 19
your description published

½ Dec. 17 ; 7:30 a.m. to 4:30 p.m.

½ Jan. ____ ; ____ a.m. to ____ p.m.

A.M.: clear [redacted].

P.M.: clear [redacted].

Temp. -2 ° to 6 ° F.

Wind NW (direction ↑), 0-8 (velocity ↑) m.p.h.

Snow cover 4 to 8 in. Fresh water [redacted] mos open frozen. [redacted].

Wild food crop [redacted] good [redacted].

Fourteen (spell out total ↑) observers, 14 (incl. feeder watchers) in 5 parties, 0 at feeders. Total party-hours, 32 (10 on foot, 22 by car ____) plus 0 hours at feeders, 0 owling; to party-miles, 151.5 (9.5 on foot, 142 by c

plus 0 miles owling.

Olive Sparrow		
Green-tailed Towhee		
Rufous-sided Towhee		
Rufous-sided (Spotted) Towhee		
Rufous-sided (E.) Towhee		
Brown Towhee		
Abert's Towhee		
White-collared Seedeater		
Bachman's Sparrow		
Cassin's Sparrow		
Rufous-winged Sparrow		
Rufous-crowned Sparrow		
Aimophila, sp.		
Am. Tree Sparrow	209	
Chipping Sparrow		
Clay-colored Sparrow		
Brewer's Sparrow		
Field Sparrow		
Black-chinned Sparrow		
Vesper Sparrow		
Lark Sparrow		
Black-throated Sparrow		
Sage Sparrow		
Lark Bunting		
Savannah Sparrow		
(Savannah) Sparrow		
Savannah (Ipswich) Sparrow		
Savannah (Belding's) Sparrow		
Savannah (Large-billed) Sparrow		
Baird's Sparrow		
Grasshopper Sparrow		
Henslow's Sparrow		
Le Conte's Sparrow		
Sharp-tailed Sparrow		
Seaside Sparrow		
Fox Sparrow		
Song Sparrow		
Lincoln's Sparrow		
Swamp Sparrow		
White-throated Sparrow		
Golden-crowned Sparrow		
White-crowned Sparrow		
Harris' Sparrow		
sparrow, sp.		
Dark-eyed Junco		
Dark-eyed (Slate-col.) Junco	51	
Dark-eyed (W.-w.) Junco		
Dark-eyed (Oregon) Junco		
Dark-eyed (Gray-headed) Junco		
Yellow-eyed Junco		

McCown's Longspur		
Lapland Longspur		
Smith's Longspur		
Chestnut-collared Longspur		
longspur, sp.		
Snow Bunting	85	
Red-winged Blackbird	1	
Tricolored Blackbird		
E. Meadowlark		
W. Meadowlark		
meadowlark, sp.		
Yellow-headed Blackbird	1	
Rusty Blackbird	1	
Brewer's Blackbird		
Great-tailed Grackle		
Boat-tailed Grackle		
Com. Grackle	15	
Bronzed Cowbird		
Brown-headed Cowbird	4	
blackbird, sp.		
Orchard Oriole		
Hooded Oriole		
Spot-breasted Oriole		
Altamira Oriole		
Audubon's Oriole		
N. Oriole		
N. (Baltimore) Oriole		
N. (Bullock's) Oriole		
Scott's Oriole		
Rosy Finch		
(Gray-crowned) Rosy Finch		
(Black) Rosy Finch		
(Brown-capped) Rosy Finch		
Pine Grosbeak		
Purple Finch		
Cassin's Finch		
House Finch		
Carpodacus, sp.		
Red Crossbill		
White-winged Crossbill		
Com. Redpoll		
Hoary Redpoll		
redpoll, sp.		
Pine Siskin		
Lesser Goldfinch		
Lawrence's Goldfinch		
Am. Goldfinch	20	
Evening Grosbeak		
House Sparrow	424	
Eur. Tree Sparrow		

Wood Thrush		
thrush, sp.		
Am. Robin	2	
[illegible]ed Thrush		
Wrentit		
Gray Catbird		
N. Mockingbird		
Sage Thrasher		
Brown Thrasher		
Long-billed Thrasher		
Bendire's Thrasher		
Curve-billed Thrasher		
California Thrasher		
Crissal Thrasher		
Le Conte's Thrasher		
Water Pipit		
Sprague's Pipit		
Bohemian Waxwing		
Cedar Waxwing	2	
Phainopepla		
N. Shrike	1	
Loggerhead Shrike		
Eur. Starling	170	
[illegible]sted Myna		
[illegible] Myna		
White-eyed Vireo		
Bell's Vireo		
Gray Vireo		
Solitary Vireo		
(Plumbeous) Solitary Vireo		
Yellow-throated Vireo		
Hutton's Vireo		
Warbling Vireo		
Philadelphia Vireo		
Red-eyed Vireo		
Blue-winged Warbler		
Tennessee Warbler		
Orange-crowned Warbler		
Nashville Warbler		
Virginia's Warbler		
Vermivora, sp.		
N. Parula		
Tropical Parula		
[illegible]ow Warbler		
[illegible]estnut-sided Warbler		
Magnolia Warbler		
Cape May Warbler		
Black-throated Blue Warbler		
Yellow-rumped Warbler		

Yellow-rumped (Myrtle) Warbler		
Yellow-rumped (Audubon's) Warbler		
Black-throated Gray Warbler		
Townsend's Warbler		
Hermit Warbler		
Black-throated Green Warbler		
Blackburnian Warbler		
Yellow-throated Warbler		
Grace's Warbler		
Pine Warbler		
Prairie Warbler		
Palm Warbler		
Bay-breasted Warbler		
Blackpoll Warbler		
Dendroica, sp.		
Black-and-white Warbler		
Am. Redstart		
Prothonotary Warbler		
Worm-eating Warbler		
Ovenbird		
N. Waterthrush		
Louisiana Waterthrush		
Kentucky Warbler		
Connecticut Warbler		
Mourning Warbler		
MacGillivray's Warbler		
Oporornis, sp.		
Com. Yellowthroat		
Hooded Warbler		
Wilson's Warbler		
Canada Warbler		
Painted Redstart		
Yellow-breasted Chat		
Olive Warbler		
warbler, sp.		
Hepatic Tanager		
Summer Tanager		
Scarlet Tanager		
W. Tanager		
N. Cardinal	9	
Pyrrhuloxia		
Rose-breasted Grosbeak		
Black-headed Grosbeak		
Blue Grosbeak		
Lazuli Bunting		
Indigo Bunting		
Varied Bunting		
Painted Bunting		
Dickcissel		

N. (Gilded) Flicker		
Pileated Woodpecker		
N. Beardless-Tyrannulet		
Olive-sided Flycatcher		
Greater Pewee		
W. Wood-Pewee		
E. Wood-Pewee		
Yellow-bellied Flycatcher		
Least Flycatcher		
Hammond's Flycatcher		
Dusky Flycatcher		
Gray Flycatcher		
W. Flycatcher		
Empidonax, sp.		
Black Phoebe		
E. Phoebe		
Say's Phoebe		
Vermilion Flycatcher		
Dusky-capped Flycatcher		
Ash-throated Flycatcher		
Great Crested Flycatcher		
Brown-crested Flycatcher		
Great Kiskadee		
Couch's Kingbird		
Cassin's Kingbird		
W. Kingbird		
E. Kingbird		
Gray Kingbird		
Scissor-tailed Flycatcher		
Rose-throated Becard		
Eur. Skylark		
Horned Lark	5	
Purple Martin		
Tree Swallow		
Violet-green Swallow		
N. Rough-winged Swallow		
Bank Swallow		
Cliff Swallow		
Barn Swallow		
swallow, sp.		
Gray Jay		
Steller's Jay		
Blue Jay	18	
Green Jay		
Brown Jay		
Scrub Jay		
Gray-breasted Jay		
Pinyon Jay		
Clark's Nutcracker		
Black-billed Magpie		

Yellow-billed Magpie		
Am. Crow	1	
Northwestern Crow		
Mexican Crow		
Fish Crow		
crow, sp.		
Chihuahuan Raven		
Com. Raven		
Black-capped Chickadee	44	
Carolina Chickadee		
Mexican Chickadee		
Mountain Chickadee		
Boreal Chickadee		
Chestnut-backed Chickadee		
Bridled Titmouse		
Plain Titmouse		
Tufted Titmouse		
(Tufted) Titmouse		
Tufted (Black-crested) Titmouse		
Verdin		
Bushtit		
Red-breasted Nuthatch		
White-breasted Nuthatch	10	
Pygmy Nuthatch		
Brown-headed Nuthatch		
Brown Creeper		
Red-whiskered Bulbul		
Cactus Wren		
Rock Wren		
Canyon Wren		
Carolina Wren		
Bewick's Wren		
House Wren		
(Brown-throated) House Wren		
Winter Wren		
Sedge Wren		
Marsh Wren		
Am. Dipper		
Golden-crowned Kinglet		
Ruby-crowned Kinglet		
Blue-gray Gnatcatcher		
Black-tailed Gnatcatcher		
E. Bluebird		
W. Bluebird		
Mountain Bluebird		
Townsend's Solitaire		
Veery		
Gray-cheeked Thrush		
Swainson's Thrush		
Hermit Thrush		

(over)

Crested Auklet		
Rhinoceros Auklet		
Tufted Puffin		
[illegible]tic Puffin		
[illegible]horned Puffin		
alcid, sp.		
Rock Dove	131	
White-crowned Pigeon		
Red-billed Pigeon		
Band-tailed Pigeon		
Ringed Turtle-Dove		
Spotted Dove		
White-winged Dove		
Mourning Dove	22	
Inca Dove		
Com. Ground-Dove		
White-tipped Dove		
Budgerigar		
Rose-ringed Parakeet		
Monk Parakeet		
Black-hooded Parakeet		
Orange-fronted Parakeet		
Orange-chinned Parakeet		
Canary-winged Parakeet		
[illegible]-crowned Parrot		
Yellow-headed Parrot		
Black-billed Cuckoo		
Yellow-billed Cuckoo		
Mangrove Cuckoo		
Greater Roadrunner		
Smooth-billed Ani		
Groove-billed Ani		
Com. Barn-Owl		
Flammulated Owl		
E. Screech-Owl		
W. Screech-Owl		
Whiskered Screech-Owl		
Great Horned Owl	2	
Snowy Owl		
N. Hawk-Owl		
N. Pygmy-Owl		
Ferruginous Pygmy-Owl		
Burrowing Owl		
[illegible]tted Owl		
[illegible]red Owl	1	
Great Gray Owl		
Long-eared Owl		
Short-eared Owl		
Boreal Owl		
N. Saw-whet Owl		

owl, sp.		
Lesser Nighthawk		
Com. Nighthawk		
nighthawk, sp.		
Com. Poorwill		
Com. Pauraque		
Chuck-will's-widow		
Whip-poor-will		
Vaux's Swift		
White-throated Swift		
swift, sp.		
Broad-billed Hummingbird		
Buff-bellied Hummingbird		
Blue-throated Hummingbird		
Magnificent Hummingbird		
Ruby-throated Hummingbird		
Black-chinned Hummingbird		
Anna's Hummingbird		
Costa's Hummingbird		
Broad-tailed Hummingbird		
Rufous Hummingbird		
Allen's Hummingbird		
Selasphorus, sp.		
hummingbird, sp.		
Ringed Kingfisher		
Belted Kingfisher		
Green Kingfisher		
Lewis' Woodpecker		
Red-headed Woodpecker		
Acorn Woodpecker		
Gila Woodpecker		
Golden-fronted Woodpecker		
Red-bellied Woodpecker		
Yellow-bellied Sapsucker		
(Yellow-bellied) Sapsucker		
Yellow-bellied (Red-naped) Sapsucker		
Red-breasted Sapsucker		
Williamson's Sapsucker		
Ladder-backed Woodpecker		
Nuttall's Woodpecker		
Downy Woodpecker	10	
Hairy Woodpecker		
Strickland's Woodpecker		
Red-cockaded Woodpecker		
White-headed Woodpecker		
Three-toed Woodpecker		
Black-backed Woodpecker		
N. Flicker		
N. (Yel.-sh.) Flicker		
N. (Red-sh.) Flicker		

Semipalmated Plover ____ ..... ;
Piping Plover ____ ..... ;
Killdeer ____ ..... ;
Mountain Plover ____ ..... ;
plover, sp. ____ ..... ;
Am. Oystercatcher ____ ..... ;
Am. Black Oystercatcher ____ ..... ;
Black-necked Stilt ____ ..... ;
Am. Avocet ____ ..... ;
N. Jacana ____ ..... ;
Greater Yellowlegs ____ ..... ;
Lesser Yellowlegs ____ ..... ;
yellowlegs, sp. ____ ..... ;
Solitary Sandpiper ____ ..... ;
Willet ____ ..... ;
Wandering Tattler ____ ..... ;
Spotted Sandpiper ____ ..... ;
Upland Sandpiper ____ ..... ;
Whimbrel ____ ..... ;
Long-billed Curlew ____ ..... ;
Marbled Godwit ____ ..... ;
Ruddy Turnstone ____ ..... ;
Black Turnstone ____ ..... ;
Surfbird ____ ..... ;
Red Knot ____ ..... ;
Sanderling ____ ..... ;
Semipalmated Sandpiper ____ ..... ;
W. Sandpiper ____ ..... ;
Least Sandpiper ____ ..... ;
White-rumped Sandpiper ____ ..... ;
Baird's Sandpiper ____ ..... ;
Pectoral Sandpiper ____ ..... ;
Purple Sandpiper ____ ..... ;
Rock Sandpiper ____ ..... ;
Dunlin ____ ..... ;
peep, sp. ____ ..... ;
Stilt Sandpiper ____ ..... ;
sandpiper, sp. ____ ..... ;
Short-billed Dowitcher ____ ..... ;
Long-billed Dowitcher ____ ..... ;
dowitcher, sp. ____ ..... ;
Com. Snipe ____ ..... ;
Am. Woodcock ____ ..... ;
Wilson's Phalarope ____ ..... ;
Red-necked Phalarope ____ ..... ;
Red Phalarope ____ ..... ;
phalarope, sp. ____ ..... ;
Pomarine Jaeger ____ ..... ;
Parasitic Jaeger ____ ..... ;

jaeger, sp. ____ ..... ;
Great Skua ____ ..... ;
Laughing Gull ____ ..... ;
Franklin's Gull ____ ..... ;
Little Gull ____ ..... ;
Com. Black-headed Gull ____ ..... ;
Bonaparte's Gull ____ ..... ;
Heermann's Gull ____ ..... ;
Mew Gull ____ ..... ;
Ring-billed Gull ____ ..... ;
California Gull ____ ..... ;
Herring Gull ____ ..... ;
Thayer's Gull ____ ..... ;
Iceland Gull ____ ..... ;
Lesser Black-backed Gull ____ ..... ;
Yellow-footed Gull ____ ..... ;
W. Gull ____ ..... ;
Glaucous-winged Gull ____ ..... ;
Glaucous Gull ____ ..... ;
white-winged gull, sp. ____ ..... ;
Great Black-backed Gull ____ ..... ;
Black-legged Kittiwake ____ ..... ;
Sabine's Gull ____ .....
Ivory Gull ____ .....
gull, sp. ____ .....
Gull-billed Tern ____ .....
Caspian Tern ____ .....
Royal Tern ____ .....
Elegant Tern ____ .....
Sandwich Tern ____ .....
Roseate Tern ____ .....
Com. Tern ____ .....
Forster's Tern ____ .....
Least Tern ____ .....
Black Tern ____ .....
tern, sp. ____ .....
Black Skimmer ____ .....
Dovekie ____ .....
Com. Murre ____ .....
Thick-billed Murre ____ .....
Razorbill ____ .....
Black Guillemot ____ .....
Pigeon Guillemot ____ .....
Marbled Murrelet ____ .....
Kittlitz's Murrelet ____ .....
Xantus' Murrelet ____ .....
Ancient Murrelet ____ .....
Cassin's Auklet ____ .....
Parakeet Auklet ____ .....

King Eider		
Steller's Eider		
eider, sp.		
Harlequin Duck		
[illegible]aw		
Black Scoter		
Surf Scoter		
White-winged Scoter		
scoter, sp.		
Com. Goldeneye		
Barrow's Goldeneye		
Bufflehead		
Hooded Merganser		
Com. Merganser		
Red-breasted Merganser		
merganser, sp.		
Ruddy Duck		
Masked Duck		
duck, sp.		
Black Vulture		
Turkey Vulture		
California Condor		
Osprey		
Hook-billed Kite		
[illegible] Swallow-tailed Kite		
[illegible]shouldered Kite		
Snail Kite		
Bald Eagle		
N. Harrier	2	
Sharp-shinned Hawk		
Cooper's Hawk		
N. Goshawk		
Accipiter, sp.		
Com. Black-Hawk		
Harris' Hawk		
Gray Hawk		
Red-shouldered Hawk		
Broad-winged Hawk		
Short-tailed Hawk		
Swainson's Hawk		
White-tailed Hawk		
Zone-tailed Hawk		
Red-tailed Hawk	5	
Red-tailed (Harlan's) Hawk		
[illegible]inous Hawk		
[illegible]-legged Hawk	3	
Buteo, sp.		
Golden Eagle		
eagle, sp.		

Crested Caracara		
Am. Kestrel	2	
Merlin		
Peregrine Falcon		
Gyrfalcon		
Prairie Falcon		
falcon, sp.		
hawk, sp.		
Plain Chachalaca		
Gray Partridge		
Chukar		
Ring-necked Pheasant	19	
Com. Peafowl		
Spruce Grouse		
Blue Grouse		
Willow Ptarmigan		
Rock Ptarmigan		
White-tailed Ptarmigan		
Ruffed Grouse		
Sage Grouse		
Greater Prairie-Chicken		
Lesser Prairie-Chicken		
Sharp-tailed Grouse		
Wild Turkey		
Montezuma Quail		
N. Bobwhite		
Scaled Quail		
Gambel's Quail		
California Quail		
Mountain Quail		
quail, sp.		
Yellow Rail		
Black Rail		
Clapper Rail		
Clapper (W.) Rail		
King Rail		
Virginia Rail		
Sora		
Purple Gallinule		
Com. Moorhen		
Am. Coot		
Caribbean Coot		
Limpkin		
Sandhill Crane		
Whooping Crane		
Black-bellied Plover		
Lesser Golden-Plover		
Snowy Plover		
Wilson's Plover		

Refuge: Horicon National Wildlife Refuge Procedure No.: #9

Species: Birds

Type: May Bird Count

I. Purpose

A spring bird census is conducted annually in cooperation with the Wisconsin Society for Ornithology (WSO). This census provides valuable information regarding the status of songbirds, raptors, waterfowl, marsh and waterbirds, shorebirds, etc., particularly in the documentation of population trends. This index may be related to weather conditions, habitat conditions, environmental hazards, etc.

II. Procedure

The May Bird Count is coordinated statewide by the Wisconsin Society for Ornithology, but selection of the count date and coordination of the actual count is carried out by a refuge staff member. The count area for the refuge includes the same area used for the Christmas Bird Count--a 15-mile diameter circle (exhibit 9-A).

A. Personnel

One refuge manager is designated as the bird count coordinator. The number of actual participants varies from year to year as the majority of them are area birdwatcher volunteering their time. Members of the Kettle Moraine, Fond du Lac, and Oconomowoc Audubon Clubs are usually involved.

B. Date, Time, Weather

The May Bird Count date is selected to coincide with the spring bird migration, particularly the migration of warblers. It is usually conducted between the second and third weeks of May, depending on spring weather conditions, i.e. early spring, late spring, etc.

The count hours are flexible and can include just a few morning hours or an entire day, depending on each participant's preference. Weather conditions that are unacceptable and would cancel the count include heavy rains and high winds.

C. Survey Unit

The count area includes a 15-mile diameter circle having the Main Ditch and Main Dike intersection as center. This has been delineated on a county map. Participants can conduct the census anywhere within this circle.

D. Equipment

Binoculars, pencil, bird list data sheet, field guide are essential. A spotting scope, vehicle, canoe and hip boots are helpful depending on where the participant chooses to conduct the survey. The refuge will provide a count area map that includes all roads, a gate key for refuge access, and a survey data sheet.

E. Inventory Procedures

The refuge count coordinator sends out a letter of invitation to all past participants in early April.

Participants meet at refuge headquarters at 5:30 a.m. on the count day or may pick up keys and report forms on the day before. Individuals normally conduct the survey in small groups, which is done at this orientation meeting. Although participants may conduct the census anywhere within the count area, the refuge coordinator makes certain that all important habitat types and traditional "hot spots" are covered by someone in the survey group. Participants receive report forms, keys, maps and voluntary assignment to groups at this early morning orientation meeting. Canoes are permitted on the refuge during the count day. Participants use a combination of walking and driving to cover the area but are not required to record the number of miles and hours.

F. Recordkeeping

Information to be recorded on this census includes a list of all species observed and/or heard and readily identified. A tally of individuals for each species is not required. Uncommon or rare species must be well documented by writing up the supporting details of the sighting (exhibit 9-B). Participants return their final species list (exhibit 9-C) to the refuge coordinator either in person or by mail. A final report is prepared by the refuge coordinator for the Wisconsin Society of Ornithology on a special form (exhibit 9-C). A copy is also placed in the refuge files. Each participant receives a copy of this final report along with a letter of thanks.

III. Special Considerations

Not applicable.

IV. Staffpower and Costs

Refuge coordinator	5 hours	$ 71.00
Administration	10 hours	143.00
Vehicle	50 miles	11.00
Total		$ 225.00

Exhibit 9-A [redacted]

[redacted]

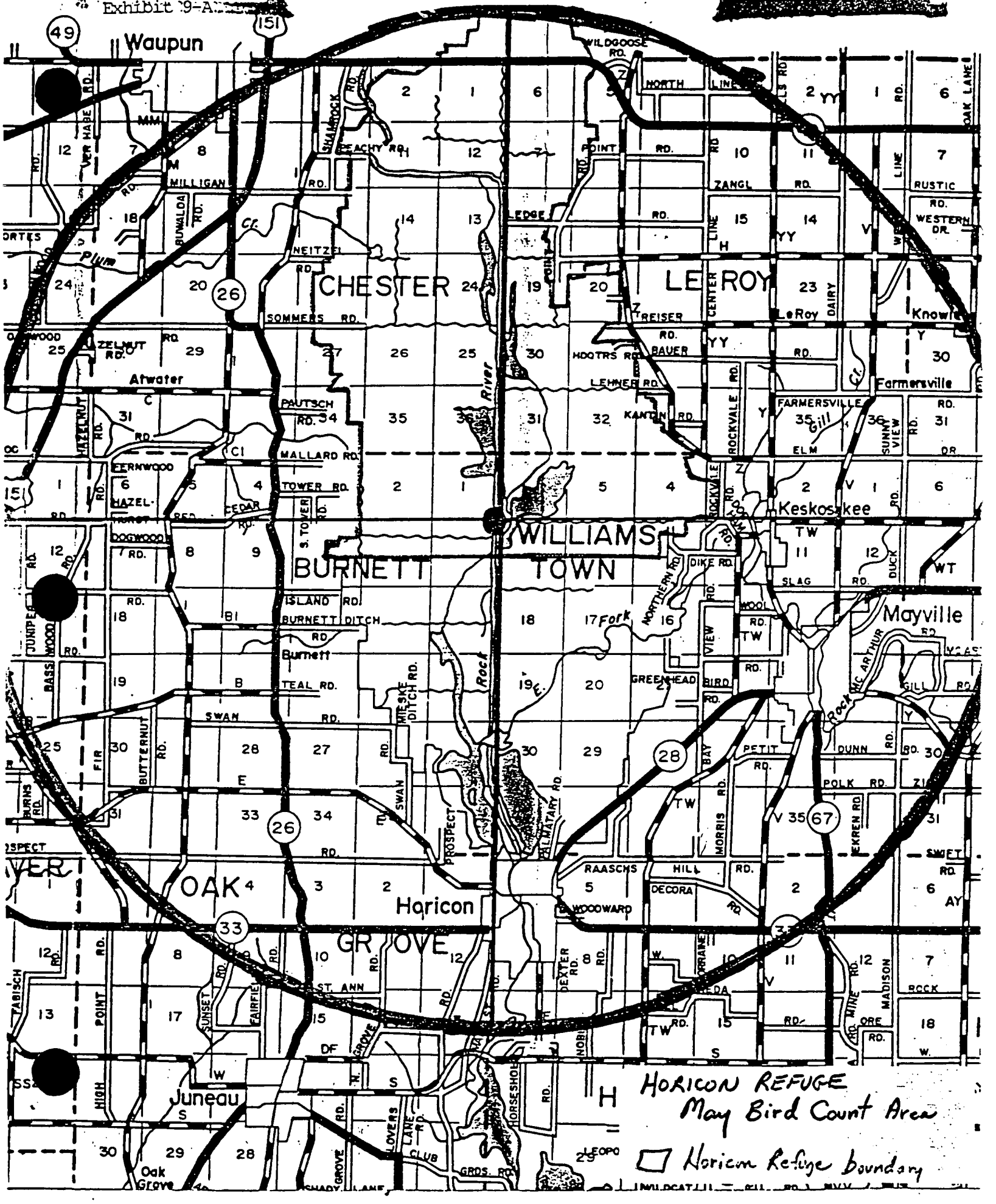


Exhibit 9-B

WISCONSIN SOCIETY FOR ORNITHOLOGY
EXCEPTIONAL RECORD DOCUMENTATION FORM

1. SPECIES _____

2. DATE _____ 3. TIME BIRD SEEN _____ to _____

4. LOCATION _____

5. NARRATIVE ACCOUNT OF SIGHTING In your own words describe the actual event. Be certain to incorporate into your narrative a complete description of distinguishing features that you observed including shape, size, body markings--head, bill, eye, legs, wings, tail, etc., behavior in flight, position and behavior when perched and other movements. Your description should include identification marks recorded in the field, not after consulting a bird book. (Remember this part, if approved by the W.S.O. Records Committee, will be published in the "By The Wayside" column of the Passenger Pigeon.)

6. VOICE DESCRIPTION (if heard) _____

_____

7. HABITAT _____

8. COMPARISON WITH SIMILAR APPEARING SPECIES (include distinguishing points)

_____

_____

_____

_____

9. DISTANCE _____ 10. OPTICAL EQUIPMENT _____

11. WEATHER (sky condition, wind, visibility) _____

_____

12. PREVIOUS EXPERIENCE WITH SPECIES _____

_____

13. OTHER MEMBERS OF OBSERVATION PARTY _____

_____

_____

14. OTHER OBSERVERS KNOWN TO HAVE INDEPENDENTLY IDENTIFIED THIS BIRD

NAME	DATE

15. BOOKS, ILLUSTRATIONS, ADVICE CONSULTED _____

_____

_____

16. SIGNATURE _____ DATE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

This form should be used with all rare and accidental (capitalized and unlisted) species on the seasonal report forms, plus sightings

Send to:
Daryl D. Tessen
Associate Editor

Exhibit 9-C

W.S.O. MAY COUNT REPORT FORM

Name of Count:_____ Date:_____ Hours:_____to _____

Center of Count/Area Included:_____

_____

Sky Conditions:_____ Wind Direction:_____ Velocity:_____

Temperature:_____ to _____

Number of Observers: _____ Number of Parties:_____

Name and Address of Compiler:_____

Observers (list alphabetically):

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

Total Species: _____ Total Individuals (Optional):_____

Indicate the species that were seen on the count day by marking with an "X" or recording the number seen for the species. Species names in capital letters must be accompanied with details of the observation, including: description of bird (size, shape, plumage, voice, distinguishing traits from similar species), place and length of observation, habitat, distance from bird, glass power.

Red-throated Loon	____	American Wigeon	____	Ring-necked Pheasant	____
Common Loon	____	Canvasback	____	Spruce Grouse	____
Pied-billed Grebe	____	Redhead	____	Ruffed Grouse	____
Horned Grebe	____	Ring-necked Duck	____	Gr.Prairie Chicken	____
Red-necked Grebe	____	Greater Scaup	____	Sharp-tailed Grouse	____
EARED GREBE	____	Lesser Scaup	____	Wild Turkey	____
WESTERN GREBE	____	Oldsquaw	____	Northern Bobwhite	____
AM. WHITE PELICAN	____	Black Scoter	____	YELLOW RAIL	____
Double-cr. Cormorant	____	Surf Scoter	____	King Rail	____
American Bittern	____	White-winged Scoter	____	Virginia Rail	____
Least Bittern	____	Common Goldeneye	____	Sora	____
Great Blue Heron	____	Bufflehead	____	Common Moorhen	____
Great Egret	____	Hooded Merganser	____	American Coot	____
SNOWY EGRET	____	Common Merganser	____	Sandhill Crane	____
LITTLE BLUE HERON	____	Red-breasted Merganser	____	Black-bellied Plover	____
TRICOLORED HERON	____	Ruddy Duck	____	Lesser Golden Plover	____
Cattle Egret	____	Turkey Vulture	____	Semipalmated Plover	____
Green-backed Heron	____	Osprey	____	PIPING PLOVER	____
Black-cr. Night Heron	____	MISSISSIPPI KITE	____	Killdeer	____
YELLOW-CR. NIGHT HERON	____	Bald Eagle	____	AMERICAN AVOCET	____
GLOSSY IBIS	____	Northern Harrier	____	Greater Yellowlegs	____
Tundra Swan	____	Sharp-shinned Hawk	____	Lesser Yellowlegs	____
Mute Swan	____	Cooper's Hawk	____	Solitary Sandpiper	____
Canada Goose	____	Northern Goshawk	____	Willet	____
Wood Duck	____	Red-shouldered Hawk	____	Spotted Sandpiper	____
Green-winged Teal	____	Broad-winged Hawk	____	Upland Sandpiper	____
American Black Duck	____	Red-tailed Hawk	____	WHIMBREL	____
Mallard	____	Rough-legged Hawk	____	Hudsonian Godwit	____
Northern Pintail	____	American Kestrel	____	Marbled Godwit	____
Blue-winged Teal	____	Merlin	____	Ruddy Turnstone	____
Northern Shoveler	____	Peregrine Falcon	____	Red Knot	____
Gadwall	____	Gray Partridge	____	Sanderling	____

Refuge: Horicon National Wildlife Refuge Procedure No.: #10

Species: Upland Mammal Species

Title: Scent Post Survey

I. Purpose

The scent post survey is conducted to determine predator abundance and the abundance of all upland wildlife species. The survey can monitor trends in wildlife numbers including fox, skunk, raccoon, opossum, white-tailed deer, and rodent populations. Population trends can be developed to determine relative abundance for key wildlife species. The predator population has a direct effect on the refuge's waterfowl production while the white-tailed deer population has a bearing on the refuge's public use and hunting programs.

II. Procedure

A. Personnel

One person is needed to run the scent post survey.

B. Date, Time, Weather

The scent post survey is conducted around September 10. At this time of the year many of the upland mammal species are active as the young of the year are dispersing throughout the country.

The scent post survey lines should be run at the same time of the day throughout the survey to avoid any bias. The morning hours are the best time to run the survey lines as many of the tracts made overnight will still be fresh. Information will not be used from the scent post survey conducted on days when rain or high winds may have caused the tracks to be destroyed or altered to where they cannot be identified.

C. Survey Units or Census Routes

The scent post survey route at Horicon NWR consists of 40 scent stations each located 3/10 of a mile apart. The scent stations are located on the road shoulder alternating from one side of the road to the other. If the scent station cannot be placed on the alternate side of the road due to the physical layout, it may be placed on the same side as the previous scent station with the next station placed on the alternate road

shoulder. The scent station route consists of two lines. One starting at the Sterr Road gate running to the Main Dike and west to the west boundary. The other line starts on Old Marsh Road at Highway 49 running south and east along Old Marsh Road to Luehring Dike crossing Luehring Dike to Ledge Road and then east along Ledge Road to the refuge boundary (exhibit 10-A).

D. Equipment

A scent post survey kit containing materials to set up a scent post station can be purchased from Pocatello Supply Depot, 238 East Dillon, Pocatello, Idaho, 83201, phone (208) 236-6920. The kit contains 100 scented attractant capsules and 6 blank forms for recording animal visits. In addition to these materials a supply of fine sand is needed to provide a smooth, fine surface for track identification, a three foot diameter auto belt or some such measuring device for setting up scent stations, a 10" x 14" with 1/4" hardware cloth sifter for sifting sand lime onto station, a sand shovel, and a guide for identifying animal tracks as required for the survey.

E. Inventory Procedure

The same survey line should be run year after year to provide a reliable index. The scent post survey line and scent station should start at the same spot as in previous years. The route should be run for three consecutive days. If wind or rain destroys all or most of the stations, reset the line and continue to run it until three days of good results are achieved.

A scent station consists of a 3-foot circle cleared of all vegetation and/or covered with 1/2" of sifted sand with a capsule containing an attractant placed in the center. Scent stations should be placed just off the edge of the road to avoid being driven over, but close enough to the road edge so that signs can be read without leaving the road.

After sifting approximately 1/2" of fine tracking sand onto the station (the sand will have to be hauled to the scent station sites in clean containers), place the scented capsule in the center of the circle on top of the sifted sand. The drawing power of the capsule will last for about six days.

After the scent stations have been set out they will be run daily until three days of usable information is received. On each day that scent station is checked all visible animal tracks will be recorded for each

station. Any capsules that have been carried off, destroyed, or clogged with dirt will be replaced. Each station containing tracks will be smoothed off with sand or lime added if needed on a daily basis. On the last day of the survey all capsules will be removed and destroyed.

F. Recordkeeping

Each day's records will be kept on individual observation forms found in exhibit 10-B. All identifiable animal tracks located within the three foot circle will be recorded for each station. Multiple animal tracks of the same species found at a station will be recorded as only one visit regardless of the number or size of the tracks present at the station. If a station contains no tracks it will be recorded as having no visits or if the station is inoperable, tracks cannot be identified because of some type of disturbance, it will be recorded as inoperable.

Final results of the three day survey will be consolidated in a final format found in exhibit 10-C. All scent stations will be recorded as to number, side of the road, location, and habitat type (either upland or dike). Visits by day will also be recorded. Total visits for each species by habitat type will be tabulated. This number will then be used to calculate the percent of actual visits by species based on the total possible visits (total number of scent post station nights for three days). This information will be recorded for upland stations, dike stations and the combined total of all stations for the three day survey.

III. Special Considerations

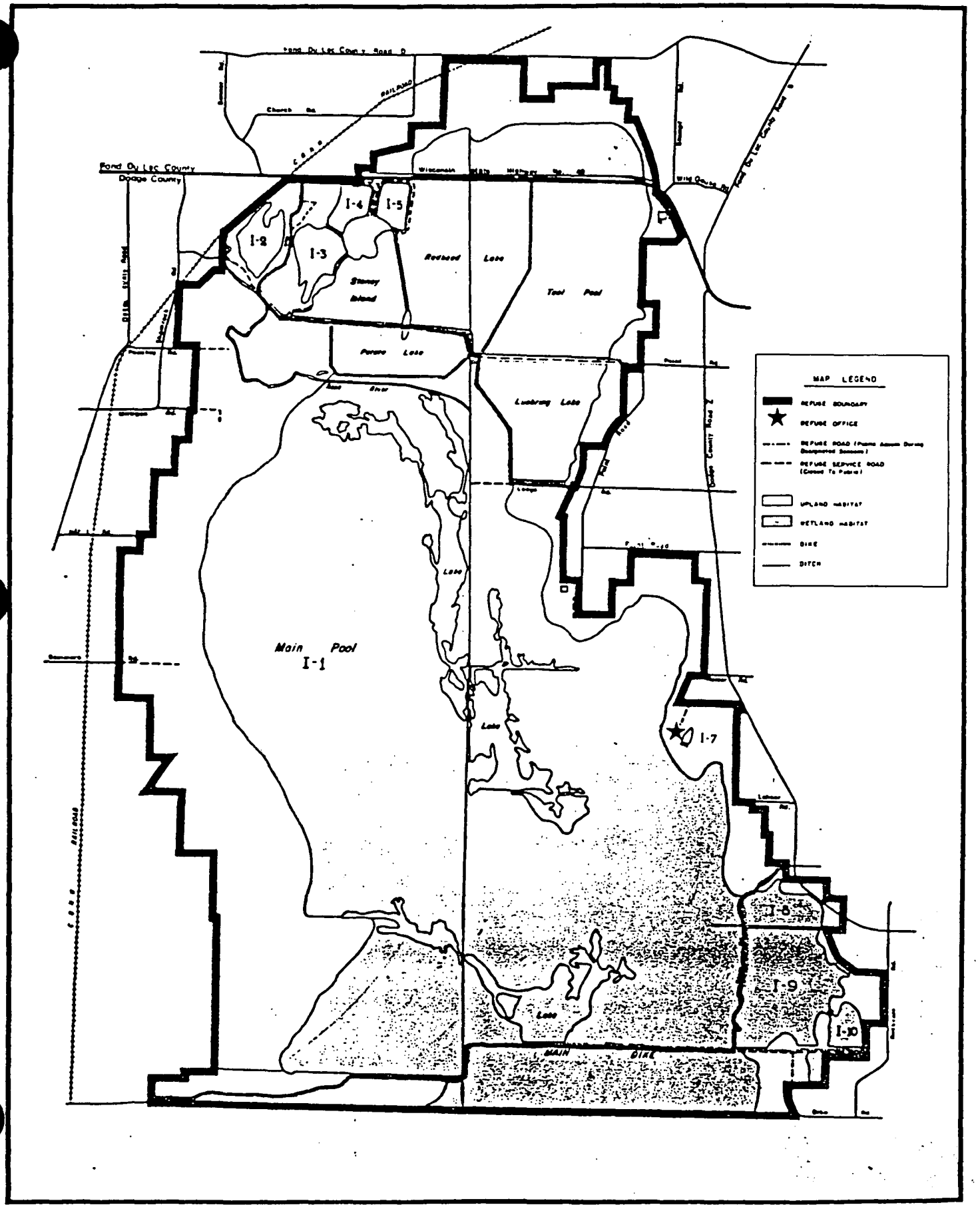
It is very important that all tracks be accurately identified. If a track cannot be identified it should be recorded as such. No guessing should take place. If there is difficulty in identifying tracks a local trapper or some other track identification expert should assist in the daily surveys.

The initial setting up the plots each year can be very time consuming especially if there has been vigorous plant growth over the summer. This time consuming process can be shortened considerably if each plot is sprayed with Roundup in late July or early August eliminating the vegetation which will have to be cleared before the plots are set up in September.

IV. Staffpower and Costs

Staffpower	40 staff hours	$ 571.00
Vehicle	150 miles	34.00
Supplies		
Lime	200 lbs. $6.00/50 lbs.	24.00
Scent Kit	1 kit	20.00
Administration	4 staff hours	57.00
Total		$ 706.00

Exhibit 10-A Scent Post Survey Route



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SCALE

DODGE AND FOND DU LAC COUNTIES, WISCONSIN

Exhibit 10-B Scent Post Survey Form

State _____ County _____ Line Name _____ Date _____, 19__

Weather conditions last night (circle one):
(1) Clear (3) Showers (5) Snow
(2) Cloudy (no rain) (4) Rain

Observer _____

Wind (circle one):
(1) No wind (3) Moderate
(2) Gusty (4) Strong

Nighttime temperature (circle one):
Hot (80°F or above) Moderate (33°F to 70°F) Freezing or below (32°F or lower)

Scent station number	Station condition	Coyote visit	Other animals visiting station	Scent station number	Station condition	Coyote visit	Other animals visiting station
1 (L)				26 (R)			
2 (R)				27 (L)			
3 (L)				28 (R)			
4 (R)				29 (L)			
5 (L)				30 (R)			
6 (R)				31 (L)			
7 (L)				32 (R)			
8 (R)				33 (L)			
9 (L)				34 (R)			
10 (R)				35 (L)			
11 (L)				36 (R)			
12 (R)				37 (L)			
13 (L)				38 (R)			
14 (R)				39 (L)			
15 (L)				40 (R)			
16 (R)				41 (L)			
17 (L)				42 (R)			
18 (R)				43 (L)			
19 (L)				44 (R)			
20 (R)				45 (L)			
21 (L)				46 (R)			
22 (R)				47 (L)			
23 (L)				48 (R)			
24 (R)				49 (L)			
25 (L)				50 (R)			

Exhibit 10-C

Predator Scent Post Survey

Station #		Station location	Animal Visits 9-13-83	9-14-83	9-15-83	Habita
1	Left	Sterr Road	—	Skunk Dog	Cat weasel	upland
2	Left	Sterr Road	Deer mouse, Bird	Raccoon	mouse Skunk	uplanc
3	Right	Sterr Road	Deer opossum, Rabbit	Skunk	Skunk Deer	uplan
4	Left	Sterr Road	Deer Raccoon	Skunk Raccoon	Skunk opossum	dike
5	Right	Sterr Road	Heron Raccoon	Raccoon	opossum muskrat	dike
6	L	Sterr Road	opossum	Raccoon	Raccoon Skunk	upland
7	R	Sterr Road	Raccoon	—	mouse	dike
8	L	Main Dike	Raccoon	Deer opossum	Raccoon	dike
9	R	Main Dike	Deer	Deer	—	dike
10	L	Main Dike	Deer wood chuck	Deer	opossum	dike
11	R	Main Dike	Deer skunk or wood chuck	—	opossum	dike
12	L	Main Dike	—	—	Deer Opossum	dike
13	R	Main Dike	—	—	—	dike
14	L	Main Dike	Deer Fox	opossum	Deer Rabbit	dike
15	R	Main Dike	—	—	—	dike
16	L	Main Dike	Deer Raccoon	Raccoon	—	dike
17	R	Main Dike	mink opossum	muskrat	weasel	dike
18	L	Main Dike	opossum	Deer	Rabbit opossum	dike
19	R	Main Dike	Raccoon Fox, Squirrel	Raccoon uniden. small mammal	Rabbit Skunk	uplanc
20	L	Main Dike	Raccoon	Raccoon, mink opossum, mouse	mink Chipmunk?	dike
21	R	Main Dike	Fox, Raccoon opossum & scat	opossum	Rabbit opossum	upland
22	L	Main Dike	Fox opossum	Raccoon	opossum Deer	dike
23	R	Main Dike	Fox opossum, Rabbit	Fox	Fox opossum	uplanc
24	R	Old Marsh Road	Dog Deer	—	Cat	uplan
25	L	Old Marsh Road	—	Fox	man, skunk opossum	uplan
26	R	Old Marsh Road	Raccoon Fox	skunk Fox, opossum	Large Bird	uplan
27	L	Old Marsh Road	Raccoon Fox	Deer Raccoon	Deer	uplan

Refuge: Horicon National Wildlife Refuge Procedure No.: #11

Species: Mourning Dove

Title: Mourning Dove Call Count

I. Purpose

Maintaining mourning dove populations in a healthy productive state is a primary objective of the Fish and Wildlife Service designed to provide good recreational opportunities for both the hunting and nonhunting public. Call count surveys are conducted annually to monitor mourning dove populations and aid wildlife administration in setting annual regulations.

II. Procedure

A. Personnel

One observer is needed to complete the survey. When possible, the observer should run the same route in successive years. The vehicle driver is the sole observer. Anyone else in the vehicle will not participate in the survey.

B. Date, Time, Weather

The count begins one-half hour before sunrise and continues for about two hours. The exact times are printed on the Mourning Dove Call Count Survey Form, Form 3-159 furnished by the State coordinator who is the wildlife biologist at the Wildlife Assistance Office in Madison, Wisconsin. The survey route is run once between May 20 and June 5. The survey is run, or stopped if already started, if the wind velocity exceeds 12 miles per hour or if it is raining.

C. Survey Units or Census Route

The established census route begins southeast of Beaver Dam and runs for 20 miles with 20 listening stations spaced at one mile intervals. The route begins at stop #1 and ends one mile past stop #20. A map of the census route is furnished by the State coordinator.

D. Equipment

The following equipment is needed to conduct the survey; stop watch, binoculars, and vehicle speedometer and odometer.

E. Inventory Procedure

The observer must arrive at stop #1 by the designated time. At stop #1 record the weather, vehicle mileage, and wind velocity using the Beaufort scale. A scale is provided on the survey form for determining wind speed.

At each stop the vehicle is stopped, the ignition is turned off, and the observer leaves the vehicle. The observer listens and observes for exactly three minutes, standing away from the vehicle. At each stop the following information is recorded on the Mourning Dove Call Count Survey Form: the time of arrival at the stop; total number of calls (one call usually consists of a preliminary note and three coos); number of doves seen while stopped (if three pairs are seen, enter numeral six in column "In Pairs"); disturbance affecting the count at each stop (see chart contained on back of form); and any applicable remarks concerning the survey.

Between each stop a vehicle driving speed of 25 miles per hour is maintained. The number of doves seen while driving is entered on the same line as the previous stop number.

At the end of the survey the weather conditions and vehicle mileage is recorded and all of the column for doves heard and doves seen are totalled.

F. Recordkeeping

Immediately following the completion of the survey the original form is mailed directly to Dove Survey, Office of Migratory Bird Management, Patuxant Wildlife Research Center, Laurel, Maryland, 20811, one copy is retained for the refuge files, and the remainder of the copies and the survey route map are mailed to the U.S. Fish and Wildlife Service survey coordinator.

III. Special Considerations

Before the survey is run, the survey route should be checked for any construction projects or detours which may cause changes in the survey route. If this happens the survey coordinator should be contacted immediately.

If it becomes necessary to change observers, the new observer should run the last actual census with the old observer to become familiar with the census route and technique. Both observers should conduct separate

surveys recording the information on separate survey forms. The new observers survey form is retained in the refuge file. No forms completed by the new observer are sent to the Dove Survey Office or the State survey coordinator.

If it begins raining or the wind speed increases to beyond 12 miles per hour while the survey is being conducted, the survey is stopped and conducted on another morning.

IV. Staffpower and Costs

Staffpower	5 staff hours	$ 71.00
Vehicle	120 miles	27.00
Administration	2 staff hours	29.00
Total		$ 127.00

Refuge: Horicon National Wildlife Refuge Procedure No.: #12

Species: Sandhill Crane

Title: Sandhill Crane Breeding Survey

I. Purpose

The sandhill crane is designated as a species of special emphasis (RRP) by the U.S. Fish and Wildlife service. A small but increasing breeding population is found on the refuge. To document increases or decreases in this population, a survey is necessary. The sandhill crane can also be used as an indicator species to assess environmental changes which may affect other wildlife species. The refuge survey is held in conjunction with a statewide survey sponsored by the International Crane Foundation. A refuge staff person serves as Dodge Co. coordinator for the county. Refuge resources are used for conducting the count.

II. Procedure

A. Personnel

Thirteen observers are needed to thoroughly census the refuge. A minimum of five people can cover the entire refuge but not as thoroughly. If a limited number of observers are available, two people can cover just those areas of the refuge containing good crane habitat. However, the reliability of the census will decrease as fewer observers are used. To obtain an adequate number of observers, volunteers could be solicited from the area including local Audubon groups. A refuge manager is designated as the survey coordinator, soliciting volunteers, assigning survey units, etc.

B. Date, Time, Weather

The refuge survey is conducted in conjunction with a statewide survey sponsored by the International Crane Foundation. The Foundation sets a date, usually a Saturday, in mid-April, when the survey is conducted. The survey hours run from 4:30 a.m. to 6:30 a.m. on the day selected by the Foundation. The survey is conducted regardless of weather conditions.

C. Survey Units or Census route

The refuge has been divided into thirteen survey units (exhibit 12-A) by the International Crane Foundation. Units 68, 7, 6, 3, and 69 are the most critical areas to cover.

D. Equipment

Bincoluars, a pen or pencil and the data sheet are essential. A spotting scope and an aerial photograph or map of the survey unit would be very helpful.

E. Inventory Procedure

Procedures for the survey are established by the International Crane Foundation. Observers must be at their predetermined survey unit by 4:30 a.m. and remain within their survey unit until 6:30 a.m. Observers may select a vantage spot in which they can see or hear cranes over their entire unit or they may walk around their unit. All cranes heard or seen within their unit are recorded. The time of observation, the number of cranes, whether the sighting was a new or repeat sighting, the cranes behavior, their vocalization, and the habitat they are in is recorded on the data sheet. The location of the cranes is then plotted on a hand drawn map or aerial photo of the survey area. At the conclusion of the count, the observer must estimate the total number of cranes and the number of breeding pairs in their survey area.

F. Recordkeeping

Information obtained from each survey unit is recorded on the Crane Count Data Sheet (exhibit 12-B) supplied by the International Crane Foundation. The data sheets are collected by the refuge coordinator who consolidates the refuge survey, determining the total number of cranes and breeding pairs using the refuge. The original data sheets are sent to a coordinator for the International Crane Foundation where this information becomes part of the Foundation's statewide survey. A copy of each data sheet is retained for the refuge files.

III. Special Considerations

Observers who can accurately identify cranes by call and site are needed. They must also be able to record this information and then determine the total number of cranes in their survey areas.

If there are not enough observers to cover the entire

refuge, some observers may have to census more than one survey unit. This will involve driving back and forth from one unit to another.

IV. Staffpower and Costs

Staffpower	40 staff hours	$ 571.00
Vehicle	40 miles	9.00
Administration	8 staff hours	114.00
Total		$ 694.00

Exhibit 12-A

SANDHILL CRANE BREEDING SURVEY

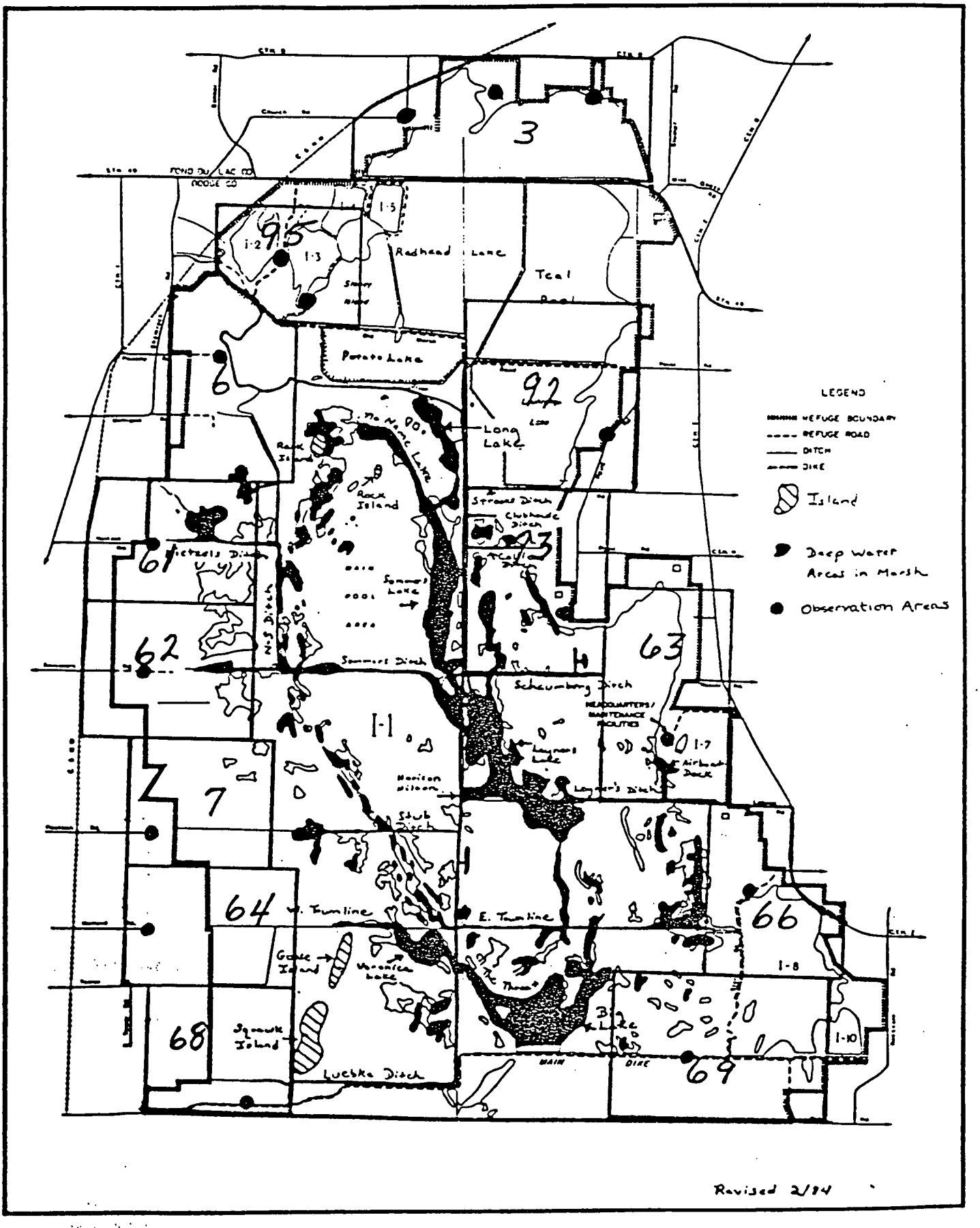

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Exhibit 12-B

CRANE COUNT DATA SHEET

YEAR

Site #

No. of observers

OBSERVERS

County

Name

Address

Zip

Phone ( )

Name

Address

Phone ( )

Intl. Crane Foundation
Rt. #1 Box 230 C Shady Lane
Baraboo, WI 53913
(608) 356-9462

The long outstreched neck and trailing legs of a crane in flight are unmistakable.

LANDOWNER

Name

Address

Zip

Permission to survey?

Weather conditions (circle)

Temp. °F	Wind	Sky	
start	calm	clear	fog
	light	rain	other
Finish	strong	snow	
	other	drizzle	

Most mis-identifications occur during flight observations. Don' mistake the following two specie for a crane: Great Blue herons fl with their necks tucked in or in a S shape. Canada Geese are rapi flyers with chunky bodies and no trailing legs.

Time: Start _____ Finish ____

CRANE OBSERVATIONS

Time observations	Number cranes (Do not include repeats)	Behavior					Vocalizations			Habitat			COMMENTS
		Not Visible	Flying	Feeding/walking	Dancing	Other (explain)	Silent	Unison	Other (explain)	WETLANDS- marsh, sedge meadow, etc	Dry fields, uplands agricultural lands	Other (explain)	Note: Remember you are estimating total number of cranes and total number of breeding pairs. DO NOT include repeat sightings. COMMENTS
:5	3			3							3		three cranes feeding in corn field
609		2						2		2			pair unison call in marsh (example)

Total number of cranes (this requires your judgement for you may be seeing or hearing 1 pair of cranes repeatedly.

Total number of breeding pairs (estimated number of pairs unison calling Remember, 2cranes = 1pair)

Refuge: Horicon National Wildlife Refuge Procedure No.: #13

Species: White-tailed Deer

Title: Aerial Deer Count

I. Purpose

Deer hunting is a very popular sport in the State of Wisconsin. The refuge provides for 12,000 activity hours of public hunting as listed in the refuge objectives. In order to maintain a deer population and a quality deer hunting program, the deer population needs to be monitored. When refuge deer populations have risen to high levels, depredation problems have occurred on a neighboring apple orchard and on a neighboring strawberry farm.

II. Procedure

A. Personnel

Two observers in the airplane would be needed to make an accurate count. If the regional pilot conducts the census, the pilot can serve as one of the observers.

B. Date, Time, Weather

The survey should be conducted annually when the snow depth is great enough to cover most upland vegetation. The survey should not be conducted when visibility is poor (snowing, heavy cloud cover, etc.). The survey should be conducted between mid-morning and mid-afternoon when the sun is high in the sky causing minimum shadows from ground objects.

C. Survey Unit or Census Route

The refuge will be divided into four census units (exhibit 13-A). The area south of Townline Ditch, the area south of Peachy Road and the Rock River and west of the Main Ditch, the area north of Peachy Road, the Rock River and Ledge Road, and the area between Ledge Road and Townline Ditch east of the Main Ditch.

D. Equipment

Besides the airplane a tally counter will be the only equipment needed for the survey.

E. Inventory Procedure

All major habitat areas within each of the four units will be flown to achieve 100% coverage of deer concentration areas. Total deer observed for each unit will be recorded.

F. Recordkeeping

A Minnesota Department of Natural Resources study found that 75% of the deer were censused using a helicopter in which all of the habitat in a particular unit was flown. The same study revealed that a fixed wing aircraft survey will miss 1.51 deer for every deer seen on a helicopter survey. Therefore, when a fixed wing aircraft is used for the deer survey, the following formula can be used to determine the refuges deer population where N equals the number of deer counted on the survey.

$$\frac{1.51 \times N}{.75} = \text{Estimated refuge deer population}$$

III. Special Considerations

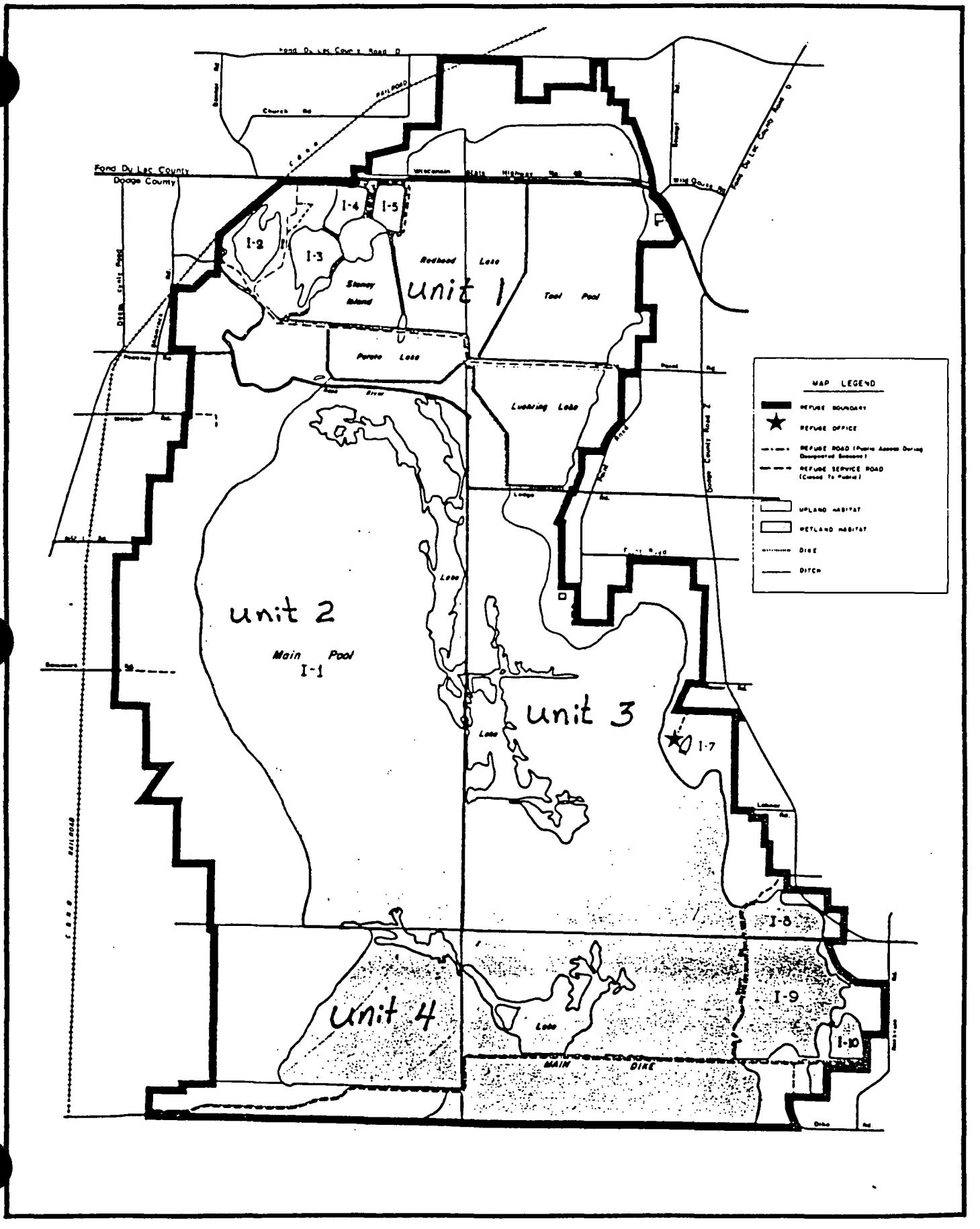
Spotlight indexes, trail counts, and pellet counts have been experimented with for usefulness in determining the refuge deer population. All of the census techniques have not worked satisfactorily. It is felt the aerial census is the only census that will provide a reliable population estimate.

IV. Staffpower and Costs

Staffpower	4 staff hours	$ 57.00
Airplane	4 hours	440.00
Administration	2 hours	29.00
Total		$526.00

Exhibit 13-A

Aerial Deer Survey



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JULY 1983

DODGE AND FOND DU LAC COUNTIES, WISCONSIN

Refuge: Horicon National Wildlife Refuge Procedure No.: 14

Species: White-tailed Deer

Title: Population Index Based on Deer Hunt Data

I. Purpose

Same as procedure no.: 13

II. Procedure

A. Personnel

It is being considered to revise the hunt plan to require permits from the refuge by hunters to hunt the refuge. If this revision is done, then a deer population index plan will be written for the wildlife inventory plan based on hunter permit returns.

Refuge: Horicon National Wildlife Refuge Procedure No.: #15

Species: Ring-necked Pheasant

Title: Ring-necked Pheasant Survey

I. Purpose

Providing small game hunting opportunities is one of the refuge objectives. The ring-necked pheasant is the major small game species hunted on the refuge. Population estimates are needed to monitor pheasant populations for the setting of refuge hunting regulations while maintaining a healthy pheasant population.

The ring-necked pheasant survey consists of three separate counts; sex ratio counts, crow counts, and brood counts, to arrive at an annual production estimate and a population estimate.

II. Procedure

A. Personnel

The entire staff can be utilized in making casual observations of pheasant sex ratio and brood counts. One person will be needed to complete the crow count survey.

B. Date, Time, Weather

1. Sex ratio count

Sex-ratio information is obtained during January and February. The best time of day to check for pheasants is from 7:30 a.m. to 9:30 a.m. and from 3:45 p.m. to 5:15 p.m. Shortly after a snowstorm is particularly a good time to check for pheasants. Checks should not be made during extreme cold weather, strong winds, or during snowfall.

2. Crow counts

Crow counts should be conducted weekly from April 15 to June 1, which is the cock's peak crowing season. The counts will begin 40 minutes before the official sunrise time. Counts will not be conducted when wind velocities exceed 4 mph, rain is falling, or on unusually cold mornings.

3. Brood Counts

Brood counts are conducted through casual observation from August 1 to September 1.

C. Survey Units or Census Route

There are no established census routes for the sex-ratio count or the brood counts.

The crow count survey consists of two, nine station survey routes, one on the east side and one on the west side of the refuge. The station locations are shown in exhibit 15-A.

D. Equipment

Binoculars and a stopwatch will be needed to conduct the pheasant surveys.

E. Inventory Procedure

1. Sex-ratio counts

Sex ratio information is generally most accurate when counts are conducted during winter months when snow is on the ground, and shortly after snowstorms. At these times birds are usually grouped, and cocks and hens are equally conspicuous. Sex-ratio counts should be taken by all members of the staff while traveling to and from job sites. When a group of birds are sighted, the total number of hens and roosters in the groups will be recorded. The time of day and location will also be recorded to avoid duplication by other staff members.

2. Crow counts

The crow count census has been designed to sample nearly all of the pheasant habitat. After arriving at a crow count station, the observer should stand away from the vehicle and listen for two minutes, recording the number of cocks heard crowing, then proceed rapidly to the next station where the procedure is repeated. All roosters and hens seen while listening and driving between stations are recorded. Crow count census data will be recorded on the Pheasant Crow Count Form (exhibit 15-B).

3. Brood counts

Brood counts are taken by all members of the staff during the work day. When a brood is encountered the total number of chicks are counted with the time of day and location recorded. Brood count data will be recorded on the wildlife observation sheet posted at the refuge office.

F. Recordkeeping

Pheasant crow count data is summarized on the form listed in exhibit 15-C.

The spring breeding population index may be determined by June 1 after sex ratio and crowing counts have been conducted. The index provides a trend for year to year comparisons of pheasant populations. The following formula provides a means for determining a spring breeding population estimates. It is assumed that the crow count stations sample 100% of the available refuge pheasant habitat.

$$Ps = (C + CH)N$$

Ps = Spring breeding population estimate
C = Average of highest number of cock calls per station
H = Hens per cock
N = Number of crow count stations

The fall population is determined by combining information from the sex-ratio count, crow counts, and brood counts. This will again provide an index for year to year comparisons of fall pheasant populations.

The following formula is used to determine the fall population estimate.

$$Pf = (C + CH + CHY)N$$

Pf = Fall population estimate
C = Average of highest number of cock calls per unit
H = Hens per cock
Y = Young per hen (this also includes hens without broods)
N = Number of crow count stations

The difference between Ps and Pf will yield the annual production estimate.

In the event that there are not enough brood observations to obtain a young per hen estimate, a

standard brood size of 2.6 young will be used. This figure takes into consideration hens that do not produce successful broods because of nest destruction and predation.

III. Special Considerations

If staffpower shortages do not allow all crow count stations to be surveyed one-half of the stations can be surveyed. In the calculations Ps and Pf can be multiplied by 2 to derive the population estimates.

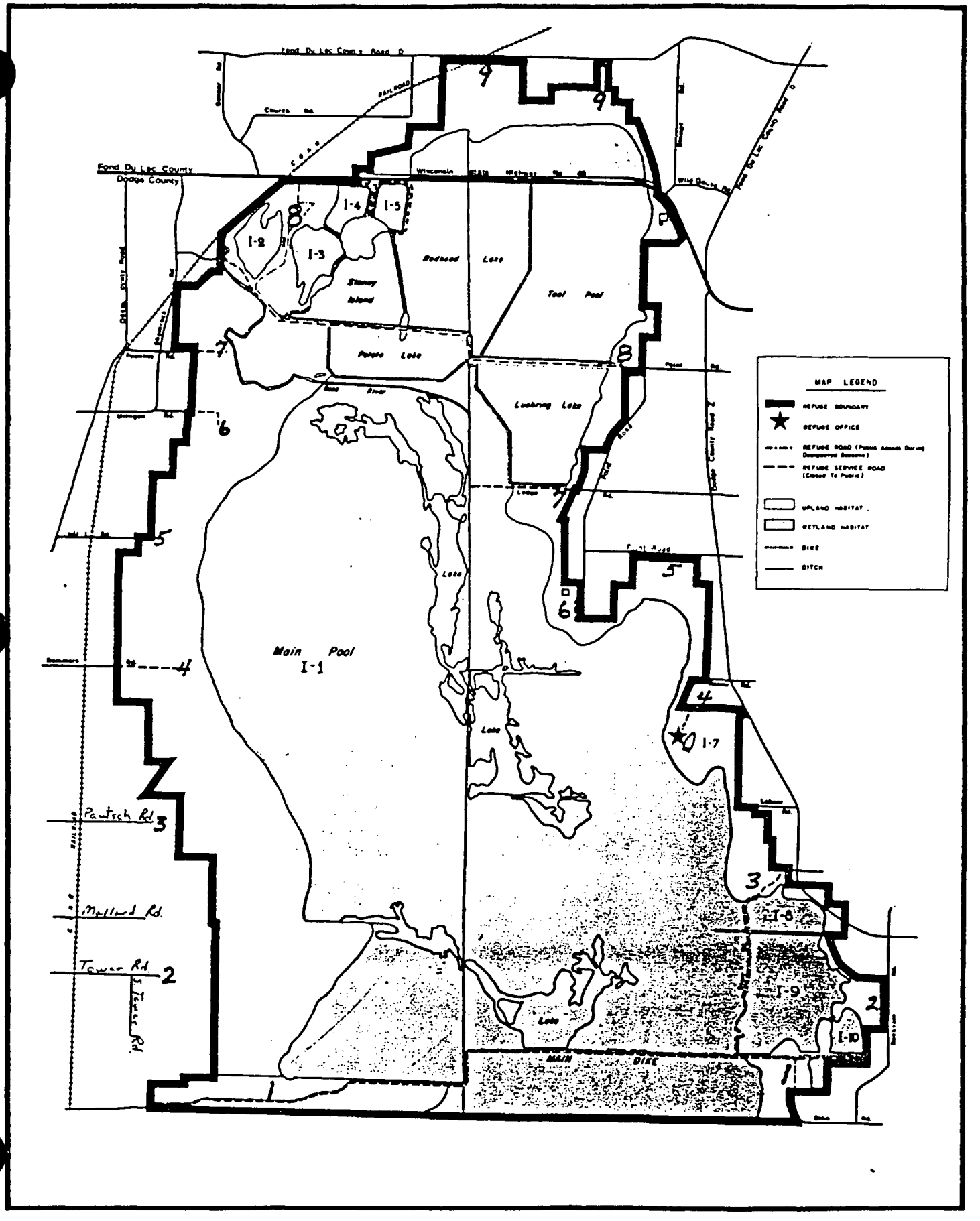
This pheasant inventory technique is modified after a technique developed by Monte Vista National Wildlife Refuge.

IV. Staffpower and Costs

Staffpower	12 staff hours (6 surveys)	$ 171.00
Vehicle	120 miles	27.00
Administration	3 staff hours	43.00
Total		$ 241.00

Exhibit 15-A

Pheasant Crow Count Stations



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SCALE

DODGE AND FOND DU LAC COUNTIES, WISCONSIN

Exhibit 15-B

HORICON NATIONAL WILDLIFE REFUGE
ROUTE 2, MAYVILLE, WISCONSIN

PHEASANT CROWING COUNT
DATA SHEET

Observer_____

Date_____

	Time	Weather (temp., sky and wind)
Start	_____	_____
Finish	_____	_____

STOP NO.	TIME	CROWINGS HEARD	BIRDS SEEN COCKS	BIRDS SEEN HENS
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
TOTAL				

Remarks:

Approx. spring sunrise time at Horicon

DATE	APRIL	MAY	JUNE
1		4:46	4:14
2		4:45	4:14
3		4:43	4:13
4		4:42	4:13
5		4:41	4:12
6		4:39	4:12
7		4:38	4:12
8		4:37	4:11
9		4:35	4:11
10	5:20	4:34	4:11
11	5:18	4:33	4:11
12	5:17	4:32	4:11
13	5:15	4:31	4:10
14	5:13	4:29	4:10
15	5:11	4:28	4:10
16	5:10	4:27	4:10
17	5:08	4:26	4:10
18	5:06	4:25	4:11
19	5:05	4:24	4:11
20	5:03	4:23	4:11
21	5:01	4:22	
22	5:00	4:21	
23	4:58	4:20	
24	4:57	4:20	
25	4:55	4:19	
26	4:54	4:18	
27	4:52	4:17	
28	4:51	4:17	
29	4:49	4:16	
30	4:48	4:15	
31		4:15	

Instructions

Arrive at first stop 40 minutes before sunrise and fill in pertinent blanks. At 35 minutes before sunrise take a position at least 15 feet from vehicle and listen for 2 minutes, counting every crowing heard. After the 2 minutes return to car and record number of crowings. Proceed to the next station as quickly as is safely possible and repeat. Avoid unnecessary delays. Record number of hens and cocks seen while listening and also those seen in driving between stops.

Exhibit 15-C

HORICON REFUGE

Pheasant Crow Counts
Summary Form

YEAR _____ WATER LEVEL _____ OBSERVERS _____

STATION	Crows per Two Minute Period											Highest calls per Station	Ave. Calls per Station
	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE		
1-E													
2-E													
3-E													
4-E													
5-E													
6-E													
7-E													
8-E													
9-E													
1-W													
2-W													
3-W													
4-W													
5-W													
6-W													
7-W													
8-W													
9-W													
REFUGE TOTAL													
Average for Refuge of Highest Calls per Stop													

Refuge: Horicon National Wildlife Refuge Procedure No.: #16

Species: Woodcock

Title: Woodcock Singing-Ground Survey

I. Purpose

This survey is conducted in conjunction with the national and international woodcock singing ground surveys to provide an index of the current woodcock breeding population. The survey is coordinated by the Wildlife Assistance Office in Madison, Wisconsin.

II. Procedure

A. Personnel

It is desirable that the same individual run the same route year after year, thereby reducing one form of bias. When this is impossible, the new participant must become thoroughly familiar with survey procedures and local route conditions. When observer change is unavoidable, it will be desirable for both observers (previous and new) to conduct the survey together so that there is a smooth transition with no loss of data. Both observers should record their results individually on the Woodcock Singing-Ground Survey Form, Form 3-156 (exhibit 16-A). Be as precise as possible in determining stops so locations will be identical each year.

B. Date, Time, Weather

The survey is conducted between April 25 and May 15 depending upon local spring conditions. Any changes in the survey time period will be made by the survey coordinator.

The observer should be at the starting point shortly after local official sunset. Add the appropriate number of minutes to sunset to determine the starting time for your route; 22 minutes if the sky is clear to 3/4 overcast, and 15 minutes if the sky is more than 3/4 overcast. Surveys should not be conducted when the temperature is below 40°F, in heavy rain or snow, or when the wind velocity is estimated to be over 12 mph.

C. Survey Units or Census Route

The survey route map will be furnished by the survey coordinator. The census route consists of ten stops, each 0.4 miles beyond the previous stop.

D. Equipment

A stopwatch and vehicle odometer are needed to conduct the survey.

E. Inventory Procedure

At stop number one, shut off your vehicle engine, step several feet away, and record the time you begin listening before making the count. Listen for two minutes and record the number of different woodcocks peenting. Then proceed rapidly 0.4 mile to the next stop and repeat procedures. Proceed until all stops have been completed. At each stop, record only individual peenting woodcock, do not record birds you hear performing only the flight song, or the number of peents hear. When no birds are heard peenting, record "0" in the appropriate column. When disturbances at a particular stop made a count invalid, note the type of disturbance and proceed to the next stop. If weather or some other factor causes invalid counts at five or more stops, the route should be rerun on another evening. Upon completion of the route, record the total number of birds heard.

F. Recordkeeping.

As soon as the survey is completed, three copies, including the original, are mailed to the survey coordinator. One copy is retained for the refuge files.

IV. Staffpower and Costs

Staffpower	3 staff hours	$ 43.00
Vehicle	25 miles	7.00
Administration	1 staff hour	14.00
Total		$ 64.00

Exhibit 16-A

NORTH AMERICAN WOODCOCK SINGING GROUND SURVEY

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

CANADIAN WILDLIFE SERVICE, DEPARTMENT OF THE ENVIRONMENT
OTTAWA, ONTARIO, CANADA K1A OH3

SURVEY YEAR: 1988
STATE OR PROVINCE: 51 WI
COUNTY: 027 Dodge
ROUTE NUMBER: 094

DATE OF SURVEY: YEAR 88 MONTH 04 DAY 27

OBSERVER'S NAME (PRINT): R. M. RIEFER

AGENCY: 1 ☐ STATE 3 ☐ PROV. 5 ☒ FED. 7 ☐ OTHER

WAS THIS ROUTE RUN BY YOU LAST YEAR? 82 ROUTE
1 ☐ YES
3 ☒ NO

MAILING ADDRESS: STREET [illegible] CITY [illegible]
STATE/PROVINCE [illegible] ZIP CODE [illegible]

OFFICIAL SUNSET: 7:55 PM

ROUTE NAME:

SKY CONDITION
0 ☒ CLEAR
1 ☐ 1/4 OVERCAST
3 ☐ 1/2 OVERCAST
5 ☐ 3/4 OVERCAST
ADD 22 MIN. TO SUNSET FOR STARTING TIME
7 ☐ >3/4 OVERCAST - ADD 15 MIN

TEMPERATURE

°F		°C
35-39	☐ 31	2-4
40-49	☒ 41	5-9
50-59	☐ 51	10-15
60+	☐ 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 ☒ MILES OR 3 ☐ KM	TIME	NUMBER HEARD PEENTING	DISTURBANCE (SEE BACK) NO[0]	LOW[1]	MOD[3]	HI[5]	REMARKS
1	07.3	8:11	00	X				
2	07.7	8:21	00	X				
3	08.1	8:25	00		X			[illegible]
4	10.3	8:29	00	X				
5	10.9	8:33	00	X				
6	11.3	8:37	00	X				
7	11.7	8:41	00	X				
8	12.1	8:45	01		X			[illegible]
9	12.5	8:49	00	X				
10	12.9	8:51	00					
TOTAL WOODCOCK HEARD PEENTING			01					

DO NOT WRITE IN THIS LINE

TOTAL STOPS	ACCEPTABLE STOPS	TOTAL WOODCOCK ON ACC. STOPS	ROUTE STATUS

SUNSET TIMES FOR THIS ROUTE:

DATE	APR 20	APR 25	APR 30	MAY 5	MAY 10	MAY 15
DAYLIGHT SAVINGS TIME	7 43	7 49	7 55	8 01	8 07	8 12
STANDARD TIME	6 43	6 49	6 55	7 01	7 07	7 12

STATE/PROVINCIAL COORDINATOR: ELDON POLARY 608-264-5469

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 (5°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.

FORM 3-186 (REV. AUG. 1987)

OMB NO. 1018-0019
APPROVAL EXP. AUG 1988

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 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 accompanys 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.

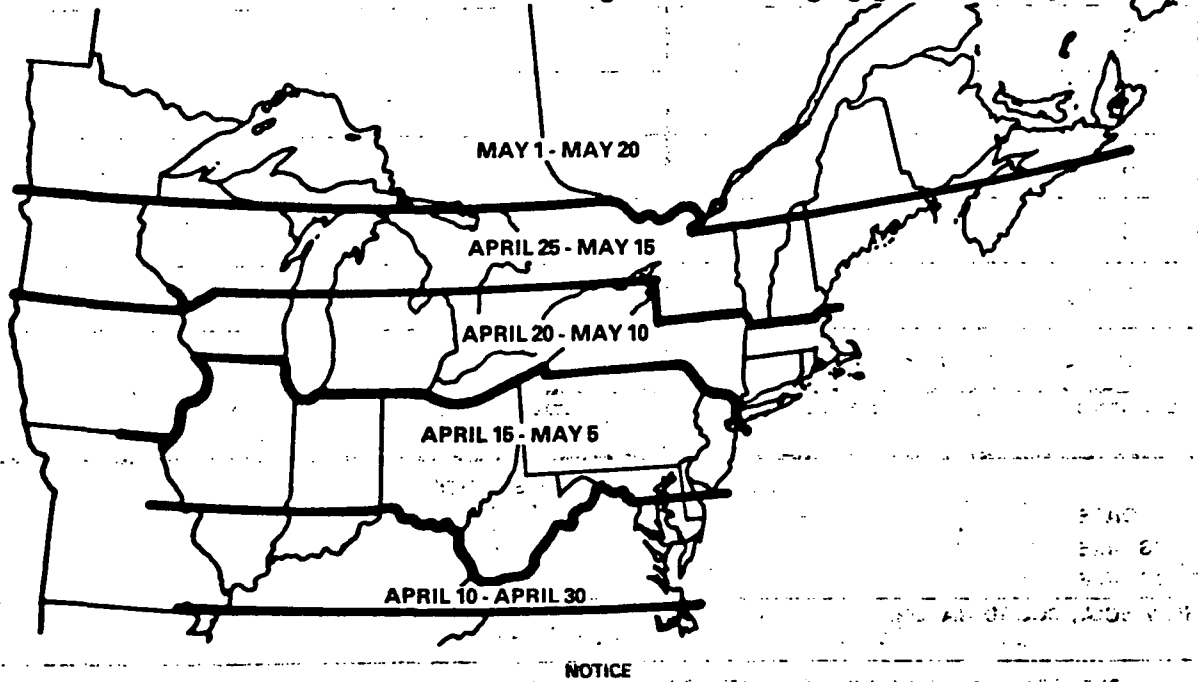
THINGS TO AVOID Do not run routes when the temperature is below 40°F, in heavy precipitation or strong wind.

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. [illegible]).
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.

Refuge: Horicon National Wildlife Refuge Procedure No.: #17

Species: Vegetation and Invertebrates

Title: Vegetation and Invertebrate Abundance

I. Purpose

The purpose of this survey is to evaluate plant and invertebrate response to water level manipulations on refuge impoundments in order to develop a water management regime waterfowl will use. Data gathered over a number of years can be used to predict and refine models of biotic response to water level manipulation on any given impoundment.

II. Procedure

A. Personnel

Two people, a data collector and a recorder, are needed to conduct the field survey. One person is needed to analyze the data.

B. Date, Time, Weather

This survey consist of two sampling periods, June 25-July 5 and July 25-August 5. Each survey requires two days to complete. On the first day vegetation abundance is recorded and invertebrate traps are set out. Forty-eight hours later the invertebrate traps are collected. There are no daily time or weather restraints associated with the survey, however for the safety of the personnel, the survey should not be conducted during a thunderstorm.

C. Survey Units or Census Routes

Sampling transects have been established in Potato Lake, Luehring Lake, Redhead Lake, Teal Pool, Stoney Island, and the Main Pool. There are six transects in the Main Pool and five in each of the other impoundments. No transects have been set up in the remainder of the impoundments, however, they could be set up in a short period of time.

Thirty random sample sites are sampled for the Main Pool and fifteen each for the five remaining impoundments. Sample site locations along transects are determined at random using a random numbers table, as follows:

1. Select thirty four (four extra) random distances for each of the remaining impoundments. These random numbers represent the number of feet from a designated starting point, i.e. the head of transect number one. Table #1 contains the lengths in feet of transects for each of the impoundments

Table #1

	1	2	3	4	5	6
Main Pool						
Teal Pool						
Redhead Lake						
Luehring Lake						
Potato Lake						
Stoney Island						

2. Plot random distance on maps or aerial photos.
3. Determine bearing from randomly selected site on transects to reference points.
4. Determine bearing from starting point to a reference point in the field and on the map. (this will serve as a correction bearing).

D. Equipment

The following checklist contains the equipment needs to complete the this survey:

1. Random numbers table.
2. Protractor for determining bearings on maps or photo's.
3. Maps or aerial photo's of each impoundment.
4. Manual on invertebrate identification.
5. Manual on aquatic vegetation identification.
6. Airboat.
7. Lath-blaze orange-one per sample site.
8. 2 x 2 stakes- 5 to 6 foot-one per sample site.
9. Activity traps (includes quart jars, 5" funnel and rubber straps, rubber bands and paper clips to hold funnel into jar.
10. Extra paper clips and rubber bands.
11. Data sheets, maps with sample site locations, clipboard, pens or pencils.
12. 150 cm sounding pole.
13. Compass.
14. M^2 hoop.
15. Swirl bracket with U.S. standard sieve.
16. Labeled whirl-bags - one per sample site.

17. Formaldehyde or alcohol.
18. Squirt bottle.
19. Plastic gloves to avoid contact with formaldehyde.
20. Container to put sample filled whirl-bags.
21. Microscope and petri dishes.

E. Inventory Procedure

The following steps are taken to locate and record data at each sample site;

Initial Visit:

1. Locate sample site along transect using compass.
2. Mark sample site along transect using orange lath.
3. Mark sample site ten meters perpendicular to transect off right side of boat-place 2 x 2" stake in center of sample plot.
4. Place M^2 hoop at sample site locating 2 x 2" stake in center of hoop.
5. Measure water depth to nearest centimeter. Allow sounding pole to come to rest on bottom, do not push into sediments. If you encounter a floating cattail mat, record depth to top of map and depth to basin bottom.
6. Record coverage for each emergent and submergent plant species and residual vegetation in M^2 area using codes.
7. Fill activity trap with sieved water (water from inside swirl bucket) affix activity trap to stake using rubber strap so that upper lip of funnel is from one to two inches below water surface. Make sure air is not trapped inside jar when in place. Orient funnel towards the west.
8. Record time first and last trap put into place.

Follow-up Visit - 48 hours After Initial Visit:

1. Collect activity trap by raising funnel end first to reduce water loss from jar.
2. Empty contents of activity trap into swirl bucket. Transfer to whirl-bag. Add formaldehyde or alcohol to approximate 5% solution.
3. Remove lath and stake.
4. Record time first and last activity trap retrieved.

The invertebrates in each sample are identified, counted and recorded. The invertebrates are identified using a microscope.

F. Recordkeeping

The data collected at each sample site is recorded.

This information is recorded through voice command from the data collector to the data recorder who is seated on the airboat.

The data collected for each impoundment is summarized in the annual water management plan. Water depth, invertebrate numbers per sample, and percent vegetation coverage by species is calculated for each impoundment. Water depth and invertebrate numbers per sample are averages of the two sample periods. Percent vegetation coverage is calculated from the combined data for the two sample periods according to the following example. Each coverage class is assigned the following percentages; 1=2.5%, 2=15%, 3=37.5%, 4=62.5%, 5=85%, 6=97.5%. For this example assume there were five sample sites per period for a particular impoundment.

Coverage Class TG (Typha Spp) at each sample site

	Period 1	Period 2	
Site 1	1 = 2.5%	2 = 15%	
Site 2	4 = 62.5%	3 = 37.5%	
Site 3	5 = 85%	0 = 0	
Site 4	0 = 0	4 = 62.5%	
Site 5	3 = 37.5%	2 = 15%	
Total	187.5	130 = 317.5	10 sample sites-32.% coverage

III. Special Considerations

To survey all impoundments using this technique would be very time consuming especially identifying and counting all invertebrates in each activity trap. The identification and counting of invertebrates could be contracted out to a university thus relieving the refuge staff of this time consuming process. The cost for the contract could range from $500-$750. To further expedite the survey the invertebrates within each activity trap could be assigned a coverage class in the field as is done with the vegetation. This would eliminate straining the contents of the activity into a whirl pack bag, transporting, storing and analyzing the activity class contents. This technique could cut the pickup time in half and would eliminate the invertebrate identification and counting step.

This survey may be eventually implemented in full if the opportunity arises, but it most likely will be

scaled down to a more manageable survey to be done by refuge staff

IV. Staffpower and Costs

Staffpower	275 hours	$ 3,925.00
Vehicle	75 miles	17.00
Airboat	35 hours	525.00
Supplies		50.00
Administration	15 hours	214.00
Total		$ 4,795.00

Refuge: Horicon National Wildlife Refuge Procedure No.: #18

Species: Sandhill Crane

Title: Aerial Sandhill Crane Production Survey

I. Purpose

The refuge sandhill crane population has increased significantly since 1980. An annual breeding survey is conducted on the refuge in conjunction with a statewide survey sponsored by the International Crane Foundation using volunteers. An aerial sandhill crane production survey would tie in production to this breeding survey.

II. Procedure

A. Personnel

One counter would be needed to conduct the survey.

B. Date, Time, Weather

The survey will be conducted in early May while the cranes are still on their nests. Survey hours will be mid-morning. The survey will not be conducted during rainy weather or in weather too hazardous to fly in.

C. Survey Units or Census Route

There are no set survey units or census routes for this survey. The pilot and counter will assure that all habitat suitable for nesting cranes will be covered.

D. Equipment

The survey will be flown with a helicopter. Nest locations will be plotted on a refuge map.

E. Inventory Procedure

All suitable crane habitat will be flown with a helicopter at an altitude of approximately 200 feet. The counter should be familiar with the refuge to be able to direct the helicopter to areas of the refuge that contain nesting habitat. The periphery of the refuge will also be flown to count pairs which may have lost or are off their nests.

F. Recordkeeping

All nests and pairs found will be plotted on a refuge

map. Total nests and pairs will be tallied.

III. Special Considerations

Care must be taken during the survey so as not to cause undue disturbance to nesting cranes.

IV. Staffpower and Costs

Staffpower	4 staff hours	$ 57.00
Helicopter rental	3 hours	675.00
Administration	2 staff hours	28.00
Total		$ 760.00

Refuge: Horicon National Wildlife Refuge Procedure No.: #19

Species: Woodcock

Title: Refuge Woodcock Singing-Ground Survey

I. Purpose

The refuge contains a good population of woodcock. The survey would provide a breeding population index or estimate for the refuge.

II. Procedure

A. Personnel

One person will be need to run each survey route.

B. Date, Time, Weather

The survey is conducted between April 25 and May 15. The observer should be at the starting point shortly after local official sunset. Add the appropriate number of minutes to sunset to determine the starting time for the route; 22 minutes if the sky is clear to 3/4 overcast, and 15 minutes if the sky is more than 3/4 overcast. Surveys should not be conducted when the temperature is below 40°F, in heavy rain or snow, or when the wind velocity is estimated to be over 12 mph.

C. Survey Units or Census Route

The procedure involves two survey routes. The first starting at the west boundary of the Main Dike proceeding to the east along the Main Dike, Sterr Road, Lehner Road, ending up at the office. This route involves ten stops, the first five 0.4 miles apart.

The second route starts at Sommers Road proceeding to Neitzels Road, Milligan Road, Peachy Road, east along Old Marsh Road to Ledge Road. This route contains ten stops with stops five through eight 0.4 miles apart.

D. Equipment

A stopwatch and vehicle odometer are needed to conduct the survey.

E. Inventory Procedure

At stop number one, shut off your vehicle engine, step several feet away, and record the time you begin listening before making the count. Listen for two minutes and record the number of different woodcock peenting. Then proceed rapidly to the next stop and repeat stop number one procedure. Proceed until all stops have been completed. At each stop, record only individual peenting woodcock, do not record birds you hear performing only the flight song, or the number of peents heard. When no birds are heard peenting, record "0" in the appropriate column. When disturbance at a particular stop make a count invalid, not the type of disturbance and proceed to the next stop. If weather or some other factor causes invalid counts at five or more stops, the route should be rerun on another evening. Upon completion of the route, record the total number of birds heard.

F. Recordkeeping

Form 3-156 (Exhibit 19-2) Woodcock Singing Ground Survey will be used to record data for each survey route. The forms will be kept in the refuge files.

III. Special Considerations

This survey is not part of the National and International woodcock singing ground surveys and therefore the results are kept at the refuge office.

IV. Staffpower and Costs

Staffpower	3 hours	$ 43.00
Vehicle	40 miles	9.00
Administration	2 hours	28.00
Total		$ 80.00

Refuge: Horicon National Wildlife Refuge Procedure No.: #20

Species: Muskrat

Title: Muskrat Survey

I. Purpose

The muskrat population is very important in the management of the marsh habitat. A population estimate is needed to regulate the trapping program of muskrats to provide an optimal population.

II. Procedure

The actual method of this survey has not yet been determined. An amendment to the wildlife inventory plan will be added once methods of muskrat population estimates have been researched and then written.