



United States Department of the Interior

U.S. GEOLOGICAL SURVEY

Northern Prairie Wildlife Research Center
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Jamestown, North Dakota 58401-7317

February 2, 2006

Memorandum

To: Bruce Toay, Kulm Wetland Management District
From: Thomas Buhl, Biological Science Technician *Tom*
Subject: 2005 Mayfield Report and Habitat/Nest Records

Enclosed are the Mayfield results for the 2005 nesting season plus approximately 100 Habitat/Nest Records.

You and your crew did a good job on filling out the Habitat/Nest Records. However, two consistent errors did occur on the Nest Depredation Form.

1). The % of Displaced Nest Material by Distance from Nest needs to equal 100%. If 40%, Box 25 coded (5), of Nest Material is "Pulled out on Ground" from 0 - 20 cm from the nest, the % of Displaced Nest Material by Distance should be coded Box 26 (7), Box 27 (0) and Box 28 (0).

2). The Number of Shells by Type, Number with "Small" and "Large" Holes are not matching the Location of Openings in Eggshells. The Number of Fractured, Number Trampled and Number Crushed are not to be added to the total to be distributed in Boxes 57-70.

I've included an example card to help with the explanation.

Feel free to call me at 701/253-5530 or email thomas_buhl@usgs.gov if you have any questions.

Enc.

NEST DEPREDATION FORM

ALL DESCRIPTORS PERTAIN TO EVIDENCE
FOUND WITHIN A 3-M RADIUS OF NEST

1
3
DATA CONTROL

2 3 4 5
K u l m
COOPERATOR

6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

K L E Ø Ø 1 2 Ø Ø 5 Ø 1 1 Ø 5 2 7 B T

STUDY AREA FIELD YEAR NEST NUMBER MONTH DAY OBSERVER

NEST MATERIAL DISPLACEMENT

% OF NEST MATERIAL PULLED OUT ON GROUND
25
5

USE FOR ALL
(Ø) NONE
(1) TRACE
(2) 1-5%
(3) 6-10%
(4) 11-25%
(5) 26-50%
(6) 51-75%
(7) 76-100%

% OF DISPLACED MATERIAL BY DISTANCE FROM NEST
GROUND DISPLACED
26 27 28
7 Ø Ø

AERIALY DISPLACED
29
Ø

AERIALY DISPLACED
30 31 32
Ø Ø Ø

≤20 CM >20 CM - 1 M >1 - 3 M
DISTANCE VALUES MUST TOTAL 0% OR 100%

CACHED EGGS
IN NEST OUTSIDE NEST
33 34 35 36 37
Ø Ø Ø Ø Ø

SOIL DEPTH OVER DEEPEST EGG OUTSIDE NEST
(Ø) NONE (2) >1 - 3 CM
(1) ≤1 CM (3) >3 CM

DUG AREAS
NUMBER WIDTH OF WIDEST
38 39 40
Ø Ø Ø

(Ø) NONE/NA
(1) 1-5 CM
(2) 6-10 CM
(3) 11-20 CM
(4) >20 CM

WHOLE EGGS
IN NEST OUTSIDE NEST
41 42 43 44
Ø Ø Ø Ø

NUMBER FOUND; ENTER (Ø) IF NONE

INSTRUCTIONS BASED ON SHELL TYPES FOUND
TYPE OF EGGSHELLS FOUND
45
2

(Ø) NO SHELL(S) OR FRAGMENT(S); SKIP BOXES 46-78
(1) ONLY FRAGMENT(S); SKIP BOXES 46-55 AND BOXES 57-78
(2) ≥1 SHELL; FILL ALL REMAINING BOXES

NUMBER OF SHELLS BY TYPE
46 47 48 49 50 51 52 53 54 55 56

NUMBER WITH SMALL HOLES Ø Ø

NUMBER WITH LARGE HOLES Ø 2

NUMBER FRACTURED Ø 6

NUMBER TRAMPLED Ø Ø

NUMBER CRUSHED Ø Ø

AMOUNT OF FRAGMENTS 2

(Ø) NONE
(1) TRACE
(2) <1 EGG
(3) 1-3 EGGS
(4) >3 EGGS

>3/4 SHAPE INTACT >1/2 - 3/4 SHAPE INTACT

CONNECTED PIECES >1/2 EGG BUT ONLY 1/4 - 1/2 SHAPE INTACT

CONNECTED PIECES >1/2 EGG ON FLATTENED MEMBRANE; <1/4 SHAPE INTACT

CONNECTED PIECES >1/2 EGG WADDLED IN SPHERE; <1/4 SHAPE INTACT

INDIVIDUAL OR CONNECTED PIECES ≤1/2 EGG

LOCATION OF OPENINGS IN EGGSHELLS
LOCATION VALUES MUST EQUAL NUMBER OF SMALL AND LARGE HOLES
57 58 59 60 61 62
Ø 1 Ø 1 Ø Ø

SIDE END SIDE/END

SHELLS WITH MULTIPLE OPENINGS
63 64
Ø Ø

NUMBER OF SHELLS WITH ≥2 OPENINGS; ENTER (Ø) IF NONE

SHELLS WITH CONTENTS
65 66 67 68 69 70
Ø 1 Ø 1 Ø Ø

CLEAN CONSPICUOUS YOLK BUT <1/4 CONTENTS PRESENT CONSPICUOUS YOLK AND ≥1/4 CONTENTS PRESENT

GIVE NUMBER; ENTER (Ø) IF NONE

FOR ALL SHELLS EXCEPT FRAGMENTS AND WHOLE EGGS; BOXES 46-55

SHELL LOCATIONS
71 72 73 74 75 76 77 78
Ø 5 Ø 3 Ø Ø Ø Ø

IN NEST EDGE - 20CM FROM NEST >20CM - 1M FROM NEST >1-3M FROM NEST

NUMBER IN EACH CATEGORY; ENTER (Ø) IF NONE

DEAD HEN OR DUCKLING(S)
79 80
Ø Ø

HEN DUCKLINGS

(Ø) NO EVIDENCE HEN DEAD
(1) LOOSE FEATHERS OR BLOOD
(2) CARCASS PARTS WITH HEAD ATTACHED
(3) CARCASS PARTS WITH HEAD DETACHED
(4) WHOLE CARCASS

NUMBER FOUND DEAD
(Ø) NONE
(1-8) NUMBER
(9) ≥9

PREDATOR SPECIES
81
-

COMMENTS
82
-

(-) NO COMMENTS PROVIDED
(1) IMPORTANT COMMENTS PROVIDED

NESTING RESULTS BY SAREA AND FIELD, ALL SPECIES COMBINED

COOPERATOR OR RESEARCH PROJECT=KULM WMD YEAR=2005

SPECIFIC										MAYFIELD		MAYFIELD	MLE	MLE	MLE
STUDY	FIELD	WITHIN	NORMAL	SUCCESSFUL	UNSUCCESS-	FATE	EXPOSURE	APPARENT		LOWER	MAYFIELD	UPPER	LOWER	HATCH	UPPER
AREA	A	STUDY	AREA	NESTS	NESTS	FUL NESTS	UNKNOWN	DAYS	HATCH	95% CL	HATCH	95% CL	95% CL	RATE	95% CL
KLE		001		68	48	20		0	869.4	0.706	0.318	0.453	0.645	0.324	0.459 0.652

NESTING RESULTS BY SAREA AND SPECIES

COOPERATOR OR RESEARCH PROJECT=KULM WMD YEAR=2005

STUDY AREA WITHIN PROJECT		HOST SPECIES	NORMAL NESTS	SUCCESSFUL NESTS	UNSUCCESSFUL NESTS	FATE UNKNOWN	EXPOSURE DAYS	APPARENT HATCH RATE
KLE		MALLARD	47	33	14	0	543.9	0.702
KLE		GADWALL	13	9	4	0	205.5	0.692
KLE		B-W-T	1	1	0	0	26.0	1.000
KLE		SHOVELER	2	0	2	0	14.0	0.000
KLE		PINTAIL	5	5	0	0	80.0	1.000

STUDY AREA WITHIN PROJECT	MAYFIELD LOWER 95% CL	MAYFIELD HATCH RATE	MAYFIELD UPPER 95% CL	MLE LOWER 95% CL	MLE HATCH RATE	MLE UPPER 95% CL
KLE	0.256	0.412	0.660	0.263	0.420	0.670
KLE	0.261	0.513	0.994	0.266	0.517	1.003
KLE	1.000	1.000	1.000	96E118	96E118	96E118
KLE	0.000	0.005	4.350	0.000	0.000	0.000
KLE	1.000	1.000	1.000	25E109	25E109	25E109

NESTING RESULTS BY STUDY AREA, ALL SPECIES AND FIELDS COMBINED

COOPERATOR OR RESEARCH PROJECT=KULM WMD YEAR=2005

STUDY AREA	NORMAL NESTS	SUCCESSFUL NESTS	UNSUCCESSFUL NESTS	FATE UNKNOWN	EXPOSURE DAYS	APPARENT HATCH RATE	MAYFIELD LOWER 95% CL	MAYFIELD HATCH RATE	MAYFIELD UPPER 95% CL	MLE LOWER 95% CL	MLE HATCH RATE	MLE UPPER 95% CL
ALL	68	48	20	0	869.4	0.706	0.318	0.453	0.645	0.324	0.459	0.652
KLE	68	48	20	0	869.4	0.706	0.318	0.453	0.645	0.324	0.459	0.652

NESTING RESULTS BY SPECIES, ALL STUDY AREAS COMBINED

COOPERATOR OR RESEARCH PROJECT=KULM WMD YEAR=2005

HOST SPECIES	NORMAL NESTS	SUCCESSFUL NESTS	UNSUCCESSFUL NESTS	FATE UNKNOWN	EXPOSURE DAYS	APPARENT HATCH RATE	MAYFIELD LOWER 95% CL	MAYFIELD HATCH RATE	MAYFIELD UPPER 95% CL	MLE LOWER 95% CL	MLE HATCH RATE	MLE UPPER 95% CL
MALLARD	47	33	14	0	543.9	0.702	0.256	0.412	0.660	0.263	0.420	0.670
GADWALL	13	9	4	0	205.5	0.692	0.261	0.513	0.994	0.266	0.517	1.003
B-W-T	1	1	0	0	26.0	1.000	1.000	1.000	1.000	96E118	96E118	96E118
SHOVELER	2	0	2	0	14.0	0.000	0.000	0.005	4.350	0.000	0.000	0.000
PINTAIL	5	5	0	0	80.0	1.000	1.000	1.000	1.000	25E109	25E109	25E109
ALL	68	48	20	0	869.4	0.706	0.318	0.453	0.645	0.324	0.459	0.652

NESTS NOT USED IN MAYFIELD CALCULATIONS

OBS	PROJECT	SAREA	FIELD	SPECIES	YEAR	NEST	NESTFATE	CAUSE	INCUB	COMMENT
1	KULM	KLE	001	1320	2005	4	3	1	4	INVESTIGATOR/PREDATOR/PARASITIC DISTURBANCE
2	KULM	KLE	001	1320	2005	8	3	1	12	INVESTIGATOR/PREDATOR/PARASITIC DISTURBANCE
3	KULM	KLE	001	3310	2005	10	1	.	.	"OTHER" SPECIES
4	KULM	KLE	001	1720	2005	12	1	.	.	"OTHER" SPECIES
5	KULM	KLE	001	1320	2005	34	1	.	55	EXPOSURE DAYS LE 0
6	KULM	KLE	001	3310	2005	41	1	.	.	"OTHER" SPECIES

NESTING RESULTS OF CANADA GEESE BY SAREA AND FIELD COOPERATOR OR RESEARCH PROJECT=KULM WMD YEAR=2005

STUDY AREA	SPECIFIC FIELD WITHIN A STUDY AREA	NORMAL NESTS	SUCCESSFUL NESTS	UNSUCCESS- FUL NESTS	FATE UNKNOWN	APPARENT HATCH RATE
KLE	001	1	1	0	0	1.000

COOPERATOR OR RESEARCH PROJECT=KULM YEAR=2005 STUDY AREA WITHIN PROJECT=KLE SPECIFIC FIELD WITHIN A STUDY AREA=001

NEST	SPECIES	VISITS	DATEDEST	AGEDEST	MXAGEERR	VSTLAPSE	DAYSICUB	CLUTSIZE	PSHL_EGG	AMTFRAGS	EGSATNST
58	GAD	1	07/06	28	6	12	12	10	10	<1	0
27	MAL	1	06/03	13	7	14	0	6	117	<1	0
28	MAL	1	06/02	31	6	14	15	10	20	Tr	0
29	MAL	1	06/03	13	7	14	0	6	100	Tr	0
31	MAL	1	06/03	22	7	14	4	11	45	<1	0
37	SHO	1	06/03	22	7	14	4	11	82	<1	0
42	MAL	1	06/01	30	5	14	17	8	63	<1	0
71	GAD	1	07/20	20	8	15	4	8	13	0	7
47	MAL	1	06/16	24	10	20	10	8	38	>1	0
3	MAL	1	05/14	19	13	22	0	10	50	<1	0

NEST	SHLATNST	PSMALL	PLARGE	PFRACT	PTRAMP	PCRUSH	PSHLINST	PSH_20CM	PSH_LE1M	PSH_GT1M	SMLGSHEL
58	1	0	0	100	0	0	0	100	100	0	0
27	7	43	57	0	0	0	14	57	86	14	7
28	2	100	0	0	0	0	0	50	100	0	2
29	6	67	33	0	0	0	0	17	100	0	6
31	5	20	40	40	0	0	0	60	100	0	3
37	9	0	56	44	0	0	0	33	67	33	5
42	5	20	40	40	0	0	0	20	100	0	3
71	1	100	0	0	0	0	100	100	100	0	1
47	3	0	100	0	0	0	0	67	100	0	3
3	5	0	40	60	0	0	40	100	100	0	2

[illegible]

DEPREDATED NESTS

COOPERATOR OR RESEARCH PROJECT=KULM YEAR=2005 STUDY AREA WITHIN PROJECT=KLE SPECIFIC FIELD WITHIN A STUDY AREA=001
(continued)

NEST	SPECIES	VISITS	DATEDEST	AGEDEST	MXAGEERR	VSTLAPSE	DAYSICUB	CLUTSIZE	PSHL_EGG	AMTFRAGS	EGSATNST
18	MAL	1	05/14	15	13	22	0	6	83	0	0
21	MAL	1	05/08	35	3	22	20	12	8	Tr	0
22	MAL	1	05/08	35	3	22	21	11	91	>1	0

NEST	SHLATNST	PSMALL	PLARGE	PFRACT	PTRAMP	PCRUSH	PSHLINST	PSH_20CM	PSH_LE1M	PSH_GT1M	SMLGSHEL
18	5	40	60	0	0	0	100	100	100	0	5
21	1	0	0	100	0	0	0	100	100	0	0
22	10	10	30	60	0	0	60	100	100	0	4

NEST	PSIDE	PENDS	PBOTH	MULTIPLE	YOLK	PNESTGRD	PNESTAIR	CACHEGGS	DUGAREA	HENDEAD	PREDATOR
18	20	0	80	0	2	0	0	0	N	0	
21	.	.	.	0	0	0	0	0	N	0	b
22	50	50	0	0	0	0	0	0	N	0	RS

HATCHED AND DESTROYED NESTS, Z= . P= .

OBS	FATES	COOPERATOR OR RESEARCH PROJECT	YEAR	Total No. Nests	No. 2 Vis. in Incub	% with Missing Eggs	Mean No. Days	St. Dev. Days	Mean Egg loss rate	St. Dev. Loss Rate
1	Hatched	KULM	2005	48	22	36.3636	14.4545	3.86347	.0083705	0.021221
2	Destroyed	KULM	2005	19

	REMOVE, KEEP, OR ASSIGN	=<14 DAY VISIT LAPSE			=<21 DAY VISIT LAPSE			=<28 DAY VISIT LAPSE		
		NO. AFFECT	NO. REMAIN	% OF N	NO. AFFECT	NO. REMAIN	% OF N	NO. AFFECT	NO. REMAIN	% OF N
TOTAL CLUTCHES			68			68			68	
DEST BY PREDATOR		19	19		19	19		19	19	
GE SIX EGGS		13	13		13	13		13	13	
VISIT LAPSE		7	7		9	9		13	13	
MISSING DATA		0	7		0	9		0	13	
SAMPLE SIZE (N)			7			9			13	
NO EGGSHELLS	K	0	0	0.0	0	0	0.0	0	0	0.0
TRACE OR MORE FRAGMENTS	R	0	0	0.0	0	0	0.0	0	0	0.0
DUG AREA	R	0	0	0.0	0	0	0.0	0	0	0.0
CARCASS/CARCASS PARTS	R	0	0	0.0	0	0	0.0	0	0	0.0
CACHED EGGS	R	0	0	0.0	0	0	0.0	0	0	0.0
- - - - -LIKELY FOX - - - - -										
> TRACE AERIALLY										
DISPLACED NEST MATERIAL	R	0	0	0.0	0	0	0.0	0	0	0.0
WHOLE EGGS	R	0	0	0.0	0	0	0.0	0	0	0.0
- - - - -ASSIGNED TO FOX - - - - -										
>25% OF NEST MATERIAL										
DISPLACED ON GROUND	R	0	0	0.0	0	0	0.0	0	0	0.0

- - - - - SUMMARY - - - - -

MAX % LIKELY DESTROYED BY REDFOX	0.0	0.0	0.0
TOTAL % ASSIGNED TO REDFOX	0.0	0.0	0.0

SKUNK
KULM 2005

	REMOVE, KEEP, OR ASSIGN	=<14 DAY VISIT LAPSE			=<21 DAY VISIT LAPSE			=<28 DAY VISIT LAPSE		
		NO. AFFECT	NO. REMAIN	% OF N	NO. AFFECT	NO. REMAIN	% OF N	NO. AFFECT	NO. REMAIN	% OF N
TOTAL CLUTCHES			68			68			68	
DEST BY PREDATOR		19	19		19	19		19	19	
GE SIX EGGS		13	13		13	13		13	13	
VISIT LAPSE		7	7		9	9		13	13	
MISSING DATA		0	7		0	9		0	13	
SAMPLE SIZE (N)			7			9			13	
HEN KILLED	R	0	7	100	1	8	88.9	1	12	92.3
CACHED EGGS	R	0	7	100	0	8	88.9	0	12	92.3
EGGSHELLS OF >60% OF DEPREDATED EGGS	K	4	4	57.1	4	4	44.4	6	6	46.2
>50% OF EGG SHELLS HAVE SMALL HOLES	R	1	3	42.9	1	3	33.3	1	5	38.5
>50% OF OPENINGS IN EGGSHELLS ON AN END	R	1	2	28.6	1	2	22.2	1	4	30.8
EGGSHELL WITH MULTIPLE OPENINGS	R	1	1	14.3	1	1	11.1	1	3	23.1

EGGSHELL WITH >25% OF CONTENTS PRESENT	R	0	1	14.3	0	1	11.1	1	2	15.4
> TRACE OF AERIALY DISPLACED NEST MATERIAL	R	0	1	14.3	0	1	11.1	0	2	15.4
- - - - - LIKELY SKUNK - - - - -										
>25% OF EGGSHELLS >1 M FROM NEST	R	0	1	14.3	0	1	11.1	0	2	15.4
CRUSHED EGGSHELL	R	0	1	14.3	0	1	11.1	0	2	15.4
DUG AREA	R	0	1	14.3	0	1	11.1	0	2	15.4
- - - - - ASSIGNED TO SKUNK - - - - -										
WHOLE EGG	R	0	1	14.3	0	1	11.1	0	2	15.4
- - - - - SUMMARY - - - - -										
MAX % LIKELY DESTROYED BY SKUNK				14.3			11.1			15.4
TOTAL % ASSIGNED TO SKUNK				14.3			11.1			15.4

RACCOON
KULM 2005

	REMOVE, KEEP, OR ASSIGN	=<14 DAY VISIT LAPSE			=<21 DAY VISIT LAPSE			=<28 DAY VISIT LAPSE		
		NO. AFFECT	NO. REMAIN	% OF N	NO. AFFECT	NO. REMAIN	% OF N	NO. AFFECT	NO. REMAIN	% OF N
TOTAL CLUTCHES			68			68			68	
DEST BY PREDATOR		19	19		19	19		19	19	
GE SIX EGGS		13	13		13	13		13	13	
VISIT LAPSE		7	7		9	9		13	13	

MISSING DATA		0	7		0	9		0	13	
SAMPLE SIZE (N)			7			9			13	
HEN KILLED	R	0	7	100	1	8	88.9	1	12	92.3
CACHED EGGS	R	0	7	100	0	8	88.9	0	12	92.3
DUG AREA	R	2	5	71.4	2	6	66.7	2	10	76.9
EGGSHELLS OF >60% OF DEPREDATED EGGS	K	2	2	28.6	2	2	22.2	4	4	30.8
>50% OF EGG SHELLS HAVE SMALL HOLES	R	0	2	28.6	0	2	22.2	0	4	30.8
>50% OF OPENINGS IN EGGSHELLS ON SIDE/SIDE-END	R	1	1	14.3	1	1	11.1	2	2	15.4
EGGSHELL WITH MULTIPLE OPENINGS	R	0	1	14.3	0	1	11.1	0	2	15.4
EGGSHELL WITH >25% OF CONTENTS PRESENT	R	0	1	14.3	0	1	11.1	0	2	15.4
> TRACE OF AERIALY DISPLACED NEST MATERIAL	R	0	1	14.3	0	1	11.1	0	2	15.4
- - - - LIKELY RACCOON - - - -										
>25% OF EGG SHELLS >1 M FROM NEST	R	0	1	14.3	0	1	11.1	0	2	15.4
CRUSHED EGG SHELL	R	0	1	14.3	0	1	11.1	0	2	15.4
>25% OF NEST MATERIAL DISPLACED ON GROUND	R	0	1	14.3	0	1	11.1	0	2	15.4
- - - - -ASSIGNED TO RACCOON - - - - -										
WHOLE EGG	R	0	1	14.3	0	1	11.1	0	2	15.4

MAX % LIKELY DESTROYED BY RACCOON	14.3	11.1	15.4
TOTAL % ASSIGNED TO RACCOON	14.3	11.1	15.4

[illegible]

TOTAL CLUTCHES		68			68			68		
DEST BY PREDATOR		19	19		19	19		19	19	
GE SIX EGGS		13	13		13	13		13	13	
VISIT LAPSE		7	7		9	9		13	13	
MISSING DATA		0	7		0	9		0	13	
SAMPLE SIZE (N)		7			9			13		
HEN KILLED	R	0	7	100	1	8	88.9	1	12	92.3
CACHED EGGS	A	0	7	100 (0.0)	0	8	88.9 (0.0)	0	12	92.3 (0.0)
NO EGGSHELLS	R	0	7	100	0	8	88.9	0	12	92.3
LE 1 WITH SMALL HOLE & >25% WITH SMALL HOLES	R	3	4	57.1	3	5	55.6	4	8	61.5
DUG AREAS	A	1	3	42.9 (14.3)	1	4	44.4 (11.1)	1	7	53.8 (7.7)

EGGSHELL WITH

>25% OF CONTENTS	R	0	3	42.9	0	4	44.4	0	7	53.8
> TRACE OF AERIALY DISPLACED NEST MATERIAL	R	1	2	28.6	1	3	33.3	1	6	46.2
EGGSHELLS OF <75% OF DEPREDATED EGGS	K	2	2	28.6	3	3	33.3	5	5	38.5
CRUSHED EGG SHELL	A	0	2	28.6 (0.0)	0	3	33.3 (0.0)	0	5	38.5 (0.0)
>50% OF EGG SHELLS HAVE OPENING IN ENDS	R	0	2	28.6	0	3	33.3	0	5	38.5
>50% OF NESTS WITH >2 EGGSHELLS ARE FRACT/TRAMPLED A	A	0	2	28.6 (0.0)	0	3	33.3 (0.0)	1	4	30.8 (7.7)
- - - - LIKELY BADGER - - - - NO FRAGMENTS	R	0	2	28.6	0	3	33.3	0	4	30.8
- - - - - SUMMARY - - - - -										
MAX % LIKELY DESTROYED BY BADGER				42.9			44.4			46.2
TOTAL % ASSIGNED TO BADGER				14.3			11.1			15.4

Boxes 2-18 Codes must be identical to those on Nest Record for same categories during termination visit.

Boxes 19-22 Month and day of termination visit.

Boxes 23-24 First and last initials of observer.

NEST MATERIAL DISPLACEMENT Boxes 25-32 pertain to the percentage of nest material displaced on ground, the percentage displaced aerially, and the percentage of each in each of 3 distance intervals from the nest.

Box 25 Estimate percentage of total nest material (vegetation, down) pulled from nest and left on ground. Select answer from 8 choices given.

Boxes 26-28 Estimate percentage of the ground-displaced nest material in each of 3 distance intervals. Select answers from 8 choices given.

Box 29 Estimate percentage of total nest material (vegetation, down) aerial displaced and left entangled on vegetation. Select answer from 8 choices given.

Boxes 30-32 Estimate percentage of the aerially-displaced nest material in each of 3 distance intervals. Select answers from 8 choices given.

CACHED EGGS To find cached eggs dig into all areas of disturbed soil/debris. Treat holes that held a cached egg and subsequently retrieved by a predator as cached eggs.

Boxes 33-34 Record number of eggs covered by soil/debris in nest bowl by a predator (do not include abandoned eggs covered with debris by a duck). Record (00) if none.

Boxes 35-36 Record number of cached eggs outside nest bowl. Record (00) if none.

Box 37 Select most appropriate category of depth (cm) of soil/debris covering top of egg that was cached deepest outside nest bowl. Include estimates of depth of covering over eggs that were retrieved from caches.

DUG AREAS Dug areas include areas recently dug but then filled (e.g., site of cached egg) and soil that predators loosened or piled. Do not include holes or diggings of nonpredators.

Boxes 38-39 Record the number of dug areas. Record (99) if uncertain of number but know it was ≥ 1 .

Box 40 Select most appropriate category describing the width in centimeters of the widest dug area.

WHOLE EGGS Whole eggs include cached eggs and eggs with cracks or indentations but no visible egg contents.

Boxes 41-42 Record number of whole eggs in nest bowl. Record (00) if none.

Boxes 43-44 Record the number of whole eggs outside of nest bowl. Record (00) if none.

INSTRUCTIONS TO PROCEED BASED ON EGGSHELLS FOUND AT NEST

Box 45 Select one of the following codes and proceed as instructed: (0) = Not one eggshell or shell fragment is found so skip boxes 46-78 (1) = Only ≥ 1 fragment of an eggshell found so skip boxes 46-55 and boxes 71-78 but fill in box 56 and boxes 79-82 (2) = ≥ 1 eggshell (any type) found so fill in all remaining boxes of form.

NUMBERS OF EGGSHELLS BY TYPE

Boxes 46-47 Record number of shells with small holes. Shells with small holes have $>3/4$ of the shell shape intact (missing portions can be from multiple holes). Record (00) if none.

Boxes 48-49 Record number of shells with large holes. Shells with large holes have $>1/2 - 3/4$ of the shell shape intact (missing portions can be from multiple holes). Record (00) if none.

Boxes 50-51 Record number of fractured shells. Fractured shells have connected pieces that make up $>1/2$ of the shell but only $1/4 - 1/2$ of the shell shape is intact. Record (00) if none.

Boxes 52-53 Record number of trampled shells. Trampled eggshells (shells predator flattened when eating contents or by stepping on or sitting) are flattened membranes with attached shell fragments whose collective pieces make up $>1/2$ of a shell but $<1/4$ of the shell shape is intact. Do not mistake for hatched eggs trampled by hen duck. Record (00) if none.

Boxes 54-55 Record number of crushed shells. Crushed shells are from eggs that predator's crushed in their mouth resulting in a spherical mass of wadded fragments that make up $>1/2$ of an egg's total shell but $<1/4$ of shell shape is intact. Record (00) if none.

Box 56 Select category best describing total amount of shell fragments found. Fragments are individual loose or connected pieces/chips that each represent $\leq 1/2$ of shell: (0) = None found; (1) = Trace (1 or few tiny chips); (2) = Total amount represents <1 egg; (3) = Total amount represents 1-3 eggs; (4) = Total amount represents >3 eggs.

****EGGSHELL OPENING LOCATIONS, SHELLS WITH MULTIPLE OPENINGS, AND SHELLS WITH CONTENTS** Use only eggshells that have small and large holes (Boxes 46-49).

Boxes 57-62 Record number of small- and large-hole eggshells opened on side(s) only, end(s) only, and on both side(s) and end(s). Record (00) for each type for which there are none.

Boxes 63-64 Record number of small- and large-hole eggshells that have ≥ 2 distinct openings separated by >1 cm of unbroken shell (hairline cracks do not constitute a broken shell).

Boxes 65-70 Egg contents are not always completely eaten; uneaten albumen may dry and be inconspicuous but dried yoke is conspicuous. Record number small- and large-hole eggshells that are clean (have no or only trace of conspicuous yoke residue), the number that have conspicuous yoke residue and total residue that comprises $<1/4$ of original egg contents, and the number that have conspicuous yoke contents and total residue that comprises $\geq 1/4$ of original egg contents (includes embryos). Record (00) for each category with none.

SHELL LOCATIONS For purposes here use all shells except fragments (total must equal total in boxes 46-55).

Boxes 71-78 Record number of eggshells of combined types that are in nest, from nest edge to 20 cm from nest, >20 cm - 1 m from nest, and $>1 - 3$ m from nest. Record (00) for each category with none.

DEAD HENS/DUCKLINGS Evidence of a dead hen may be a few feathers or a carcass. Evidence of a dead duckling (duckling outside shell) is a carcass or carcass parts. Assume a dead hen or dead duckling(s) at a nest site are from that nest unless of a different species.

Box 79 Based solely on evidence at nest site select the best category concerning fate of hen: (0) = No evidence hen dead, (1) = Loose feathers or blood indicates hen was killed, (2) = Carcass parts with attached head, (3) = Carcass parts with detached or missing head, (4) = Whole carcass.

Box 80 Record number of dead ducklings. Record (0) if none, record number if 1-8, and record (9) if ≥ 9 .

PREDATOR SPECIES IDENTIFICATION Occasionally the predator species responsible for depredation of the nest is positively known. Indicate if the predator species is positively known; record the species name in the space provided.

Box 81 Record (-) if predator species is unknown. Record (Y) if predator species is positively known. Write species name and describe circumstances.

GENERAL COMMENTS Sometimes it is desirable to provide written comments or drawings to help explain evidence found at a depredated nest. Indicate if comments are provided; write comments in the space provided on the back of the form.

Box 82 Record (-) if no comments are recorded. Record (1) if comments are provided on card.

COMMENTS: