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A Feasibility Study on the Establishment of a Wildlife Population Data Bank for Western Canada

by

Dennis Surrendi
Biologist

Canadian Wildlife Service

January 1971

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A feasibility study on the establishment of a wildlife population data bank for western Canada.

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A Feasibility Study on the Establishment of a Wildlife Population Data Bank for Western Canada

by

Dennis Surrendi

Introduction:

Wildlife ecologists are continually faced with problems demanding immediate information concerning the presence, numbers, dynamics, behaviour and ecology of wildlife populations in specific areas or regions. Although an abundance of data may exist, for all practical purposes much of it becomes useless because of its lack of availability. A system whereby all wildlife population data could be catalogued and made available upon request would be extremely useful to all biologists.

Only after much scrutiny of wildlife population data does one appreciate the diversity of available information as well as the inconsistencies in its documentation. Accommodating these diverse data into a mechanized retrieval system is the primary objective of this study. The system design is not meant to solve population problems nor will it be set up for data analyses. Its primary function will be to provide a method of immediate access to available data with particular emphasis on associating wildlife information with preselected geographic sites or regions and vice versa.

Observational Methods and Documentation:

To cite individual methods of acquiring and documenting wildlife population data would require a major paper, however, some examples are included in Appendix A of this report. In place of these specific examples I have taken the liberty of dividing wildlife population observational methods into the following general groupings with their associated forms of documentation:

A: Surveys

1. Systematic Transects

Characteristics: - fixed distances, similar locations, data comparable from year to year.

- data are either grouped or designated by point locations

Examples:
a. Waterfowl breeding pair, habitat, and production surveys conducted by U.S.B.S.F.W.

b. Ground/Air comparisons in waterfowl transects

c. D.U. ground surveys

d. Some goose surveys

2. Nonsystematic Surveys

Characteristics: - distances covered are variable, may or may not be similar locations.

- data is either grouped or designated by point locations.

- data may or may not be comparable from year to year.

Examples:
a. Big Game surveys

b. Goose surveys

B: Point Observations

- Observations associated with specific geographic locations

- Location designated by land description, longitude and latitude coordinates, names of land forms, or proximity to a known point.

Example: a. Individual observations of wildlife from a vehicle or on foot.

Regardless of which of the above methods are used, certain basic information is common to all types of wildlife observations. The following list probably summarizes these common data:

(1) Major Wildlife Group:

- This would either be assumed or stated

Example: Ducks, Geese, Bear, Rodent, Ungulate etc.

(2) Species:

- Generally this will be stated, however, on some occasions it may not be present. (e.g., some waterfowl surveys may indicate only the numbers of major groups - ducks, geese, etc.).

Example: Mallard, Canada geese, Mule Deer, etc.

(3) Date or Time Period of the Observation:

- All wildlife observations have either the date or time period when the observations occurred.

Example:

	Mo.	Day	Year	
a.	01	12	71	
b.	01	12	71	+ 5 (i.e., Jan. 12,13,14,15,16,17)

(4) Time of Day:

- This may or may not be present

Example: 0800

(5) Number of Animals Observed:

- An accurate count or "educated" guess usually is included in all wildlife observations.

Example: 5000 Snow Geese

(6) General Behaviour:

- These data may or may not be recorded.

Example: Breeding, Feeding, Migrating, etc.

(7) Habitat Type:

- Usually a general description of the habitat type is presented.

Example: a. Muskeg, Terminal Moraine, Parkland, Slough, Willow Bog, etc.

Note: This does not include the quality of the habitat type.

(8) Observational Methods:

- The technique or method involved in obtaining the observation is usually stated or it can be determined by the format of the data.

Example: Aerial Survey (fixed wing), Ground Survey (vehicle), Air Boat, etc.

(9) Location of the Observation(s):

- The location of an observation or a group of observations will usually be stated. However, the fact that some survey data is grouped allows one to extrapolate these data only to a region and not to a point location.

Examples: a. Point locations

(i) Ground observations of waterfowl on specific lakes.

(ii) Waterfowl aerial surveys that indicate populations on specific lakes.

b. Locations by regions normally associated with grouped data

(i) Big game survey on moose between Edmonton and Rocky Mountain House indicating the total moose observed between these points.

(ii) Eighteen mile segments of U.S.B.S.F.W. waterfowl transects with grouped data on waterfowl populations or habitat conditions within each of these segments.

In view of the fact that the preceding data are probably recorded commonly in all wildlife observations, I feel that this information would be desirable as an output from a mechanized data retrieval system. It should again be emphasized that the primary objective of this study is to provide a method of access to population data oriented around species and location (points (1), (2), and (9) above). The data available in 3-8 would allow the researcher to focus upon specific data that may be more relevant to his interests.

The Feasibility of Data Storage, Retrieval, and Access to Records

In order to determine the feasibility of data storage, its retrieval and a method of access to pertinent wildlife data records, the following questions will have to be answered:

(1) Can a coding system be designed to accommodate the nine basic categories of wildlife population data previously stated?
and/or
Can a data retrieval system be designed?

(2) How can a coordinated filing system be established and what method of filing would be best suited for this purpose?

(3) What would the estimated cost be for such an undertaking?

Question #1: Can a coding system be designed to accommodate the nine basic categories of wildlife population data?

Answer: In an attempt to answer this question I will examine each of the data categories to see if each can be coded.

1. Wildlife Group -

Each wildlife group could be assigned a corresponding numerical value. The first three columns of the 80 column data processing cards could accommodate these values, (Column 1-3) and would allow for 999 different major wildlife groups. (These columns have been chosen here simply for presentation purposes. More columns could be used if desired.)

e.g. 001 = Ducks
002 = Geese
003 = Gulls
004 = Hawks
etc.

In all cases the data is "right justified" in the data field so all zeros preceding the above numbers will be assumed by the computer.

Conclusion: This is feasible and could easily be done.

2. Species -

Every wildlife species could be coded with a numerical value. Columns 4-9 could be used allowing for 999,999 species to be recorded.

e.g. 000001 - Mallard
000002 - Pintail
000003 - Grizzly Bear
000004 - Canada Goose

Conclusion: The coding of species could easily be done.

3. Date or Time Period of Observation -

These data could be recorded by numerical codes. Ten columns would be required to accommodate the coding (Columns 10-19).

e.g. a. Specific Date

Day	Mo.	Year	
01	01	1971	= January 1, 1971

b. Time Period

01	01	1971 + 5	= Time period 6 days in duration beginning Jan. 1/71 to Jan. 6/71 inclusive.

The date or time period could also be recorded simply by abbreviation of the months. Using this method would require 11 columns.

e.g. Jan. 01 1971

Jan. 01 1971 + 5

Conclusion: The date or time period of the observation could easily be coded.

4. Time of Day:

The time of day could be coded to the nearest minute (or second if necessary) by using the 2400 hour day. Such a method of coding would involve four digital columns (Columns 20-23) for documentation.

e.g. 0830 = 830 AM

1800 = 600 PM

Conclusion: Coding the time of day that an observation was made could easily be done.

5. Number of Animals Observed:

The exact number or estimated number of wildlife species observed could be transposed directly to data cards without coding. If six columns were used (Columns 24-29), up to 999,999 individuals could be recorded for one observation.

e.g.	001,020	=	1,020
	024,611	=	24,611

Conclusion: There would be no difficulty coding the number of animals observed.

6. General Behavior

Each type of behavior would require a numeric association. This would be similar in method to that previously used in designating a numeric value for species, major group, etc. The description of each form of behavior would be given a numeric value or code. Three columns could be used (Columns 30-32) on the data card to accommodate behavioral information. This system would allow for the compilation of 999 forms of behavior.

e.g.	001	=	Feeding
	101	=	Migrating
	091	=	Incubating
			etc.

Conclusion: Behavior could be coded and stored on data cards.

7. Habitat Type:

The general habitat types would each require a numeric code. If three columns were used, then 999 habitat types could be recorded. (Columns 33-35).

e.g.	001	=	River
	002	=	Spruce/Aspen
	003	=	Tundra
			etc.

Conclusion: Habitat type could be coded and stored on data cards.

8. Observational Methods:

Observational methods would each require a numeric code for computer storage. If three columns were used, then 999 observational methods could be coded. (Columns 36-38).

e.g.	001	=	Fixed Wing Aircraft
	121	=	Helicopter
	917	=	Motor Vehicle
			etc.

Conclusion: These data could easily be transposed and recorded for data processing.

9. Location:

Designing a system that would accommodate point observations, systematic transects, and nonsystematic transects posed a difficult problem. The system would have to integrate systematically obtained regional data (e.g. U.S.B.S.F.W waterfowl survey data), nonsystematically obtained regional data (e.g. Big Game Census), and specific point observations (e.g. Waterfowl on a specific lake or field). Such a system should allow a biologist to obtain wildlife data from a specific point or from preselected regions moving away from a specific point. That is, one should be able to obtain information from general regions to specific locations by a simple sorting procedure.

Ideally, the basis for such a system would provide natural or artificial delineations of Canada with smaller sub-units that would permit categorization of data into relatively small geographic areas. In view of these requirements, I selected the N.T.S. (National Topographic System) mapping index as the basis for delineating the locations of wildlife observations. The N.T.S. index forms a mozaic of Canada (Figure 1) with major blocks having a maximum East-West distance of 8° longitude and a maximum North-South distance of 4° latitude. These major blocks are systematically numbered permitting their immediate location (e.g. Block 82, Figure 1). Each major block is divided into 16 units (Figure 2) having dimensions of 2° longitude from East to West and 1° latitude from North to South. All such units are given a letter code for identification (e.g. Block

FIGURE I:

NATIONAL TOPOGRAPHIC SURVEY MAP INDEX DIVISIONS OF WESTERN CANADA

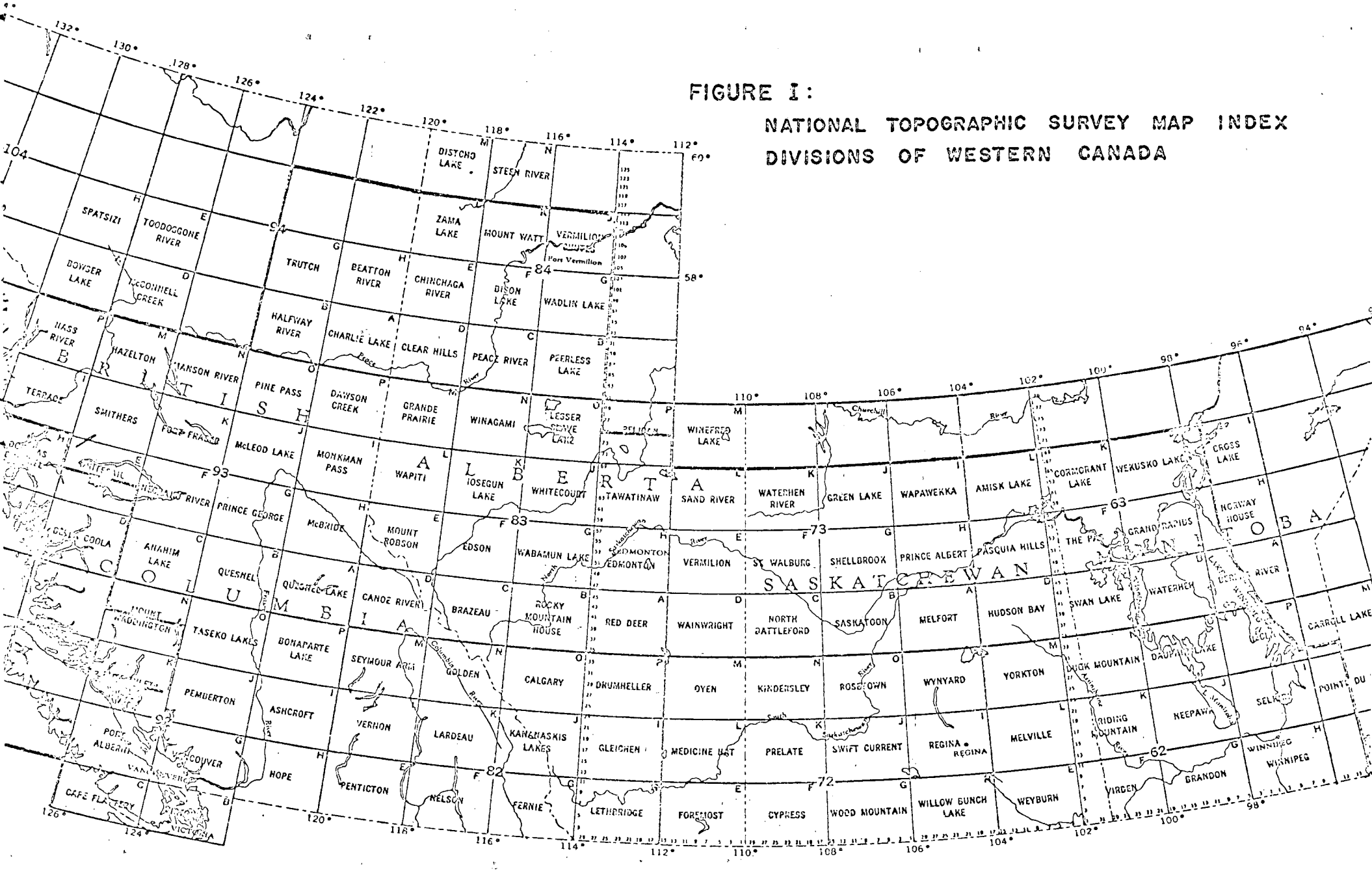
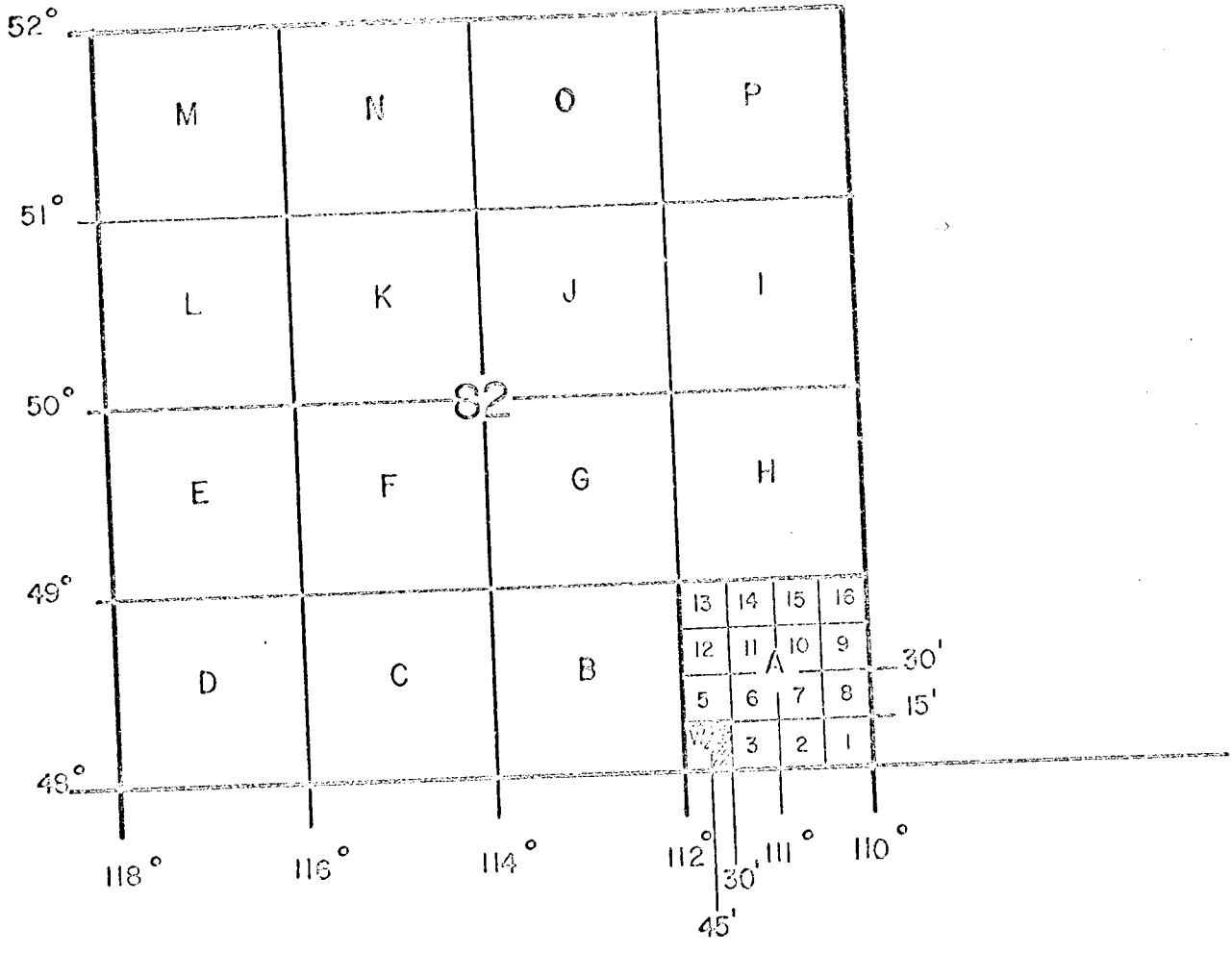


FIGURE II: SUBDIVISIONS OF A MAJOR N.T.S. BLOCK



82, unit A; Figure 2). Within each of the letter coded blocks (e.g. 82A, Figure 2) there are 16 subdivisions with each having dimensions of 15' latitude and 30' longitude. All such subdivisions are coded by a number (e.g. 82A/4, Figure 2). In addition, each subdividion is further divided into east and west blocks having dimensions 15' latitude by 15' longitude (e.g. 82A/4E, Figure 2).

In using the N.T.S. system, one could code surveys and point observations in relation to the respective units from which they were obtained. Within the 15' latitude x 15' longitude blocks or 15' latitude x 30' longitude blocks (which ever was the smallest unit available) point observations could be precisely coded using either longitude-latitude coordinates or land description or both.

The main problem encountered in using any system is the incorporation of grouped survey data or data designated only by region. Regardless of what units one uses in a system, much of the survey data does not coincide with boundary designs. In order to include such data, I made the following decision. Whenever a transect with grouped data passes through, touches, or borders any of the N.T.S. units or sub-units previously described, then the grouped data associated with such a transect shall be coded to each respective N.T.S. unit. Whenever such an N.T.S. unit is examined for wildlife population data, all of the grouped data associated with a survey will be retrieved regardless of where the N.T.S. unit occurs in such a survey.

In order to clarify the methodology and logic involved in such a design the following hypothetical example was constructed.

Example: Using the N.T.S. index for coding the location of wildlife observations.

We would like to obtain all available information on wildlife populations that have been observed at "Mud Lake, Alberta" located on SE¼ 4-3-21 or 49° 30'N latitude and 111° 11' W longitude. Mud Lake can be found on N.T.S. map sheet 82H-4/W (See Figure 3).

The investigator will be at liberty to set the geographic limits from which the wildlife data will be obtained. In this case, I have chosen to obtain information on the specific site (i.e. Mud Lake) then on the regions 82H-4/W, 82H-4, 82H and finally 82.

Note: If I desired, I could obtain information on other areas depending on how relevant I felt the data was to Mud Lake.

Such a data retrieval system would be accomplished by computer sorts of the stored information.

Sample Analysis (See Figure 3):

Sort #1 - Specific Site Data
- Mud Lake data (o)
- Sort would occur for SE¼ 4-3-21 and 49° 30'N latitude - 111° 11'W longitude

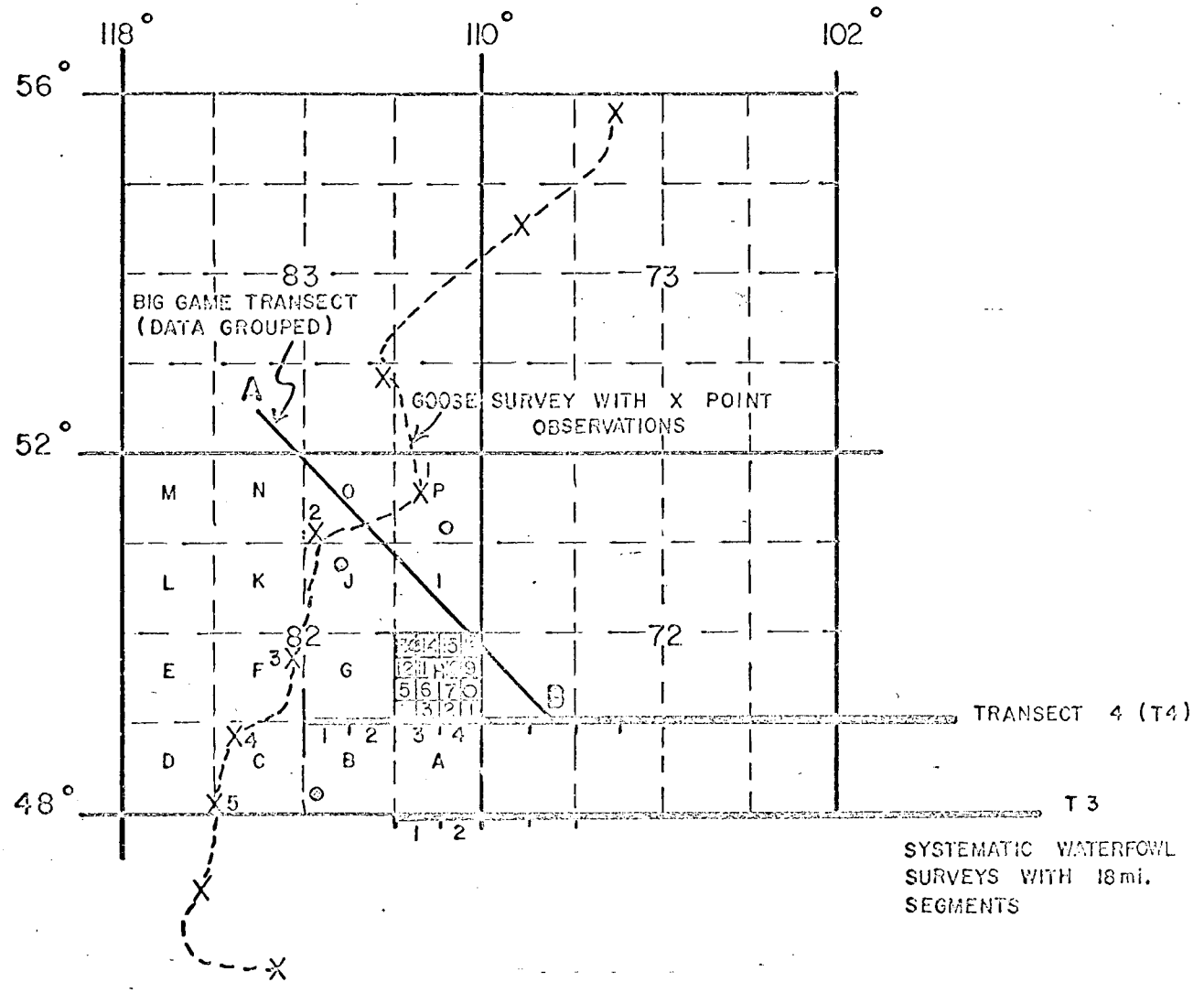
Sort #2 - 82H - 4/W
Total Data Obtained - Mud Lake data (o) + segment 3 of waterfowl Transect 4

Sort #3 - 82H - 4
Total Data Obtained - Mud Lake data (o) + segment 3 of waterfowl Transect 4 (same as Sort #2)

Sort #4 - 82H block
Total Data Obtained - Mud Lake site data (o)
- segments 3 and 4 of waterfowl Transect 4.
- two site observations (o+o)
* - all data for big game survey between points A and B

*Note: Because a portion of this survey passed through the 82H block, then the grouped data for the entire survey will be sorted.

FIGURE III : DATA RETRIEVAL RELEVANT TO N.T.S. LOCATIONS



ORDER OF DATA RETRIEVAL :

Specific ↕ General

1. Data on specific site --- o (location by long. and lat. coordinates) or land description
2. Data for 82 H 4/W --- o + $\frac{}{3}$ T4
3. Data for 82 H 4 --- o + $\frac{}{3}$ T4
4. Data for 82 H --- o + o + o + A $\xrightarrow{(ALL)}$ B + $\frac{}{3\ 4}$ T4
5. Data for 82 --- o + o + o + o + o + o + A $\xrightarrow{(ALL)}$ B + $\frac{}{1\ 2\ 3\ 4}$ T4 + $\frac{}{1\ 2}$ T3 + $X_1 + X_2 + X_3 + X_4 + X_5$

KEY :

o —— POINT OBSERVATION AT " MUD LAKE."

o —— OBSERVATIONS IN N.T.S. BLOCK NO. 82

Sort #5 - 82 block
Total Data Obtained - Mud Lake site data (o)
- segments 1-4 of waterfowl Transect 4
- segments 1 and 2 of waterfowl Transect 3
- five site observations (o+o+o+o+o)
- all of big game data from Transect A-B
- point sitings 1-5 from goose survey

The preceding example could have been sorted in reverse order (i.e. from general to specific).

The coding of locations on data cards could be accommodated in the following columns:

N.T.S. Block code:
- 82 - Columns 39-40
- H - Columns 41-56 (This would allow for a maximum of 16 letter units per major N.T.S. block)
- 4 - Columns 57-72 (Allows for 16 sub-units)
- W - Columns 73-74 (This would allow two spaces for an E. or W. reference to each numbered sub-unit)

Land Description:
- SE - Columns 75-76
- $\frac{1}{4}$ - This could be assumed so it need not be recorded.

(Section No.)
- 4 - Columns 77-78 (Two columns would allow for a maximum of 36 sections)

(Township)
- 3 - Columns 79-80 plus Column 1 of a second data card.
  Note: Each data processing card has a maximum of 80 columns. In order to accommodate data greater than 80 units, additional cards must be used.
  (Three columns would allow for a maximum of three Township units)

(Range)
- 21 - Columns 2-3 (data card #2 assumed) (Two columns would allow for a maximum of two digits)

Location by Latitude and Longitude:

(a) Latitude -
- 40° - Columns 4-6 (Allows for 3 units maximum)
- 30' - Columns 7-8 (Allows for 2 units maximum)
- 15" - Columns 9-10 (Allows for 2 units maximum)
- N - Column 11 (Allows for 1 unit maximum)

(b) Longitude - 118° - Columns 12-14 (Allows for 3 units maximum)
11' - Columns 15-16 (Allows for 2 units maximum)
15" - Columns 17-18 (Allows for 2 units maximum)
W - Column 19 (Allows for 1 unit maximum)

Conclusion: The coding of locations using the N.T.S. mapping index is possible. Point locations can be coded by land descriptions, latitude and longitude, or both.

10. Microfilm File Reference Number - (Answer to Question #2, page 5)

A microfilm file containing the wildlife population data would be a necessary part of a data bank. Each computer card would be cross-referenced to the microfilm files. This would enable the investigator to obtain detailed data on any coded observation. The N.T.S. mapping index could be used as the basis for such a filing system. Access to such files would be easily accomplished through a simple computer sort of the data cards.

Major N.T.S. map block numbers and letters would serve as the basic subdivisions of the file number code, e.g. 82H-4. Within these units, each observation or survey touching such units will be designated by a number, e.g. 82H-4-1 or 82H-4-205. The first six places of the file code number (e.g. 82H-4-, 81A-1-, etc.) would always require six unit columns of space on the data card. The maximum space required to accommodate the specific file number of each observation would be variable but for example sake I will use 12 spaces. In other words, allowing a total of 18 columns for the placement of the file number will permit the storage of 999,999,999,999 individual file numbers for each subdivision (1:50,000 map sheet) of a major N.T.S. block (e.g. 82H-1, or 82H-2, 82H-3, 82H-4, etc.). These data could be placed in Columns 20-37 of the second data processing card. Regardless of the observational method or documentation (i.e. grouped data, point

observation, etc.), only one file number would have to be used for each wildlife observation. For example in a case where a survey with grouped data passes through more than one N.T.S. unit, only one file reference will be used regardless of which N.T.S. unit location is obtained for sought.

Conclusion: The integration and coding of an N.T.S. based file reference coding system is feasiable.

Foreseeable Problems in Coding Population Data

The coding of location data will undoubtedly create the greatest problem in any attempt to establish a population data retrieval system. All point location data will have to be transposed into land descriptions, latitude - longitude locations, or both. Surveys with grouped data will have to be plotted on N.T.S. maps and the respective N.T.S. units recorded. Such procedures will probably be difficult, time consuming and costly.

Cost Estimates: (Answer to Question #3, page 5)

A. Computer Program

1. Writing Program
   1 programmer 2 weeks at $200/day = $ 2,800.00
2. Computer Time (program testing) = 15,000.00

Sub-total = $17,800.00

B. Transposing Wildlife Information to Data Processing Cards

(Assuming a backlog of 1 million records)

1. Transposing of Data to Standardized Information Code Sheets:
   - 10 technicians transposing a combined 1,000 records per day for 3 years - at $7,000/yr. per technician = $210,000.00
2. Key Punching of Transposed Data
   -- 4 key punch operators with a combined 1,000 records per day for 3 years - at $7,000/yr. per technician = $ 84,000.00

Sub-total = $294,000.00

C. Microfilm Record Library

Filming	-	$ 500,000.00
Cataloguing	-	30,000.00
Sub-total		$ 530,000.00
Total		$ 841,800.00

This cost figure would bring the backlog data up to the present date (i.e. 1971) and would theoretically be completed by 1974. A figure of one million dollars ($1,000,000.00) would be more realistic when the data from 1971-1974 is included.

Comments:

Once the pertinent data has been coded and recorded on data processing cards, a competent FORTRAN programmer would have little difficulty designing a program to retrieve the information.

In addition, the previously described data retrieval system is flexible and could be expanded to include any data that may be desirable.

Information associated with active research projects would have to be restricted in order to protect the interests of the scientists involved. These data would be made available only at the consent of the respective investigators or upon the termination of their studies.

From my examination of survey data and point observations on wildlife, it is very apparent that inconsistencies exist in the documentation of such data. If a wildlife population data retrieval system is established, certain basic information will have to be included in the documentation of all wildlife observations. Of particular importance would be the formation of a standard method for the documentation of locations.

Appendix

Appendix A

Some Examples of Wildlife Population Data

CWS WESTERN REGION

-2 DEC 70 39386

REF: WLU 61-6-5

Department of Indian Affairs and Northern Development | Canadian Wildlife Service | Ministère des Affaires indiennes et du Nord canadien | Service canadien de la faune

114-A Garry St.,
WINNIPEG 1, Man.

ATTENTION OF	✓	& INITIALS	REPLY	SIGNATURE
REG. DIR.				
SUPV. M. B. R.S.	✓			
SUPV S & E	✓			
SHAVER				
SORENSON				
FYFE				
VERMEER				
NELSALL				
BARRY				
STAINES	✓			

our file/notre dossier WLU 61-6-5
your file/votre dossier
date November 30, 1970

Mr. R. Jessen,
Division of Game & Fish,
Minnesota Dept. of Conservation,
390 Centennial Building,
St. Paul, Minnesota,
U.S.A.

Dear Bob:

As the fishermen say, "You should've been here last week or, come next week." While you and Roger were at Rochester on Nov. 24 & 25, I was not overly impressed with the numbers of geese at Silver Lake or the numbers of neck-bands observed as compared to Nov. 1969. The same holds for Nov. 23 and 26. Nick and I got a brief opportunity to make a rough census on Nov. 25. Counts were mainly in groups of 50 and hurried, but geese were not flying at the time. Results:

Silver Lake -	13,950
Baihley's Pond -	3,000
Total	16,950

I think this is a fair approximation of what had been present. It is not different than last year's count, but I couldn't be sure that geese were not roosted elsewhere. Warden Gilbertson had previously observed neck-bands I had not yet seen.

During the evening feed period on Nov. 25, I found a few thousand in a corn field by Mayowood. Six of seven neck-bands I was able to read were bands I had not observed at Silver Lake or Baihley's Pond. I suspected there was a large group(s) roosting in other locations (probably on the Zumbro River?).

The wind died down Thursday (Nov. 26) night and it was quite cold (10°). Baihley's Pond almost froze over completely. Perhaps other roosting areas froze?

On Friday morning, Nov. 27, only about one-half the geese went out to feed

1867 | 1967

...2

(typical for cold, but not below zero mornings). They soon came back and the population at Silver Lake looked about the same as it had all week. Then 2 large flocks came into the lake. I have never seen so many geese at Silver Lake. Almost all of them were on the water. So I made another census try. Results:

Silver Lake	- 20,070 (about 800 per acre!)
Baihley's Pond	- 1,950
Gravel Pit (along Zumbro west of Baihley's Pond)	- 240
Total	22,260

This total includes a few hundred (no more) migrants of Baffin Island and interior types. So, happily, the ever present increase in numbers of geese is maintained. I observed 41 neck-bands I had not seen previously.

It seems obvious that a few thousand geese are using roost sites not accessible from the ground. With this ever increasing number of geese in the Rochester area, censuses are more difficult every year. I suggest air reconnaissance on census days (clear weather) and coordinated ground crews to drive the geese out into the water where they should be photographed from a high enough level to avoid the problems of low flight over town. One has to be at Rochester almost daily in order to know the best timing for a census.

It will be important to know the mid-December and mid-January population. In 1968 and 1969 about 1/3 of the November peak has departed from Rochester. The November peak occurs between Nov. 20-30. Last day of migration from Man. has been: 1968 - Nov. 19; 1969 - Nov. 13; 1970 - Nov. 21.

Thanks for the hospitality. Certainly I am happy to learn of your immediate readiness to proceed costing a plan to develop roost ponds within the present refuge and daily use radius of the flock. Instant success. In the two years we have been seriously talking about potential flock growth (given present regulations), potential problems in Manitoba and Minnesota, and potential management measures at Rochester, we have seen this flock continue to move faster than we can. Best of luck in your ventures. I reiterate my plans to continue study on this flock and will be anxious to learn of your plans and be of assistance in any way I can.

P.S. Think big--peaks of 40,000? At least 30,000; winter 30,000? Need more than one 10-acre area to take pressure off Silver Lake.
P.P.S. Continue planning for food plantings to avoid depredations should this large a population result.

Best regards,

D. G. Raveling,
Research Scientist,
Canadian Wildlife Service.

cc. F.G. Cooch
C.C. Dixon
A. Dzubin
J. Gilbertson
N. Gulden
R. Holmes
D. Stephen

Coordinated Tall Grass Prairie Canada Goose Survey

SASKATCHEWAN
FALL - 1970

Census Area: Quill Lakes, Last Mountain Lake, eastern Saskatchewan.
Date : November 3, 1970.
Time : 1100 to 1510.
Pilot : Al Smith
Plane : Cessna 182 CF-WZF
Weather
Start : 40°, clear, wind NW 5 mph., visibility good.
Finish: 40°, 4/10 strato-cumulus, wind NW 5 mph., visibility good.

Lake	Large Canada	Small Canada	White	Unid. Dark
Basin Lake	27			
Middle Lake	6			
Lake Lenore	482	270		
Waterhen Marsh	30			
Big Quill Lake	16			
Middle Quill Lake	12	200		
Little Quill Lake	145	2500		200
Kutawagan Lake	150	550		
Sloughs at Hatfield & Saline Creek - Frozen				
Last Mtn. Lake	20	300	60	
Axe Lake				
Bank Lake				
Boulder Lake				
Little Manitou				
Totals	888	3820	60	200

Most lakes have ice along shorelines. Temperatures have varied in the 20-45°F range since October 22, but lack of snow has kept food available. Small movement reported southward November 4-6. No major movement of geese observed until November 9. Nearly 250T ducks, 90% mallard and mostly drakes, observed on above lakes, 3T swans censused with high proportion, 15-20% of young, 4 cranes seen.

Canadian Wildlife Service

Saskatoon, Sask.,
November 10, 1970.

CWS WESTERN REGION

16 JUN 69 01110

Flyway Biologist
Bureau of Sport Fisheries & Wildlife
P. O. Box 3737
Portland, Oregon 97208

REF: NHH-61-1a 05/06/69

Canada Goose Survey - Alberta

Area	Singles	Pairs	Flocks	TOTAL GEESE	Singles	Pairs	Flocks	Broods	Adults with broods	TOTAL GEESE
RED DEER RIVER										
Red Deer to Heatburg	2	2/4	1/4	10						
Heatburg to Drumheller	16	23/46	2/6	68						
Drumheller to Empress	35	49/98	4/14	147						
TOTAL Red Deer River	53	74/148	7/24	225						
SOUTH SASKATCHEWAN RIVER										
Empress to Medicine Hat	27	61/122	5/28	177						
Medicine Hat to Grand Forks	31	27/54	2/15	100						
TOTAL South Saskatchewan	58	88/176	7/43	277						
OLDMAN RIVER										
Grand Forks to Lethbridge	38	42/84	4/21	143						
BOW RIVER										
Grand Forks to Crowfoot	22	56/112	7/33	167						
GRAND TOTAL	171	260/520	25/121	812						

ATTENTION OF	✓	NOTE & INITIAL	REPLY	DISCUSS
REG. DIR.				
SUPV S & E	✓			
SHAVER				
SORENSON	✓			
FYFE				
VERMEER				
KELSALL				
RADVANYI				
TELFER				

CWS WESTERN REGION
29 00168 04622
REF:

FALL AERIAL WATERFOWL SURVEY

Census Area: Calgary East, Alberta.
Date : October 18, 1968.
Time : 11:15 am to 5:00 pm.
Weather : 40° - 50°; clouds 20/10 scattered; wind NNW & SE 10 mph. Visibility good.
Pilot : John Light, Cessna 172, XEQ, Gateway Aviation, Calgary, Alberta.
Observers: : Dennis McDonald and Harold Carr.

Lake	Canada Large	Canada Small	White-front	White	Unid. Dark	Ducks	Cranes	Swans
Bow River (Calgary to Carseland)	45	13	--	--	--	1,400	--	--
Carseland Reservoir	--	--	--	--	--	300	--	--
Carseland Dam to S Stobart.	--	35	--	--	--	1,100	--	--
S Stobart to Bassano Reservoir	510	260	--	--	--	2,950	--	--
Bassano Reservoir	295	--	--	--	--	3,150	--	95
Stobart Lake	--	--	--	--	--	500	--	375
Namaka Lake	15	--	--	--	--	2,400	--	9
Eagle Lake	80	--	--	--	--	625	--	33
Lake Newell	185	--	--	--	--	1,830	--	18
McGregor Lake	115	--	--	2,200	--	20,700	--	--
Total	1,245	308	--	2,200	--	34,955	--	530

Comments: Were late starting survey because of weather problems, and, therefore did not have time to survey Deadhorse, Nattoyekiu, and Seiu Lakes. Although the sky was fairly clear over Calgary, much of the survey was flown under overcast conditions.

Canadian Wildlife Service
Sask. Department of Natural Resources
U.S. Bureau of Sport Fisheries & Wildlife

Saskatoon, Sask.,
October 28, 1968.

ALBERTA AERIAL WATERFOWL SURVEY

Census Area : Calgary-Bow River-Strathmore-Hussar
Date : September 15, 1966.
Time : 12:20 to 3:23 p.m.
Weather : 75°, clear, sunny; wind SE 35 - variable.
Pilot : Vic McCormick, Cessna 172
Observers : R. Webb, T. Sadler, M. Eberle

Water Body	Canada Geese: Large	Canada Geese: Small	Canada Geese: Unident. Canadas	Snow	Ducks	Swans
Bow River						
1) Calgary - Carseland Reservoir	341	-	169	-	4,259	-
2) Carseland Reservoir	3	-	20	-	930	-
3) Carseland Dam - S. of Stobart Lake	33	-	-	-	299	-
4) S. of Stobart Lake- Bassano Reservoir	(2,549- (2,569	25	348	-	3,953	-
5) Bassano Reservoir	425	60	35	-	(4,777- (5,077	-
Namaka Lake	-	-	-	-	1,600	-
Sloughs in Eagle Lake Area	25	-	-	-	(2,365- (2,465	2
Stobart Lake	65	-	20	-	(3,000- (4,000	-
Matheyohin Lake	-	-	160	1		-
Sion Lake	75	-	-	-		-
Deadhorse Lake	6	-	-	-	1,275	-
Sloughs SE of Irricana (includes Rutterdite Lake)	144	-	60	26	-	-
Totals	(2,436- (2,486	85	822	27	(22,553- (23,853	2

Remarks: Bow River duck totals highly significant; others less so. Most Pintails and Mallards in areas were on unsurveyed small sloughs. Geese estimates significant. Most unclassified Canadas were probably 'large' ones. A few small flocks of White-fronts reported in area, but none seen. Juvenile snow geese prominent among both flocks seen.

No major goose movements yet.

Alberta Fish and Wildlife Division
Canadian Wildlife Service.

CWS WESTERN REGION

14 AUG 69 01071

REF: WLU 61-6-5

MEMORANDUM

G.H.Staines
Supervisor of Lands

Saskatoon, Sask., August 13, 1969.
WLU 61-6-5

Re. Canada Geese at Cypress Lake

The following are brood surveys made at Cypress Lake from 1960-66 inclusive.

Year	Canada Goose Broods observed
1960	11
1961	17 (Average 21 broods with
1962	13 an average brood size
1963	29 of 4, the area produced
1964	28 about 84 geese per year
1965	25 during this period.)
1966	24

J.R. Caldwell,
Wildlife Biologist.

Alberta Waterfowl Habitat Survey

Observers: K. Duane Norman, Bureau of Sport Fisheries & Wildlife, Portland, Oregon
David J. Neave, Alberta Lands & Forests, Red Deer, Alberta

Stratum 26: 24,614 square miles
738 square miles sampled
33.4 expansion factor

June 25 & 26, 1970

Transect & Segment	Stockdams			Dugouts			Temporary Water			Permanent Water			All Water
	KDN	DJN	TOT	KDN	DJN	TOT	KDN	DJN	TOT	KDN	DJN	TOT	TOTAL
03 - 01	4	2	6	5	6	11	8	13	21	33	36	69	107
02	3	3	6	1	1	2	42	16	58	96	71	167	233
03	2	1	3	5	5	10	6	7	13	22	45	67	93
04	3	2	5	0	7	7	1	1	2	14	28	42	56
05	1	2	3	0	1	1	21	3	24	21	44	65	93
06	1	0	1	15	11	26	4	3	7	52	48	100	134
07	2	0	2	0	0	0	0	5	5	4	10	14	21
08	1	1	2	0	0	0	2	2	4	3	6	9	15
09	0	0	0	1	0	1	0	1	1	2	0	2	4
10	0	0	0	2	0	2	2	1	3	5	5	10	15
total	17	11	28	29	31	60	86	52	138	252	293	545	771
04 - 01	1	1	2	1	1	2	5	0	5	5	17	22	31
02	0	0	0	2	0	2	7	1	8	8	13	21	31
03	1	1	2	1	2	3	4	2	6	14	17	31	42
04	1	1	2	5	1	6	0	6	6	4	3	7	21
05	1	1	2	1	4	5	4	0	4	16	9	25	36
06	1	1	2	2	7	9	3	14	17	16	34	50	78
07	1	1	2	3	2	5	7	11	18	11	19	30	55
08	0	2	2	1	3	4	13	9	22	28	21	49	77
09	1	0	1	1	2	3	27	31	58	59	38	97	159
total	7	8	15	17	22	39	70	74	144	161	171	332	530
05 - 01	1	0	1	2	1	3	9	7	16	11	17	28	48
02	0	2	2	3	0	3	56	32	88	89	82	171	264
03	0	0	0	1	1	2	53	38	91	43	73	116	209
04	4	1	5	1	0	1	24	25	49	44	35	79	134
05	7	5	12	9	11	20	8	13	21	20	36	56	109
06	3	1	4	3	0	3	6	8	14	21	35	56	77
07	2	0	2	8	1	9	20	41	61	52	80	132	204
08	1	4	5	8	3	11	2	10	12	22	28	50	78
09	3	0	3	13	5	18	4	6	10	35	33	68	99
10	1	0	1	3	5	8	5	16	21	37	53	90	120
11	0	0	0	3	1	4	6	18	24	42	44	86	114
total	22	13	35	54	28	82	193	214	407	416	516	932	1,456

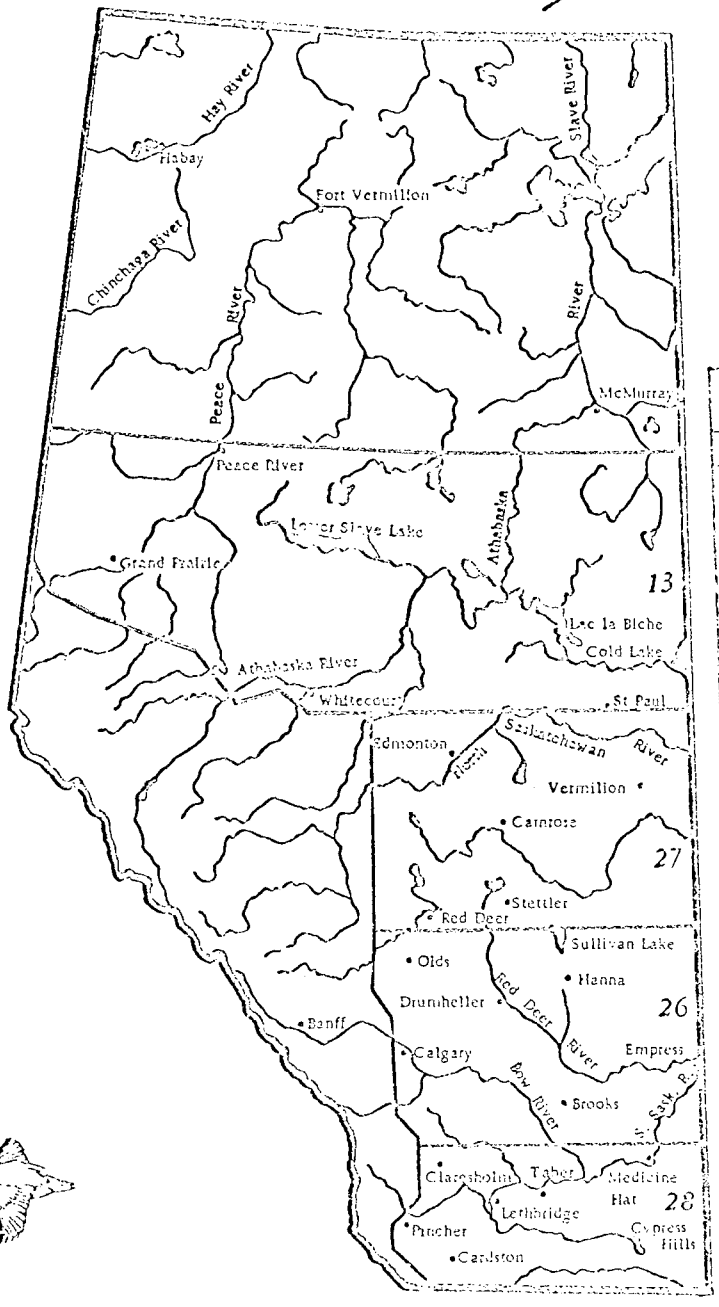
erfowl

Production Survey

27 JUL 70 30373

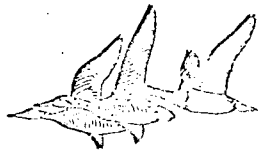
REF: WAll 42-9

Southern ALBERTA



ATTENTION OF	✓	NOTE & INITIAL	REPLY	DISPOSITION
	✓			
	✓			

1970



UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BUREAU OF SPORT FISHERIES AND WILDLIFE

TABLE NO. 1 WATERFOWL BROOD AND LATE NESTING INDEXES BY STRATUM COMPARED TO PREVIOUS YEAR AND 1956-62 AVERAGE
(Index numbers in thousands)
UNADJUSTED FOR VISIBILITY BIAS

Species	Strata			Total		Average	Percent Change From	
	26	27	28	1969	1970	1956-62	1969	Average
Broods:								
Duck brood index	36.0	43.5	8.0	141.7	87.5	249.8	- 38.2	- 65.0
Average brood size[1]	5.6	5.6	5.4	5.9	5.6	5.8	- 5.1	- 3.4
Coot brood index	2.1	13.0	0.3	16.4	15.4	55.6	- 6.1	- 72.3
Late-nesting Index:[2]								
Dabblers:								
Mallard	4.8	8.0	2.9	7.7	15.7	4.1		
Gadwall	5.5	8.9	1.4	2.6	15.8	1.8		
American widgeon	0.9	2.2	0.8	3.2	3.9	0.8		
Green-winged teal	1.2	4.8	0.3	5.7	6.3	0.1		
Blue-winged teal	1.4	4.6	1.1	6.8	7.1	1.5		
Shoveler	1.2	3.6	1.5	3.1	6.3	0.8		
Pintail	1.4	4.3	1.5	11.9	7.2	1.0		
Subtotal	16.4	36.4	9.5	41.0	62.3	10.1	+ 52.0	+516.8
Divers:								
Redhead	0.4	1.2	0.2	1.4	1.8	0.5		
Canvasback	0.4	-----	-----	1.2	0.4	0.3		
Scaup	3.7	13.8	1.9	13.3	19.4	7.7		
Ring-necked duck	0.5	0.5	-----	-----	1.0	0.1		
Goldeneye	-----	-----	0.2	0.4	0.2	0.1		
Bufflehead	-----	-----	-----	0.3	-----	0.2		
Ruddy duck	0.2	4.8	-----	3.7	5.0	2.9		
Subtotal	5.2	20.3	2.3	20.3	27.8	11.8	+ 36.9	+135.6
Grand total	21.6	56.7	11.8	61.3	90.1	21.9	+ 47.0	+311.4

1 Class II and III broods only.
2 As indicated by adult pairs and singles.

TABLE NO. 2 LONG-TERM TREND IN JULY WATERFOWL BROOD AND LATE-NESTING INDEXES BY SPECIES
(Index numbers in thousands)
UNADJUSTED FOR VISIBILITY BIAS

Species	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Broods:										
Duck brood index	213.5	132.1	204.3	199.4	107.4	172.2	164.9	94.8	141.7	87.5
Average brood size[1]	5.7	5.6	6.0	6.0	6.1	6.6	5.9	5.2	5.9	5.6
Coot brood index	48.6	18.8	19.4	18.5	16.6	34.8	25.3	2.1	16.4	15.4
Late-nesting Index:[2]										
Dabblers:										
Mallard	0.8	1.4	1.6	3.2	12.2	15.3	14.4	14.7	7.7	15.7
Gadwall	0.9	0.2	1.1	1.2	7.9	7.0	6.5	8.6	2.6	15.8
American widgeon	0.2	0.2	0.1	1.1	5.2	2.4	2.4	4.3	3.2	3.9
Green-winged teal	0.1	---	---	---	0.4	2.4	5.4	2.0	5.7	6.3
Blue-winged teal	0.9	0.1	0.1	0.3	7.4	5.1	2.6	4.0	6.8	7.1
Shoveler	0.1	0.2	1.1	1.4	8.1	5.1	7.8	2.7	3.1	6.3
Pintail	0.8	---	0.1	0.2	7.7	11.7	8.4	5.2	11.9	7.2
Subtotal	3.8	2.1	4.1	7.4	48.9	49.0	47.5	41.5	41.0	62.3
Divers:										
Redhead	---	0.2	0.2	0.2	2.4	1.3	2.0	1.2	1.4	1.8
Canvasback	---	0.2	---	---	0.5	0.6	---	1.6	1.2	0.4
Scaup	2.5	1.0	1.3	3.2	14.2	9.9	7.8	8.2	13.3	19.4
Ring-necked duck	---	---	---	---	---	---	0.3	---	---	1.0
Goldeneye	---	---	---	---	0.1	0.1	---	0.7	0.4	0.2
Bufflehead	0.2	---	---	---	---	---	---	---	0.3	---
Ruddy duck	1.1	0.6	2.3	0.9	5.0	6.8	2.0	4.6	3.7	5.0
Subtotal	3.8	2.0	3.8	4.3	22.2	18.7	12.1	16.3	20.3	27.8
Grand total	7.6	4.1	7.9	11.7	71.1	67.7	59.6	57.8	61.3	90.1

1 Class II and III broods only.
2 As indicated by adult pairs and singles.

TABLE NO. 3 LONG-TERM TREND IN MAY AND JULY POND INDEXES BY STRATA WITH COMPARISONS TO AVERAGE AND PREVIOUS YEAR
(Index numbers in thousands)
UNADJUSTED FOR VISIBILITY BIAS

May Ponds	Strata			
Year	26	27	28	Total
1961	213	432	56	701
1962	132	345	49	526
1963	189	601	59	849
1964	153	366	113	632
1965	299	637	103	1,039
1966	282	490	72	844
1967	260	361	140	761
1968	103	307	92	502
1969	213	399	69	681
1970	230	486	62	778
Average 1956-62	238	436	89	763
Percent change from 1969	+ 8.0	+ 21.8	- 10.1	+ 14.2
Percent change from average	- 3.4	+ 11.5	- 30.3	+ 2.0

July Ponds	Strata			
Year	26	27	28	Total
1961	56	153	30	239
1962	72	257	39	368
1963	162	471	60	693
1964	87	162	59	308
1965	260	485	111	856
1966	187	234	66	487
1967	182	280	92	554
1968	90	159	66	315
1969	122	228	41	391
1970	115	325	38	478
Average 1956-62	117	258	44	419
Percent change from 1969	- 5.7	+ 42.5	- 7.3	+ 22.2
Percent change from average	- 1.7	+ 26.0	- 13.6	+ 14.1

TABLE NO. 4 TEMPERATURE AND PRECIPITATION SUMMARY FOR CALGARY AND EDMONTON

CALGARY

Month	Rainfall This Month	Rainfall Normal	Snow Depth This Month	Snow Depth Normal	Total PPT. This Month	Total PPT. Normal	Temperatures Highest	Temperatures Lowest	Temperatures Mean
January	Tr	0.01	9.3	6.7	0.49	0.68	45.3	-37.9	7.6
February	Tr	0.00	5.8	7.8	0.37	0.78	58.2	- 4.9	26.6
March	0.01	0.03	13.0	9.8	0.91	1.01	55.0	-19.1	24.9
April	Tr	0.37	20.0	9.9	1.39	1.36	61.7	17.9	35.6
May	0.42	1.70	4.9	3.3	0.75	2.03	78.2	26.1	49.2
June	6.16	3.37	0.0	0.8	6.16	3.45	90.8	39.1	60.9
July (as of 7/8)	Tr	2.30	0.0	0.0	Tr	2.30	88.0	44.0	66.0

EDMONTON

Month	Rainfall This Month	Rainfall Normal	Snow Depth This Month	Snow Depth Normal	Total PPT. This Month	Total PPT. Normal	Temperatures Highest	Temperatures Lowest	Temperatures Mean
January	Tr	0.01	7.2	9.4	0.58	0.95	43.2	-36.0	2.7
February	0.03	0.01	5.8	7.6	0.47	0.77	46.0	-11.1	21.9
March	0.01	0.05	10.5	7.8	0.87	0.83	51.2	- 9.9	21.2
April	0.18	0.50	0.9	6.0	0.27	1.10	59.2	21.0	39.9
May	1.00	1.71	1.3	1.2	1.13	1.83	83.1	31.5	52.9
June	3.59	3.15	0.0	0.0	3.59	3.15	94.0	47.2	64.8
July (as of 7/12)	3.11	3.34	0.0	0.0	3.11	3.34	87.0	51.0	61.3

SOUTHERN ALBERTA

TABLE NO. 5 STRATUM DATA SHEET

Constants

Survey Design	Strata 26	27	28
Square miles in the stratum	24,614	26,087	13,235
Square miles in the waterfowl sample	299.25	247.50	85.50
Square miles in the habitat sample	598.50	495.00	171.00
Lineal miles in the sample	2,394	1,980	684
Number of transects in the sample	13	10	4
Number of segments in the sample	133	110	38
Waterfowl expansion factor	82.26	105.40	154.80
Habitat expansion factor	41.13	52.70	77.40

Current Survey Design	Strata 26	27	28
Square miles in the waterfowl sample	139.50	108.00	85.50
Square miles in the habitat sample	279.00	216.00	171.00
Lineal miles in the sample	1,116	864	684
Number of transects in the sample	6	5	4
Number of segments in the sample	62	48	38
Waterfowl expansion factor	176.44	241.55	154.80
Habitat expansion factor	88.22	120.77	77.40

TABLE NO. 5 STRATUM DATA SHEET
(continued)

Data

Numbers of	Strata 26 Sample	26 Stratum	27 Sample	27 Stratum	28 Sample	28 Stratum
Class I broods	39	6,881	52	12,561	7	1,084
Class II broods	76	13,409	57	13,768	22	3,406
Class III broods	61	10,763	41	9,904	20	3,096
Class ? broods	28	4,940	30	7,246	3	464
Duck broods	204	35,993	180	43,479	52	8,050
Coot broods	12	2,117	54	13,044	2	310
Pairs and singles	122	21,526	240	57,971	76	11,766
Ponds	1,304	115,039	2,688	324,630	496	38,390
Complete count of young in broods						
Class II broods	39	6,881	28	6,763	12	1,858
Class III broods	53	9,351	31	7,488	14	2,167
Class II and III broods	92	16,232	59	14,251	26	4,025
Ducklings per Class II brood	6.3		5.8		5.7	
Ducklings per Class III brood	5.1		5.3		5.2	
Ducklings per Class II & III brood	5.6		5.6		5.4	