CWS SEABIRD COLONY REGISTRY PROGRESS REPORT:

OUTLINE OF A USER-FRIENDLY DATA RETRIEVAL SYSTEM

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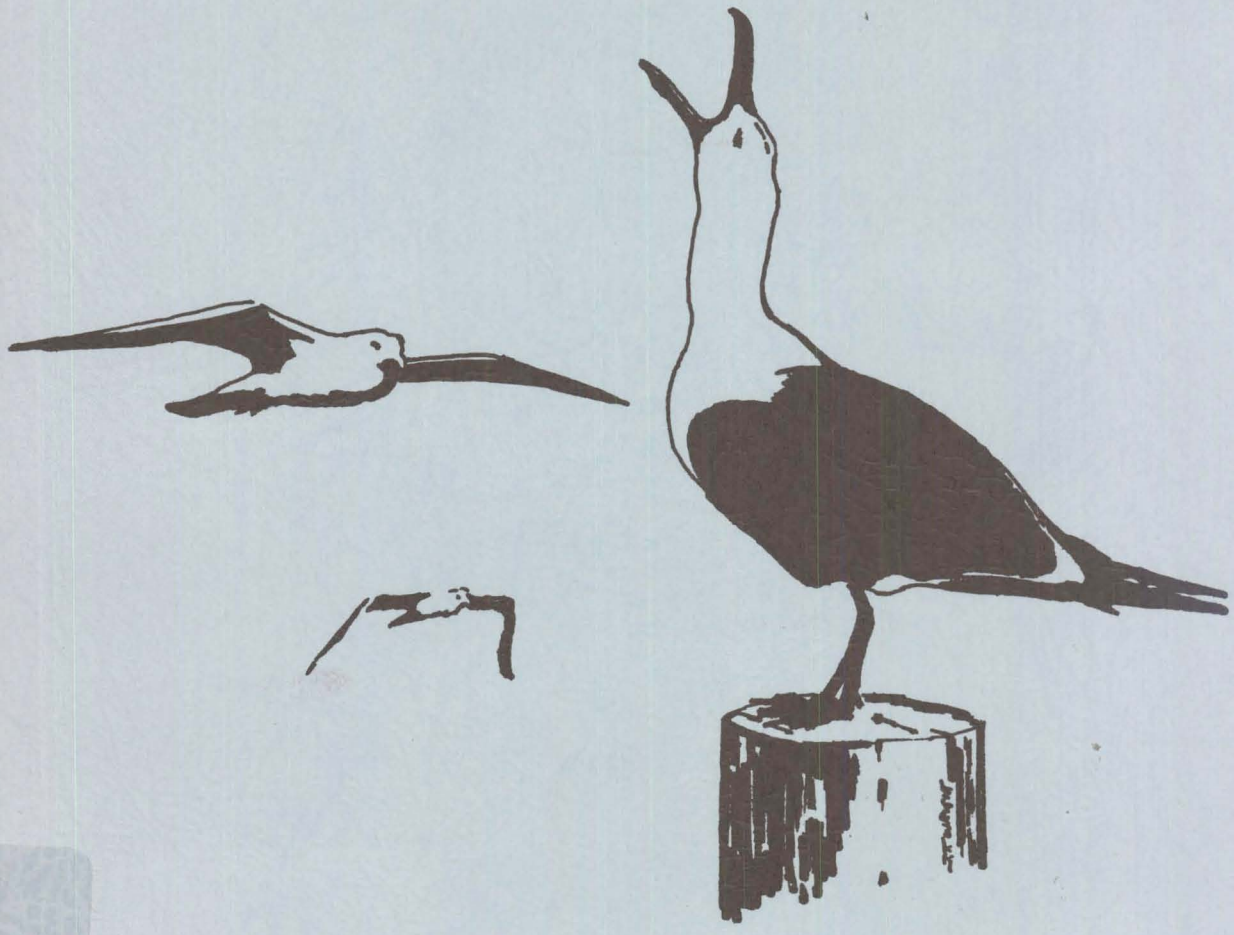

CANADIAN WILDLIFE SERVICE —
ATLANTIC REGION

CWS SEABIRD COLONY REGISTRY PROGRESS REPORT: OUTLINE OF A USER-FRIENDLY DATA RETRIEVAL SYSTEM [1]

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[1] This study is associated with the program "Studies on northern seabirds", Seabird Research Unit, Canadian Wildlife Service, Environment Canada (Report No. 239).

SUMMARY

The Canadian Wildlife Service Seabird Colony Registry (CWS-SCR) has available for use a new database retrieval system for survey and census data of colonially-breeding seabirds in Canada. The retrieval system comprises a series of "user-friendly" menus that will retrieve any combination of "Area/Region", "Colony", or "Species" specific request based on input paramaters of the seabird colony database. Output of the required information is produced on pre-defined report formats which can be printed on 8.5"x11" or 11"x14" paper, or on the screen.

Information and statistics, using any combination of items such as province, county, water body, land name, map or colony reference, species name (scientific or common), survey/census date, etc., as retrieval criteria, can be obtained from the database. Details of the capability and power of this retrieval system are outlined by describing a flow chart of information pathways, and by presenting a number of sample retrievals to show formats of output reports.

CONTENTS

INTRODUCTION

The concept of a computerized storage-retrieval system for survey and census data of colonially-breeding seabirds in Canada has a lengthy history. The need for a CWS Seabird Colony Registry (CWS-SCR) was identified at the inception of the CWS seabird program in 1971 (Nettleship 1972, 1973), and reasons for the delay in its initiation until 1987 and subsequent developments are detailed in Nettleship (1989). By April 1989 the specifications of input parameters and design of the data storage system for the SCR were virtually complete (see Nettleship & Chardine 1989), but the development of a suitable data retrieval system was delayed until January 1990 owing to staff reduction and relocation.

The retrieval system of the SCR has been designed to bridge the gap between data entry from SCR Data Summary Sheets (see Nettleship & Chardine 1989), and the existing service need for extracting data and/or statistics from the database's potentially large holdings of current and historical data. It is believed preferable that the inquirer be able to access information easily with a minimum of knowledge of the database management language (dBase) and/or computer programming design.

The aim of this progress report is to present a preliminary outline of the design and use of a new database retrieval system, a menu based "user-friendly" system that can be considered in four parts:

1. Information flow - the structure and function of the retrieval portion of the SCR database, and how data may be selected and displayed using any combination of retrieval requests based on data elements of geographic area/region, colony, and species.

2. System usage - how to use the system to extract selected information and observations for further processing and/or analysis.

3. Retrieval examples - procedures followed and menu formats used to obtain certain data and report outputs.

4. Data reports - forms that reports can take and the potential for the generation of unique report formats not yet designed and programmed.

It must be stressed that the system is extremely flexible and efficient. It is designed on the principle that 90% of inquiries (i.e., general data requests) will be serviced by the pre-constructed output report formats. Over time, the validity of this assumption will be confirmed; it is also predicted that the percentage of requests that fall outside the designed report formats should decrease. The system utilizes a number of computer programs that are kept transparent to the user. This program development of a "user-friendly" approach -- menu driven with extensive prompting aids -- should make the system *user-orientated* and maintain user problems to a minimum.

FLOW CHART OF THE RETRIEVAL SYSTEM

The structure of the retrieval system is shown in Figure 1. The design is simple with procedures for usage straightforward. The objective is to enable the enquirer to fulfill 90% of the enquiries for data retrieval. It is designed to be self-explanatory and requires no more knowledge of the database, database management system (dBase), computer programming, or computers than has been outlined in this document or in the database input specifications (Nettleship & Chardine 1989).

The system is based on a menu-driven procedure that uses any combination of the following three starting points for the selection of data/information retrieval by:

1. Area or Region
2. Colony
3. Species

Each of these "start" points result in the presentation of a series of menus that function to narrow the scope of the retrieval until all the required information has been secured and synthesised. A complete overview of the system can be obtained by executing an imaginary retrieval after becoming familiar with the characteristics of the flow chart (Fig. 1) and the definitions of its constituent parts. A summary of definitions of boxed letters and details of information flow pathways are given in Table 1.

FIGURE 1. Flow chart of SCR retrieval system. A "user-friendly" system of menus using any combination of "Area/Region", "Colony", or "Species" for selection of data retrieval to pre-determined reports.

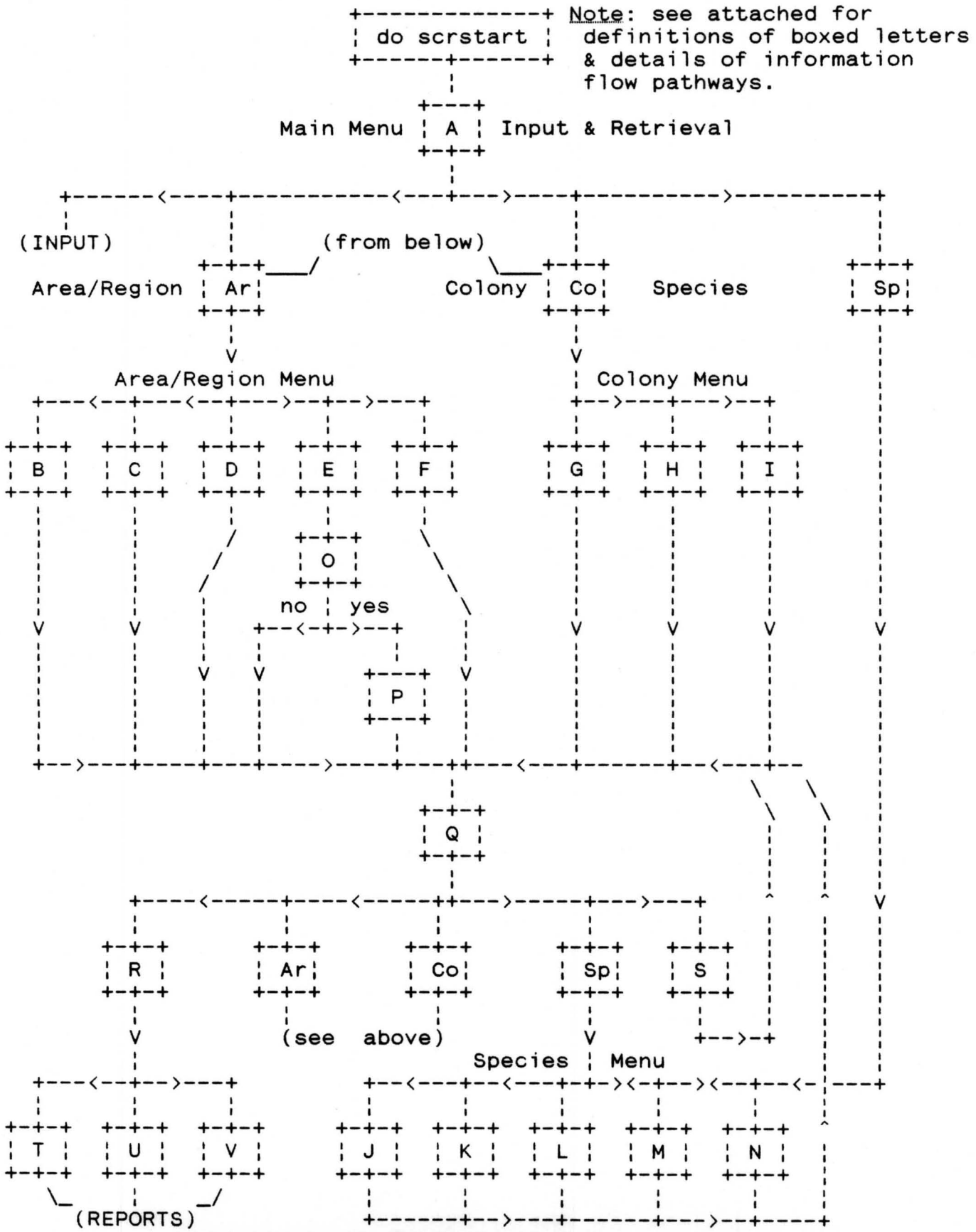


TABLE 1. Summary of definitions of boxed letters and details of information flow pathways as shown in figure 1.

	EXPLANATION	SCREEN DISPLAYED
A	= Record input and retrieval.	Main Menu
Ar	= Which area region?	Area/Region Menu
Co	= Which colony?	Colony Menu
Sp	= Which species?	Species Menu
B	= Define lat & long area.	Lat/Long Input Screen
C	= Which adjacent water body?	Adjacent Water Menu
D	= Which general location?	General Location Menu
E	= Which province?	Province Menu
F	= Which Country?	Country Menu
G	= Which location code?	Location Code Menu
H	= Which official colony name?	Official Colony Name Menu
I	= Which other colony name?	Other Colony Name Menu
J	= Which common species name?	Common Species Name Menu
K	= Which scientific sp. name?	Scientific Sp. Name Menu
L	= Which species code?	Species Code Menu
M	= Which A.O.U. number?	A.O.U. Number Menu
N	= Which Family?	Family Name Menu
O	= Do you wish to specify a county?	
P	= Which county?	County Menu
Q	= Do you wish to narrow this down further? NO: print YES: loop back	
R	= Which report medium?	Medium Choice Menu
S	= Which survey?	Survey Year Menu
T	= Which screen report?	Screen Report Choice Menu
U	= Which 8.5x11 paper report?	8.5x11 Report Choice Menu
V	= Which 14x11 paper report?	14x11 Report Choice Menu

HOW TO USE THE SYSTEM: USER'S GUIDE

The system can be used to retrieve information by executing the following steps in the order given (Note: letters in parentheses and/or capitalized refer to those shown in flow chart - see Fig. 1):

1. Go to the computer.

2. Start SCR program with the "do scrstart" command.
   Result: Main Menu (A) will appear.

3. Select retrieval mode (a,b,c) and press Enter/Return.
   Selection:
   a. by Area/Region (Ar)
   b. by Colony (Co)
   c. by Species (Sp)

   Result: Once choice is made, another menu specific to retrieval type selected will appear (see step 4).

4. Options available from principal retrieval mode selected:

If you choose	You will get menu with:
Area/Region (Ar)	B. Lat/Long Box C. Adjacent Water D. General Location E. Province F. Country
Colony (Co)	G. Location Code H. Colony Name (official) I. Colony Name (common)
Species (Sp)	J. Species Name (common) K. Species Name (scientific) L. Species Code M. A.O.U. Number N. Family Name

Select option. Once user selects retrieval approach (Ar, Co, or Sp) to be used, choice is entered by typing in the corresponding number and pressing Enter/Return. *Result*: The menu will disappear, a prompt will be shown, and the program will wait for the user to type in a selection: if Ar, then one of B-F; if Co, then one of G-I; and if Sp, then one of J-N. Once the entry has been selected and the corresponding number typed in, press Enter/Return. This causes the screen to clear and a new menu (Q) to appear. [Note: the exception

is with the "Lat/Long Box" selection; in this case, the user must type in the coordinates desired.]

6. Menu Q asks the user whether the retrieval request is to be further subdivided or not (i.e., made even more specific in content than indicated by previous choice).
   Result: if "yes" then the above steps 3-5 are repeated; if "no", then the screen clears and the report procedure begins with presentation of new menu (R).

7. Select report format from menu (R):
   Selection: (T) Screen
   (U) 8.5"x11" paper
   (V) 11"x14" paper
   Result: Once selection of format has been made, new menu appears requesting identification of report type.

8. Select report type from submenu of (T), (U), or (V).
   Selection: a. Colony Summary
   b. Species Summary
   c. Colony sizes (individuals)
   d. Colony Sizes (breeding pairs)
   Result: Production of report to screen or hard copy.

The user now has extracted the desired information from the database using the menu-driven data retrieval system. At this stage, the user either returns to the Main Menu (A) and initiates a new retrieval request or "exits" from the SCR.

TYPICAL EXAMPLES OF USING THE SYSTEM

The following description attempts to outline how the system works by taking the reader through the various operational steps using two inquiry examples from an "Area/Region" selection mode through to colony summary (detailed) output reports: the first, through a retrieval by geographic coordinates, and the second, by general location. These two examples are representative of the information requests that are likely to be made by most survey biologists and environmental/land-use consultants and decision-makers. To show the flexibility of the retrieval reporting system now constructed, additional report formats are presented for both examples including: Colony Summary (simplified), Species Summary, and Colony Sizes (individuals and breeding pairs). All reports carry out simple statistics, data processing that can be enhanced to permit a user to select any particular population or survey parameter of interest contained within the SCR general specifications.

Example 1: Retrieval request by Area/Region (Ar) using coordinates of latitude and longitude

Features of the retrieval procedure are outlined below in a stepwise progression with menus and selections presented. The extraction of data occurs as follows:

1. Presentation of Main Menu
2. Selection of retrieval mode: "Area/Region" (5)
3. Presentation of Ar Menu
4. Selection of retrieval Ar type: Lat/Long box (1)
5. Identify geographic area: input coordinate values
6. Coordinates entry check: yes, entry ok.
7. Additional detail required: yes or no? Entry: No (1)
8. Select output medium (R). Entry: 14"x11" paper (3)
9. Select report type. Entry: Colony Summary (1)
   . Colony Summary (detailed)
10. Retrieval complete

Other example outputs:
- . Colony Summary (simplified)
- . Colony Sizes (individuals)
- . Species Summary

Example 2: Retrieval request by Area/Region (Ar) using general location

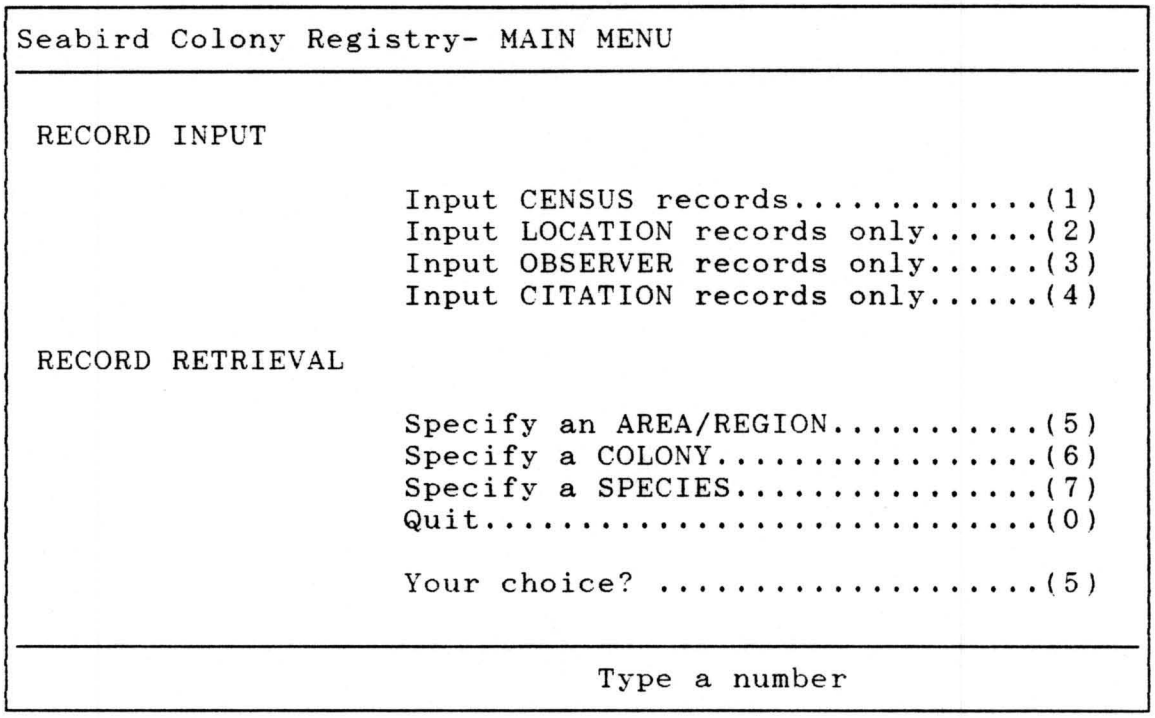
Features of the retrieval procedure are outlined below in a stepwise progression with menus and selections presented. The extraction of data occurs as follows:

1. Presentation of Main Menu
2. Selection of retrieval mode: "Area/Region" (5)
3. Presentation of Ar Menu
4. Selection of retrieval Ar type: General Location (3)
5. Identify general location: Cornwallis I (5)
6. Additional detail required: yes or no? Entry: No (1)
7. Select output medium (R). Entry: 14"x11" paper (3)
8. Select report type. Entry: Colony Summary (1)
   . Colony Summary (detailed)
9. Retrieval complete

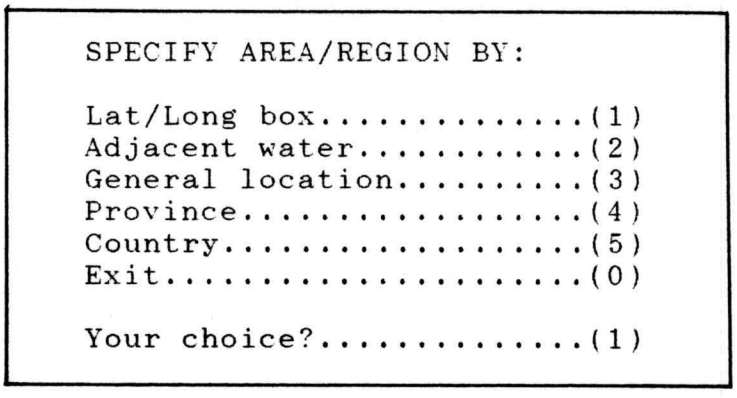
Other example outputs:
- . Colony Summary (simplified)
- . Colony Sizes (breeding pairs)
- . Species Summary

Example 1

Retrieval request by Area/Region (Ar) using coordinates of latitude and longitude


Seabird Colony Registry- MAIN MENU
RECORD INPUT
Input CENSUS records.....(1)
Input LOCATION records only.....(2)
Input OBSERVER records only.....(3)
Input CITATION records only.....(4)
RECORD RETRIEVAL
Specify an AREA/REGION.....(5)
Specify a COLONY.....(6)
Specify a SPECIES.....(7)
Quit.....(0)
Your choice? .....(5)
Type a number

Ar


SPECIFY AREA/REGION BY:
Lat/Long box.....(1)
Adjacent water.....(2)
General location.....(3)
Province.....(4)
Country.....(5)
Exit.....(0)
Your choice?.....(1)

B

B

DESCRIBE BOX:

NORTH BOUNDARY = 46 11 30

WEST BOUNDARY = 83 50 0 EAST BOUNDARY = 82 46 40

SOUTH BOUNDARY = 46 10 40

Is the above information correct (Y/N)? Y

Q

(by lat. & long.)
BETWEEN 46 ° 11 ' 30 " N AND 46 ° 10 ' 40 " N , AND
BETWEEN 83 ° 50 ' 00 " W AND 82 ° 46 ' 40 " W

Narrow this down further?

No:-Print REPORT.....(1)

/Specify a smaller AREA/REGION....(2)
YES:-Specify a COLONY.....(3)
\Specify a SPECIES.....(4)
\Specify a CENSUS.....(5)

Exit.....(0)

Your choice?.....(1)

R

R

```
(by lat. & long.)
BETWEEN  46 ° 11 ' 30 " N  AND  46 ° 10 ' 40 " N , AND
BETWEEN  83 ° 50 ' 00 " W  AND  82 ° 46 ' 40 " W
```

```
Which output medium?

Screen.....................(1)
8.5 x 11 paper.............(2)
14 x 11 paper..............(3)
Exit.......................(0)

Your choice?...............(3)
```

V


```
(by lat. & long.)
BETWEEN  46 ° 11 ' 30 " N  AND  46 ° 10 ' 40 " N , AND
BETWEEN  83 ° 50 ' 00 " W  AND  82 ° 46 ' 40 " W
```


```
Which 14 x 11 report?

Colony Summary.........(1)
Species Summary........(2)
Colony Size (BP).......(3)
Colony Size (IND)......(4)
Exit...................(0)

Your Choice............(1)
```

Reports

COLONY SUMMARY (detailed)

Page No. 1
SEARCH CRITERIA:
(by lat. & long.)
BETWEEN 46°11'30"N AND 46°10'40"N, AND
BETWEEN 83°50'00"W AND 82°46'40"W

COLONY PROV. (LOCATION CODE) COORDINATES SPECIES	BREEDING PAIRS no.	% of COLONY	% of REPORT	INDIVIDUALS no.	% of COLONY	% of REPORT	CENSUS REFERENCE DATE
IRONSIDE REEF							
ONT (041J003)							
46°11'06"N 83°46'12"W							
Ring-billed Gull	262	88.81	33.55	524	88.81	32.96	1989
Common Tern	33	11.19	4.23	66	11.19	4.15	1989
COLONY TOTALS:	**295**	**100.00**	**37.77**	**590**	**100.00**	**37.11**	
MAGAZINE ISLAND - WEST							
ONT (041J010)							
46°10'42"N 82°46'48"W							
Ring-billed Gull	424	91.97	54.29	848	89.26	53.33	1989
Herring Gull	37	8.03	4.74	74	7.79	4.65	1989
Double-crested Cormorant				28	2.95	1.76	1989
COLONY TOTALS:	**461**	**100.00**	**59.03**	**950**	**100.00**	**59.75**	
MAGAZINE ISLAND - EAST							
ONT (041J011)							
46°10'42"N 82°46'42"W							
Herring Gull	7	100.00	0.90	14	100.00	0.88	1989
COLONY TOTALS:	**7**	**100.00**	**0.90**	**14**	**100.00**	**0.88**	
BIGHT ISLAND							
ONT (041J020)							
46°10'48"N 82°55'36"W							
Herring Gull	18	100.00	2.30	36	100.00	2.26	1989
COLONY TOTALS:	**18**	**100.00**	**2.30**	**36**	**100.00**	**2.26**	
GRAND TOTALS:	781		100.00	1,590		100.00	

TOTAL # OF COLONIES: 4

COLONY SUMMARY (simplified)

Page No. 1
SEARCH CRITERIA:
(by lat. & long.)
BETWEEN 46°11'30"N AND 46°10'40"N, AND
BETWEEN 83°50'00"W AND 82°46'40"W

COLONY PROV. (LOCATION CODE) COORDINATES SPECIES	BREEDING PAIRS	INDIVIDUALS	CENSUS REFERENCE DATE
IRONSIDE REEF			
ONT (041J003)			
46°11'06"N 83°46'12"W			
Ring-billed Gull	262	524	1989
Common Tern	33	66	1989
COLONY TOTALS:	**295**	**590**	
MAGAZINE ISLAND - WEST			
ONT (041J010)			
46°10'42"N 82°46'48"W			
Double-crested Cormorant		28	1989
Ring-billed Gull	424	848	1989
Herring Gull	37	74	1989
COLONY TOTALS:	**461**	**950**	
MAGAZINE ISLAND - EAST			
ONT (041J011)			
46°10'42"N 82°46'42"W			
Herring Gull	7	14	1989
COLONY TOTALS:	**7**	**14**	
BIGHT ISLAND			
ONT (041J020)			
46°10'48"N 82°55'36"W			
Herring Gull	18	36	1989
COLONY TOTALS:	**18**	**36**	
GRAND TOTALS:	781	1,590	

RELATIVE COLONY SIZES (INDIVIDUALS)

SEARCH CRITERIA:
(by lat. & long.)
BETWEEN 46 ° 11 ' 30 " N AND 46 ° 10 ' 40 " N , AND
BETWEEN 83 ° 50 ' 00 " W AND 82 ° 46 ' 40 " W

SPECIES CODE	1-10		11-100		101-1,000		1,001-10,000		10,001-100,000		100,001-1,000,000		>1,000,000		COLONIES/ SPECIES
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	
DCCO			1	100.00											1
RBGU					2	100.00									2
HERG			3	100.00											3
COTE			1	100.00											1
ALL SPP			2	50.00	2	50.00									

TOTAL # OF COLONIES: 4
TOTAL # OF SPECIES: 4

SPECIES SUMMARY

SEARCH CRITERIA:
(by lat. & long.)
BETWEEN 46 ° 11 ' 30 " N AND 46 ° 10 ' 40 " N , AND
BETWEEN 83 ° 50 ' 00 " W AND 82 ° 46 ' 40 " W

SPECIES CODE	COLONIES/SPECIES		BREEDING PAIRS		INDIVIDUALS	
	no.	%	no.	%	no.	%
DCCO	1	25.00			28	1.76
RBGU	2	50.00	686	87.84	1,372	86.29
HERG	3	75.00	62	7.94	124	7.80
COTE	1	25.00	33	4.23	66	4.15
GRAND TOTALS:			781	100.00	1,590	100.00

TOTAL # OF COLONIES: 4
TOTAL # OF SPECIES: 4

Example 2

Retrieval request by Area/Region (Ar)
using General Location

A

```
Seabird Colony Registry- MAIN MENU

 RECORD INPUT

                   Input CENSUS records.............(1)
                   Input LOCATION records only......(2)
                   Input OBSERVER records only......(3)
                   Input CITATION records only......(4)

 RECORD RETRIEVAL

                   Specify an AREA/REGION...........(5)
                   Specify a COLONY.................(6)
                   Specify a SPECIES................(7)
                   Quit.............................(0)

                   Your choice? ....................(5)

                             Type a number
```

↓

Ar

```
SPECIFY AREA/REGION BY:

Lat/Long box..............(1)
Adjacent water............(2)
General location..........(3)
Province..................(4)
Country...................(5)
Exit......................(0)

Your choice?..............(3)
```

↓

B

B

```
Which general location?

CORNWALLIS I, NWT.....................................(1)
LAKE SUPERIOR, ONT....................................(2)
MOUTH OF BLACK BAY, ONT...............................(3)

More general locations................................(9)
Exit..................................................(0)

Your choice?..........................................(1)
```

Q

GENERAL LOCATION = CORNWALLIS I

```
Narrow this down further?

No:-Print REPORT.....................(1)

    /Specify a smaller AREA/REGION....(2)
YES:-Specify a COLONY.................(3)
    \Specify a SPECIES................(4)
    \Specify a CENSUS.................(5)

Exit..................................(0)

Your choice?..........................(1)
```

R

R

GENERAL LOCATION = CORNWALLIS I

```
Which output medium?

Screen.....(1)
8.5 x 11 paper.....(2)
14 x 11 paper.....(3)
Exit.....(0)

Your choice?.....(3)
```

V

GENERAL LOCATION = CORNWALLIS I

```
Which 14 x 11 report?

Colony Summary.....(1)
Species Summary.....(2)
Colony Size (BP).....(3)
Colony Size (IND).....(4)
Exit.....(0)

Your Choice.....(1)
```

Reports

COLONY SUMMARY (detailed)

Page No. 1
SEARCH CRITERIA:
GENERAL LOCATION = **CORNWALLIS I**

COLONY PROV. (LOCATION CODE) COORDINATES SPECIES	BREEDING PAIRS no.	 % of COLONY	 % of REPORT	INDIVIDUALS no.	 % of COLONY	 % of REPORT	CENSUS REFERENCE DATE	
BARLOW INLET								
NWT (058F001)								
74°45'00"N 93°27'00"W								
Glaucous Gull	20	25.00	7.27				1972	NETTLESHIP 1974
Thayer's Gull	10	12.50	3.64				1972	NETTLESHIP 1974
Black Guillemot	50	62.50	18.18				1972	NETTLESHIP 1974, UNPUBL. OBSER.
COLONY TOTALS:	**80**	**100.00**	**29.09**					
CAPE HOTHAM								
NWT (058F002)								
74°41'00"N 93°29'00"W								
Glaucous Gull	10	66.67	3.64				1972	NETTLESHIP 1974
Thayer's Gull	5	33.33	1.82				1972	NETTLESHIP 1974
COLONY TOTALS:	**15**	**100.00**	**5.45**					
READ BAY (NORTH OF)								
NWT (058G001)								
75°04'00"N 93°30'00"W								
Glaucous Gull	10	100.00	3.64				1972	NETTLESHIP 1974
COLONY TOTALS:	**10**	**100.00**	**3.64**					
SEPARATION POINT								
NWT (058G002)								
75°07'00"N 93°29'00"W								
Glaucous Gull	45	26.47	16.36				1972	NETTLESHIP 1974
Black-legged Kittiwake	125	73.53	45.45				1972	NETTLESHIP 1974
COLONY TOTALS:	**170**	**100.00**	**61.82**					
GRAND TOTALS:	275		100.00					

TOTAL # OF COLONIES: 4

COLONY SUMMARY (simplified)

Page No. 1
SEARCH CRITERIA:
GENERAL LOCATION = CORNWALLIS I

COLONY PROV. (LOCATION CODE) COORDINATES SPECIES	BREEDING PAIRS	INDIVIDUALS	CENSUS DATE	REFERENCE
BARLOW INLET				
NWT (058F001)				
74°45'00"N 93°27'00"W				
Thayer's Gull	10		1972	NETTLESHIP 1974
Glaucous Gull	20		1972	NETTLESHIP 1974
Black Guillemot	50		1972	NETTLESHIP 1974, UNPUBL. OBSER.
COLONY TOTALS:	80			
CAPE HOTHAM				
NWT (058F002)				
74°41'00"N 93°29'00"W				
Thayer's Gull	5		1972	NETTLESHIP 1974
Glaucous Gull	10		1972	NETTLESHIP 1974
COLONY TOTALS:	15			
READ BAY (NORTH OF)				
NWT (058G001)				
75°04'00"N 93°30'00"W				
Glaucous Gull	10		1972	NETTLESHIP 1974
COLONY TOTALS:	10			
SEPARATION POINT				
NWT (058G002)				
75°07'00"N 93°29'00"W				
Glaucous Gull	45		1972	NETTLESHIP 1974
Black-legged Kittiwake	125		1972	NETTLESHIP 1974
COLONY TOTALS:	170			
GRAND TOTALS:	275			

RELATIVE COLONY SIZE (BREEDING PAIRS)

SEARCH CRITERIA:
GENERAL LOCATION = **CORNWALLIS I**

SPECIES CODE	1-10		11-100		101-1,000		1,001-10,000		10,001-100,000		100,001-1,000,000		>1,000,000		COLONIES/ SPECIES
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	
THGU	2	100.00													2
GLGU	2	50.00	2	50.00											4
BLKI					1	100.00									1
BLGU			1	100.00											1
ALL SPP	1	25.00	2	50.00	1	25.00									

TOTAL # OF COLONIES: **4**
TOTAL # OF SPECIES: **4**

SPECIES SUMMARY

SEARCH CRITERIA:
GENERAL LOCATION = **CORNWALLIS I**

SPECIES CODE	COLONIES/SPECIES		BREEDING PAIRS		INDIVIDUALS	
	no.	%	no.	%	no.	%
THGU	2	50.00	15	5.45		
GLGU	4	100.00	85	30.91		
BLKI	1	25.00	125	45.45		
BLGU	1	25.00	50	18.18		
GRAND TOTALS:			275	100.00		

TOTAL # OF COLONIES: 4
TOTAL # OF SPECIES: 4

DATA REPORT FORMATS

The procedure for report production is simple and easy to use. The new user will quickly become familiar with the general approach to retrieval reports, and how to select the format best suited for a specific work requirement. Although the sample reports given above vividly demonstrate the power of the retrieval system, other report forms can be constructed to meet individual user needs. In the end, there should be a large portfolio of report forms that can be employed by users, a selection sufficient to meet most requirements of researchers and managers alike. And finally, it must also be stressed that the samples presented above in "Typical Examples of Using the System" represent only a small fraction of data output and report forms available. A quick inspection of the options outlined in Figure 1 and the menus presented in the examples will make this fact clear.

Much work remains to be done on the identification and programming of report formats. The system is presently operational for the summary reports presented, but these must be refined and combined with other report programs still in a conceptual form only as well as those yet to be identified and described by other potential users of the system. The overall aim is to make the system user-orientated and suitable for regional, national, and/or international usage. In the end, the need for the development of data management systems for seabird colonies is a problem that would benefit from being tackled globally to ensure compatability of existing and proposed databases for the management and conservation of the world's seabirds.

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