OCS Study
MMS 93-0057
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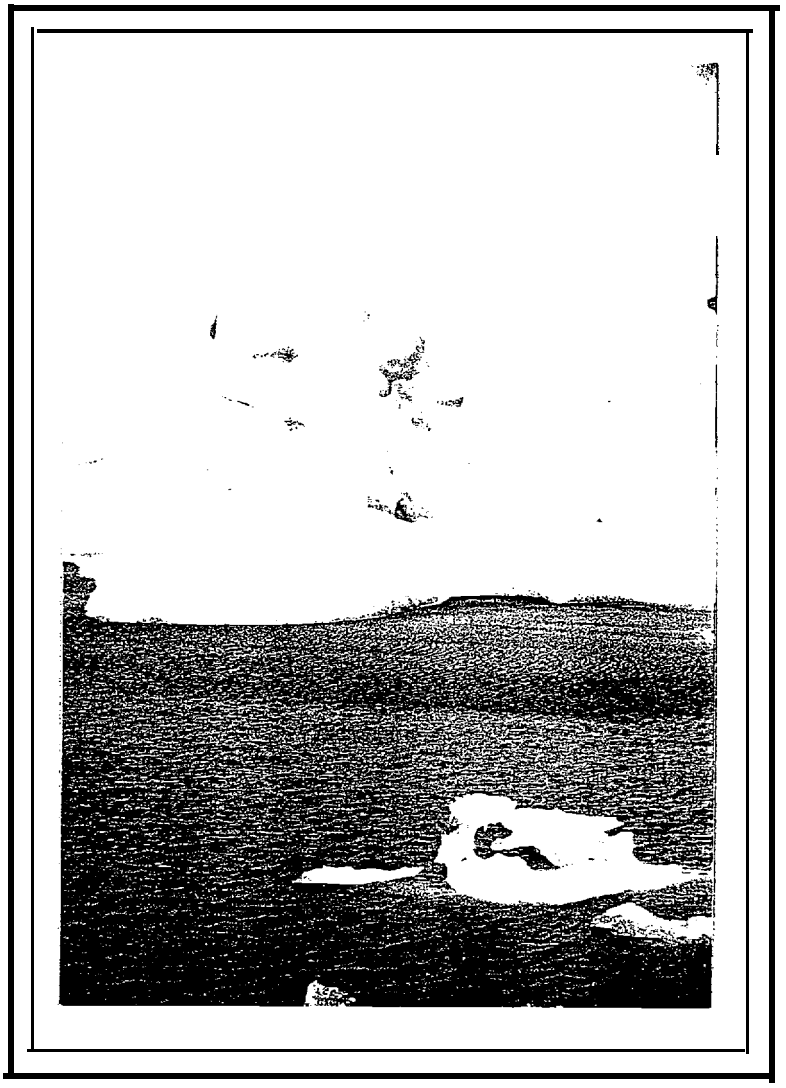

Arctic Fisheries Database

User's Manual

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User's Manual

Department of the Interior
Minerals Management Service
Alaska OCS Region
Anchorage, Alaska

and

The Arctic Fisheries Database Project
Math/Computer Science Department
University of Alaska Anchorage

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Table of Contents

Introduction

Over a period of seventeen years, NOAA and the Department of the Interior cooperatively sponsored and managed a number of environmental studies in the Arctic marine waters of Alaska as part of the Outer Continental Shelf Environmental Assessment Program (OCSEAP). These OCSEAP studies were designed to provide information necessary to assess the environmental impact of oil and gas development in the Alaska outer continental shelf areas, including the Beaufort Sea, the Bering Sea, and the Gulf of Alaska, that are managed by the Department of the Interior. The data collected were recorded in standardized formats, digitized, stored in the NOAA National Oceanographic Data Center (NODC) database, and are now available to any researcher with an interest in the Arctic marine environment.

This package consists of raw fisheries data and a separate software "Retriever", which can efficiently extract any subset of the database and create a file suitable for statistical analysis. With this kind of access to raw data researchers are now in a position to analyze the historical data for themselves. New in this package is the ability to view sampling locations as displayed on a map of Alaska using the "Mapit" software.

It is important to realize that data analysis is not a part of this package. Every effort has been made to avoid any sort of data conversion or modification. Little attempt has been made to alter the content of the original raw data or to weed out errors. In this way, any existing, possibly unsuspected, relations in the original data will be preserved. The few instances where modifications and additions have been made are documented in Chapter Eight (Data Observations and Alterations).

The Arctic Fisheries Database package is primarily intended for those involved with scientific research who have access to sophisticated PC-based statistical packages, such as SAS ™, BMDP™, SPSS™ and StatGraphics™.

The software which accompanies this package, Retriever version 2.00 and Mapit version 1.00, are designed to run with Windows™ 3.1. It is assumed that the user has a familiarity with the Windows™ 3.1 operating system. If you are new to Windows™ 3.1, please explore it using the documentation which accompanies it.

List Box **Selections**

The list boxes are operated in much the same way as files are selected in Windows™ File Manager. To select a single item, place the cursor on the item desired and click the mouse button. The item will now be highlighted. To deselect the item click the mouse again.

A range of items may be selected by selecting the first item in the range and scrolling to the final item. Hold the shift key while clicking on the final item. The entire range should be highlighted. A range may also be selected by selecting the first item with the mouse and dragging to the last item in the range while holding the mouse button. If you wish to scroll to items not on the list, just drag the cursor above or below the list box and watch the items scroll into view as they are selected.

Adding isolated items to the selection list is done by holding the control key whle clicking on the item. Isolated items can be deselected in the same manner. Groups of isolated items may be added by dragging and scrolling as described above.

Chapter One Getting Started

Getting started is relatively simple. The hardware and software requirements are listed below, as are the installation instructions. Once the system is up and running, go to the next chapter to learn how to extract data by building a query and using the Retriever.

Hardware Requirements:

1) An IBM PC or compatible computer. For all practical purposes it should be a 386DX or better although the database will work, marginally, on a slower model.

2) CD- ROM drive.

3)2 megabytes of RAM, 4 recommended.

4) A hard disk drive with sufficient memory to hold output files, which may be larger than the 76 megabytes in the original database due to output formatting. A 120M hard drive would probably be the minimum acceptable size. A larger hard drive could allow the entire database and retriever, about 80 megabytes altogether, to be copied from the optical disc to the hard drive. This yields considerable improvements in performance.

5) A mouse or other pointing device.

6) 3 1/2 inch hard disk drive.

Software Requirements:

1) Microsoft® Windows™ 3.1.

Installation of the Database, Retriever and Mapit:

1) Open Windows™.

2) Select **File** from the main menu.

3) Select **Run** from the File options.

4) Insert the floppy disk into the drive (e.g. drive A:).

5) Type **A:\install** in the File Run dialog box.

6) Follow the directions from the dialogue boxes.

Chapter Two Using the Retriever

The Arctic Fisheries Database provides easy, efficient access to any subset of the data. We refer to data extraction as "processing a query" and the software program that actually does the extraction is called the "Retriever." The user builds a query and sends it to the Retriever which sifts through the data, extracting the desired information.

In reality, processing a query is nothing more than eliminating unwanted data. The query itself contains the guidelines for this elimination. The Retriever performs its task by matching data against these guidelines.

Overview of Query Construction

Query construction is in two parts:

1) Selecting data Qualifiers.
2) Selecting Report Items.

It may be useful to think of query construction as designing an experiment. Qualifiers are independent variables and Report Items are dependent variables. Retrieval then becomes an experiment to see how output field values change in response to different qualifiers. This chapter will discuss the two parts of a query, briefly review some terminology, and explain how to build and launch a query.

There are five key fields in the database that are used to extract data. These are:

1) Investigator
2) Location
3) Date
4) Gear Type
5) Species

The query contains specific values in each of these five fields and the Retriever picks out data that matches these values, or is linked to them. For example, a user might just be interested in data from investigators Wolotira and Johnson, using a gear type of fyke nets between longitudes 162 degrees and 141 degrees, between latitudes 72 degrees and 69 degrees, and between the dates of June 1, and September 1, 1979. Finally, only information about the species Coregonus autumnalis is of interest.

The qualifier portion of this query would then look like this:

Investigator Selections
JOHNSON
WOLOTIRA
Geographic Constraints
North West Corner 162° 00' 00", 72° 00' 00"
South East Comer 141° 00' 00", 69° 00' 00"
Date Constraint
Starting Date 01 0679
Ending Date 01 0979
Gear Type Selections
FYKE NET
Species Selection
Coregonus autumnalis

These are the constraints placed on the data and only the data that fits within these constraints will be sent to the output file.

Qualifiers narrow the territory and isolate a subset of the database, but the data of real interest are contained in the other database fields that are linked to the qualifiers. All of these fields are in the Report Items list, any number of which can be chosen and added to the report in the query. In addition, there are standard fields reported in every report as described in Chapter Four (The Retriever - How It Works).

Building a Query

Now you are ready to build a query. If the Retriever program is not already opened, open it with one of following methods:

If you are in DOS: type: >\windows\win retrievr

If you are already in Windows:

1) Using the icon:
   a) open the AFDB group.
   b) click on the retriever icon.

2) Using the File Manager:
   a) find RETRIEVR.EXE in the RETRIEVR directory.
   b) double-click the left mouse button on the file name.

Transparent to the user is the fact that while the query is under construction, every data qualifier or report item selected is recorded. However, only the latest selection from any given qualifier or the report iterns will become part of the query. In other words, reselection of a category is not additive. For example, if you specify certain values for a qualifier but decide you want other values, reselect that qualifier and choose the desired values. The previous values for that selection are effectively eliminated.

By selecting 'Fetch Data' from the menu bar, the current status of the query under construction can be examined. At least one qualifier value and one report item must have been selected before this window becomes accessible and the current status of a query can be double checked. If query construction is not complete, be sure to click on the Cancel square to close the window. Clicking the OK square will start the Retriever with whatever query exists at that point. After processing, the query structure will then be erased to prepare for a new query.

When Retriever begins, you will see a graphic of fish in the client area of the screen. You may deactivate this display by selecting the menu-item 'Configure' and choosing 'Disable Picture'. To define the query you need to select the menu-item 'Select Data' and choose at least one of the data qualifiers which appear in the pop-up menu as well as choosing the 'Report Items' pop-up item. After the query is defined, you launch it by choosing 'Fetch Data' from the main menu.

The 'Select Data' menu-item pop-up window has information on all the following:

- Investigator Selections
- Location
  - North West Corner
  - South East Corner
- Date Constraints
  - Begin
  - End
- Gear Type Selections
- Species Selection
- Report Items

Although some of the five qualifiers may appear empty at this point, they are not. By default, all values for the Investigator, Geographic Constraints, Date Constraints, Gear Type Selections, and Species Selections categories will be used for a Retriever search unless replaced by selections from the user.

The reasoning goes like this. If any one qualifier is empty, then there is no data that can qualify and no output is possible. Since this is self-defeating, the qualifiers all start out full. Once a selection is made for a particular qualifier, however, only selections made by the user go into the query. Even though a qualifier starts with all values, after the frost selection the number of values drops to one, and the user must build from there.

> Note! There is a distinction here between what the Retriever uses to select data subsets, and what the Retriever reports out. Just because qualifier fields are used in the selection process does not mean they will be in the final output. Output, with a few minor exceptions explained in the next chapter, will occur only for fields that have been specifically selected by the user as will be discussed shortly in the Report Items section.

There is no reason to follow a particular order while building a query. The query is sent as a completed package; as long as the final query structure is the desired one, the order of construction is not important. We will construct a query in the following order:

1) Selecting data qualifiers
2) Selecting report items

Data Qualifiers

Pull down the Select Data menu to expose the following six command choices:

1) Investigator
2) Locations
3) Date
4) Gear Type
5) Species
6) Select Report Items

At this point our concern is only with the first five items, the qualifiers. The sixth item will be discussed later in the chapter in the section on Report Items.

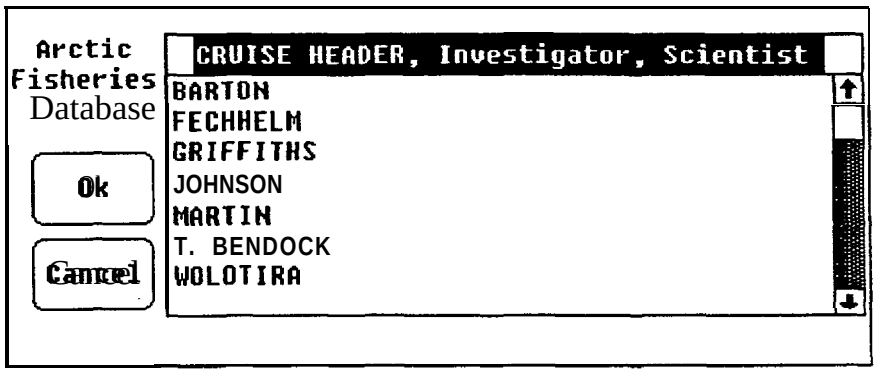

Illustration 2-1 Investigator dialogue box. *This box is essentially the same as any other box showing a list, including the Gear Type box, the Species box, the Report Items box, and the Fetch Data box.*

Investigator

Selecting this item opens a new box which presents you with a list of the principal investigators who have conducted research. Select one or more using the List Box selection methods as used in Windows™ File Manager. When done, click OK. A list of the selected names will now appear under the Fetch Data menu if it is pulled down. If no selection is made, all investigators are included in the query. Remember, once any selection is made, the software assumes nothing, and will only use names that are specifically selected.

Gear Type

This is just like the Principal Investigator list, but longer. It will be necessary to scroll to examine the entire list. Simply select as many items as desired from the list. After selecting the items, click "OK" to add the selections to the query and to close the box.

Species

This selection box is another long list from which as many selections as desired may be made. Again, it will probably be necessary to scroll through the list to ftnd all the species desired. The list contains only those taxonomic designations that actually occur in the database.

> **Note!!** Species selection actually offers a wider range of choices than just individual species. Classes, orders, families, and genera can be selected as well. Be warned, however, that selecting a more general taxonomic subdivision does not mean all members of that subdivision will be included in the extraction. It only means that specimens identified by the investigator with that particular classification will be included. For example, if a Retrieval is to include all the members of the family Salmonidae, the query must include Salmonidae as well as all the genera, species, and varieties that are included in the family.

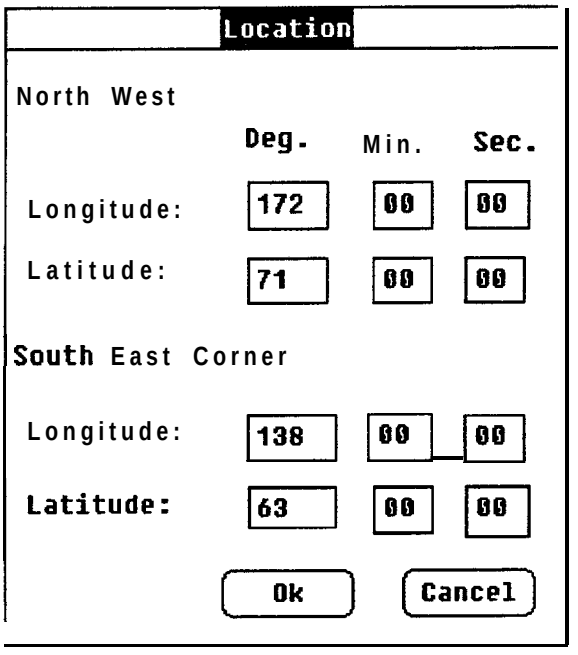

Illustration 2-2 *Location input box.*

Locations

Selecting Locations opens a box with two areas: North West corner and South East corner. Latitude and longitude are entered in degrees, minutes, and seconds. The box is requesting the coordinates for two corners of a geographic rectangle, the upper left (northwest) corner, and the lower right (southeast) corner. Any cruises, or portions of a cruise that fall within these boundaries will be considered for the final output.

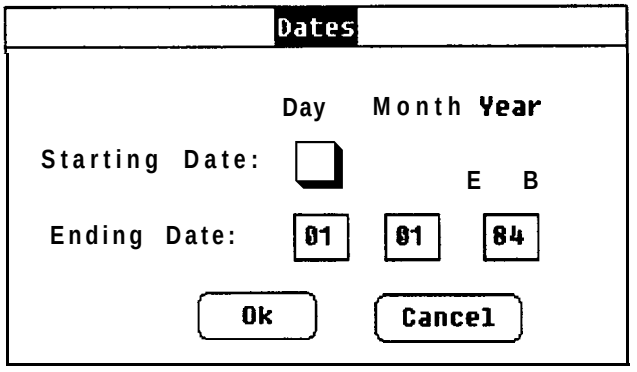

Illustration 2-3 *Date input box.*

Dates

Selecting this item opens a box for setting the date qualifiers. The two sets of boxes are labeled Starting Date and Ending Date. Type in a new value in any of these modifies the bracketing dates. Any activity that occurs between these two dates, inclusively, will be considered in the selection process.

Note: Single-digit dates must be entered with leading zeros.

The qualifiers chosen isolate a database subset. Now the software needs to know exactly what information to pull from that subset.

Report Items

Report Items are chosen from inside the Select Data menu. Select the last item from the menu, labeled Select Report Items. There are a lot of these fields in the database arranged by record type. A complete list is in Appendix A. You may wish to refer to appendix A when selecting Report Items. Selection is done as with any other list -- select each field to be in the Output file, including any desired qualifier fields. As mentioned earlier, *Qualifier Fields will not be included in the output unless they are also selected as Report Items*. There is no limit on the number of fields, although it is possible to create an output record line that is too long for some statistical packages to accept. The chapter on the File Splitter has information on how to break up long records into manageable fragments, but only for the purposes of printing.

Sending the Query tothe Retriever .

When the query is fully constructed, send it to the Retriever. This is done by pulling down the Fetch Data menu and clicking inside the "OK" box.

WARNING!! Once you click the OK box, the current query structure is gone, and cannot be brought back except by going through all the original steps of construction. Even if a Retrieval is cancelled after clicking OK, which is an option, it will still be necessary to start the query over from scratch.

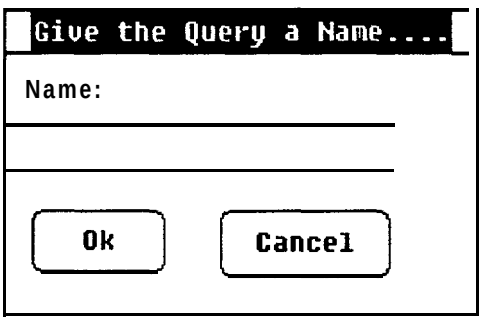

Illustration 2-4 Query *name box.*

At this point a new box will appear asking for a query name. To call off the query at this point, click CANCEL, and query construction starts over. Otherwise, enter a name and click OK. The box will disappear and an hourglass will replace the pointer, indicating that the computer is working on the query. The interface will be slow to respond to user actions (if the database is on the CD-ROM) until the Retriever is finished and the hourglass changes back to a pointer. The user may cancel the query at any time by clicking on CANCEL. While the retriever is searching the database, the user may work on any other windows application which does not use the AFDB.

WARNING!! If the same query name is used twice, the old output files will be overwritten by the new output files. Always use a new name for every query to *prevent* losing old query results. Directory paths cannot be included in query names. These will be removed by the software and only the file name will be used. If a file needs to go into a different directory, the only option is to copy it into that directory after a Retrieval then delete the old copy in the RETRIEVR directory.

On completion of a retrieval, four new files will have been created, using the query name entered at the “Fetch Data” command:

"Newfile".OUT: contains the output data.
"Newfile".TBL: contains the ouput record formatting information.
"Newfile".TRN: contains translations for coded fields in the output data.
"Newfile".QRY: is a text file with a record of the query structure.

If a query retrieval was unsuccessful, an error message appears. Queries can fail for a variety of reasons, but the most likely cause is that there is not enough disk space for the output files. There are really only two solutions for this. One is to make more room by deleting files, getting a larger disk or using a disk compression program. The second is to make the qualifiers more restrictive, thereby reducing the size of the final output. Even if a retrieval is unsuccessful, creation of the “Newfiie’’.QRY file is almost always a success and may prove useful in figuring out why the retrieval did not work.

Chapter Three Query Results

Executing a query generates four new output files in ASCII text format:

"Newfile".OUT*
"Newfile".TBL
"Newfile".TRN
"Newfile".QRY

“Newfile’’.OUT

The query name "Newfile" was given by the user when the Retriever was requested to ‘Fetch Data’. The suffixes indicate the nature of the file. “Newfiie’’.OUT contains the output data. It consists of a series of identically formatted lines, the output records, with each line containing the data from the query Report Items. It is a simple ASCII text file.

There are two important points to make about this file:

1) It is likely that there will be a lot of empty fields in each record. Empty fields are filled with blanks in order to keep line lengths and field formatting consistent from line to line. The absence of data in a field may be because the investigators did not enter data into that particular field, or because there was no record containing that field. Both situations are handled the same as far as output is concerned; blanks go into the field.

2) There is a lot of repetition of field values in the output records. As explained in the section on Database Concepts, a particular type of database record may have a one-to-many relationship with another type of record. This just means that, for instance, there may be only one Station Record, but it may be linked to a number of Sample Records.

Now suppose the Retriever has found situation number two, and is writing data from fields in the Station Record and the Sample Records. Since every field is reported in every output record, the Retriever must repeat the information from the single Station record with each new Sample record, It is important to realize that these repeated fields do not represent new information. In order to make this distinction clear in the output

records, there are up to six extra fields that may appear to show when data in regular Report Items are being repeated.

These six fields are the Start Date of Survey field, the End Date of Survey field, the Station Number field, the Haul Number field, the Sample Number field, and the Specimen Number field. These are positioned in such a way as to indicate where repeated data, due to one-to-many database relationships, occur. Examine the illustration 4-1.

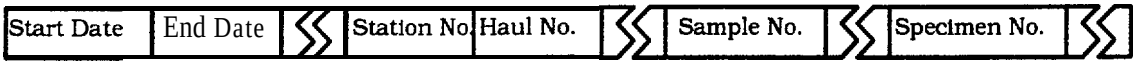

Illustration 3-1 *Key fields help to show relationships of fields to one another.*

All the fields between the Start Date/End Date* and the Station Number "belong" to the Start Date/End Date. What this means is that in a series of records, if the Start Date/End Date number is unchanged, then all the fields "owned" by that number are repeated values. Likewise, the fields between Haul Number and Sample Number are "owned" by the Haul Number and a repeated Haul Number value indicates that all the "owned" fields are being repeated. The same is true, of course, for the Sample Number and the Specimen Number. These fields are very important, because they indicate when data in a particular block of fields represents new data, and when it is just repeated data.

Another way to look at the organization of an output line is to use these key numbers as a way to tell where the data came from. While the Start Date/End Date number is unchanged in a series of lines, that indicates that all those lines came from the same cruise. Any data about the cruise as a whole is repeated. Now within a single cruise, there can be many stations and hauls. So while cruise data is being repeated, there can be changing station data. As with the cruise, if the station and haul numbers are unchanged, all the information that follows them in a line are from the same station and haul, and repeated station and haul numbers in a series of lines will indicate that station and haul data is being repeated. The same logic applies to Sample and Specimen fields.

The next two pages show a very simplified example of this. The key fields are labeled, the key numbers are simplified, and the data between key fields is left out.

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*Because none of the investigators included cruise numbers in the Cruise Header Record, the Start Date and the End Date together are used to unique] y identify a cruises, They are, in effect, substitutes for the Cruise Number.

1)	Cruise - 1	Station - 1	Haul - 1	Sample - 1	specimen - 1
2)	Cruise - 1	Station - 1	Haul - 1	Sample - 1	specimen -2
3)	Cruise - 1	Station - 1	Haul - 1	Sample - 1	specimen -3
4)	Cruise - 1	Station - 1	Haul - 1	Sample -2	Specimen - 1
5)	Cruise - 1	Station - 1	Haul - 1	Sample -2	Specimen -2
6)	Cruise - 1	Station - 1	Haul - 1	Sample - 2	specimen - 3
7)	Cruise - 1	Station - 1	Haul -2	Sample - 1	Specimen - 1
8)	Cruise - 1	Station - 1	Haul - 2	Sample - 1	specimen -2
9)	Cruise - 1	Station - 1	Haul - 2	Sample - 1	specimen - 3
10)	Cruise - 1	Station - 1	Haul - 2	Sample - 2	specimen - 1
11)	Cruise - 1	Station - 1	Haul -2	Sample - 2	Specimen - 2
12)	Cruise - 1	Station - 1	Haul - 2	Sample - 2	specimen -3
13)	Cruise - 1	Station - 2	Haul - 1	Sample - 1	specimen - 1
14)	Cruise - 1	Station - 2	Haul - 1	Sample - 1	specimen - 2
15)	Cruise - 1	Station - 2	Haul - 1	Sample - 1	Specimen - 3
16)	Cruise - 1	Station - 2	Haul - 1	Sample - 2	specimen - 1
17)	Cruise - 1	Station - 2	Haul - 1	Sample - 2	specimen - 2
18)	Cruise - 1	Station - 2	Haul - 1	Sample -2	specimen - 3
19)	Cruise - 1	Station - 2	Haul -2	Sample - 1	specimen - 1
20)	Cruise - 1	Station - 2	Haul -2	Sample - 1	specimen -2
21)	Cruise - 1	Station - 2	Haul - 2	Sample - 1	Specimen - 3
22)	Cruise - 1	Station - 2	Haul -2	Sample -2	Specimen - 1
23)	Cruise - 1	Station - 2	Haul -2	Sample -2	specimen -2
24)	Cruise - 1	Station - 2	Haul -2	Sample -2	specimen -3
25)	Cruise - 2	Station - 1	Haul - 1	Sample - 1	specimen - 1
26)	Cruise - 2	Station - 1	Haul - 1	Sample - 1	specimen - 2
27)	Cruise - 2	Station - 1	Haul - 1	Sample - 1	specimen -3
28)	Cruise - 2	Station - 1	Haul - 1	Sample -2	specimen - 1
29)	Cruise - 2	Station - 1	Haul - 1	Sample - 2	specimen - 2
30)	Cruise - 2	Station - 1	Haul - 1	Sample -2	Specimen - 3
31)	Cruise - 2	Station - 1	Haul -2	Sample - 1	specimen - 1
32)	Cruise - 2	Station - 1	Haul - 2	Sample - 1	Specimen -2
33)	Cruise - 2	Station - 1	Haul -2	Sample - 1	specimen -3
34)	Cruise - 2	Station - 1	Haul -2	Sample - 2	specimen - 1
35)	Cruise - 2	Station - 1	Haul -2	Sample - 2	specimen -2
36)	Cruise - 2	Station - 1	Haul - 2	Sample -2	Specimen - 3
37)	Cruise - 2	Station - 2	Haul - 1	Sample - 1	Specimen - 1
38)	Cruise - 2	Station - 2	Haul - 1	Sample - 1	Specimen -2
39)	Cruise - 2	Station - 2	Haul - 1	Sample - 1	specimen - 3
40)	Cruise - 2	Station - 2	Haul - 1	Sample - 2	Specimen - 1
41)	Cruise - 2	Station - 2	Haul - 1	Sample - 2	Specimen -2
42)	Cruise -2	Station - 2	Haul - 1	Sample -2	specimen -3
43)	Cruise - 2	Station - 2	Haul -2	Sample - 1	Specimen - 1
44)	Cruise - 2	Station - 2	Haul - 2	Sample - 1	Specimen - 2
45)	Cruise - 2	Station - 2	Haul -2	Sample - 1	Specimen - 3
46)	Cruise - 2	Station - 2	Haul -2	Sample - 2	Specimen - 1
47)	Cruise - 2	Station - 2	Haul -2	Sample -2	specimen -2

48) Cruise - 2 Station - 2 Haul -2 Sample -2 Specimen - 3

Two cruises are represented here; lines 1 through 24 are from the frost and lines 25 through 48 are from the second. Within each cruise there are two stations; in the first cruise, the frost station generates data in lines 1 through 12 and the second station in lines 13 through 24. The subdivisions continue. At each station there are two hauls. Within each haul there are two samples taken. From each sample there are 3 specimens examined. Note that the closer a field is to the beginning of a line, the more likely it is to be repeated.

As a final note on key fields, notice that no fields fall between the Station Number and the Haul Number. Both of these fields occur in the same record, the Station Header Record. Since several hauls may be taken from the same station, it is the Haul Number that is used to link a Station Header Record to other records it may "own." For completeness, both the Station Number and Haul Number are included.

"Newfile".TBL

There are no special delimiting characters, such as a comma or a space, to separate the fields in each output record. Instead the software generates a table that lists the starting position, ending position, and length of each field. This table is in "Newfiie''.TBL. In addition, the table gives the length of the field, the record the field came from, the unit of measurement, if any, and the Code Table, if any, for the field. Finally the table contains the number of fields found by the query.

'* Newfile".TRN

Many of the fields in this database use special NODC codes. A complete listing of the codes is provided in Appendix A, but the software keeps track of any coded fields and provides translation tables for the codes used. Those translations are in the file "Newfile".TRN.

"Newfile".QRY

This file contains the qualifier values used to construct the query Report Items used in the query will be in the "Newfile".TBL file. Both files can be opened and examined with any word processing program, or can be printed out. "Newfile".QRY,

together with "Newfile".TBL, can be used to construct similar queries, or to troubleshoot unexpected results.

Statistical Analysis

The Output file, "Newfile".OUT, is designed to be used with any of these commonly used analysis packages: SPSS™, BMDP™, SAS™ and StatGraphics™. Instead of using field delimiters in the output records, such as commas or spaces, fields are delimited positionally. The table provided in "Newfiie''.TBL tells how many fields there are, the length of each field, the starting and ending column position for each field, and the unit of measurement for each field. All files end with the standard ASCII end of file marker which is Control-Z, or ASCII code 26.

Data Compression

A lot of disc space can be saved by compressing output files, using any of several commercially available programs. After compression, a "Newfile''.OUT file will typically occupy only 10% to 20% of the memory it did before compression. If a lot of output files need to be stored, the use of data compression should be kept in mind.

Chapter Four The Retriever - How It Works

Once submitted, the query is sent as a package to the data Retriever. The Retriever then searches through the database, finding cruises with data which match the qualifier values in the query. As each matching cruise is found, the Retriever extracts data and builds a series of output records which are then sent to an output file.

Data Selections

The Retriever search works essentially by sifting, letting only those cruises with the proper qualifications fall through. Each of the five qualifiers (Principal Investigator, Date, Location, Gear Type, and Species) has specific values against which database records are compared. These are the values selected during the query construction. A cruise will only *make* it through the selection process if it has matching data in all five qualifiers,

The five qualifiers are like a series of sifting screens, one for each of the qualifiers in the request. The mesh of each screen is set small or large according to the range of values selected for that particular qualifier. The selection of only one value results in the finest mesh, meaning that most of cruises will not pass. The selection of a large number or wide range of values results in the widest mesh, and selecting all values has the effect of removing the screen because now all cruises will pass, at least for that one criterion.

Visualize a series of five screens through which the desired data must pass. A single very restrictive screen can have the effect of removing nearly all the cruises. If this is not the desired result, changing overly restrictive qualifiers by selecting more values or a wider range of values may help.

After having selected cruises, the Retriever pulls data from the cruise, organizes it, and sends it to the output file. The output file is simply a series of identically formatted records, each record consisting of the Report Items put into the original query plus some strategically placed key identifier fields. These key fields are Start Date of Survey, End Date of Survey, Station Number, Haul Number, Sample Number, and Specimen Number.

Not all of these key fields will necessarily show up in the output of a Retrieval. They are discussed more fully in Chapter Four- Query Results.

Data Reporting

The Retriever begins Output Record construction by laying out empty Report Items in an output record containing all the Report Items that are in the query. 'T'hen the Retriever will begin putting in values as it moves down through the database tree (see Chapter Six - The Fish Database). The Retriever follows the links defined by the five qualifier values for the frost matching cruise which was found. These five values are linked with data from that cruise, and the Retriever will start popping values, field by field, from the cruise data into the record's Report Items. Once completed, the record is sent to the output file, a new blank record is generated, and the process repeats until all the data fitting the qualifier values are reported.

An important point to make here is that the Retriever can only report what it finds. If previous values for Report Items are repeated in the database, then these values are repeated in the output records. If no value at all is found in the database field, then blanks get put into the output record field. If a record containing a desired output field is absent, be prepared to have a lot of fairly long output records that contain many empty Report Items.

That is the Retriever in a nutshell. Remember, however, that the Retriever's task is a very narrow one. It only extracts data subsets from the database. We have gone out of our way to insure that no misrepresentation of that data occurs (see Chapter Eight - Data Observations and Alterations). This may result in a lot of empty space in the final output file, but comes from a deliberate choice on our part not to imply relations that may not exist.

Our intent is only to provide uncorrupted data. It is up to the user to analyze the data using a separate statistical analysis package. The few instances in which we added, modified, or deleted items are documented in Chapter Eight (Data Observations and Alterations).

Chapter Five File Splitter Utility

After the Retriever has finished a query, four new files are produced. Of these, the most important is the file with the .OUT suffix, for that is the one with all the data. This file is a collection of identically formatted records. Each line represents one record in the file. It is a line that can be hundreds of characters long, creating a problem if the file is to be printed out. Each line is likely to be too wide for a page, and using wrap-around printing makes record-by-record comparisons difficult.

We have therefore provided a DOS utility called the File Splitter to solve this problem. This utility breaks a data file, which we will call LongFile.OUT, into several smaller files. Each of these files contains a segment of every record and they can be arranged side by side, after printing, so that each record can be seen as a single line.

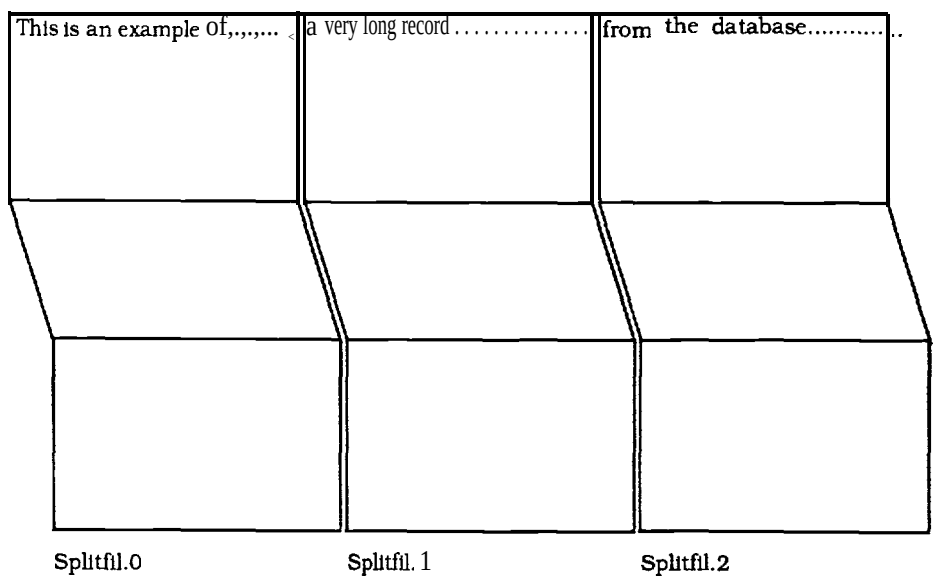

Illustration *5-1 After splitting, the files can be placed side by side to see an entire record*

Suppose LongFile.OUT's records are 240 characters long and we wish to split each line up so it prints across three, 80 column pages. The utility will break each line into three parts using the following command:

> split -i LongFile.OUT -o **Splitfil** -s 80160

In this instance, the breaks will occur between columns 80 and 81, as well as between 160 and 161. The first part of every line goes into a file called Splitfil.0, the second part of every line goes into Splitfil. 1, and the last part goes into Splitfil.2. When printed the three files can be lined up in the order given by the file suffiies to show each line in a single row (See illustration 8-2).

This utility has a great deal of flexibility in how the records are split and how they are formatted in each new file. In addition to splitting the original file, the Splitter can:

Include a top margin
Include a bottom margin
Include a left margin
Include a header at the front of each line
Specify the number of lines per page

The general form of the command, with all options implemented, looks like this:

>split-i LongFile.OUT-o Splitfil -l#-t#-b#-n#-h'' header" -s## #...

Some parts of the command are required and some are optional. The meaning of the command breaks down like this:

-i followed by the name of the input file. Required. The path to the file can be included, but is not needed if the file is in the current directory.

-o followed by the name of the output file. Optional. Again, the path to the file can be included, but is not needed if the fide is going into the current directory. If no output file name is given the input file name is used with new extensions added to it The extensions will start from *O* and increase by one for each additional file.

-1 followed by the number of spaces to put in the left margin. Optional. If this option is left out, there will be no left margin.

-t followed by the number of lines to put in the top margin of each page. Optional. If this option is left out, there will be no top margin.

-b followed the number of lines to put in the bottom margin. Optional. Leaving out the option results in no bottom *margin.*

-n followed by the number of lines per page. Optional. If the number of lines is not specified, there will be 69 lines per page. If a top or bottom margin has not been specified, there will be no way to tell where a page begins or ends, and this option become superfluous.

-h followed by any number of characters up to 60. Optional. The header is placed at the beginning of every line in every file. If there are any embedded spaces, the characters must be enclosed in double quotes. For example: -h 1/1 9/90 and -h “Jan 19, 90” are both acceptable, but -h Jan 1990 is not.

-s followed by the ending column numbers for the first through the next to the last files. Required For instance, as in the example above, -s 80 160 splits the file between column 80 and 81 as well as between 160 and 161.

Chapter Six The Fish Database

The Arctic Fisheries Database has been generated from reports that used a standardized format for reporting data. The exception to this is data which was collected before the formats existed. This data was retroactively entered into the NODC format.

An example of one of these standard formats is the Cruise Header Record.

PARAMETER	DESCRIPTION	SC
CRUISE HEADER RECORD	ALWAYS 'A - THIS RECORD SHOULD BE USED ONLY ONCE FOR EACH FILE ID. INFORMATION SHOULD AGREE WITH THAT IN THE DOCUMENTATION THAT ACCOMPANIES THE DATA.	10
VESSEL/PLATFORM NAME	ELEVEN-CHARACTER FIELD	11
CRUISE NUMBER	SIX-CHARACTER FIELD ASSIGNED BY THE ORIG.	22
START DATE OF SURVEY	YYMMDD	28
END DATE OF SURVEY	YYMMDD	34
INVESTIGATOR, SCIENTIST OR DATA SOURCE	FIFTEEN-CHARACTER FIELD IDENTIFYING DATA SOURCE	40
INSTITUTION OR AGENCY	FIFTEEN-CHARACTER FIELD IDENTIFYING ORGANIZATION	55
AGENCY CODE	TWO-CHARACTER CODE - USE CODE 0079	70
VESSEL CODE	TWO-CHARACTER CODE - USE CODE 0133- 'THESE TWO CODE FIELDS ARE INCLUDED PRIMARILY TO PERMIT CONVERSION OF DATA PREVIOUSLY SUBMITTED IN FILE TYPE 023. IT IS RECOMMENDED THAT THE INVESTIGATOR AND INSTITUTION NAME FIELDS BE UTILIZED WHERE POSSIBLE RATHER THAN THE CODE FIELDS WHEN SUBMITTING DATA IN THIS FORMAT.	?2
BLANKS		74

illustration 6-1 *Cruise Header Record.*

T'he Parameter is the name of the data field, the Description is what the data represents, and the SC is the starting column of the field. All of the records are designed to fit in an 80 column line.

Another example is the Station Header Record.

PARAMETER	DESCRIPTION	SC
STATION HEADER RECORD	ALWAYS 'B - THIS RECORD INCLUDES MANDATORY FIELDS FOR POSITION, DATE, AND OF CATCH STATISTICS AND OTHER DATA PRODUCTS. ONLY ONE RECORD FOR EACH STATION NUMBER SHOULD BE SUBMITTED.	10
STATION NUMBER	**six-CHARACTER FIELD ASSIGNED BY THE INVESTIGATOR WHICH MUST BE UNIQUE WITHIN A FILE ID. REOCCUPATION OF STATIONS WITHIN THE SAME CRUISE OR SURVEY CAN BE MODIFIED BY PREFIXING ALPHA-CHARACTERS (E.G. STATION 1, A1,B1,C1,ETC)**	11
HAUL NUMBER	**THREE-CHARACTER FIELD ASSIGNED BY THE INVE TIGATOR**	**17**
NUMBER OF HAULS	XXX - INDICATES THE TOTAL NUMBER OF HAULS TAKEN AT A STATION - ENTRY WILL BE REPEATED FOR MULTIPLE HAULS PER STATION	20
LATITUDE	DDMMSS PLUS HEMISPHERE 'N' OR 'S	23
LONGITUDE	DDDMMSS PLUS HEMISPHERE 'E' OR 'W	30
DATE (GMT)	YYMMDD	38
TIME (GMT)	XXXX (HOURS AND MINUTES)	44
GEAR TYPE	TWO-CHARACTER CODE - USE CODE 0129	48
FISHING DURATION	XXX (HOURS TO TENTHS)	50
DISTANCE FISHED	XXXX (KILOMETERS TO TENTHS)	53
DIRECTION OF TOW	ONE-CHARACTER CODE - USE CODE 0096	57
PERFORMANCE	ONE-CHARACTER CODE - USE CODE 0131	58
FISHING DURATION	XXX (MINUTES)	59
DISTANCE FISHED	XXXX (METERS)	62
SALINITY FLAG	ONE-CHARACTER CODE - USE CODE 0502	66
STATION IDENTIFIER	1O-CHARACTER ORIGINATOR STATION IDENTIFIER	67
SEQUENCE NUMBER	XXXX - USED FOR SORTING ALL RECORDS WITHIN A STATION OR A FILE ID	77

Illustration 6-2 *Station Header Record with key fields underlined.*

Notice the underlined field Station Number. This number will appear in all the records that are generated from one particular station. The Haul Number is also underlined and works exactly the same way. You can see both in the following record. Several hauls may be taken at a single station but each will have an identifying number and all records generated from a particular haul will be uniquely identified by a combination of the Station Number and the Haul Number.

Examine the Total Catch Record:

PARAMETER	DESCRIPTION	SC
TOTAL CATCH RECORD	ALWAYS 'F - THIS RECORD IS TO BE USED TO RECORD GENERAL INFORMATION ON CATCHES WITHOUT REGARD TO SPECIES	10
STATION NUMBER	**SEE RECORD 'B'**	11
HAUL NUMBER	**SEE RECORD 'B'**	17
TOTAL WET WEIGHT OF CATCH	XXXXXXXXX - WEIGHT OF ALL SPECIES (WHOLE GRAMS OR KILOGRAMS TO THOUSANDTHS)	20
WEIGHT DETERMINATION	ONE-CHARACTER CODE - USE CODE 0161	29
TOTAL NUMBER	XXXXXX - TOTAL FOR ALL SPECIE	30
NUMBER DETERMINATION	ONE-CHARACTER CODE - USE CODE 0162	36
VOLUME OF CATCH	XXXXX - USED PRIMARILY FOR SMALL CATCHES (WHOLE MILLILITERS)	37
NUMBER OF FISH PER LITER	XXXX - NUMBER FOR ALL SPECIES COMBINED	42
NUMBER OF SPECIES EXAMINED	XXXX - NUMBER EXAMINED FROM TOTAL CATCH	46
BLANKS		50
SEQUENCE NUMBER	SEE RECORD 'B'	77

Illustration 6-3 *Total Catch Record with key fields from owner station underlined.*

All Total Catch Records with the same Station Number came from the same station. Of these, all Total Catch Records with the same Haul Number will have been generated from the same Haul. In fact, all records with the same Station Number and Haul Number came from the same Haul.

This record linking is carried on at several levels. Let's look at the next record, Length Frequency.

PARAMETER	DESCRIPTION	Sc
LENGTH/FREQUENCY RECORD	ALWAYS 'G' - THIS RECORD PROVIDES FOR REPORTING LENGTH/FREQUENCY DATA FOR INDIVIDUAL SAMPLES OF A GIVEN SPECIES WITHIN EACH HAUL	10
STATION NUMBER	SEE RECORD 'B'	11
HAUL NUMBER	SEE RECORD 'B'	17
SAMPLE NUMBER	**FOUR-CHARACTER FIELD FOR IDENTIFYING SUBSAMPLES OF EACH HAUL**	**20**
BLANKS	BLANKS INSERTED HERE TO ALLOW FOR TAXONOMIC CODE FIELD TO OCCUR IN THE SAME POSITION IN ALL RECORD TYPES	24
TAXONOMIC CODE	TWELVE-CHARACTER CODE - USE NODC TAXONOMIC CODES - ALSO USED IN RECORDS H THRU Q	28
PREDOMINATE SEX OF SAMPLE	ONE-CHARACTER CODE - USE CODE 0101	40
PREDOMINATE AGE OF SAMPLE	XX - AGE IN YEARS	41
AGE METHOD	ONE-CHARACTER CODE - USE CODE 0090	43
LENGTH OF CLASS	XXXX (WHOLE MILLIMETERS)	44
LENGTH CODE	ONE-CHARACTER CODE - USE CODE 0082	48
LENGTH FREQUENCY	XXXX - NUMBER OF EACH SPECIES IN LENGTH CLASS INDICATED ABOVE	49
LENGTH SAMPLE	ONE-CHARACTER CODE - USE CODE 0169	53
BLANKS		54
SEQUENCE NUMBER	SEE RECORD 'B'	77

Illustration 6-4 *Length/Frequency Record, with key field Sample Number underlined.*

In addition to a Station Number and Haul Number it has a Sample Number. This Sample Number will provide a link to all the records generated by one particular sample, such as an Individual Species Catch Record.

PARAMETER	DESCRIPTION	Sc
NDIVIDUAL SPECIES CATCH RECORD	ALWAYS 'J' - THIS RECORD CAN BE USED TO REPRESENT A SUBSET OF THE CATCH FOR EACH SPECIES IDENTIFIED, COUNTED AND WEIGHED FOR EACH SAMPLE.	10
STATION NUMBER	SEE RECORD 'B	11
HAUL NUMBER	SEE RECORD 'B'	17
SAMPLE NUMBER	SEE RECORD 'G'	20
BLANKS	SAME AS RECORD 'G' NOTE	24
TAXONOMIC CODE	TWELVE-CHARACTER CODE - USE NODC TAXONOMIC CODES	28
TOTAL WET WEIGHT	XXXXXXXXX - TOTAL WET WEIGHT FOR EACH SPECIES (GRAMS OR KILOGRAMS TO THOUSANDTHS)	40
WEIGHT DETERMINATION	ONE-CHARACTER CODE - USE CODE 0161	49
TOTAL NUMBER FOR SPECIES	XXXXXX - NUMBER FOR EACH SPECIES	50
NUMBER DETERMINATION	ONE-CHARACTER CODE - USE CODE 0162	56
VOLUME OF CATCH	XXXXX - VOLUME FOR INDIVIDUAL SPECIES (WHOLE MILLILITERS)	57
NUMBER OF FISH PER LITER	XXXX - NUMBER FOR INDIVIDUAL SPECIES	62
PREDOMINATE SEX OF EACH SPECIES	ONE-CHARACTER CODE - USE CODE 0101	66
PREDOMINATE AGE OF EACH SPECIES	XX - AGE IN YEARS	67
AGE METHOD	ONE-CHARACTER CODE - USE CODE 0090	69
BLANKS		70
SEQUENCE NUMBER	SEE RECORD 'B'	77

Illustration 6-5 *Individual Species Catch Record, with key field from owner sample highlighted.*

It is the use of these linking fields in the NODC records that ties all the records together and allows the correlation of information from different record types. A graphic representation of this linkage would look like this.

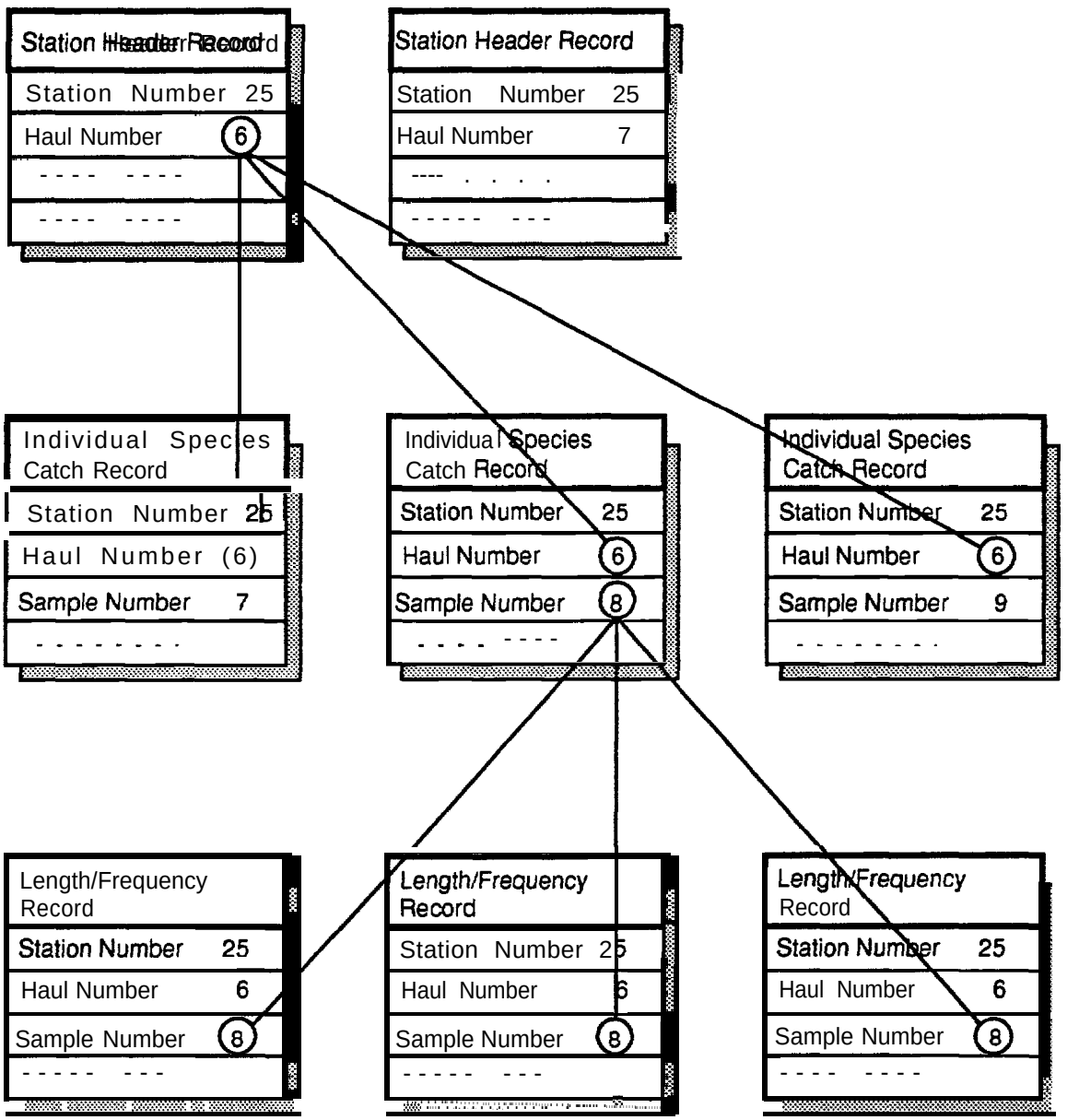

Illustration 6-6 *Representation of several levels of owns-ship, showing how key* ***field values*** *provide* ***linkage****. The* ***Length/Frequency*** *Records are linked* ***to*** *the Station Record By Station Number 25 and Haul Number 6. The Individual Species* ***Catch*** *Records are* ***linked*** *by the Sample Number 8.*

The Station Number 25 and Haul Number 6 in the Station Header Record at the top also appears in the three Individual Species Catch Records just below. This provides the link between these records, represented by the lines. It means that any information that is in the Station Header Record also applies to the Individual Species Catch Records, or any other record of any type that has the same Station Header Record identifying numbers in it.

Similarly, in the second Individual Species Catch Record, there is a Sample Number of 8. Again this links this record to the three Length/Frequency Records at the bottom. Once again this means that any information in that particular Individual Species Catch Record is linked to any other records with the same Station Number and Sample Number.

This linkage is the basis for building a database. All records from each cruise are tied together in a web of such linkages and provide the paths for navigating through a database, finding and extracting data related by the particular values in the Qualifier Fields of the query.

The backbone of the database looks like Illustration 6-7 This is a simplified diagram in that while each parent record has dozens of children, the diagram shows only a single child record. But the diagram does show the path used for retrieving information.

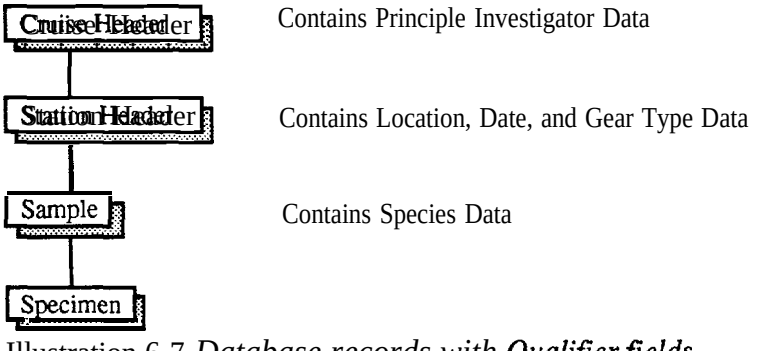

Illustration 6-7 *Database records with Qualifier fields*

Four records contain the fields with the retrieval qualifier values and are the locations where qualifying data is isolated. Once isolated, the Report Items from these and related records can be examined, and the data placed in the output record. The full database looks like the figure in Illustration 6-8.

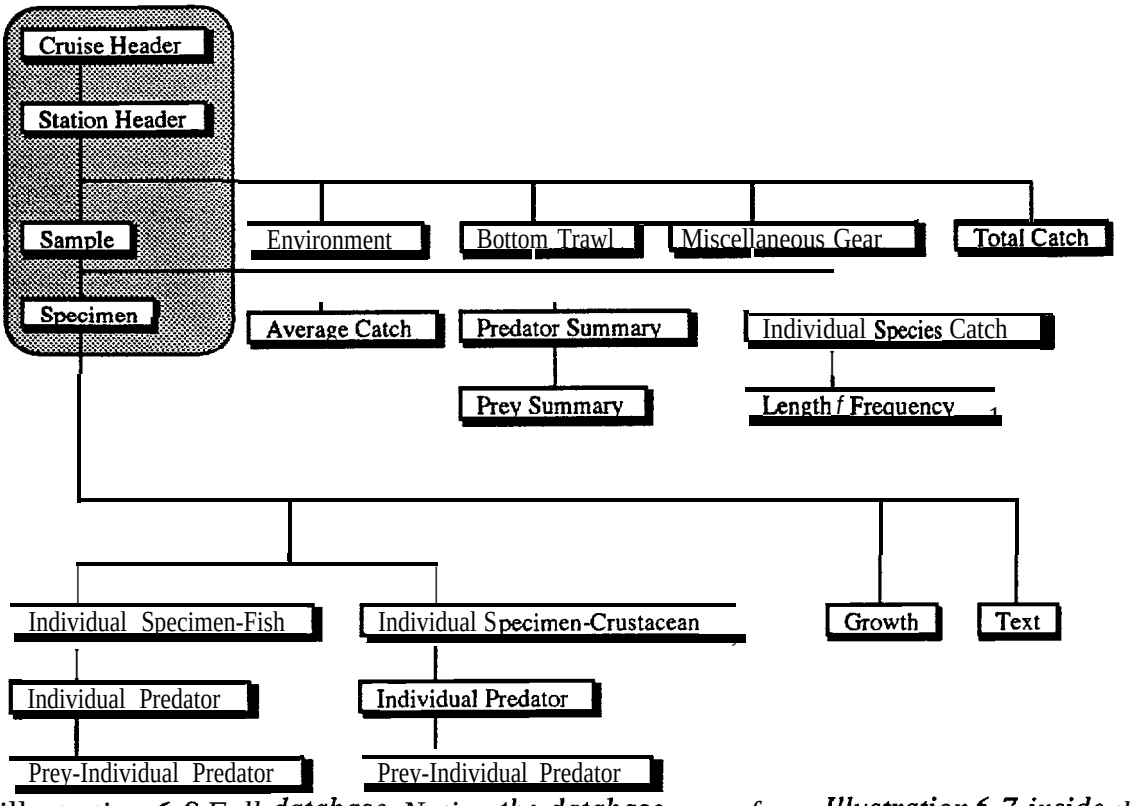

illustration 6-8 *Full database. Notice the database core, from Illustration 6-7 inside the box in the upper left corner.*

One final note. Two of the records in the database, Sample and Specimen, are not true NODC record types. They were created to preserve the parent - child relationships throughout the database so that "orphan" records would not be created by Retriever navigation. They do, however, contain duplicates of NODC record type fields from the previous discussion and do not impose any new relationships between records.

Chapter Seven Data Sources - OCSEAP

The Outer Continental Shelf Environmental Assessment program (OCSEAP) was established in 1974 by an interagency agreement between the Bureau of Land Management, Department of the Interior, and the National Oceanic and Atmospheric Administration, Department of Commerce and was terminated in 1991. The purpose of the program was to obtain environmental data and information to address specific needs, objectives and goals of the Department of the Interior in outer continental shelf leasing decisions in Alaska.

The general study elements in OCSEAP were:

1) Contaminant Distribution, which finds background levels and distribution of contaminants associated with oil and gas development.

2) Sea Ice and Environmental Geology. which assesses potential environmental hazards to outer continental shelf structures and facilities.

3) Pollutant Transport, Weathering, and Fate, which measures the movement of contaminants through the environment, and studies how this could be altered by chemical, physical, and biological processes.

4) Living Resources, which characterizes animal and plant populations that could be affected by development, as well as the communities and ecological systems they inhabit.

5) Effects, which determines the potential effects of contamination and human activity on living resources.

During its course, the program encompassed nearly all oceans and seas around Alaska, creating a vast amount of new information on and a greatly improved understanding of the physical environment and biological resources of the region.

Following NOAA's policy on marine environmental data management, OCSEAP-generated data were submitted to the National Oceanographic Data Center (NODC) or the National Geophysical Data Center (NGDC) in prescribed formats. Data were also subjected to quality assurance through such mechanisms as intercalibration, standardization, and effective experimental design.

The first phase of this project, the development of this particular database package, occurred under a cooperative agreement between the University of Alaska Anchorage and NOAA's National Ocean Service, Office of Oceanography and Marine Assessment Ocean Assessments Division office in Anchorage. The original intent of the project was to create a strictly "arctic" database; however, the scope of the project was broadened to encompass the entirety of Alaska's marine waters. Given the extensive marine distributions and movements of many fish occurring in the region, the enlarged database should allow more comprehensive analyses than would otherwise be possible. The bulk of the fisheries data in this database were collected under the auspices of OCSEAP. However, the database also includes some fisheries data collected for other purposes (e.g., the NOAA/National Marine Fisheries Service Fishery Management Studies).

Chapter Eight Data Observations and Alterations

As mentioned earlier our intent was not to alter the data from its original raw form. No data were altered except for the following:

1) Cruise number 421 was not used in this data base. The data did not conform to the expected reporting sequence, therefore it could not be imported into the database. This is a small ASCII file which is found on the CD-ROM in the \DOCUMENT\RAW_DATA directory as CR_421.DAT.

2) The following line was deleted from Cruise number 406:

123 TR8199NOO04 3 }]8120 2 10

It was preceeded by:

123 TR8199MOO04 3 2 28117031201 9

It was followed by:

123TR8199MOO04 3 4 18117031001 11

It was deleted because the '}' character makes set connection impossible. See CR_406.DAT on the CD_ROM in the \DOCUMENT\RAW_DATA directory.

3) Several Individual Predator records had no Individual Specimen records, In these cases, the taxonomic codes were used along with the station and sample numbers to create an otherwise empty Individual Specimen record of the same type (Fish or Crustacean). These records were created solely to provide linkage.

4) The cruise number field was originally filled with non-unique values. We assigned the fields a value which matches the number found in the name of the raw data file on the CD in the directory \DOCUMENT\RAW_DATA.

In our atempt to give you unaltered data we have observed the following problems:

1) In some cases the input data appeared to be shifted one character to the right or left.. Example: 7 10S HRIMP should be 710 SHRIMP. This may cause problems in statistical analysis packages.

2) In some AVERAGE CATCH records there is no weight information.

3) No growth records exist in the collected data.

Chapter Nine The Mapit Utility

New to this package is the ability to view the locations where data records were collected by using the Mapit (vers. 1.00) utility. Using a full map of the Alaskan coastline with the surrounding islands or a map of the Beaufort Coast, the user may view the areas traversed by cruises or the specific locations of stations.

Using Mapit

Mapit maybe run simultaneously with Retriever to facilitate the choice of location limits as selection criteria. Start Mapit with one of the two following methods:

1) At the DOS prompt: > MAPIT
2) In Windows, open the AFDB group and click on the Mapit icon.

Once Mapit begins, the user must select one of the available maps. Latitude and Longitude lines may be added to the maps by selecting the Add Lat/Lon choice under the menu item Display. Similarly, Remove Lat/Lon will remove the lines. The Alaska map displays longitude in two degree and latitude in one degree increments. The Beaufort Coast map displays longitude in one degree and latitude in twenty minute increments. It may help to have a map available to identify the lines when the map is zoomed.

Zooming the map is accomplished by marking the area to be zoomed using the Mark Box selection under the menu item Display. To define the box, click the left mouse button on any corner of the area you want to zoom and drag the box, releasing the button when you have covered the desired area. If your box has the same shape as your current window, you will see only the area you marked. Normally your marked area will not exactly match the shape of your window and you will see more than the desired area in either the x or y dimension when you zoom.

> Note: If you resize your window after selecting a map, Mapit will automatically restart the full map. This is only true for resizing, not moving the window.

At any time you may restart the full map by selecting Restart Full Map from the Display menu. This allows you to select a new area to zoom on, and is automatically selected by Mapit whenever you resize your window.

Multiple zooms will allow you to view an even smaller area, however the accuracy of the view will decrease due to the mapping method used. Beware that zooming too small will result in malfunctions due to graphic limitations.

Displaying Data Locations

Selecting Data Locations from the 'Display' menu item will place a dialog box on the window. This dialog box may be located anywhere on or off the Mapit window. You may perform any of the available Mapit functions such as Zoom or Restart Full Map while this box is active.

Data locations may be shown as boxes which outline the maximum and minimum extents of cruises or as points which define the exact locations of data stations as defined in the Station record. The desired cruises may be selected by cruise number using the Cruises list box or by year using the Years list box. These list boxes operate in the same manner as Windows File Manager and the data selection list boxes used in Retriever. If the Purge Previous check box is not chosen, the selected cruises will be displayed in addition to the previous selections. After you have made your selection click on the Use Years or Use Cruises check box. AU cruises maybe selected for viewing by checking the Use AU Cruises box. At any time before you click on the Display button, you may alter your selection.

> **Note!!** The cruise extents are actually the maximum and minimum semen coordinates of the station locations to ensure that all possible locations are included within the displayed rectangle, This is due to the non-rectangular form of the latitude and longitude "rectangles."

At any time you may click on the Choose Stations or Choose Cruises check boxes which will determine whether the individual stations or the cruise extents are displayed. If you select neither, cruise extents are shown by default. Mapit will not let you display anything until you define a cruise to display using either the specific cruises or years list box selection. To display your selections, click on the Display button. To exit without displaying, click on Cancel.

Caveats

The Mapit utility is not exact. Some station locations were not in the defined mapping area and are thus omitted from display and from calculation of cruise extents. In addition, the latitude and longitude lines were defined separately from the map creation by using Windows graphic calls. While every effort has been made to ensure the accuracy of these lines, they are not precise.

In addition the maps we obtained for display presented additional challenges. In order to display the Alaska map in a reasonable time, the definition of the coastline is a close approximation. Zooming on the coast **will** make this evident. A close look at St. Lawrence Island will show that it is not sized properly to the latitude and longitude lines. The Beaufort Coast map required expansion along the y-axis by a power of 2.6. It is not known when the maps were created, but it is known that the Beaufort Coast is **ever**-changing in form. Some data locations reported by the investigators have been noted to be inland from the coast. It is not known whether this is due to reporting error or due to sample collection on inland waterways.

Due to these reasons, some station locations may be shown as being on the land. Every effort has been made to make the display as accurate as possible in spite of the problems, and we hope that Mapit proves to be a **usefull** tool regardless of its imperfections.

Chapter Ten Troubleshooting and Common Errors

problem:	Possible cause:	Remedy:
No output data.	1) Query too narrow; no data fits the qualifiers.	1) Widen qualifiers.
"Error writing to filename.out".	1) Output file size exceeds available disk space.	1) Make qualifiers more restrictive. 2) Make more room by data compression, larger disks or deleting files.
System sluggish during query.	1) CD-ROM access too slow.	1) Reinstall database to hard drive. 2) Use faster CD-ROM.
Previous query files missing.	1) Using same name for all queries built.	1) Use different names for future queries.
Error reading .taf or log file.	1) Vista.taf file corrupted.	1) Delete Vista.taf.
All selected items not in query.	1) Not using proper selection method.	1) Follow List Box selection method.

Appendix A Output Items

This appendix is a list of all the Report Items in the same order as they appear in the Retriever. The name of the record is in capital letters, and the name of the field is in lower case. All but two of the records are NODC Type 123 records, which are described in Appendix A. The two records that are not NODC types, SAMPLE and SPECIMEN, are records created to speed up searching and extracting data by the Retriever.

Some fields are repeated in different records, such as Taxonomic Code and Sample Number. These are key linking fields and the reason for the repetition is discussed in Chapter Six (The Fish Database).

Fields that are marked with an asterisk (*) are not in the original NODC type 123 Record descriptions, but have been created to assist Retriever navigation.

CRUISE HEADER, Investigator, Scientist or Data Source
CRUISE HEADER, Vessel/Platform Name
CRUISE HEADER, Cruise Number
CRUISE HEADER, Start Date of Survey
CRUISE HEADER, End Date of Survey
CRUISE HEADER, Institution or Agency
CRUISE HEADER, Agency Code
CRUISE HEADER, Vessel Code

STATION HEADER, Latitude in DDMMSS
STATION HEADER, Longitude in DDMMSS
STATION HEADER, Gear Type
STATION HEADER, Station Number
STATION HEADER, Haul Number
STATION HEADER, Number of Hauls
STATION HEADER, Time (GMT)
STATION HEADER, Fishing Duration
STATION HEADER, Distance Fished
STATION HEADER, Direction of Tow
STATION HEADER, Performance
STATION HEADER, Date
STATION HEADER, Sequence Number

ENVIRONMENT, Gear Depth
ENVIRONMENT, Gear Temperature
ENVIRONMENT, Gear Salinity
ENVIRONMENT, Average Bottom Depth

ENVIRONMENT, Bottom Type
ENVIRONMENT, Sounding Record
ENVIRONMENT, Bottom Temperature
ENVIRONMENT, Bottom Salinity
ENVIRONMENT, Surface Temperature
ENVIRONMENT, Surface Salinity
ENVIRONMENT, Transparency
ENVIRONMENT, Tide Height
ENVIRONMENT, Tide Stage
ENVIRONMENT, Air Temperature
ENVIRONMENT, Weather
ENVIRONMENT, Cloud Amount
ENVIRONMENT, Sea State
ENVIRONMENT, Wind Direction (From)
ENVIRONMENT, Wind Force (Beaufort)
ENVIRONMENT, Current Direction (Toward)
ENVIRONMENT, Current Speed
ENVIRONMENT, Haul Number
ENVIRONMENT, Station Number
ENVIRONMENT, Sequence Number

BOTTOM TRAWL, Gear Depth
BOTTOM TRAWL, Gear Type
BOTTOM TRAWL, Bottom Trawl Type
BOTTOM TRAWL, Bottom Trawl Accessories
BOTTOM TRAWL, Opening Height of Trawl
BOTTOM TRAWL, Opening Width of Trawl
BOTTOM TRAWL, Overall Length
BOTTOM TRAWL, Codend Length
BOTTOM TRAWL, Foot Rope Length
BOTTOM TRAWL, Head Rope Length
BOTTOM TRAWL, Gear Material
BOTTOM TRAWL, Opening Mesh
BOTTOM TRAWL, Average Body Mesh
BOTTOM TRAWL, Codend Mesh
BOTTOM TRAWL, Codend Liner
BOTTOM TRAWL, Number of Floats
BOTTOM TRAWL, Float Diameter
BOTTOM TRAWL, Tickler
BOTTOM TRAWL, Roller Gear
BOTTOM TRAWL, Length of Bridles
BOTTOM TRAWL, Length of Doors
BOTTOM TRAWL, Width of Doors
BOTTOM TRAWL, Warp Length
BOTTOM TRAWL, Scope of Warp
BOTTOM TRAWL, Haul Number
BOTTOM TRAWL, Station Number
BOTTOM TRAWL, Sequence Number

MISC. GEAR, Gear Depth
MISC. GEAR, Gear Type
MISC. GEAR, Net Depth
MISC. GEAR, Unit Length
MISC. GEAR, Number of Units
MISC. GEAR, Number of Subunits
MISC. GEAR, Gear Material
MISC. GEAR, Bait/Lure
MISC. GEAR, Type of Lure
MISC. GEAR, Seine Mesh - Towing
MISC. GEAR, Seine Mesh - Upper
MISC. GEAR, Seine Mesh - Average Body
MISC. GEAR, Seine Mesh - Bunt
MISC. GEAR, Seine Mesh - Outside
MISC. GEAR, Seine Mesh - Middle
MISC. GEAR, Seine Mesh - Bag
MISC. GEAR, Number of Shackles (1st Gillnet)
MISC. GEAR, Material (lst Gillnet)
MISC. GEAR, Mesh (1st Gillnet)
MISC. GEAR, Number of Shackles (2nd Gillnet)
MISC. GEAR, Material (2nd Gillnet)
MISC. GEAR, Mesh (2nd Gillnet)
MISC. GEAR, Number of Shackles (3rd Gillnet)
MISC. GEAR, Material (3rd Gillnet)
MISC. GEAR, Mesh (3rd Gillnet)
MISC. GEAR, Number of Shackles (4th Gillnet)
MISC. GEAR, Material (4th Gillnet)
MISC. GEAR, Mesh (4th Gillnet)
MISC. GEAR, Number of Shackles - Trammel Net
MISC. GEAR, Outer Panel Material - Trammel Net
MISC. GEAR, Outer Panel Mesh - Trammel Net
MISC. GEAR, Inner Panel Material - Trammel Net
MISC. GEAR, Inner Panel Mesh - Trammel Net
MISC. GEAR, Station Number
MISC. GEAR, Haul Number
MISC. GEAR, Sequence Number

TOTAL CATCH, Total Wet Weight of Catch
TOTAL CATCH, Weight Determination
TOTAL CATCH, Total Number
TOTAL CATCH, Number Determination
TOTAL CATCH, Volume of Catch
TOTAL CATCH, Number of Fish Per Liter
TOTAL CATCH, Number of Species Examined
TOTAL CATCH, Station Number
TOTAL CATCH, Haul Number
TOTAL CATCH, Sequence Number

SAMPLE, Taxonomic Code
SAMPLE, Station Number
SAMPLE, Sample Number
SAMPLE, Cruise Number
SAMPLE, Haul Number

AVERAGE CATCH, Average Wet Weight of Catch/Species
AVERAGE CATCH, Weight Determination
AVERAGE CATCH, Average Number in Catch/Species
AVERAGE CATCH, Number Determination
AVERAGE CATCH, predominate Sex of Catch
AVERAGE CATCH, predominate Age of Catch
AVERAGE CATCH, Age Method
AVERAGE CATCH, Number of Days
AVERAGE CATCH, Number of Species Examined
AVERAGE CATCH, Station Number
AVERAGE CATCH, Haul Number
AVERAGE CATCH, Taxonomic Cede
AVERAGE CATCH, Sample Number
AVERAGE CATCH, Sequence Number

Individual SPECIES CATCH, Total Wet Weight
INDIVIDUAL SPECIES CATCH, Weight Determination
INDIVIDUAL SPECIES CATCH, Total Number for Species
INDIVIDUAL SPECIES CATCH, Number Determination
INDIVIDUAL SPECIES CATCH, Volume of Catch
INDIVIDUAL SPECIES CATCH, Number of Fish Per Liter
INDIVIDUAL SPECIES CATCH, Predominate Sex of Each Species
INDIVIDUAL SPECIES CATCH, predominate age of each species
INDIVIDUAL SPECIES CATCH, Age Method
INDIVIDUAL SPECIES CATCH, Station Number
INDIVIDUAL SPECIES CATCH, Haul Number
Individual SPECIES CATCH, Taxonomic Cede
INDIVIDUAL SPECIES CATCH, Sample Number
INDIVIDUAL SPECIES CATCH, Sequence Number

PREDATOR SUMMARY, Number of Stomachs Pooled
PREDATOR SUMMARY, Total Wet Weight
PREDATOR SUMMARY, Weight Determination
PREDATOR SUMMARY, Station Number
PREDATOR SUMMARY, Haul Number
PREDATOR SUMMARY, Taxonomic Code
PREDATOR SUMMARY, Sample Number
PREDATOR SUMMARY, Sequence Number

PREY SUMMARY, Taxonomic Code
PREY SUMMARY, Total Wet Weight
PREY SUMMARY, Weight Method
PREY SUMMARY, Total Number
PREY SUMMARY, Number Determination
PREY SUMMARY, Total Volume
PREY SUMMARY, Prey or Prey Part
PREY SUMMARY, Small Prey Wet Weight
PREY SUMMARY, Small Prey Volume
PREY SUMMARY, Station Number
PREY SUMMARY, Haul Number
PREY SUMMARY, Sample Number
PREY SUMMARY, Sequence Number

LENGTWFREQUENCY, Predominate Sex of Sample
LENGTH/FREQUENCY, Predominate Age of Sample
LENGTHfFREQUENCY, Age Method
LENGTH/FREQUENCY, Length of Class
LENGTH/FREQUENCY, Length Code
LENGTH/FREQUENCY, Length Frequency
LENGTH/FREQUENCY, Length Sample
LENGTH/FREQUENCY, Station Number
LENGTH/FREQUENCY, Haul Number
LENGTH/FREQUENCY, Taxonomic Code
LENGTH/FREQUENCY, Sample Number
LENGTH/FREQUENCY, Sequence Number

*SPECIMEN, Specimen Number
*SPECIMEN, Station Number
*SPECIMEN, Sample Number

TEXT, Text
TEXT, Station Number
TEXT, Haul Number
TEXT, Sample Number
TEXT, Specimen Number
TEXT, Taxonomic code
TEXT, Sequence Number

INDIVIDUAL SPECIMEN (FISH), Sex
INDIVIDUAL SPECIMEN (FISH), Sex Maturity
INDIVIDUAL SPECIMEN (FISH), Length of Individual
INDIVIDUAL SPECIMEN (FISH), Length Code
INDIVIDUAL SPECIMEN (FISH), Wet Weight of Individual
INDIVIDUAL SPECIMEN (FISH), Weight Determination
INDIVIDUAL SPECIMEN (FISH), Age of Individual
INDIVIDUAL SPECIMEN (FISH), Age Method (Structure)
INDIVIDUAL SPECIMEN (FISH), Age Determination
INDIVIDUAL SPECIMEN (FISH), Sample Type
INDIVIDUAL SPECIMEN (FISH), Data Type
INDIVIDUAL SPECIMEN (FISH), Stomach Examined
INDIVIDUAL SPECIMEN (FISH), Gut Collected
INDIVIDUAL SPECIMEN (FISH), Fin Clip
INDIVIDUAL SPECIMEN (FISH), Gored or Ovarian Weight
INDIVIDUAL SPECIMEN (FISH), Gonad-Somatic Index
INDIVIDUAL SPECIMEN (FISH), Egg Color
INDIVIDUAL SPECIMEN (FISH), Egg Condition
INDIVIDUAL SPECIMEN (FISH), Clutch Size
INDIVIDUAL SPECIMEN (FISH), Station Number
INDIVIDUAL SPECIMEN (FISH), Haul Number
INDIVIDUAL SPECIMEN (FISH), Sample Number
INDIVIDUAL SPECIMEN (FISH), Specimen Number
INDIVIDUAL SPECIMEN (FISH), Taxonomic Code
INDIVIDUAL SPECIMEN (FISH), Sequence Number

INDIVIDUAL SPECIMEN (CRUSTACEAN), Sex
INDIVIDUAL SPECIMEN (CRUSTACEAN), Sex Maturity
INDIVIDUAL SPECIMEN (CRUSTACEAN), Carapace Width

INDIVIDUAL SPECIMEN (CRUSTACEAN), Shell Condition
INDIVIDUAL SPECIMEN (CRUSTACEAN), Wet Weight
INDIVIDUAL SPECIMEN (CRUSTACEAN), Weight Determination
INDIVIDUAL SPECIMEN (CRUSTACEAN), Age of Individual
INDIVIDUAL SPECIMEN (CRUSTACEAN), Age Method (Structure)
INDIVIDUAL SPECIMEN (CRUSTACEAN), Age Determination
INDIVIDUAL SPECIMEN (CRUSTACEAN), Sample Type
INDIVIDUAL SPECIMEN (CRUSTACEAN), Data Type
INDIVIDUAL SPECIMEN (CRUSTACEAN), Chelae Length
INDIVIDUAL SPECIMEN (CRUSTACEAN), Petasma/Thelycum
INDIVIDUAL SPECIMEN (CRUSTACEAN), Gonad or Ovarian Weight
INDIVIDUAL SPECIMEN (CRUSTACEAN), Gonad-Somatic Index
INDIVIDUAL SPECIMEN (CRUSTACEAN), Egg Color
INDIVIDUAL SPECIMEN (CRUSTACEAN), Egg Condition
INDIVIDUAL SPECIMEN (CRUSTACEAN), Clutch Size
INDIVIDUAL SPECIMEN (CRUSTACEAN), Station Number
INDIVIDUAL SPECIMEN (CRUSTACEAN), Haul Number
INDIVIDUAL SPECIMEN (CRUSTACEAN), Sample Number
INDIVIDUAL SPECIMEN (CRUSTACEAN), Specimen Number
INDIVIDUAL SPECIMEN (CRUSTACEAN), Taxonomic Cede
INDIVIDUAL SPECIMEN (CRUSTACEAN), Sequence Number

INDIVIDUAL PREDATOR, Life History
INDIVIDUAL PREDATOR, Organ Code
INDIVIDUAL PREDATOR, Gut Position
INDIVIDUAL PREDATOR, Stomach Fullness
INDIVIDUAL PREDATOR, Stomach Digestion
INDIVIDUAL PREDATOR, Wet Weight of Specimen Stomach Contents
INDIVIDUAL PREDATOR, Weight Determination
INDIVIDUAL PREDATOR, Volume of Total Gut Contents
INDIVIDUAL PREDATOR, Station Number
INDIVIDUAL PREDATOR, Haul Number
INDIVIDUAL PREDATOR, Sample Number
INDIVIDUAL PREDATOR, Specimen Number
INDIVIDUAL PREDATOR, Taxonomic Code
INDIVIDUAL PREDATOR, Sequence Number

PREY RECORD-INDMDUAL PREDATOR, Taxonomic Code
PREY RECORD-INDIVIDUAL PREDATOR, Life History
PREY RECORD-INDIVIDUAL PREDATOR, Wet Weight of Prey Specimen
PREY RECORD-INDIVIDUAL PREDATOR, Weight Method
PREY RECORD-INDIVIDUAL PREDATOR, Number of Prey
PREY RECORD-INDIVIDUAL PREDATOR, Number Determination
PREY RECORD-INDIVIDUAL PREDATOR, Volume of Prey
PREY RECORD-INDIVIDUAL PREDATOR, Prey or Prey Part
PREY RECORD-INDIVIDUAL PREDATOR, Length of Prey Size
PREY RECORD-INDMDUAL PREDATOR, Percent of Prey Items
PREY RECORD-INDIVIDUAL PREDATOR, Station Number
PREY RECORD-INDIVIDUAL PREDATOR, Haul Number
PREY RECORD-INDIVIDUAL PREDATOR, Sample Number
PREY RECORD-INDIVIDUAL PREDATOR, Specimen Number
PREY RECORD-INDIVIDUAL PREDATOR, Sequence Number

Appendix B Research Contractors

This appendix contains addresses and/or phone numbers for the contractors that actually conducted the research. With the passage of time, personnel, addresses, and phone numbers will change. The addresses and phone numbers are as up to date as possible. The principal investigators, however, date from the time of the actual research and their whereabouts and affiliations at this time are unknown.

Principal Investigator	Agency (Contractor\
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Index