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RVAN: Research Vessel ANalysis programs

Edited by D. Clay

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Fisheries and Oceans | Pêches et Océans
Canada

Canadian Manuscript Report of Fisheries and Aquatic Sciences

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Les rapports manuscrits contiennent des renseignements scientifiques et techniques qui constituent une contribution aux connaissances actuelles, mais qui traitent de problèmes nationaux ou régionaux. La distribution en est limitée aux organismes et aux personnes de régions particulières du Canada. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

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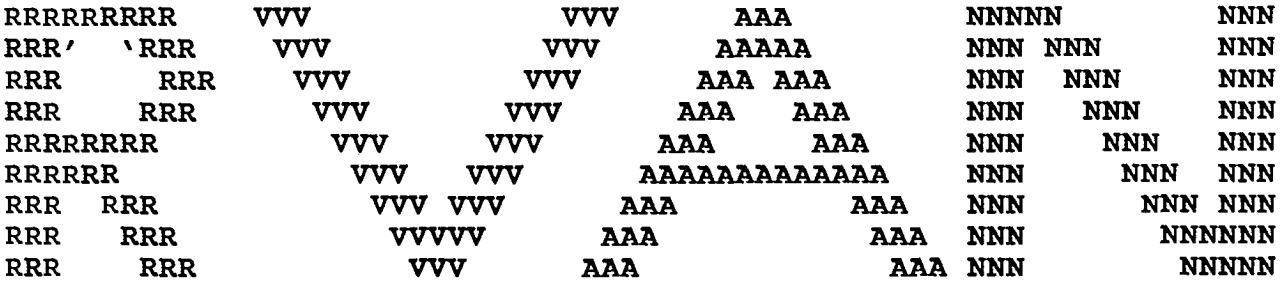
Les numéros 1 à 900 de cette série ont été publiés à titre de manuscrits (série biologique) de l'Office de biologie du Canada, et après le changement de la désignation de cet organisme par décret du Parlement, en 1937, ont été classés comme manuscrits (série biologique) de l'Office des recherches sur les pêcheries du Canada. Les numéros 901 à 1425 ont été publiés à titre de rapports manuscrits de l'Office des recherches sur les pêcheries du Canada. Les numéros 1426 à 1550 sont parus à titre de rapports manuscrits du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 1551.

Les rapports manuscrits sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Manuscript Report of

Fisheries and Aquatic Sciences 2044

August 1989



R esearch
V essel
AN alysis programs

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The original intention was to append the source code listings to this report, however the volume of data has made this impossible. Thus the listings are available as an Annex through the editor.

* The source listings are available from the editor. If computer readable listings are required please send five 3 1/2 inch floppy disks formatted to 720 Kb with the request.

ABSTRACT

Clay, D. 1989. RVAN: Research vessel analysis programs. Can. Man. Rep. Fish. Aquat. Sci. 2044: 133p.

This documentation is provided to aid those persons using the Department of Fisheries and Oceans (DFO) database of research vessel groundfish surveys conducted annually in the southern Gulf of St. Lawrence. The programs are written in 'Turbo Pascal' and include a data editor/validation system, a report generator, an analysis system to provide biomass and catch at age estimates, and a plotting package to map the various forms of the data.

The data can be either in the form used by the Gulf Region of the DFO or that used prior to 1984 by the Scotia Fundy Region of the DFO. The data formats are provided and source code listings are available.

RESUME

Clay, D. 1989. RVAN: Research vessel analysis programs. Can. Man. Rep. Fish. Aquat. Sci. 2044: 133p.

Cette documentation a été préparée pour aider les personnes qui utilisent la base de données de l'étude annuelle des poissons de fond conduite dans le sud du Golfe Saint-Laurent par navire de recherche de la Ministère de Pêches et Oceans (MPO). Les logiciels sont écrit en language "TURBO PASCAL" et comprennent un logiciel pour l'édition et la validation des données, un système pour produire divers sommaires, un logiciel d'analyse de la biomasse et des estimés des captures ainsi qu'un système de traçage de cartes pour la représentation des données.

Les données peuvent être soit dans le format utilisé par le MPO, Région du Golfe, soit dans le format utilisé avant 1984 par le MPO, Région de Scotia-Fundy. Les formats des données sont fournis et les programmes sont disponible.

INTRODUCTION AND ACKNOWLEGEMENTS

This collection of programs was written partially under contract to the Department of Fisheries and Oceans, Gulf Fisheries Center by ISMT-Microcybernetics and partially by DFO staff. These programs were designed to replace the STRAT and STRAP systems utilized currently and in the past by the other regions of DFO within the Atlantic zone. (STRAP is a newer re-designed program that has replaced STRAT.)

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Contract Programmer: Pierre C. Brien (902)-425-6460
(version 1.0) ISMT-Microcybernetics Ltd.
P.O. Box 3663
Halifax, N.S. B3J 3K6

PROGRAMS and FILES COVERED

	Contract	Date written	Last version	Last update
Documentation	no	87/02	ver 3.1	89/01/20
AltCol	no	85/04	ver 2.065	88/08/20
CheckIT	yes	85/10	ver 3.12	89/01/19
LoranC2	yes	86/02	ver 1.0	86/02
DataLst	no	88/08	ver 1.1	88/12
BioFreq	yes	85/02	ver 3.0	88/08
BldSet	yes	85/02	ver 2.3	87/04
BldCat	yes	85/02	ver 2.3	87/04
BldLen	yes	85/02	ver 2.31	89/04
BldBio	yes	85/02	ver 2.3	87/04
CatStat	yes	85/03	ver 4.00	89/05
MALKey1	yes	85/04	ver 3.31	89/05
MALKey2	yes	85/04	ver 3.6	89/06
MALKey3	no	88/04	ver 3.01	89/04
SpBld	yes	85/07	(taken out of use)	
PikAMap	no	87/06	ver 2.0	89/01/15
CatMap	no	87/06	ver 2.0	87/05/24
AtlMap	no	87/08	ver 2.1	89/01/20

This document outlines a series of utility and statistical programs used to edit, list, plot, and analyse research vessel survey data on a cruise and species basis. Several utility programs and common data format files are included as a part of this documentation package. Appendices provide the source code listing for each of the programs in this collection.

DOCUMENTATION for Research Vessel ANalysis programs
(version 3.1)

R esearch
V essel
AN alysis programs

Background to Research Vessel Surveys and Analysis

Along Canada's east coast, fisheries managers formulate the harvest of marine species based on analytical stock assessments. These can take any one of three main forms -

- Catch Per Unit Effort (CPUE) - sometimes referred to as 'status quo' - maintain the effort (fishing mortality) at recently acceptable levels,
- General Production Models - fisheries with a long history of limited catch and effort data, and
- Virtual Population Analysis (VPA or SPA) - age structured models of population estimates.

VPA is based on 'our best estimate' - the best estimate is selected by comparing a range of possible answers (population estimates) with one or more fishery independent indices of abundance. This process is called calibration.

Research vessel surveys are one of the most common independent estimates of abundance. The fall groundfish survey in the southern Gulf of St. Lawrence used a random stratified daylight-only design agreed to in the late 1960's by ICNAF (International Commission of North Atlantic Fisheries). The aim was to establish ICNAF wide standardized coordinated surveys.

Research surveys have the following principal objectives:

- to monitor fluctuations in structure and size of fish populations within the survey area,
- to assess the fish production potential of Atlantic coastal waters, and
- to determine environmental factors controlling fish distribution and abundance.

Stratified random design was selected for the surveys because:

- it produces unbiased estimates of abundance with associated estimates of precision,
- it permits sampling to be spread over the total area of interest,
- it permits sampling rates to be varied between strata to improve precision, and
- it allows post aggregation of strata.

The stratification scheme chosen for Atlantic Canada was based on depth. This was because large scale trends related to hydrographic and bathymetric conditions were evident, it was assummed that some homogeneity of environment would relate to these areas. To exploit these trends the stratified random sampling scheme was implimented over the purely random scheme. The stratification was based on depth ranges 0 to 91 m, 92 to 183 m, and 184 to 366 m.

Problems with the stratified random daylight scheme used in the southern Gulf area are:
- to produce unbiased estimates with acceptable confidence intervals it would be necessary to sample an order of magnitude more intensively than we now do,
- diel variation is highly significant for some species (this variation was accounted for prior to 1985 when only daylight surveys were conducted) ,
- 90% of the survey area is under 91 m in depth (one of the Atlantic zone strata), thus the depth strata selected may not be the most suitable for our stratification.

These programs are designed to produce routine annual 'production type' analysis of this data set - bearing in mind the various assumptions of the survey design. The output of each species/year combination is used to build the historic yearly biomass estimates for calibration of our stock assessments. These surveys were originally designed to survey the southern Gulf cod (Gadus morhua) and American plaice (Hippoglossoides platessoides) stocks. These two stocks have been the only fisheries for which this data has been incorporated into the annual assessment process.

Program Compilation notes

All programs in the RVAN suite are written in Turbo Pascal (ver 3.0) and some utilize utilities from the Turbo Toolbox (eg. Turbo Sort). They also share many common "include" files. All the programs have been compiled to --.COM files for ease of use.

Turbo Pascal is available on CPM80, CPM86, MS/DOS and Apple MacIntosh operating systems. Some options (such as retrieving the date and time from the OS) have been included in the MS/DOS version. These have been marked and must be commented out for CPM80 and CPM86 versions or the programs will 'bomb'.

The program files (--.COM) and the necessary associate files (--.PAR, STRATA.DAT, etc.) require approximately 1 Mb of disk space. These files can conveniently be separated into four 360 Kb disks. One disk is used for each topic: editing, data listing, data analysis and plotting. Many of the programs produce data files and some produce intermediate temporary files for storage and sorting. At least 50 K (preferably 100 K) disk space should be free for a moderate sized cruise (30 to 50 sets).

Some additional utility files are used for creating command files for use with the commercial package 'SuperSort'. This is the method used to sort the data files and select subsets as required. These programs are written in Utah Fortran (ver 1.01). These small, single purpose programs are listed in Appendix I.

Many of these programs can be used with other similar data sets by simply substituting the appropriate format structure as an 'include' file. Batch files have been used to simplify procedures when more than one program is used to complete a task.

Program Utilization Notes

The programs are all interactive. The user is required to identify both themself and the data set to be used. Each analysis program uses a separate parameter file containing much of the information (detailed formatting, heading setups, data selection criteria) required to customize the output. For many programs several species and cruise combinations can be run together.

At the top of each report a program title including program version and data version number is output. Below this all programs output the header which is composed of a title, date and time, and name of person running the program. While this procedure may seem tedious it is necessary in order to maintain proper documentation and identification of runs and to keep separate 'official' or standard runs from 'research' runs.

The MALKey series of programs can generate a large number of temporary and permanent files depending on the cruise/species combinations. A CONFIG.SYS file of

```
Buffers = 20
Files   = 40
```

has been found adequate to date.

Each of the programs is run by simply typing the name and pressing the return key. The user then answers the interactive queries, many of which are used in completing the page headings on the output.

All data files are identified by cruise ID only and the appropriate name is constructed by the program. For example cruise 244 on the RV E.E. Prince uses P244 for the cruise ID and the biological data file would be RVP244B.DAT. The data file sequence of naming for the above file would be RVP244B.DAT for the keypunched data, RVP244B.NEW for the same data converted to the standardized format by AltCol, and RVP244B.DBA for the same data in the reduced format produced by BldBIO. The other three data types follow the same protocol except the 'B' in 'RVP244'+ B +'.DAT' is replaced by an 'S', 'C', or 'L' respectively for set, catch, and length. The standardized format, in addition to being converted to a single format, has zero filled values and some standardization of codes. The reduced formats are sorted at the time of reduction, the standardized formats are not - before running the analysis programs sorting in necessary.

AltCol

- program to standardize historical (1970 to 1983) and current (1984, 1985, 1986 to present) data into a single common standardized format.

```
program Alter_Columns;
{  program:       to add, delete or alter columns of existing research
                  vessel data files producing one standardized format

                      R esearch
                      V essel
                      AN alysis programs

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                  Marine Fisheries Division
                  Gulf Fisheries Center, Moncton, N.B.
                  Department of Fisheries and Oceans

  Date_Written:   85/04/07          version 1.0
       Updated:   87/04/09                  2.0
                  87/04/30                  2.01
                  87/08/09                  2.02
                  87/08/18                  2.03
                  87/12/01                  2.04
                  88/04/06                  2.05
                  88/07/18                  2.06
                  88/08/20                  2.065

              list of include files (include files are self contained
                   PrtConst           parts of the program on separate
                   NewVal             files that are read into the program
                   RvSETac            sequentially as listed)
                   RvCATac
                   RvLENac
                   RvBIOac
                   ChangeS
                   ChangeC
                   ChangeL
                   ChangeB
                   Exist
                   HeadALT                              }

{                        DOCUMENTATION

     this program takes St. Andrews historic data and Gulf Region
     current data and creates one common data series
```

The input data file is named with the following convention, 'RV' + Xnnn + T + '.DAT' and the standardized output file has a name in the form of 'RV' + Xnnn + T + '.NEW' where Xnnn is the cruise ID and T is a single letter representing the card type - S for set, C for catch, L for length and B for biological.

Version 2.0 adds the data version number to the set card

version 2.02 corrects function HowLong for individual data types
version 2.03 accounts for the 4 digit time in 1985 data P327
H141

version 2.04 corrects error in time duration calculation
version 2.05 corrects truncation of
weight sampled
---
weight caught ratio on Len card

and re-writes the set data (RVXnnnS.DAT file as RVXnnnS.VER) with new version number.

}

{ after running AltCol the data should be sorted as described below:

INPUT data should be sorted by these fields before running the edit program and the programs to reduce the data files:

data type:	SET	CATCH	LENGTH	BIOLOGICAL	columns
fields	set no.	set no.	set no.	set no.	9 to 11
		species			41 to 44
			species		22 to 25
				species	23 to 26
			sex		32
			start len		37 to 39
				fish no.	28 to 31
				record no.	27

}

INPUT data should be sorted by these fields before running the analyses programs:

data type:	SET	CATCH	LENGTH	BIOLOGICAL	columns
fields	set no.				9 to 11
		species			41 to 44
			species		22 to 25
				species	23 to 26
		set no.	set no.	set no.	9 to 11
			sex		32
			start len		37 to 39
				fish no.	28 to 31
				record no.	27

}

{ LIST OF PROPOSED DATA VERSION NUMBERS FOR RESEARCH VESSEL DATA

number	description
1.00	first keypunched version
1.10	St. Andrews manual edit
1.20	Gulf 'CHECK-IT' edit
2.X0	Standardized format (.NEW)

}

This program requires two parameter files. The first is AltCol.PAR, it has the version number to be used on the first line. The second CruzYr.PAR has a list of valid cruise ID's and the year in which the survey was carried out (see Files - Utility).

AltCol.PAR

```
2.10  {data version number to be inserted - 0.00 defaults to existing}
NEW   {data type - first time conversion/OLD - updates version no./NEW}
```

LoranC2

- program to calculate the location in degrees, minutes, and seconds from Loran C readings.

```
program LoranC;

{ Program:        Loran C conversion to Lat and Long

                       R esearch
                       V essel
                       AN alysis programs

  Scientific       Douglas Clay                        (506)-857-6218
   Authority       Marine Fisheries Division
                   Gulf Fisheries Center, Moncton, N.B.
                   Department of Fisheries and Oceans

  Contract Author:          Pierre C. Brien
     (ver 1.0)              ISMT-Microcybernetics Ltd.
                            P.O. Box 3663
                            Halifax, N.S. B3J 3K6    (902)-425-6460

  Date_Written:   86/02     ver 1.0

  Function: This program converts LORAN C readings into Latitude and
            Longitude values. The program has been converted from
            a previous program written in HP model 85 BASIC. Where
            possible, variable names have been converted to have
            mnemonic value; other variable names have been left as is.
            Functions existing in the BASIC library but not
            present in the PASCAL math functions have been
            implemented as follows:

              Tan(X) using the identity Tan(X) := Sin(X) / Cos(X)

              ATN2(X,Y) the arcTangent of Y/X in the proper quadrant
                where X,Y are the rectangular coordinate position of
                a point. ATN2(X,Y) := arcTan(Y/X)

              RTD - Radians to degrees

              DTR - Degrees to radians
```

Changes made and problems encountered during conversion were as follows:

Loop counters - BASIC increments before testing whereas Pascal terminates with the control variable equal to the final value. See procedure ImproveSolution.

Unused variables - the statements using unused variables are commented out.

Local variables - variables used as local or temporary variables have been made local to the procedure or function using them.

Naming conventions - BASIC recognizes as different A and A(I) whereas Pascal considers this to be an error. Where this situation was encountered the array was renamed Aa (a for array) and the scalar was not changed. There is one exception to this rule: Those arrays used to store the station data are named Td (d for data).

Debugging and testing the program was done using a TRACE ALL printout from the BASIC program. The writeln statements used to produce comparable output have been left in place but are commented out. They may thus be reactivated easily should the need arise.

If it is desired to increase the number of stations stored on the data file this may be done up to a limit of 51 stations (from the present 44) without any structural changes to the program. The limit of 51 is derived from the maximum length of a string 255 (255 / 5 = 51). More then 51 stations may be stored by changing the way in which the Loran station IDs are stored and by writing a function to search the array rather than using the pos function as has been done.

****** end of documentation *******}

{ list of include files

exist.pas
DirSol.pas
RevSol.pas
Baseline.pas
Solution.pas }

Notes to aid in the interpretation of program function.

The acronym **LORAN** means LOng Range Aid to Navigation.

Loran C is a long range navigation system that operates at an assigned frequency of 100 KHz. It uses pulsed signals from widely spaced transmitting stations and measures the difference in

arrival times of the pulses to determine position relative to the transmitting stations. The time difference is the time of arrival of the secondary signal minus the time of arrival of the master signal, as observed on a single receiver.

The master station is the controlling station of the Loran C Chain which transmits the reference timing signals. The secondary station is any transmitting station in the chain that is not the master station. Secondaries are usually designated as W, X, Y, and Z and referenced to the master M station GRI. The GRI or Group Repetition Interval is a 4 digit number with a time coded delay which is used to identify the group of transmitter stations in a specified Loran C Chain. The chain is a group of Loran C transmitting stations identified by a specific GRI.

There are 12 GRI chains, these are:

Canadian east coast	5930	USA west coast	9940
Canadian west coast	5990	Gulf of Alaska	7960
Great lakes	8970	Norwegian Sea	7970
Northeast USA	9960	Mediterranean	7990
North Atlantic	7930	North Pacific	9990
Southeast USA	7980	Central Pacific	4990

An example of the Canadian east coast chain 5930 is:

STATION	PLACE NAME	LOCATION
Master station	Caribou, Maine	46 48 27.54 N 67 55 39.35 W
X Secondary station	Nantucket, Mass.	41 15 11.98 N 69 58 40.51 W
Y Secondary station	Cape Race, Nfld.	46 46 32.62 N 53 10 32.41 W
Z Secondary station	Fox Harbour, Labrador	52 22 35.11 N 55 42 31.35 W

Emission delay or time delay between master and each of the secondary stations is:

X	13131.88	u sec
Y	28754.93	u sec
Z	41594.56	u sec

The data file containing the necessary parameters to complete the triangulation calculations to change Loran readings to degrees, minutes and seconds is as follows:

```
4990X 15972.23 16.444395 -169.30312  20.144916 -155.53097
4990Y 34253.18 16.444395 -169.30312  28.234177 -178.17302
5930X 13131.88 46.48272  -67.553771  41.151193 -69.583909
5930Y 28755.02 46.48272  -67.553771  46.463218 -53.102816
5990X 13343.6  51.575878 -122.220224 55.262085 -131.151965
5990Y 28927.36 51.575878 -122.220224 47.034799 -119.44953
5990Z 42266.63 51.575878 -122.220224 50.362972 -127.212935
7930W 15068.02 59.591727 -45.102747  64.542658 -23.552175
7930X 27803.77 59.591727 -45.102747  62.175968 -7.042671
7930Z 48212.2  59.591727 -45.102747  46.463218 -53.102816
7960X 13804.45 63.194281 -142.48319  57.262021 -152.221122
7960Y 29651.14 63.194281 -142.48319  55.262085 -131.151965
```

Further reading is available in any operating manual of a LORAN unit or the Canadian Coast Guard report "Radio aids to Marine Navigation" Vol 28 No. 2-E. (Published annually.)

DataLst

- program to list data from four card types in detailed and summarized tabular form and to produce X-Y files for statistical analysis and plotting.

```
program DataLst;
{ Program:        Data List File Program

                      R esearch
                      V essel
                      AN alysis programs

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    Authority     Marine and Anadromous Fish Division
                  Gulf Fisheries Center, Moncton, N.B.
                  Department of Fisheries and Oceans

  Term Programmer:          Joe Myers (3 rd year computer science)
     (ver 1.0)              University of Moncton
                            Moncton , New Brunswick.

  Date_Written:   88/08                  version 1.0
                  88/12                          1.1

  Function: This routine is used to print out data reports on
            each of the 4 data files. The files used are RVXnnnB.NEW,
            RVXnnnL.NEW, RVXnnnC.NEW and RVXnnnS.NEW, where Xnnn is
            the cruise ID for a particular file. See the parameter
            file DataLst.PAR for parameter input.

            This program produces either full reports of data files
            or subset reports for specific species, sex codes and
            experiment types in these files. The SET card report is
            standard and will not vary. Full and subset reports exist
            for all other data files. Furthermore, the biological data
            report produces either a full or subset summary listing of
            this file. The full reports are printed out to the default
            files XnnnB.RPT, XnnnS.RPT, XnnnC.RPT and XnnnL.RPT,
            where Xnnn is the cruise ID, and the subset reports to
            XnnnBxxx.RPT, XnnnLxxx.RPT, XnnnCxxx.RPT and XnnnS.RPT,
            where xxx is a alphanumeric expression for species being
            selected. The summary biological reports are printed
            to files with extension .SUM.

            If a subset LENGTH report is specified, the program will
            prompt the user for specific length intervals.
            The user may select ALL for a full length report or one
            may give minimum and maximum interval values. A file
            containing the Longitude, Latitude and the number of fish
            in the length interval specified is printed to the file
```

XnnnSpec.PTS in a format then used for plotting (where Xnnn is the cruise ID and Spec is the subset species code).

This program will also print to the standard device LST: (printer) depending on options selected in a user defined parameter file (DataLst.PAR). This parameter file also contains the device locations of the BIO, SET, CAT, LEN, SPECIES and STRATA data files. It also lists selection information for SEX codes and EXPERIMENT types to be included in the generation of the report.

The parameter file also contains printing and pagination information fields - RightMargin, LeftMargin, LinesPerPage and CharsPerLine;the user thus has the ability to select various paper sizes and pitch combinations without program modification.

This program is long and quite complex for first time users or particularly for those wishing to modify this report generator for other data sets. To assist in this task, all the debug statements used in the initial writing have been left in place and can be turned on or off with single commands in the parameter file DataLst.PAR.

****** end of documentation *******}

{ list of include files

rvBIOin.pas
rvSETin.pas
rvCATin.pas
rvLENin.pas
DataLst2.pas
BinSrch.pas
HeadLST.pas
GetDate.pas
Exist.pas
DataLst3.pas
Getpar.pas
DataLst4.pas
ReportB.pas
ReportS.pas
ReportC.pas
ReportL.pas
DataLst5.pas }

A parameter file DataLst.PAR is required to identify many of the options to be selected for a particular report. These options handle report selection and formatting of the output. For future modifications debug statements have been left in the program. The last three options in this parameter file are the switches for these debug statements.

```
C:              ;drive for RVXnnnS.NEW
C:              ;drive for RVXnnnC.NEW
C:              ;drive for RVXnnnL.NEW
C:              ;drive for RVXnnnB.NEW
C:              ;drive for Species.DBA and CheckIT.spp
C:              ;drive for Strata.DAT
*               ;SexCodes to process *=all or 1,2,3
1,2,3           ;Experiment Type valid = 1,2,3
y               ;Y/N do biological summary report      {Yes/No}
y               ;Y/N do biological detailed report
y               ;Y/N output bio detailed report to file (n if no report)
n               ;Y/N output bio detailed report to printer (  "    "   )
n               ;Y/N output set    report to printer  |
n               ;Y/N output catch  report to printer   }these reports always
n               ;Y/N output length report to printer  |   go to file
y               ;Y/N Subset report only (same species,sex,experiment type)
7               ;right margin
7               ;left margin
100             ;lines per page
100             ;cols per line
N               ;Y/N deBug_1 for tracing of data files being read
N               ;Y/N deBug_2 for tracing of errors
N               ;Y/N deBug_3 for tracing accumulations of frequencies
```

This program is often used in association with CheckIT. It is important to remember that the double carriage return used at the end of CheckIT **must** be removed before use by other programs.

All reports written to file go to the default drive.

To produce reports in various orders, ie. by species, by set, by strata it is necessary to sort the data files in the desired order.

BioFreq

- program to summarize the sampled (detailed) fish by strata and produce X-Y files for statistical analysis and plotting.

```
program BioFreqDist;
{ Program:        Biological data file Frequency Distributions

                      R esearch
                      V essel
                      AN alysis programs
```


Scientific Authority	Douglas Clay Marine Fisheries Division Gulf Fisheries Center, Moncton, N.B. Department of Fisheries and Oceans	(506)-857-6218
Contract Author: (ver 1.0)	Pierre C. Brien ISMT-Microcybernetics Ltd. P.O. Box 3663 Halifax, N.S. B3J 3K6	(902)-425-6460
Term Programmer: (ver 3.0)	Joe Myers (3 rd year computer science) University of Moncton Moncton , New Brunswick.	

Date_Written:	84/10	version 1.0
	85/02	version 2.0
	87/04	version 2.1
	88/07	version 3.0

Function: This routine is used to accumulate and print the frequency distributions of 4 variables. The files used are 'RV'+ Xnnn +'B.NEW', 'RV'+ Xnnn +'S.NEW' where Xnnn is the Cruise ID for a particular file. See the parameter file BioFreq.PAR for input options.

This program will print to a user specified file and/or to the standard LST: device depending on directives in a user specified parameter file (BioFreq.PAR). This parameter file contains the drive locations of the BIO and SET data files as well as the output files if required. It also lists selection information for SEX codes and EXPERIMENT types to be included in the analysis. The user may select which variables are to be used and if the age and weight files are selected then a further option exists to have files of x and y values written for age/length and Length/Weight. The XY files are output in a format suitable for a regression program and come complete with titles and program control cards. The file names are of

the form XnnnSpec.XYA and XnnnSpec.XYW where Xnnn is the Cruise ID and Spec is the 4 digit numeric species code ID.

The parameter file also contains printing and pagination information fields - RightMargin, LeftMargin, LinesPerPage and CharsPerLine; from these fields the program will compute the ColPerPage field which determines the number of Frequency Columns which will be printed across each line. The user thus has the ability to select for various paper sizes and pitch combinations without program modification.

****** end of documentation *******}

{ list of include files

rvBIOin.pas
rvSETin.pas
BioFreq2.pas
BinSrch.pas
HeadFRQ.pas
GetDate.pas
Exist.pas
BioFreq3.Pas
BioFreq4.pas
BioFreq5.pas
Getpar.pas
BioFreq6.pas }

A parameter file BioFreq.PAR is required to identify many of the options to be selected. These options handle data type selection and formatting of the output. For future modifications debug statements have been left in the program. The last three options in this parameter file are the switches for these debug statements.

```
BioFreq.lst     ;printed output file for BioFreq   N  for none
n               ;output to printer Y/N
d:              ;drive for RVXnnnB.NEW
d:              ;drive for RVXnnnS.NEW
C:              ;drive for Species.DBA
C:              ;drive for Strata.DAT
C:              ;drive destination for XY and Sex ratio files
*               ;SexCodes to process *=all or 1,2,3
1,2,3           ;Experiment Type valid = 1,2,3
n               ;Y/N  do maturity statistics
n               ;Y/N  do length statistics
nn              ;Y/N  do age statistics    / Y/N write Len Age xy file
yy              ;Y/N  do weight statistics / Y/N write Len Wght xy file
n               ;Y/N  sex ratio file MALES/(MALES+FEMALES) by length
7               ;right margin
7               ;left margin
50              ;lines per page
132             ;cols per line
n               ;Y/N deBug_1 for tracing of data files being read
n               ;Y/N deBug_2 for tracing of errors
n               ;Y/N deBug_3 for tracing accumulations of frequencies
```

Notes: The file name for the output canNOT have an 'n ' (that is an 'n' followed by a blank) in the name. The 'n' for none must start in column 1 and cannot be the word 'none'.

If your printer does not have a buffer, sending output to it will extend the running time considerably. A faster routine would be to send the output to a file and use the MS-DOS command PRINT to list it on your printer.

CheckIT

- program to edit data in the standardized '.NEW' format for both internal consistency and data range limits. A user guide is provided in Appendix II.

```
program CheckIT;
{ Program:        Data Checking and Validation

                      R esearch
                      V essel
                      AN alysis programs

  Scientific      Douglas Clay                        (506)-857-6218
   Authority      Marine Fisheries Division
                  Gulf Fisheries center, Moncton, N.B.
                  Department of Fisheries and Oceans


  Contract Author:          Pierre C. Brien
    (ver 1.0)               ISMT-Microcybernetics Ltd.
                            P.O. Box 3663
                            Halifax, N.S. B3J 3K6  (902)-425-6460

  Term Programmer:          Joe Myers  (3 rd year computer science)
    (ver 3.0)               University of Moncton
                            Moncton , New Brunswick.


  Date_Written:   85/10
                  86/11/17        modifications marked as        {1.1}
                 {88/05/25             "          "     "        {3.0}
                 {88/08/30             "          "     "        {3.1}
                 {88/11/28             "          "     "        {3.12}

 {Function: This program is designed as a general purpose data
            validation program for ASCII files. The files to be
            validated are defined variable by variable and a
            series of checks can be carried out on each variable.
            Variables are identified by name and the column location
            is specified as well as a variable type.

            This specific application is used to edit the research
            vessel data collected by the Gulf Region of the DFO. This
            implimentation can edit data from 1970 to present after
            the format has been standardized by AltCol to the '.NEW'
            form. Additional checks could be added and the implimented
            checks turned on or off for special cruises.
```

The file nomenclature has been imbedded in the source code and follows the style 'RV'+ Xnnn +'T.NEW' where Xnnn is the cruise ID and T is the card or data type (S for set, C for catch, L for length, and B for biological).

This program is long and complex for first time users or particularly for those wishing to modify this edit system for other data sets. To assist in this task all the debug statements used in the initial writing have been left in place and can be turned on or off with single commands in the parameter file, CheckIT.PAR.

Version 3.0 has added additional checks and a concept of visual checks and report generation is associated with the programs BioFreq and DataLst.

Current version 3.1 at end of summer student Joe Myers' term.

****** end of documentation *******}

{ It is necessary to ensure the data files are sorted in the correct order prior to running each test. The tests have been ordered in such a way that each test follows logically and each test should be run and the corrections made before the next is run. Many errors will be found by more than one test. The tests are also grouped by sorting order. The sorting order is found below (this is a copy of the 'on screen' menu presented at the beginning of each run).

Test	Default File	Sort Order
1) Range Test	Range.PAR	SORTED:SET/SPEC/FISH_NO
2) Set Validation	Set.PAR	"
3) Catch Validation	Cat.PAR	"
4) Set/Catch Validation	SetCat.PAR	"
5) Bio/Catch Validation	BioCat.PAR	"
6) Len/Catch Validation	LenCat.PAR	SORTED:SPEC/SET/FISH_NO
7) Biological Validation	Bio.PAR	SORTED:SPEC/FISH_NO/SET
8) Regression Test	Reg.PAR	"
9) Report	run DataLst	
10) Plot Data	run DataLst & BioFreq	
99) EXIT	return to DOS	

}

{ list of INCLUDE files

```
Chkconst.pas
CheckIT1.pas
Exist.pas
GetDate.pas
HeadChk.pas
CheckIT2.Pas
CheckIT3.Pas
CheckIT4.Pas
CheckIT5.Pas
CheckIT6.Pas
CheckIT7.pas
Getpar.pas                                                    }
```

A parameter file CheckIT.PAR is required to identify many of the options to be selected for a particular run of a data set. These options handle formatting of the output, acceptable error levels, and the toggle switches for the debug statements.

```
LST:                    :  output file name   lst:  =  printer
d:                      :  bioDrive          'RV'+ Xnnn +'B.NEW'
d:                      :  lenDrive
d:                      :  catDrive
d:                      :  setDrive
c:                      :  speciesDrive      CheckIT.SPP
c:                      :  strataDrive       STRATA.DAT
                        :  PrintOptions
4                       :  RightMargin
4                       :  LeftMargin
60                      :  LinesPerPage
80                      :  CharPerLine
0.25                    :  RegFuzzFactor for SPdistance
0.35                    :  RegFuzzFactorW for L/W regression test
0.10                    :  RegFuzzFactorL for L/W regression test
0.9                     :  SetCatLow  {Set Catch Validation acceptable
1.1                     :  SetCatHigh  wght ratio range as Catch/Set}
0.01                    :  Tolerance
N                       :  deBug1     Y/N  audit for line by line reading
N                       :  deBug2     Y/N  tracing set and species
N                       :  deBug3     Y/N  audit of regression
N                       :  deBug4     Y/N  invert listing
```

User documentation for running the CheckIT system is available in Appendix II.

CheckIT con't on following pages

A further 13 parameter files are necessary for the entire edit system to operate; however, not all are required for every test. These files follow.

parameter file **SETIN.PAR** contains the format structure for the first (set) card type.

```
/VARLIST  Name=SETDATA
 CARD_TYPE,    1,1,I/                  {SETCAT}
 CRUISE,       +,4,C/
 STATION,      +,3,I/
 SET_NO,       +,3,I/                    {V1}
 DATEDAY,      +,2,I/
 DATEMON,      +,2,I/
 DATEYR,       +,2,I/
 ICNAF_NAFO,   +,3,I/
 EXPERIMENT,   +,1,I/
 TIME_BEG,     +,4,I/
 TIME_DUR,     +,2,I/
 GEAR,         +,3,I/
 AUX,          +,1,I/
 SPEED,        +,3,I/
 OBTAIN,       +,1,I/
 LATITUDE,     +,4,I/
 LONGITUDE,    +,4,I/
 DEPTH_AVE,    +,3,I/
 DEPTH_RAN,    +,2,I/
 DISTANCE,     +,2,I/
 SOURCE,       +,1,I/
 WIND_DIR,     +,1,I/
 WIND_FORCE,   +,1,I/
 TIDE,         +,1,I/
 TEMP_SUR,     +,3,I/
 TEMP_BOT,     +,3,I/
 SALIN_BOT,    +,3,I/
 LIGHT,        +,3,I/
 BT_SLIDE,     +,3,I/
 HYDRO_STN,    +,3,I/
 BOTTOM,       +,1,I/
 NO_FISH,      +,2,I/                    {V2}
 NO_INVERTS,   +,2,I/                    {V3}
 WEIGHT_CAT,   +,4,R/                    {V4}
 VER_DAT,      +,4,R/
```

The variables indicated by V1, V2, etc. are the code names used in the program itself for the test listed above, in this case the SETCAT test (test #4).

parameter file **CATIN.PAR** contains the format structure for the second (catch) card type.

```
/VARLIST  Name=CATDATA
 CARD_TYPE,    1,1,I/                {LENCAT}    {SETCAT}    {BIOCAT}
 CRUISE,       +,4,C/
 STATION,      +,3,I/
 SET_NO,       +,3,I/                  {V1}        {V1}        {V1}
 DATEDAY,      +,2,I/
 DATEMON,      +,2,I/
 DATEYR,       +,2,I/
 ICNAF_NAFO,   +,3,I/
 EXPERIMENT,   +,1,I/
 TIME_BEG,     +,4,I/
 TIME_DUR,     +,2,I/
 DEPTH_GEAR,   +,3,I/
 TEMP_GEAR,    +,3,I/
 SALIN_GEAR,   +,3,I/
 LIGHT,        +,3,I/
 BOTTOM,       +,1,I/
 SPECIES,      +,4,I/                  {V2}        {V2}        {V2}
 NUMBER_SP,    +,5,I/                  {V4}        {V3}
 WEIGHT_SP,    +,4,R/                  {V5}        {V4}
 BASKET_SP,    +,4,R/
 NO_LENGTH,    +,4,I/                  {V3}
 SEX,          +,4,I/                                          {V3}
 MATURITY,     +,3,I/                                          {V4}
 WEIGHT,       +,3,I/                                          {V5}
 OTOLITHS,     +,3,I/                                          {V6}
 PARISITES,    +,3,I/
 STOMACH,      +,3,I/
 FREE,         +,3,I/
 WEIGHT_CAL,   +,1,I/
```

parameter file **LENIN.PAR** contains the format structure for the third (length frequency) card type.

```
/VARLIST  Name=LENDATA
 CARD_TYPE,    1,1,I/                {LENCAT}
 CRUISE,       +,4,C/
 STATION,      +,3,I/
 SET_NO,       +,3,I/                  {V1}
 DATEDAY,      +,2,I/
 DATEMON,      +,2,I/
 DATEYR,       +,2,I/
 ICNAF_NAFO,   +,3,I/
 EXPERIMENT,   +,1,I/
 SPECIES,      +,4,I/                  {V2}
 NO_SAMPLED,   +,4,I/                  {V6}
 RATIO,        +,2,R/                  {V7}
 SEX,          +,1,I/                  {V8}
 FREE,         +,2,I/
 RECORD_NO,    +,1,I/
 GROUPING,     +,1,I/                  {V3}
 START_LEN,    +,3,I/                  {V4}
 LEN1,         +,3,I/                  {V5}
 LEN2,         +,3,I/
 LEN3,         +,3,I/
 LEN4,         +,3,I/
 LEN5,         +,3,I/
 LEN6,         +,3,I/
 LEN7,         +,3,I/
 LEN8,         +,3,I/
 LEN9,         +,3,I/
 LEN10,        +,3,I/
 LEN11,        +,3,I/
 LEN12,        +,3,I/
 LEN13,        +,3,I/
 LEN14,        +,3,I/
```

parameter file **BIOIN.PAR** contains the format structure for the fourth (biological) card type.

```
/VarList  Name=BioData
 CARD_TYPE,    1,1,I/      {BIO}      {BIOCAT}    {LENCAT}    {REGRESSION}
 CRUISE,       +,4,C/
 STATION,      +,3,I/
 SET_NO,       +,3,I/       {V8}        {V1}         {V1}         {V5}
 DATEDAY,      +,2,I/
 DATEMON,      +,2,I/       {V4}
 DATEYR,       +,2,I/       {V2}
 ICNAF_NAFO,   +,3,I/
 EXPERIMENT,   +,1,I/
 BOTTOM,       +,1,I/
 SPECIES,      +,4,I/       {V7}        {V2}         {V2}         {V1}
 RECORD_NO,    +,1,I/      {V10}                     {V3}
 FISH_NO,      +,4,I/       {V9}                                   {V6}
 LENGTH,       +,3,R/                                {V4}         {V2}
 SEX,          +,1,I/                    {V3}                     {V7}
 MATURITY,     +,1,I/                    {V4}                     {V8}
 WEIGHT,       +,5,R/                    {V5}                     {V4}
 STOMACH_CON,  +,1,I/
 ST_VOLUME,    +,5,R/
 ST_NO_SPEC,   +,2,I/
 ST_PART,      +,2,I/
 ST_SP_CODE,   +,4,I/
 AGE_MATL,     +,1,I/                    {V6}
 AGE_ANNULI,   +,2,I/       {V6}
 AGE_EDGE,     +,1,I/       {V5}
 AGE_CHECK,    +,3,I/
 AGE,          +,2,R/       {V3}                                   {V3}
 YEAR_CLASS,   +,2,I/       {V1}
 AGER,         +,1,C/
 PARASITE,     +,3,I/
 FEILD_DEFN,   +,6,R/
```

parameter file **SPECIES.PAR** contains the format structure for the species code file.

```
/VARLIST  Name=Species, Lines=3
 Species,     1,4,I/
 Divisor,     +,4,I/
 AMWGT,       11,9,R/
 BMWGT,       21,9,R/
 AFWGT,       31,9,R/
 BFWGT,       41,9,R/
 ACWGT,       51,9,R/
 BCWGT,       61,9,R/
 AMAGE,       11,9,R/
 BMAGE,       21,9,R/
 AFAGE,       31,9,R/
 BFAGE,       41,9,R/
 ACAGE,       51,9,R/
 BCAGE,       61,9,R/
```

parameter file **Range.PAR** contains the list of each range or group of values that individual variables will be tested against

```
/VALUES
  VAL1,I(1,2)
  AGE_MAT,I(0,1,9)
  L_TYPE,I(0,999)
  GEAR_TYPE,I(3,8,9,12,13)
  SPECIES,I,FROM('CheckIT.SPP',1,3,1,4)
  STRAT,I,FROM('Strata.DAT',1,1,1,3)
  CDTY5,I(5)
  CDTY6,I(6)
  CDTY7,I(7)
  CDTY8,I(8)
/RANGES
  DAYS,I(1,31)
  MONTHS,I(1,12)
  YEARS,I(70,88)
  NAFO_RNG,I(431,439)
  EXP_VALID,I(1,3)
  BOT_TYPE,I(1,5,9,9)
  SEX,I(0,2,9,9)
  SEX_LEN,I(0,4,9,9)
  MAT_RNG,I(0,9)
  T_BEG,I(1,2400)
  T_DUR,I(20,40)
  NOSP_RNG,I(1,20)
  REC_LEN,I(0,9)
  GROUP_RNG,I(1,3)
  SPEED_RNG,I(20,30)
  LAT_RNG,I(4515,4900)
  LONG_RNG,I(6000,6600)
  DEP_AVE,I(10,200)
  DEP_RAN,I(0,20)
  DIST_RNG,I(10,15)
  TEMP_SUR,I(-5,220)
  NOFISH_RNG,I(1,20)
  NOINVERTS,I(0,10)
/PRINT VALUES VARIABLES FILES
                              what follows (without these spaces)
                              are the variables on each of the four
                              card types and the test and test
                              values to be applied
/VARLIST  Name=SETDATA
 CARD_TYPE,    1,1,I,CHECKS=CDTY5/
 CRUISE,       +,4,C/
 STATION,      +,3,I,CHECKS=STRAT/
 SET_NO,       +,3,I/
 DATEDAY,      +,2,I,CHECKS=DAYS/
 DATEMON,      +,2,I,CHECKS=MONTHS/
 DATEYR,       +,2,I,CHECKS=YEARS/
 ICNAF_NAFO,   +,3,I,CHECKS=NAFO_RNG/
```

```
 EXPERIMENT,   +,1,I,CHECKS=EXP_VALID/
 TIME_BEG,     +,4,I,CHECKS=T_BEG/
 TIME_DUR,     +,2,I,CHECKS=T_DUR/
 GEAR,         +,3,I,CHECKS=GEAR_TYPE/
 AUX,          +,1,I/
 SPEED,        +,3,I,CHECKS=SPEED_RNG/
 OBTAIN,       +,1,I/
 LATITUDE,     +,4,I,CHECKS=LAT_RNG/
 LONGITUDE,    +,4,I,CHECKS=LONG_RNG/
 DEPTH_AVE,    +,3,I,CHECKS=DEP_AVE/
 DEPTH_RAN,    +,2,I,CHECKS=DEP_RAN/
 DISTANCE,     +,2,I,CHECKS=DIST_RNG/
 SOURCE,       +,1,I/
 WIND_DIR,     +,1,I/
 WIND_FORCE,   +,1,I/
 TIDE,         +,1,I/
 TEMP_SUR,     +,3,I,CHECKS=TEMP_SUR/
 TEMP_BOT,     +,3,I/
 SALIN_BOT,    +,3,I/
 LIGHT,        +,3,I,CHECKS=L_TYPE/
 BT_SLIDE,     +,3,I/
 HYDRO_STN,    +,3,I/
 BOTTOM,       +,1,I,CHECKS=BOT_TYPE/
 NO_FISH,      +,2,I,CHECKS=NOFISH_RNG/
 NO_INVERTS,   +,2,I,CHECKS=NOINVERTS/
 WEIGHT_CAT,   +,4,I/
 VER_DAT,      +,4,R/
/Test name=SETDATA, file='default.fil'
/VARLIST  Name=CATDATA
 CARD_TYPE,    1,1,I,CHECKS=CDTY6/
 CRUISE,       +,4,C/
 STATION,      +,3,I,CHECKS=STRAT/
 SET_NO,       +,3,I/
 DATEDAY,      +,2,I,CHECKS=DAYS/
 DATEMON,      +,2,I,CHECKS=MONTHS/
 DATEYR,       +,2,I,CHECKS=YEARS/
 ICNAF_NAFO,   +,3,I,CHECKS=NAFO_RNG/
 EXPERIMENT,   +,1,I,CHECKS=EXP_VALID/
 TIME_BEG,     +,4,I,CHECKS=T_BEG/
 TIME_DUR,     +,2,I,CHECKS=T_DUR/
 DEPTH_GEAR,   +,3,I/
 TEMP_GEAR,    +,3,I/
 SALIN_GEAR,   +,3,I/
 LIGHT,        +,3,I,CHECKS=L_TYPE/
 BOTTOM,       +,1,I,CHECKS=BOT_TYPE/
 SPECIES,      +,4,I,CHECKS=SPECIES/
 NUMBER_SP,    +,5,R/
 WEIGHT_SP,    +,4,R/
 BASKET_SP,    +,4,R/
 NO_LENGTH,    +,4,I/
 SEX,          +,4,I/
 MATURITY,     +,3,I/
 WEIGHT,       +,3,I/
 OTOLITHS,     +,3,I/
 PARISITES,    +,3,I/
```

```
 STOMACH,      +,3,I/
 FREE,         +,3,I/
 WEIGHT_CAL,   +,1,I/
/TEST NAME=CATDATA, FILE='default.fil'
/VARLIST  Name=LENDATA
 CARD_TYPE,    1,1,I,CHECKS=CDTY7/
 CRUISE,       +,4,C/
 STATION,      +,3,I,CHECKS=STRAT/
 SET_NO,       +,3,I/
 DATEDAY,      +,2,I,CHECKS=DAYS/
 DATEMON,      +,2,I,CHECKS=MONTHS/
 DATEYR,       +,2,I,CHECKS=YEARS/
 ICNAF_NAFO,   +,3,I,CHECKS=NAFO_RNG/
 EXPERIMENT,   +,1,I,CHECKS=EXP_VALID/
 SPECIES,      +,4,I,CHECKS=SPECIES/
 NO_SAMPLED,   +,4,I/
 RATIO,        +,2,R/
 SEX,          +,1,I,CHECKS=SEX_LEN/
 FREE,         +,2,I/
 RECORD_NO,    +,1,I,CHECKS=REC_LEN/
 GROUPING,     +,1,I,CHECKS=GROUP_RNG/
 START_LEN,    +,3,I/
 LEN1,         +,3,I/
 LEN2,         +,3,I/
 LEN3,         +,3,I/
 LEN4,         +,3,I/
 LEN5,         +,3,I/
 LEN6,         +,3,I/
 LEN7,         +,3,I/
 LEN8,         +,3,I/
 LEN9,         +,3,I/
 LEN10,        +,3,I/
 LEN11,        +,3,I/
 LEN12,        +,3,I/
 LEN13,        +,3,I/
 LEN14,        +,3,I/
/TEST NAME=LENDATA, FILE='default.fil'
/VarList  Name=BioData
 CARD_TYPE,    1,1,I,CHECKS=CDTY8/
 CRUISE,       +,4,C/
 STATION,      +,3,I,CHECKS=STRAT/
 SET_NO,       +,3,I/
 DATEDAY,      +,2,I,CHECKS=DAYS/
 DATEMON,      +,2,I,CHECKS=MONTHS/
 DATEYR,       +,2,I,CHECKS=YEARS/
 ICNAF_NAFO,   +,3,I,CHECKS=NAFO_RNG/
 EXPERIMENT,   +,1,I,CHECKS=EXP_VALID/
 BOTTOM,       +,1,I.CHECKS=BOT_TYPE/
 SPECIES,      +,4,I,CHECKS=SPECIES/
 RECORD_NO,    +,1,I,CHECKS=VAL1/
 FISH_NO,      +,4,I/
 LENGTH,       +,3,I/
 SEX,          +,1,I,CHECKS=SEX/
 MATURITY,     +,1,I,CHECKS=MAT_RNG/
 WEIGHT,       +,5,R/
```

```
 STOMACH_CON, +,1,I/
 ST_VOLUME,   +,5,R/
 ST_NO_SPEC,  +,2,I/
 ST_PART,     +,2,I/
 ST_SP_CODE,  +,4,I/
 AGE_MATERIAL,+,1,I,CHECKS=AGE_MAT/
 AGE_ANNULI,  +,2,I/
 AGE_EDGE,    +,1,I/
 AGE_CHECK,   +,3,I/
 AGE,         +,2,I/
 YEAR_CLASS,  +,2,I/
 AGER,        +,1,C/
 PARASITE,    +,3,I/
 FEILD_DEFN,  +,6,R/
/TEST  NAME=BIODATA, FILE='default.fil'
/CLOSE
```

parameter file **SET.PAR** contains the format structure for the first (set) card type and the instruction to carry out the special test for distance checking.

```
/VARLIST  Name=SETDATA
 TIME_DUR,     26,2,R/
 SPEED,       32,3,R1/
 DISTANCE,    49,2,R1/
 DUMMY,       49,2,C,checks=SpDistance/
/Test  Name=SETDATA, File='default.fil'
/Close
```

parameter file **CAT.PAR** contains the format structure for the second (catch) card type and the instruction to carry out the special test for distance checking.

```
/VARLIST  Name=CATDATA
 NUMBER_SP,   45,5,I/
 NO_LENGTH,   58,4,I/
 SEX,         +,4,I/
 MATURITY,    +,3,I/
 WEIGHT,      +,3,I/
 OTOLITHS,    +,3,I/
 PARASITES,   +,3,I/
 STOMACH,     +,3,I/
 DUMMY,       +,1,C,checks=SpNomeas/
/Test  Name=CATDATA File='default.fil'
/Close
```

parameter file **SetCat.PAR** contains the instructions to read the first (set) and second (catch) card types and carry out the test for 'setcatch'.

```
/READ FILE=SetIN.PAR
/READ FILE=CatIN.PAR
/VALIDATE
  SETCATCH,SET=SETDATA='DEFAULT.FIL',CAT=CATDATA='DEFAULT.FIL'/
```

parameter file **BioCat.PAR** contains the instructions to read the second (catch) and fourth (biological) card types and carry out the test for 'biocatch'.

```
/READ FILE=CatIN.PAR
/READ FILE=BioIN.PAR
/Validate
  BioCatch,Bio=BIODATA='default.fil',Cat=CATDATA='default.fil'/
/Close
```

parameter file **LenCat.PAR** contains the format for reading the file CheckIT.SPP containing the sex specific regression coefficients (a & b) for a length weight relationship and the instructions to read the second (catch), third (length), and fourth (biological) card types and carry out the test for 'length'.

```
/VARLIST  Name=Species, Lines=3
 Species,     1,4,I/
 Divisor,     +,4,I/
 AMWGT,       11,9,R/
 BMWGT,       21,9,R/
 AFWGT,       31,9,R/
 BFWGT,       41,9,R/
 ACWGT,       51,9,R/
 BCWGT,       61,9,R/
 AMAGE,       11,9,R/
 BMAGE,       21,9,R/
 AFAGE,       31,9,R/
 BFAGE,       41,9,R/
 ACAGE,       51,9,R/
 BCAGE,       61,9,R/
/Set sex=COMBINED
/Read file=LenIN.PAR
/Read file=CatIN.PAR
/Read file=BioIN.PAR
/Validate
  Length,species=species='default.fil',Len=LENDATA='default.fil',
         Cat=CATDATA='default.fil', Bio=BIODATA='default.fil'/
```

parameter file **Bio.PAR** contains the instructions to read the fourth (biological) card type and carry out the test for 'biological'.

```
/Read file=BioIN.PAR
/VALIDATE
  biological,bio=BIODATA='default.fil'
```

parameter file **Reg.PAR** contains the instructions to read the fourth (biological) card type and the species file CheckIT.SPP and carry out the test for 'regression'. The toggle switches for sex and for length and weight or length and age are in this parameter file.

```
/Read  file=Species.PAR
/Read  file=BioIN.PAR
/Set   TESTWEIGHT=ON, TESTAGE=OFF
/Set   SEX=COMBINED
/Print files
/Validate
  Regress,Bio=BIODATA='default.fil',species=Species='CheckIT.SPP'/
```

CheckIT is the main program of this RV edit system. Other components of the system are several short Fortran programs which produce command files for use with the commercial sort package 'SuperSort' and a series of batch programs to link various aspects of the system together (see Appendix I for listings of these components).

BldXXX

- **four programs to build smaller reduced data sets (*.DBA files) with all the data required for use by the statistical programs CatStat and MALKey1,2,& 3 and the mapping program CatMap.**

  The original versions of these statistical programs used the reduced data files produced by this set of 'build' programs. However, with the advances in computer storage capacity, the analysis programs were modified to use the entire data files (*.NEW files). The 'BUILD' programs are available to produce a reduced data set for individual analysis involving the catch, length, and biological data sets. The set file when 'built' with BldSET is an indexed file used by all the analysis programs.

The original program was a single generic version which had to be compiled each time for building a data set from a different card type. A series of 3 uppercase X's are located throughout the program whenever a change is required. Using a 'global change' the 'XXX' can be substituted by SET, CAT, LEN, or BIO. The program can then be recompiled to build the specific file in question. To simplify the operation each program has been converted and maintained in its own file space.

Generic Program BldXXX.pas **Build Bio,Cat,Len and Set**

```
program Build_XXX_Rec_File;
{ Program:        Build Data base files for

                      R esearch
                      V essel
                      AN alysis programs

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   Authority      Marine Fisheries Division
                  Gulf Fisheries Center, Moncton, N.B.
                  Department of Fisheries and Oceans

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     (ver 1.0)              ISMT-Microcybernetics Ltd.
                            P.O. Box 3663
                            Halifax, N.S. B3J 3K6  (902)-425-6460

  Date_Written:   85/02     version 1.0
                  85/10     version 2.0
                  86/01     version 2.1   modifications marked as (2.1)

{ Function: This routine is a generalized routine to build the 4
            data base files and associated indexes. To create the
```

appropriate program just replace all occurences of XXX by the characters BIO, CAT, LEN or SET and compile the program.

Ensure that any change made to any of the data type specific include files is propagated to all other such files. These files can be identified in the text because they contain the string BIO CAT LEN or SET.

85/07/12 - this routine has been modified so as to eliminate all need for Turbo Access files, no files are indexed and only the SET file is a relative file using SET NO as the relative key. All other files will be read and rewritten as sequential ASCII files with CRUISE, STRATUM, and set specific header information left off. This modification is being made to eliminate disk space problems caused by the size of the files and index files with the turbo access system.

The files are sorted using TURBO SORT,
the Set file by set number and
the Cat Len and Bio data types on species and set no.

****** end of documentation *******}

{ list of include files

PrtConst	
RvXXXin	note the XXX will be replaced
RvXXXstr	by SET CAT LEN BIO when compiled
Sort.box	TURBO SORT routine
XXXInStr	
Exist	
HeadBld	

}

Note:- In version 1.0 all files were indexed for speedy access. These indexed files required more space than was saved by building the smaller files and therefore version 2.0 dropped indexing for all but the station and set card files.

Example of Build file: BldSET

```
program Build_SET_Rec_File;
{ Program:        Build Data base files for

                      R esearch
                      V essel
                      AN alysis programs

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   Authortity     Marine Fisheries Division
                  Gulf Fisheries Center, Moncton, N.B.
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  Date_Written:   85/02     version 1.0
                  85/10     version 2.0
                  86/01     version 2.1   modifications marked as (2.1)
{                 86/03     version 2.2         "          "    " (2.2)
{                 87/04     version 2.3         "          "    " (2.3)

{ Function: This routine is a generalized routine to build the 4
            data base files and associated indexes. To create the
            appropriate program just replace all occurences of XXX by
            the characters BIO, CAT, LEN or SET and compile the program.

            This ensures that any change made to any of the file specific
            include files is propagated to all other such files.
            These files can be identified in the text because they
            contain the string BIO CAT LEN or SET.

            85/07/12 - this routine has been modified to eliminate
            all need for Turbo Access files, no files are indexed and
            the SET file is the only relative file, with SET NO as the
            relative key. All other files will be read and rewritten as
            sequential ASCII files with CRUISE, STRATUM, and set specific
            header information left off. This modification is being
            made to eliminate disk space problems caused by the size of
            the files and index files with the turbo access system.

            The files are sorted using TURBO SORT,
               the Set file by SET NO and
               the Cat Len and Bio data files on SPECIES and SET NO.
               The Bio file is also sorted on fish number.
```

Version 2.2 allowed relative files from set cards to be built relative to sequential set number rather than actual set number.

Version 2.3 allows the use of the new data format and includes the data version number.

****** end of documentation *******}

{ INPUT data is generally sorted by the following fields by the time the user is ready to run build:

data type:	SET	CATCH	LENGTH	BIOLOGICAL	columns
	set no.	set no.	set no.	set no.	9 to 11
		species			41 to 44
			species		22 to 25
				species	23 to 26
			sex		32
			start len		37 to 39
				fish no.	28 to 31
				record no.	27

}

The data is sorted to the following form in the reduced data files and must be sorted like this before running the analyses programs:

data type:	SET	CATCH	LENGTH	BIOLOGICAL	columns
fields	set no.				9 to 11
		species			41 to 44
			species		22 to 25
				species	23 to 26
		set no.	set no.	set no.	9 to 11
			sex		32
			start len		37 to 39
				fish no.	28 to 31
				record no.	27

}

{ list of include files

PrtConst
RvSETin
RvSETstr
Sort.box
SETInStr
Exist
HeadSet

}

No parameter or other support files are required by the build programs.

The data is read from the NEW (common) format and reduced to a version that was used by CatStat and MALKey1,2& 3. The data input and the reduced data fields are listed below for each of the four card types.

STATION AND SET CARD

```
  RVSET_INPUT_REC = record                    RVSET_STORE_REC = record

*   CARD_TYPE     :    string [1];          CRUISE        :    string [4];
    CRUISE        :    string [4];          SET_NO        :    string [3];
    STATION       :    string [3];          STATION       :    string [3];
    SET_NO        :    string [3];          DATE          :    string [6];
    DATE          :    string [6];          ICNAF_NAFO    :    string [3];
    ICNAF_NAFO    :    string [3];          EXPERIMENT    :    string [1];
    EXPERIMENT    :    string [1];          TIME_BEG      :    string [4];
    TIME_BEG      :    string [4];          TIME_DUR      :    string [2];
    TIME_DUR      :    string [2];          GEAR          :    string [3];
    GEAR          :    string [3];          AUX           :    string [1];
    AUX           :    string [1];          SPEED         :    string [3];
    SPEED         :    string [3];          OBTAIN        :    string [1];
    OBTAIN        :    string [1];          LATITUDE      :    string [4];
    LATITUDE      :    string [4];          LONGITUDE     :    string [4];
    LONGITUDE     :    string [4];          DEPTH_AVE     :    string [3];
    DEPTH_AVE     :    string [3];          DEPTH_RAN     :    string [2];
    DEPTH_RAN     :    string [2];          DISTANCE      :    string [2];
    DISTANCE      :    string [2];          SOURCE        :    string [1];
    SOURCE        :    string [1];          WIND_DIR      :    string [1];
    WIND_DIR      :    string [1];          WIND_FORCE    :    string [1];
    WIND_FORCE    :    string [1];          TIDE          :    string [1];
    TIDE          :    string [1];          TEMP_SUR      :    string [3];
    TEMP_SUR      :    string [3];          TEMP_BOT      :    string [3];
    TEMP_BOT      :    string [3];          SALIN_BOT     :    string [3];
    SALIN_BOT     :    string [3];          LIGHT         :    string [3];
    LIGHT         :    string [3];          BT_SLIDE      :    string [3];
+   BT_SLIDE      :    string [3];          HYDRO_STN     :    string [3];
+   HYDRO_STN     :    string [3];          BOTTOM        :    string [1];
    BOTTOM        :    string [1];          NO_FISH       :    string [2];
    NO_FISH       :    string [2];          NO_INVERTS    :    string [2];
    NO_INVERTS    :    string [2];          WEIGHT_CAT    :    string [4];
    WEIGHT_CAT    :    string [4];          VER_DAT       :    string [4];
    VER_DAT       :    string [4];       end;
  end;
```

* removed fields
\+ only present to be consistent with past data collection,
presently BT_Slide = set number
HYDRO_Stn = set number

Note: - See also Files Data : SET page 66

This indexed file increases the data storage by 31%. As the station and set data cards generally comprise less than 1% of the total RV data for a year this is not of any significance.

CATCH CARD

```
 RVCAT_INPUT_REC  = record
*  CARD_TYPE     :     string[1];
*  CRUISE        :     string[4];
*  STATION       :     string[3];
   SET_NO        :     string[3];
*  DATE          :     string[6];
*  ICNAF_NAFO    :     string[3];
*  EXPERIMENT    :     string[1];
*  TIME_BEG      :     string[4];
*  TIME_DUR      :     string[2];
   DEPTH_GEAR    :     string[3];
   TEMP_GEAR     :     string[3];
   SALIN_GEAR    :     string[3];
*  LIGHT         :     string[3];
*  BOTTOM        :     string[1];
   SPECIES       :     string[4];
   NUMBER_SP     :     string[5];
   WEIGHT_SP     :     string[4];
   BASKET_SP     :     string[4];
   LENGTH        :     string[4];
   SEX           :     string[4];
   MATURITY      :     string[3];
   WEIGHT        :     string[3];
   OTOLITHS      :     string[3];
   PARASITES     :     string[3];
   STOMACH       :     string[3];
   FREE          :     string[3];
   WEIGHT_CAL    :     string[1];
 end;
```

```
 RVCAT_STORE_REC  = record
   SET_NO        :     string[3];
   SPECIES       :     string[4];
   DEPTH_GEAR    :     string[3];
   TEMP_GEAR     :     string[3];
   SALIN_GEAR    :     string[3];
   NUMBER_SP     :     string[5];
   WEIGHT_SP     :     string[4];
   BASKET_SP     :     string[4];
   LENGTH        :     string[4];
   SEX           :     string[4];
   MATURITY      :     string[3];
   WEIGHT        :     string[3];
   OTOLITHS      :     string[3];
   PARASITES     :     string[3];
   STOMACH       :     string[3];
   FREE          :     string[3];
   WEIGHT_CAL    :     string[1];
 end;
```

* removed fields

Note: - See also Files Data : CATCH page 67

This reduces the data storage by 31%. The catch data cards generally comprise between 6 and 7% of the total RV data for a year.

LENGTH (Frequency) CARD

```
 RVLEN_INPUT_REC  = record              RVLEN_STORE_REC  = record

*  CARD_TYPE     :    string [1];       SET_NO        :    string [3];
*  CRUISE        :    string [4];       SPECIES       :    string [4];
*  STATION       :    string [3];       NO_SAMPLED    :    string [4];
   SET_NO        :    string [3];       RATIO         :    string [2];
*  DATE          :    string [6];       SEX           :    string [1];
*  ICNAF_NAFO    :    string [3];       LEN_INT       :    string [1];
*  EXPERIMENT    :    string [1];       UNITS         :    string [1];
   SPECIES       :    string [4];       RECORD_NO     :    string [1];
   NO_SAMPLED    :    string [4];       GROUPING      :    string [1];
   RATIO         :    string [2];       START_LEN     :    string [3];
   SEX           :    string [1];       LEN           :    array [1..14]
   LEN_INT       :    string [1];    end;                      of string [3];
   UNITS         :    string [1];
   RECORD_NO     :    string [1];
   GROUPING      :    string [1];
   START_LEN     :    string [3];
   LEN           :    array [1..14] of string [3];
 end;
```

* removed fields

Note: - See also Files Data : LENGTH page 68

This reduces the data storage by 22%. The length frequency data cards generally comprise between 13 and 15% of the total RV data for a year.

BIOLOGICAL (Fish) CARD

```
 RVBIO_INPUT_REC  = record
*  CARD_TYPE     :    string [1];
*  CRUISE        :    string [4];
*  STATION       :    string [3];
   SET_NO        :    string [3];
*  DATE          :    string [6];
*  ICNAF_NAFO    :    string [3];
*  EXPERIMENT    :    string [1];
*  BOTTOM        :    string [1];
   SPECIES       :    string [4];
   RECORD_NO     :    string [1];
   FISH_NO       :    string [4];
   LENGTH        :    string [3];
   SEX           :    string [1];
   MATURITY      :    string [1];
   WEIGHT        :    string [5];
   STOMACH_CON   :    string [1];
   ST_VOLUME     :    string [5];
   ST_NO_SPEC    :    string [2];
   ST_PART       :    string [2];
   ST_SP_CODE    :    string [4];
   AGE_MATERIAL  :    string [1];
   AGE_ANNULI    :    string [2];
   AGE_EDGE      :    string [1];
   AGE_CHECK     :    string [3];
   AGE           :    string [2];
   YEAR_CLASS    :    string [2];
   AGER          :    string [1];
   PARASITE      :    string [3];
   FIELD_DEFN    :    string [6];
 end;
```

```
 RVBIO_STORE_REC  = record
   SET_NO        :    string [3];
   SPECIES       :    string [4];
   RECORD_NO     :    string [1];
   FISH_NO       :    string [4];
   LENGTH        :    string [3];
   SEX           :    string [1];
   MATURITY      :    string [1];
   WEIGHT        :    string [5];
   STOMACH_CON   :    string [1];
   ST_VOLUME     :    string [5];
   ST_NO_SPEC    :    string [2];
   ST_PART       :    string [2];
   ST_SP_CODE    :    string [4];
   AGE_MATERIAL  :    string [1];
   AGE_ANNULI    :    string [2];
   AGE_EDGE      :    string [1];
   AGE_CHECK     :    string [3];
   AGE           :    string [2];
   YEAR_CLASS    :    string [2];
   AGER          :    string [1];
   PARASITE      :    string [3];
   FIELD_DEFN    :    string [6];
 end;
```

* removed fields

Note: - See also Files Data : BIOLOGICAL page 69

This reduces the data storage by 25%. The biological (fish) data cards generally comprise between 76 and 80% of the total RV data for a year.

Each of these four data file records are a separate include file which can be incorporated as the format description in a Turbo Pascal program to access the research vessel data base. The file names are in the form 'RV'+xxx+'In.PAS', where xxx is either SET, CAT, LEN, or BIO respectively.

SpBld

- program to create a direct access data file for species codes used in Gulf groundfish surveys. This program is no longer in use and other programs now use standard ASCII files for species codes and names.

```
program Build_Species_Name_File;

  Date_Written:   85/07

  Function: This routine is used to build a working file of species
            names for use in identifying the species in the statistics
            programs both prior to processing and on the output.
            The program takes the base file SPECIES.DAT and strips off
            the ruler line and header documentation to create a file
            which can be used by the procedure GetParams

Include Files
{$I PrtConst.pas}
{$I SpName.pas}
{$I Exist.pas}
```

The raw species data file is SPECIES.DAT, the indexed output was SPECIES.DBA. The present SPECIES.DBA is the ASCII version of this and bears no relationship to the earlier name sake.

see also Utility File documentation: Species.DBA page 61
: CheckIT.SPP page 62

CatStat

- program to calculate the abundance by numbers and weight for a species in a single survey. The abundance of a species is estimated by set, by strata, and for the entire survey area.

```
program CATchSTATistics;
{ Program:        Estimate abundance from
                  Catch Statistics by Stratum

                      R esearch
                      V essel
                      AN alysis programs

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                  Gulf Fisheries Center, Moncton, N.B.
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                            P.O. Box 3663
                            Halifax, N.S. B3J 3K6  (902)-425-6460

  Date_Written:   85/03     version:  1.0
                  85/08               2.0
                  86/02               2.1   modifications marked {2.1}
{                 86/04/04            2.2         "          "   {2.2}
{                 86/04/12            2.3         "          "   {2.3}
{                 87/04/13            2.4         "          "   {2.4}
{                 88/05/26            2.41        "          "   {2.41}
{                 89/03/23            3.0         "          "   {3.0}
{                 89/05/15            4.0         "          "   {4.0}

  {Function:      This routine estimates the catch statistics by stratum
                  of one species at a time for any number of species
                  and cruises in a run. For each species processed the
                  following steps occur:
                  1) the catch file data are selected for the desired
                     species and then sorted by stratum number producing
                     a temporary output file.
                  2) this output file is then used to generate a
                     statistical summary report.
                  This procedure is repeated for as many species as
                  required and for all cruises (files) as required.

                  The CatStat program has a feature incorporated to
                  allow for the transformation of data. Additional
                  transformations may be added to the program by
                  expanding the case statements in CatStat3.PAS.
                  This segment of the program transforms the data,
                  converts it back for printing and prints the
```

identification of the transformation in the header. The only transformation currently installed is log e of n+1 of numbers and weight.

Version 2.2 has added the capacity to incorporate missing strata with the mean biomass per unit area for the surveyed part of the Gulf. This is an add on feature in that the biomass estimates calculated in versions 2.1 and earlier are still given. Any instances where catch numbers exist with no catch weight recorded are now given a default catch weight of 1 rather than 0 as in earlier versions.

Version 2.3 allows the sets in a cruise to be non sequential in nature although they must still be sorted.

The parameter file provides for the following options:-

name of the listing file LST: for the listing device,
disk drive for the CAT,
SET,
SPECIES and
STRATA files,
selection of the valid EXPERIMENT types, and
transformation option codes for weight and number
(the codes presently implemented are:-
0 ..... no transformation
1 ..... log e of n+1)
report formating control: right margin,
left margin,
lines per page and
columns per line.

Version 2.4 uses the new data format as produced from AltCol, and includes a program and data version number on the output header.

Version 2.41 added S hort L ong version output option and a total standard deviation calculation.

Version 3.0 produces a file to use for CROSSTAB with strata, temperature, depth, species, species numbers and weight, total catch and total number of species.

Version 4.0 uses *.NEW data files (except for set card) in lieu of *.DBA.

****** end of documentation *******)

```
{             list of include files                              }

{                   CatStat1
                    CatStat2
                    CrossTAB1
                    CrossTAB2
                    CrossTAB3
                    CatStat3
                    CatStat5
                    PrtConst
                    RvCATin
                    RvSETstr
                    SpName
                    Sort.box
                    GetDate
                    GetPar
                    Exist
                    HeadCat                              }

 PgmTitle  =
'R esearch V essel AN alysis  CATSTAT      pgm ver:4.00 11 july 1989';

 PgmTitle2 =
'Abundance Estimates / Numbers & Weight    dat ver:';
```

This program requires the associate files STRATA.DAT and SPECIES.DBA to function correctly. (see Utility Files)

To permit a degree of customization by the user, a parameter file is required to run the program. This file allows the user to select specific subsets of the data and (within limits) alter the format of the output. To protect the user against inadvertently using the wrong parameter file, the output lists most of the options used in the heading. The parameter file is named CatStat.PAR and is listed below.

```
CATSTAT.LST     ;printed output file        N for none
Y               ;printed output to printer Y/N
s               ;S hort or L ong version of output
d:              ;drive for RVXnnnC.NEW      Cat
d:              ;drive for RVXnnnS.DBA      Set
d:              ;drive for Species.DBA      Species data file
d:              ;drive for Strata.DAT       file containing stratum areas
c:              ;drive for XnnnSppp.CTB     CrossTAB file
>,<             ;delimiter for CrossTAB file
n               ;CrossTAB file produced     Yes/No
1 2             ;experiment type            valid types = 1,2,3
0 0             ;transformation options     Wght, Num 0=no tran 1=log e
2               ;right margin
4               ;left margin
66              ;lines per page
80              ;cols per line
```

Notes: The file name for the output canNOT have an 'n ' (that is an 'n' followed by a blank) in the name. The 'n' for none must start in column 1 and cannot be the word 'none'.

If your printer does not have a buffer, sending output to it will extend the running time considerably, a faster routine would be to send the output to a file and use the MS-DOS command PRINT to list it on your printer.

MALKey 1,2 & 3

- three programs to produce maturity or age by length keys of specified subsets of a research vessel survey. These programs use age or maturity from one or more cruises and the length frequency of a single cruise. These programs provide estimates of total and spawning stock biomass at age.

This is a series of three programs each of which produces a series of intermediate files that can be used for further analysis if required.

These programs all require access to STRATA.DAT and SPECIES.DBA in order to run, for further information on these files see Utility Files.

MALKey1

```
program AgeLengthKey1;

{ Program:        Multiple Cruise Age Length Key Table -- Part 1

                      R esearch
                      V essel
                      AN alysis programs

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                            Halifax, N.S. B3J 3K6 (902)-425-6460

  Date_Written:   85/04       Version 1.0
                  85/08       Version 2.0  modifications marked {2.0}
{                 86/03       Version 2.1        "           "   {2.1}
{                 86/04       Version 2.2        "           "   {2.2}
{                 87/04       Version 2.3        "           "   {2.3}
{                 88/12       Version 2.31       "           "   {2.31}
{                 89/05       Version 3.31       "           "   {3.31}

 {Function: This is the first of three programs designed to generate
            X - Y matrices from either AGE and LENGTH, or MATURITY
            and LENGTH. This program will accumulate an age or
            maturity at length key matrix from one or more cruises.

            For floppy disk systems the opportunity exists to have
            the different cruises on different disks.
```

The files used are 'RV'+ Xnnn +'B.NEW' and RV'+ Xnnn +'S.DBA', where Xnnn is a Cruise ID (the latter file is produced by the BldSET program). This program is a successor to the program ALKey.pas and will perform the same functions when used with only one cruise from which to build the matrix.

This Key may be run as an AGE Length Key or as a MATURITY Length Key but not as both simultaneously.

The age or maturity matrix as well as accompanying title date and author information are written to an intermediate file after processing. The file name is constucted as follows:

'M'+'A or M'+'LK'+Spec+'.DAT'

where Spec is the species ID code. In order to keep these files they must be renamed - possibly to a form such as Xnnn + Spec + .ALK where Xnnn is the cruise ID and Spec is the species ID code.

Several species may be processed in one run. Only one key per species can be saved at a time, due to the above file nomenclature.

Version 2.2 allows the use of non sequential set numbers, uses the GetDate function and defaults to the parameter file.

Version 2.3 uses the standardized format and adds the program and data version number to the output header.

Version 3.31 uses *.NEW files for biological card.

note:
A batch file option is now available using a FORTRAN program MALKGO to create an input file MALKEY.GO. To run this batch system simply type <MALKEY>.

****** end of Documentation }

```
{       list of include files
{           MALKVar
            PrtConst
            SpName
            rvSETstr
            rvBIOstr
            MALK101
            BinSrch
            Exist
            MALK102
            MALK103
            Getpar
            GetDate
{           HeadAM1             }
```

To permit a degree of customization by the user, a parameter file is required to run each of the three programs. These files allow the user to select specific subsets of the data and (within limits) alter the format of the output. To protect the user against inadvertently using the wrong parameter file the output lists most of the options used in the heading. The parameter file for MALKey1 is named MALKey1.PAR and is listed below.

```
d:              ;drive for RVcccB.NEW       Bio
d:              ;drive for RVcccL.NEW       Len
d:              ;drive for RVcccS.DBA       Set
e:              ;drive for Species.DBA      Species codes
e:              ;drive for Strata.DAT       Strata numbers and areas
e:              ;drive for length/weight parameter file
c:              ;drive for Temporary Length Vectors (.6 k per set)
A               ;Select Age or Maturity     A/M
X               ;Include/eXclude missing ages or maturities   I/X
*               ;SexCodes to process        * = all or 1,2,3
1,2             ;Experiment Type            valid codes are 1,2,3
Y               ;L/W coefficients from 'MALKeyab.PAR'   Y/N


                {parameter file for MALKey1}
```

NOTES:- all missing lengths are excluded automatically

the coefficients from the length/weight regression can be entered from the parameter file or entered by user interactively

the drive for temporary length vectors is the location of the stored age/maturity matrix

An additional file used by this program is the list of regression coefficients (a & b) to be used in the run(s). It is stored as MALKeyab.PAR, an example follows:

```
0010                    species code
0.007656                a:    length weight regression parameters
3.044187                b:
0012
0.004804
3.1017
0040
0.00478527
3.17746
```

The 'a' and 'b' used in this file should give the weight of a fish in grams.

MALKey2

```
program AgeLengthKey2;

{ Program:        Multiple Cruise Age Length Key Table -- Part 2

                       R esearch
                       V essel
                       AN alysis programs

  Scientific       Douglas Clay                          (506)-857-6218
   Authority       Marine Fisheries Division
                   Gulf Fisheries Center, Moncton, N.B.
                   Department of Fisheries and Oceans


  Contract Author:          Pierre C. Brien
   (ver 1.0)                ISMT-Microcybernetics Ltd.
                            P.O. Box 3663
                            Halifax, N.S. B3J 3K6    (902)-425-6460


  Date_Written:   85/04      Version 1.0
                  85/08      Version 2.0  modifications marked {2.0}
{                 86/03      Version 2.1        "             "   {2.1}
{                 86/04      Version 2.2        "             "   {2.2}
{                 87/04      Version 2.3+.01    "             "   {2.3}
{                 88/04      version 2.4        "             "   {2.4}
{                 88/12      version 2.5        "             "   {2.5}
{                 89/04      version 2.55       "             "   {2.55}
{                 89/05      version 3.55       "             "   {3.55}
{                 89/06      version 3.6        "             "   {3.6}

 {Function: This is the second of three programs designed to generate
            X-Y matrices from either AGE and LENGTH or MATURITY and
            LENGTH. This program uses the accumulated age or maturity
            at length matrix from one or more cruises that were stored
            by MALKey1.

            This program accumulates a length by stratum set of vectors
            for use in expanding the numbers and percent composition
            to survey and population estimates.

            The stored key and the length vectors are combined with
            appropriate area weighting and then printed to an output
            file and/or printer according to the options selected in
            the parameter file.
```

For floppy disk systems the opportunity exists to have the different cruises on different disks. The files used are RV Xnnn L.NEW and RV Xnnn S.DBA where Xnnn is a Cruise ID (the set file output is from the BldSET program).

This Key may be run as an AGE Length Key or as a MATURITY Length Key but not as both simultaneously.

This program uses the age or maturity matrix stored by MALKey1. This intermediate file can be based on one or more cruises.

The length by strata data are stored as a matrix with accompanying title, date and author information obtained from the user. The file name is constructed as follows:

Xnnn + Spec + '.LEN'

where Xnnn is the cruise ID and Spec is the species code ID. Several species may be processed in one run. Only one key per species cruise combination can be saved at a time, this is due to the above file nomenclature.

Version 2.2 allows the use of non sequential set numbering, date retrieval from the GetDate function, and parameter file default.

Version 2.3 uses the standardized data format and adds the program and data version number to the output header.

Version 2.4 corrects an error in the sampled/caught ratio on the length frequency. Ver 2.41 corrects a misassignment of 1 for the length frequencies due to the change in data recording on the length frequency cards. Ver 2.42 corrects the test for when to stop reading records for a species. This program now tests species as well as set number.

Version 2.5 incorporates the average length and weight by age as the average value of the table in which it appears rather than the average of the measured fish. The weights of fish from the cruise (survey) total and Gulf (area) total are calculated from the regression coefficients (a & b) and used in those tables with numbers estimated for expanded areas.

Tables 1 and 2 now contain the average length, weight and age of the measured (detailed) fish. Tables 3 and 4 contain the mean length and weight of those fish in the table based on the length weight regression.

Version 2.55 incorporates corrections for an error in the calculation of sex separated keys. BldLen ver 2.3 was also updated to BldLen 2.31 to include sex as a sorting criteria.

Version 3.55 uses *.NEW files (except for set card) in lieu of *.DBA files.

Version 3.6 adds the option of defining a maturity type for a particular run. The first type, 'ML' (Maturity at Length), produces a report and output file with the total number of fish at length for each maturity stage, the output file is named XnnnSppp.MAL. This file contains the percent of mature fish associated with each length in the data file. The second option maturity type, MA (Maturity at Age), when run at a subsequent time then reads this file and produces a report of the mature fish (capable of spawning) at age. The 'ML' (Maturity at Length) option is run with 'M' AgeOrMaturity option. The 'MA' maturity type option is run with the 'A' AgeOrMaturity option. In order to obtain a run without these maturity options an 'N ' can be entered for none, in this case the total survey numbers at age or at maturity will be output.

This version (3.6) can also create a total of seven new files. Some are activated with (Y/N) in the parameter file and others are created depending on the type of run. Files containing the average length at age and average weight at age are created with directives from the parameter file. The file names are XnnnSppp.AL? and XnnnSppp.AW?. Where the ? represents 'S' or 'T' for spawning or total.

Length frequency files from tables 1, 3 and 4 are also created with directives from the parameter file. The file names are XnnnSppp.L1?, XnnnSppp.L2? and XnnnSppp.L4? where the ? represents 'S' or 'T' for spawning or total.

Finally, population at age and maturity at age files are created depending on the type of run executed. An age at length run with a maturity type 'N ' - for none, will produce a population at age file from table 4 (Gulf estimates). An age at length run with maturity type 'MA' creates a maturity at age file, containing the number of spawning fish, also taken from table 4. The file names are XnnnSppp.PNA and XnnnSppp.MNA respectively. (These extensions stand for Population Numbers at Age and Mature Numbers at Age.)

note:
A maturity type 'MA' cannot be specified in a maturity run (AgeOrMaturity option = M).
An option of maturity type 'MA' may not be run without a previous run of maturity type 'ML'.

note:
A batch file option is now available using a FORTRAN program MALKGO to create an input file MALKEY.GO. To run this batch system, simply type <MALKEY>.

****** end of Documentation }

```
{           list of include files                                    {2.0}
{               MALKVar
                PrtConst
                SpName
                rvSETstr
                rvLENin                                               3.55
                NewVal                                               {2.5}
               {Exist
                HeadAM2                                              {2.2}
               {GetDate                                              {2.2}
               {MALK201
                MALK202
                GetTitle
                Getpar                          }
const
     PgmTitle2 =
 'Age/Maturity  Length Key Statistics          Dat ver:';
     PgmTitle  =
 'R esearch V essel AN alysis    MALKEY2       Pgm ver:3.6   08 jun 89';
```

The parameter file for MALKey2 follows.

```
A2p079c.TOT     ;printed output file detailed key     N for none/file name
n               ;printed output to printer Y/N
c:              ;drive for RVcccB.NEW      Bio
c:              ;drive for RVcccL.NEW      Len
c:              ;drive for RVcccS.DBA      Set
d:              ;drive for Species.DBA     Species codes
d:              ;drive for Strata.DAT      Strata numbers and areas
d:              ;drive for Temporary Length Vectors (.6 k per set)
A               ;Select Age or Maturity    A/M
N              ;Maturity Type             MA/ML/(N)one
YY              ;Avg Length/Weight at age files Y/N   eg:YY/NN/YN/NY
YYY             :Length Freq. files from table 1/3/4  eg:NNN,YYY,NYY,YNY etc.
>,<             ;delimiter for printed files Y/N
X               ;Include/eXclude missing ages or maturities   I/X
1               ;Experiment Type           valid codes are 1,2,3
1,3,4           ;Print options 1=actual 2=%table 3=*Lengths 4=*Gulf N=none
1               ;Right Margin
6               ;Left Margin
56              ;LinesPerPage
80              ;ColsPerLine

                {parameter file for MALKey2}
```

NOTES

- -Print options are entered eg: 1/ 1,4 /1,2,3,4 or N for none
- -The file name for the output canNOT have an 'n ' (that is an 'n' followed by a blank) in the name. The 'n' for none must start in column 1 and can not be the word 'none'.
- -The drive for temporary length vectors is the location of the stored age/maturity matrix and the length by strata data.
- -If your printer does not have a buffer, sending output to it will extend the running time considerably. A faster routine would be to send the output to a file and use the MS-DOS command PRINT to list it on your printer.

MALKey3

```
program AgeLengthKey3;

{ Program:        Multiple Cruise Age Length Key Table -- Part 3

                       R esearch
                       V essel
                       AN alysis programs

  Programmer:     Douglas Clay              (506)-857-6218
                  Marine Fisheries Division
                  Gulf Fisheries Center, Moncton, N.B.
                  Department of Fisheries and Oceans


  Date_Written:   {taken from MALKey2 version 2.42}
                  88/04            Version 3.0    modification marked{3.0}
                  89/04            Version 3.01

 {Function: This is the third of three programs designed to generate
            X - Y matrices from either AGE and LENGTH or MATURITY and
            LENGTH. This program uses the accumulated age at length
            matrix from one or more cruises that were stored by MALKey1.

            The age or maturity matrix and the length by strata are
            used from previously stored files. This program stores
            the catch at age by set and variance data in a file.
            The file name is constucted as follows:

                     Xnnn + Spec + '.CAT'

            where Xnnn is the cruise ID and Spec is the species code ID.

            This program also uses the accumulated Length by Stratum set
            of vectors stored by MALKey2 for use in calculating the catch
            at age by set and variance both by strata and for the
            entire survey.

            The stored key and the length vectors are combined with
            appropriate area weighting and then printed to an output
            file and/or printer according to the options selected
            in the parameter file.

            This Key may be run as an AGE Length Key or as a MATURITY
            Length Key but not as both simultaneously.

            Several species may be processed in one run. Only one key
            per species cruise combination can be saved at a time,
            due to the above file nomenclature.
```

```
            Version 3.0 incorporates variance calculations for catch at
            age according to the report by Smith and Somerton (1981),
            Strap: A user orientated computer analysis system for
            groundfish research trawl survey data. Can. Tech. Rept.
            Fish. Aquat. Sci:1030.

            Age by age variance is calculated for each strata and
            weighted by area for the entire cruise. This program also
            produces a set by set catch at age table.

            Version 3.01 replaces the variance calculated with the
            equivalent CV in % (ie. times 100).

                  ******    end of Documentation  }


{           list of include files

{               MALKVar
                PrtConst
                SpName
                Exist
                HeadAM3
               {GetDate
               {MALK301
                MALK303
                GetTitle
                GetPar
                                                    }

const
   PgmTitle2 =
    'Age/Maturity  Length Key Statistics       dat ver:';
   PgmTitle  =
    'R esearch V essel AN alysis    MALKey     pgm ver:3.01  19/04/89';
```

The parameter file for MALKey3 is as follows:

```
K3.OUT          ;printed output file summary/variance  N for none
y               ;printed output to printer Y/N
d:              ;drive for RVcccB.NEW      Bio
d:              ;drive for RVcccL.NEW      Len
d:              ;drive for RVcccS.DBA      Set
d:              ;drive for Species.DBA     Species codes
d:              ;drive for Strata.DAT      Strata numbers and areas
c:              ;drive for Temporary Length Vectors (.6 k per set)
A               ;Select Age or Maturity    A/M
X               ;Include/eXclude missing ages or maturities   I/X
*               ;SexCodes to process       * = all or 1,2,3
1               ;Experiment Type           valid codes are 1,2,3
1               ;Print options 1=actual 2=%table 3=*Lengths 4=*Gulf
1               ;Right Margin
6               ;Left Margin
60              ;LinesPerPage
80              ;ColsPerLine

                {parameter file for MALKey3}

                NOTES
                    Print options are entered     eg: 1/ 1,4 /1,2,3,4
                                                  or  N for none

                    The file name for the output canNOT have an 'n '
                    (that is an 'n' followed by a blank) in the name.
                    The 'n' for none must start in column 1 and can
                    not be the word 'none'.

                    The drive for temporary length vectors is the
                    location of the stored age/maturity matrix, the
                    length by strata data, and also the catch at age
                    by set data.
```

If your printer does not have a buffer, sending output to it will extend the running time considerably. A faster routine would be to send the output to a file and use the MS-DOS command PRINT to list it on your printer.

PikAMap

- program to select a smaller subset of points from a large map data base in order to reduce plotting time. This program is also designed to aid in editing a digitized map.

```
program PIcK_A_MAP;

{   program        PIcK A MAP
                   to select a subset of scaled points from a master
                   data set of a map drawn from coordinates expressed
                   as digitized longitudes and latitudes

                   OR

                   to edit a set of scaled points to reduce the overall
                   size of the data file or to remove erroneous points.

                        R esearch
                        V essel
                        AN alysis programs


                   Douglas Clay          (506)-857-6218
                   Marine and Anadromous Fisheries Division
                   Gulf Fisheries Center, Moncton, N.B.
                   Department of Fisheries and Oceans


   Date_Written:   87/06/18                    version 1.0
                   89/01/15                    ver     2.0

                        Documentation

                   The available map coordinates are from the US MarMap
                   program from Woods Hole and cover the Atlantic coast
                   from the Carolinas to northern Labrador. This program
                   allows pre-selection of subsets from this larger
                   map data base for maps in frequent use. Preselecting
                   a smaller map set results in much faster plotting,
                   although for a single 'one shot' map a 'window' in
                   the larger data set can be used.

                   Longitudes are by convention stored as negative values.
                   The degrees and minutes are stored as decimal degrees.

                   Version 2.0 allows file editing of the list of scaled
                   points by either taking a set percentage or by
                   targeting for a specific accuracy. A segment by
                   segment map is produced to aid in editing.

                   The printer must be turned on in Edit mode, it is not
                   required in Select mode.
              **** end of Documentation    }
```

```
{                  list of include files
                        PrtConst
                        Exist
                        HeadPiK
                        NewVal
                        GetDate
                        PikAMap1
                        PikAMap2
                        PikaMap3                                        }

const
   PgmTitle =
'R esearch V essel AN alysis     PikAMap       pgm ver: 2.0   15/JAN/89';
```

This program requires two parameter files. The first, AtlMap.PAR is the same as that used by the program AtlMap (see page 58). It provides the coordinates for the smaller map being selected from the larger master map. The second parameter file, **PikAMap.PAR** is specific to this program and is listed below. It is used when editing a new map.

```
Y                       Print A Segment listing       Y/N
Y                       Print A Map  of the segment   Y/N
200                     Segment size
75                      Map width - columns    segment map dimensions
45                      Map height - rows        "     "      "
LC4462_1.MAP            Starting original map
Edit.MAP                Finished map
Pikamap.OUT             Audit output file
```

The map width and height are currently set for 8.5 x 11 inch paper

The nameing protocols for digitized maps are:

the map number	ie. LC4462
the portion of the map in that section	ie. 1,2,3,4,etc.
extention	ie. .MAP

LC4462_3.MAP is the file for the third sector of map LC4462

CatMap

- program to select catch statistics by number or weight from the research vessel data set for a particular cruise - species combination. The data is presented for plotting by AtlMap.

```
program CATchstatisticsMAPping;

{ Program:        CatMap

                  retrieves the estimates of abundance from the
                  research vessel data base (catch cards) using
                  a modification of the RVAN program:
                  CATch STATistics by stratum.

                      R esearch
                      V essel
                      AN alysis programs

                  Douglas Clay          (506)-857-6218
                  Marine Fisheries Division
                  Gulf Fisheries Center, Moncton, N.B.
                  Department of Fisheries and Oceans


  Date_Written:   87/06/19                1.0
                  taken as modification from CatStat ver 2.4}
                 {89/05/24     version   2.0     modifications  2.0}

  {Function:     This routine is used to retrieve the catch statistics
                 by numbers or weight for any species and cruise for
                 subsequent plotting with the program AtlMap.

                 For each species processed the following steps occur.
                 1) the catch file data are selected for the desired
                    species and then sorted by size of catch producing
                    a temporary output file.
                 2) this output file is then used to generate a map on
                    the screen or plotter .

                 This procedure can be repeated for as many species as
                 required and for all cruises (files) as required.

                 Version 2.3 of CatStat allowed the sets in a cruise to
                 be non sequential in nature although they must still be
                 sorted.
```

```
The parameter file provides for the following options:
 -name of the listing file, LST: for the listing device
 -transformation option codes for weight and number
      the codes presently implemented are:-
            0  .......  no transformation
            1  .......  log e of n+1
 -report formatting control,
 -right margin, left margin,
 -lines per page and columns per line.
 -selection of catch numbers or weight

Version 1.0 uses the new data format as produced from
AltCol and includes a data version number on the output
header.

Version 2.0 uses *.NEW files for the catch data.


******  end of documentation *******}


{            list of include files                                  }{2.1}

{                 CatMap1
                  CatMap2
                  CatMap3
                  CatMap4
                  CatMap5
                  PrtConst
                  RvCATin
                  RvSETstr
                  SpName
                  Sort.box
                  GetDate
                  GetPar
                  Exist
                  HeadMap                          }


  PgmTitle1 =
 'R esearch V essel AN alysis  CatMap       pgm ver:2.0  24 may 1989';

  PgmTitle2 =
 'Abundance Estimates / Numbers & Weight    dat ver:';
```

This program requires the associate files STRATA.DAT and SPECIES.DBA to function correctly. (see Utility Files)

To permit a degree of customization by the user, a parameter file is required to run the program. This file allows the user to select specific subsets of the data. To protect the user against inadvertently using the wrong parameter file, the title on the map lists some of the options used. The parameter file is named **CatMap.PAR** and is listed below.

```
CatMap.LST      ;printed output file        N for none
N               ;printed output to printer  Y/N
D:              ;drive for RVXnnn.DBA       Cat
D:              ;drive for RVcccS.DBA       Set
D:              ;drive for Species.DBA      Species data file
D:              ;drive for Strata.DAT       file containing stratum areas
1 2 8           ;experiment type            valid types = 1,2,3
0 0             ;transformation options     Wght, Numb 0=no tran 1=log e
2               ;right margin
4               ;left margin
66              ;lines per page
80              ;cols per line
W               ;plotting variable          W/N  weight & numbers per tow
```

notes: The file name for the output canNOT have an 'n ' (that is an 'n' followed by a blank) in the name. The 'n' for none must start in column 1 and cannot be the word 'none'.

AtlMap

- program to plot a map with stations marked either for location only (by an 'x') or for a scaled catch or other variable (circle). The data is required in the form longitude, latitude, catch.

```
program ATLanticMAPping;

{   program      -to plot scaled points on a map which is drawn from
                  coordinates expressed as longitudes and latitudes
                  previously stored on data files.

                       R esearch
                       V essel
                       AN alysis programs

                  Douglas Clay          (506)-857-6218
                  Marine and Anadromous Fisheries Division
                  Gulf Fisheries Center, Moncton, N.B.
                  Department of Fisheries and Oceans

   Date_Written:  87/06/18          version 1.0  turbo screen version
                  87/08/15                  2.0  Hp 7470 version
                  89/01/20                  2.1

                       Documentation

                  The available map coordinates are from the US MarMap
                  digitized coastline and depth contours from Woods Hole
                  Oceanographic Institute and cover the Atlantic coast
                  from the Carolinas to northern Labrador. A program
                  'PIKAMAP' allows pre-selection of subsets from this
                  larger map data base (or any data set) for maps in
                  frequent use.

                  Preselecting a smaller map set results in much faster
                  plotting, although for a single 'one shot' map a
                  'window' in the larger data set can be used.

                  Longitudes east of Greenwich are by convention stored
                  as negative values, similarly latitudes south of the
                  the equator are negative.

                  One option in the parameter file allows plotting of set
                  locations only when the distribution of sampling is
                  required. A second option allows only coastlines
                  and place names if required

                  There are two options, the screen option (a preview)
                  and an HP plotter option (sending commands in HPGL).
                  THe screen version does not support all the refinements
                  available for the plotter.
```

Locations (any text) can be placed anywhere on the map in any size, at any angle. The names (text) are entered on a file named in the parameter file, by convention this file has .LOC as the extention.

list of include files

```
   TypeDef.sys   |
*  Graphix.sys    } Turbo graphix tool kit
   Kernel.sys    |
     SpName
     Exist
     HeadAtl
     GetPar
     NewVal
     AtlMap1
     AtlMap2          }
```

* this file must be installed correctly for the graphics card in the computer in use, currently installed as CGA card.

This program requires the associate files from the Turbo Graphix Toolkit for the fonts being used in the title and the utility file SPECIES.DBA to function correctly. (see Utility Files)

To permit a degree of customization by the user, a parameter file is required to run the program. This file allows the user to select specific subsets of the data. To protect the user against inadvertently using the wrong parameter file, the title on the map lists some of the options used. The parameter file is named AtlMap.PAR and is listed below.

This parameter file is also used by the program PikAMap.

```
GulfS.Map           map for default plotting
-66.25              maximum longitude (negative by convention for deg E)
46.5                minimum latitude
-64.00              minimum longitude (negative by convention for deg E)
48.5                maximum latitude
1.00                interval for CrossHairs
0                   line type for primary file (coast line)
4                   legend corner [TopLeft-1,TRight-2,BottomR-3,BL-4]
c:                  drive for Species.DBA     Species data file
n                   HpPlot7470: Y for HP7470 plot & N for screen graph
1                   CircleScale
0500                short delay - crosses
1000                medium delay-
2500                long delay  - circles
Y                   Location_Only: Y/N=sampling sites & C=scaled catches
>                Maritime Provinces                  <Title for map only
GulfS.Loc           file for location place names
```

In order to use various plotters a batch file can be created to install the COM1 port of the computer to correspond to the plotter. PLOTTER.BAT has been set up to allow the computer to match an HP plotter set to 9600 baud. PLOTTER.BAT follows:

```
mode COM1:9600,e,7,1
COM1:9600,e,7,1 -
```

ADDENDUM

Since the preparation of this report nearly a year has passed. This program now has the capacity to have overlays (ie. depth contours, political boundaries, etc.) in various pen thicknesses and line types, layers of data points in different colours and symbols that can be variable in size and shape. The value assigned to each size of data symbol in the ledgend is now selected in the parameter file.

The current version is 3.16. The sample plot on page 132 was produced by version 3.16.

Utility Files - Species File **SPECIES.DAT**

```
L-----!-----!-!-!---------!---!---------------------------R
------------------------------^----------------------------
```

[This file and its product are no longer in use.]

This is the species list for all marine fish species surveyed during southern Gulf research cruises.

The following comment lines can be kept at the top of the file, they will be ignored by the program which will search for the character string '****' in the first 4 characters of each line and will then use the data lines which follow.

The first line of this file is a WORDSTAR ruler line which may be used when modifying or adding to the file. The fields on the first line are: species code (4 digit code),
weight divisor (weights are recorded in grams, to give kilograms divide by 1000),
number of decimals to print,
(each of these integers must be separated by a blank on the working file)
a units title (10 character) for output, and
the 'a' and 'b' values from the length-weight regression.
The age-length regression follows in F10.8 format.
On the second line the fields are:
the common name (30 character) and
scientific name (30 character).

The ^ on the line under the ruler line indicates the location of the start of the scientific name.

Dividing the weight by 1000 will give kilos, the final output field is 4 characters thus with 2 decimal places the weight could range from 0.00 - 9.99 kg.

This file is indexed and rebuilt by the program SpBld (Species BuiLD) and then used by the RVAN package as SPECIES.DBA.

****

```
 .... sample file
0010  1000  1 3 Kilos.       0.0084    3.01500
Cod                          Gadus morhua
0011  10    2 1 Kilos.
Haddock                      Melanogrammus aeglefinus
0012  1000  1 1 Kilos.       0.0048    3.102
White Hake                   Urophycis tenuis (Mitchill)
0014  10    2 1 Kilos.
Silver Hake                  Merluccius bilinearis (Mitchill)
0112  10    2 1 Kilos.
Long-Fin Hake                Urophycis chesteri
0013  10    2 1 Kilos.
Red Hake                     Urophycis chuss (Walbaum)
0016  10    2 1 Kilos.
Pollock                      Pollachius virens (Linnaeus)
 ......
```

Utility Files - Species File **SPECIES.DBA**

This is a sample of the actual ASCII file used by all the programs in this series. All species caught from 1983 to present are listed in this file. Species are added as new occurences are found by the edit program CheckIT.

```
0010 1000  1  x 1 Kg
Atlantic Cod                    Gadus morhua
0011 1000  2  x 1 Kg
Haddock
0012 1000  1  x 1 Kg
White Hake                      Urophycis tenuis (Mitchill)
0013 1000  2  x 1 Kg
Red Hake
0014 1000  2  x 1 Kg
Silver Hake
0015 1000  1  x 1 Kg
Cusk
0016 1000  1  x 1 Kg
Pollock
0020 1000  2  x 1 Kg
Winter Skate
0023 0100  1  x 100 g
Redfish - unspecified           Sebastes spp.
0030 1000  1  x 1 Kg
Atlantic Halibut
0031 1000  2  x 1 Kg
Greenland Halibut
0040 1000  2  x 1 Kg
American Plaice                 Hippoglossoides platessoides
0041 1000  2  x 1 Kg
Witch Flounder
0042 0100  1  x 100 g
Yellowtail Flounder
0043 0100  1  x 100 g
Winter Flounder
0050 1000  1  x 1 Kg
Atlantic Wolffish
 .
 ...  sample file only
 .
4511   10  2  x 10 g
Squid
6200   10  2  x 10 g
Brittle Star
8100   10  2  x 10 g
Comb Jellies
8324   10  2  x 10 g
Soft Coral
```

Utility Files - Species File **CheckIT.SPP**

This file contains the same species (and codes) as SPECIES.DBA. It has some differences: 1) the common name is a shortened form using the 3 character NAFO code wherever possible, 2) regression coefficients (a & b) are added for males, females, and combined sex for the length and weight (first line) and length and age (second line). The numerals for the regression coefficient must be right justified in their 9 digit field. The coefficients should give the weight in grams and the age in years from the length in cm.

```
0010      A   0.0084B    3.015A   0.0084B    3.015A   0.0084B    3.015L/W
0010      A          B         A          B         A          B         L/A
COD-A
0011
0011
HAD
0012      A   0.0048B    3.102A   0.0048B    3.102A   0.0048B    3.102
0012      A  21.1320B   0.5956A  19.288B    0.6997A  20.034B   0.65500
HKW
 .
 .
 .
0031
0031
GHL
0040      A0.0047853B  3.17746A0.0047853B  3.17746A0.0047853B  3.17746
0040      A          B         A          B         A          B
PLA
0041      A0.0000893B  4.14487A0.0000893B  4.14487A0.0000893B  4.14487
0041      A          B         A          B         A          B
WIT
0042
0042
YEL
 .
 . sample file for documentation purposes
 .
0201
0201
T-SKA
0202
0202
S-SKA
 .
 .
 .
8600
8600
SPONGE-UN
9200
9200
STONES/ROCKS
```

Utility Files - Stratum File **STRATA.DAT**

The stratum number is listed and the corresponding stratum area is given in square nautical miles. In some years the research vessel data files have the strata coded as '015' or ' 15' rather than '415'. To standardize the RVAN package to a single format, AltCol and the Build programs make all of the data files the same and use '4' as the first digit to represent NAFO area 4.

401	0344	{441}	{North coast P.E.I.}	
402	0452	{440}	{Northumberland Strait}	
403	0113	{430}	{St. Georges Bay}	
415	0764	404	0048	{Cheticamp}
416	1067	405	0060	{Baie des Chaleurs}
417	0525	406	0171	{Tracadie}
418	0394	407	0128	{Gaspe}
419	0443			
420	0773			
421	0329			
422	1244			
423	3211			
424	1050			
425	0630			
426	0388			
427	0951			
428	0202			
429	1696			
430	0	not assigned		
431	1419			
432	0301			
433	1188			
434	1211			
435	0639			
436	0958			
437	0495			
438	0168			
439	0353			

The STRAT.DAT files are not indexed and are left in their original ASCII format, sorted by stratum number.

Stratum 430 does not exist and strata 404 to 407 have been identified and mapped for area but have not been used in any survey as of January 1989.

Strata numbers 401 to 414 are also assigned and used by other regions of DFO. They are used in the northern part of division 4T including parts of the St. Lawrence River.

Utility Files - Stratum File **CRUZYR.PAR**

CruzYR.PAR is used by many programs to verify a valid cruise selection and provide a year of survey for the header output. This file is kept up to date by running the edit program CheckIT.

```
P079 70
P091 71
P106 72
P122 73
P143 74
P157 75
P172 76
P188 77
P204 78
P229 79
P244 80
P260 81
P278 82
P296 83
P312 84
A001 85
A002 85
A003 85
A004 85
A005 85
N012 85
P327 85
P328 85
H141 85
H142 85
H143 85
A010 86
H159 86
H160 86
H161 86
H166 86
N014 86
N017 87
N073 87
H172 87
H174 87
H179 87
H884 88
N028 88
END  99
```

Data Files

- **the research vessel surveys in the Gulf Region are recorded on five data or card types. Four of these are keypunched, they are the station and set card, the catch card, the length (frequency) card and the biological (fish) card.**

Data formats were originally laid down in the late 1960's and were used from 1970 to 1983 for the fall (September) groundfish survey in the southern Gulf of St. Lawrence. The four data formats were limited to the 80 column computer card style of this earlier period. To permit use of the greater flexibility provided by new computers the formats were altered slightly during 1984 and 1985. No data were lost and the new or altered fields were combined with the historical data to provide a single compatible format for the entire data series.

The following listings of the formats of these data cards indicate both the past and current data collection and also indicate the columns for the present standardized data storage. The file nomenclature for the research data files is 'RV' + Xnnn + T '.DAT' for the keypunched version, where Xnnn represents the cruise ID, T represents a single letter S/C/L/B for set, catch, length, or biological card type. Data files with the extension .DAT are the keypunched version and those with the extension .NEW are the new standardized format version created after running the program AltCol. Files with reduced headers are produced from these files by the programs BldXXX, these have the extension .DBA.

Files with the extension .DAT are similar in format for the periods 1970 to 1983, 1984, 1985, and 1986 to 1987. (The format has not changed in 1988, however, some codes have been altered and care must be used when using data spanning the 1987/88 period.) Files with the extension .NEW and .DBA are standard format over all years.

Data preparation sequence and the programs and species files used with each format are presented below:-

file type	description	programs	species file
.DAT	keypunched version	AltCol	Species.DBA
.NEW	prepared by AltCol	CheckIT	CheckIT.SPP
		BioFreq	Species.DBA
		DataLst	Species.DBA
			CheckIT.SPP
		BldXXX	..none.....
		CatStat	Species.DBA
		MALKey1	Species.DBA
		MALKey2	Species.DBA
		MALKey3	Species.DBA
		CatMap	Species.DBA
.DBA	prepared by BldXXX	reduced files available for use	

STATION SET CARD FORMAT

- found on the include file **RvSETac.pas** in AltCol.

```
RVSET_INPUT_REC = record          {column numbers on NEW file}

  CARD_TYPE     :    string [1]; { 1}
  CRUISE        :    string [4]; { 2}
  STATION       :    string [3]; { 6}
  SET_NO        :    string [3]; { 9} {2 before 1984 - 3 after 1983}
  DATE          :    string [6]; {12}
  ICNAF_NAFO    :    string [3]; {18}
  EXPERIMENT    :    string [1]; {21}
  TIME_BEG      :    string [4]; {22} {3 before 1985 - 4 after 1984}
  TIME_DUR      :    string [2]; {26} {2 before 1986 - 4 after 1985 $}
  GEAR          :    string [3]; {28} {2 before 1986 - 3 after 1985}
  AUX           :    string [1]; {31}
  SPEED         :    string [3]; {32}
  OBTAIN        :    string [1]; {35}
  LATITUDE      :    string [4]; {36}
  LONGITUDE     :    string [4]; {40}
  DEPTH_AVE     :    string [3]; {44} {DEPTH_AVE before 1986 $ }
  DEPTH_RAN     :    string [2]; {47} {2 before 1986 - 3 after 1985 $}
  DISTANCE      :    string [2]; {49}
  SOURCE        :    string [1]; {51}
  WIND_DIR      :    string [1]; {52}
  WIND_FORCE    :    string [1]; {53}
  TIDE          :    string [1]; {54}
  TEMP_SUR      :    string [3]; {55}
  TEMP_BOT      :    string [3]; {58}
  SALIN_BOT     :    string [3]; {61}
  LIGHT         :    string [3]; {64}
  BT_SLIDE      :    string [3]; {67} {zero or blank since 1984  + }
  HYDRO_STN     :    string [3]; {70} {zero or blank since 1984  + }
  BOTTOM        :    string [1]; {73}
  NO_FISH       :    string [2]; {74}
  NO_INVERTS    :    string [2]; {76}
  WEIGHT_CAT    :    string [4]; {78}
  VER_DAT       :    string [4]; {82} {exists after 1985 only}
end;                               {85 - last character}
```

$ - both TIME_DUR, DEPTH_AVE and DEPTH_RAN must be calculated from TIME_BEG and TIME_END and DEPTH_BEG and DEPTH_END respectively.

\+ - since 1984 these numbers have been made equal to the SET_NO and thus are no longer entered.

CATCH CARD FORMAT

- found on the include file **RvCATac.pas** in AltCol.

```
RVCAT_INPUT_REC  = record          {column numbers on NEW file}

  CARD_TYPE     :    string [1]; { 1}
  CRUISE        :    string [4]; { 2}
  STATION       :    string [3]; { 6}
  SET_NO        :    string [3]; { 9} {2 before 1984 - 3 after 1983}
  DATE          :    string [6]; {12}
  ICNAF_NAFO    :    string [3]; {18}
  EXPERIMENT    :    string [1]; {21}
  TIME_BEG      :    string [4]; {22} {3 before 1986 - 4 after 1985}
  TIME_DUR      :    string [2]; {26} {2 before 1986 - 4 after 1985 $}
  DEPTH_GEAR    :    string [3]; {28} {ave before 1986 - st after 1985}
  TEMP_GEAR     :    string [3]; {31}
  SALIN_GEAR    :    string [3]; {34} {dropped after 1985}
  LIGHT         :    string [3]; {37} {dropped after 1985}
  BOTTOM        :    string [1]; {40}
  SPECIES       :    string [4]; {41}
  NUMBER_SP     :    string [5]; {45}
  WEIGHT_SP     :    string [4]; {50}
  BASKET_SP     :    string [4]; {54}
  NO_LENGTH     :    string [4]; {58}
  SEX           :    string [4]; {62}
  MATURITY      :    string [3]; {66}
  WEIGHT        :    string [3]; {69}
  OTOLITHS      :    string [3]; {72}
  PARASITES     :    string [3]; {75}
  STOMACH       :    string [3]; {78}
  FREE          :    string [3]; {81} {1 before 1986 - 3 after 1986}
  WEIGHT_CAL    :    string [1]; {84}
end;                               {84 - last character}
```

$ - TIME_DUR must be calculated from TIME_BEG and TIME_END
and DEPTH_GEAR is the starting depth after 1985 - prior
to that it was the average depth.

LENGTH CARD FORMAT

- found on the include file **RvLENac.pas** in AltCol.

```
  RVLEN_INPUT_REC  = record        {column numbers on NEW file}

    CARD_TYPE     :    string [1]; { 1}
    CRUISE        :    string [4]; { 2}
    STATION       :    string [3]; { 6}
    SET_NO        :    string [3]; { 9} {2 before 1984 - 3 after 1983}
    DATE          :    string [6]; {12}
    ICNAF_NAFO    :    string [3]; {18}
    EXPERIMENT    :    string [1]; {21}
    SPECIES       :    string [4]; {22}
    NO_SAMPLED    :    string [4]; {26}
{*} RATIO         :    string [2]; {30} {after 1985 wt caught & wt sam}
    SEX           :    string [1]; {32}
    LEN_INT       :    string [1]; {33} {before 86, FREE adjusted to "11"}
    UNITS         :    string [1]; {34} {after 86, 2 separate variables}
    RECORD_NO     :    string [1]; {35}
    GROUPING      :    string [1]; {36}
    START_LEN     :    string [3]; {37}
    LEN           :    array [1..14] of string [3]; {40}
end;                                                 {81 - last character}
```

* before 1986 the ratio was calculated by the coder - after 1985 the weight caught and weight sampled are entered and the ratio is calculated as:

$$\frac{\text{weight sampled} \times 100}{\text{weight caught}}$$

The ratio value is calculated by the computer and rounded to 2 digits (nearest percent) for storage purposes. It is important for those calculating the number caught for the catch card to round off the ratio value before it is used to multiply the number measured.

BIOLOGICAL (FISH) CARD FORMAT

- found on the include file **RvBIOac.pas** in AltCol.

```
      RVBIO_INPUT_REC  = record        {column numbers on NEW file}

         CARD_TYPE     : string [1]; { 1}
         CRUISE        : string [4]; { 2}
         STATION       : string [3]; { 6}
         SET_NO        : string [3]; { 9} {2 before 1984 - 3 after 1983}
         DATE          : string [6]; {12}
         ICNAF_NAFO    : string [3]; {18}
         EXPERIMENT    : string [1]; {21}
         DEPTH_GEAR    : string [3]; {   } {dropped after 1985}
         TEMP_GEAR     : string [3]; {   } {dropped after 1985}
         TIME_BEG      : string [3]; {   } {dropped after 1985}
         BOTTOM        : string [1]; {22}
         SPECIES       : string [4]; {23}
         RECORD_NO     : string [1]; {27}
         FISH_NO       : string [4]; {28}
         LENGTH        : string [3]; {32}
         SEX           : string [1]; {35}
{order}  MATURITY      : string [1]; {36}                {see below for}
{on card} WEIGHT       : string [5]; {37}                {additional codes
  {1*}   STOMACH_CON   : string [1]; {42} {variable: 0=st con, 1=st type}
  {3*}   ST_VOLUME     : string [5]; {43} {variable: 0=st vol, 1=st wt}
  {2*}   ST_NO_SPEC    : string [2]; {48} {variable: 0=no sp, 1=st full.}
  {4*}   ST_PART       : string [2]; {50} {variable: 0=part, 1=stand len.}
  {6*}   ST_SP_CODE    : string [4]; {52} {variable: 0=sp code, 1=gonad wt
         AGE_MATERIAL  : string [1]; {56}
         AGE_ANNULI    : string [2]; {57}
         AGE_EDGE      : string [1]; {59}
         AGE_CHECK     : string [3]; {60}
         AGE           : string [2]; {63}
         YEAR_CLASS    : string [2]; {65}
         AGER          : string [1]; {67}
         FREE          : string [2]; {   } {removed after 1985}
  {5*}   PARASITE      : string [3]; {68} {variable: 0=para., 1=liver wt}
         FIELD_DEFN    : string [6]; {71} {occurs after 1985}
      end;                           {76 - last character}
```

* - these six fields have been made VARIABLE with the addition of a six character field called a field FIELD_DEFN. If this field is blank or zero all the variables have their historic values. If there is a value in FIELD_DEFN then one or more of the fields have been altered. Eg. to change PARASITE from its past value to liver weight in grams, FIELD_DEFN would be '_____1'.

SEE NEXT PAGE .....

{ CODES for FIELD DEFINITION on biological data card

	FIELD /cols	HEADING (on data form)	ORIGINAL VALUE (pre 1986)	CODE	PARAMETER
1.	42-42	Stomach type	Stomach condition	0	Stomach condition
				1	Stomach type
				2	Tagging character
2.	48-49	Stomach full	No. spec in stom.	0	No species in stomach
				1	Stomach full (1/10,2/10,etc)
				2	Standard length in cm.
				3	Stomach weight - no contents
3.	43-47	Stomach weight	Stomach volume	0	Stomach volume
				1	Stomach weight - with cont.
				2	Fish weight (2nd reading) g
				3	Girth in mm.
				4	Tag number
				5	Gutted weight in g
4.	50-51	..blank	Stomach part	0	Stomach part
				1	Standard length in cm.
5.	68-70	..blank	Parasite	0	Parasite
				1	Liver weight in g
				2	1st dorsal length in cm.
6.	52-55	Gonad weight	Stom spec code	0	Stomach spec code
				1	Gonad weight in g
				2	Head off weight in g

end of codes}

These are a complete list of codes used until January 1990.

Appendix I

- a series of batch files and short programs written in UTAH Fortran to produce command files for the commercial package SuperSort. These batch files sort RV data files and select subsets of the data.

Documentation to run : **RVSORT**

This is a batch file to take research vessel data in the old Maritimes (St. Andrews) format or the current Gulf format and reformat it to a standardized common format.

Included in this standardization are such things as:
1. adding a data version number to the set card,
2. making all strata numbers '4xx',
3. zero filling, and
4. sorting.

This batch file calls five programs. These are:
1. RVSET a short UTAH Fortran program that queries the user as to the cruise to be processed, it then creates command files to control the sort routine, one for each of the four data card types (set,catch,length, and biological).
2. AltCol is a TURBO PASCAL program to standardize and reformat the data. It queries the user as to the cruise and card type to be processed.
3. TRIM is a public domain assember language utility that strips trailing blanks and blank lines from files.
4. SORT is the commercial program SUPER SORT that is used to sort the four data card types.
5. PKARC is an assembler shareware program that compresses and archives the data; both the original and the new data are compressed and archived. The old data (RVXnnn?.DAT) is archived as RVXnnn.ARC and the new data as RVXnnnN.ARC. All the above use Xnnn to designate the cruise ie. P244 or H159.

In order to run this procedure type

RVSORT Xnnn

where Xnnn is the cruise designation. After this step respond to the queries.

Remember the space between the replaceable parameter Xnnn and RVSORT.

Note the printer must be on to provide an audit trail.

-xXx-

This is the batch file **RVSORT.BAT**

```
echo processing of data for cruise %1 > PRN
RVSET
ask do you wish to run AltCol ver 2.04 ?  Y/N
IF ERRORLEVEL 1 GOTO NOKEY
echo running AltCol ver 2.04 > PRN
AltCol
:NOKEY
echo beginning set data .... > PRN
trim -0 <d:rv%1s.NEW >d:rv%1s.TMP
SORT CF=SETSORT > PRN
del d:rv%1s.TMP
del d:rv%1s.NEW
ren d:rv%1s.SRT d:rv%1s.NEW
echo beginning catch data .... > PRN
trim -0 <d:rv%1c.NEW >d:rv%1c.TMP
SORT CF=CATSORT > PRN
del d:rv%1c.TMP
del d:rv%1c.NEW
ren d:rv%1c.SRT d:rv%1c.NEW
echo beginning length data .... > PRN
trim -0 <d:rv%1l.NEW >d:rv%1l.TMP
SORT CF=LENSORT > PRN
del d:rv%1l.TMP
del d:rv%1l.NEW
ren d:rv%1l.SRT d:rv%1l.NEW
echo beginning biological data .... > PRN
trim -0 <d:rv%1b.NEW >d:rv%1b.TMP
SORT CF=BIOSORT > PRN
del d:rv%1b.TMP
del d:rv%1b.NEW
ren d:rv%1b.SRT d:rv%1b.NEW
SET pkarctmp = d:
d:
echo pkarc a b:rv%1  d:rv%1?.DAT > PRN
a:pkarc a b:rv%1  d:rv%1?.DAT > PRN
echo pkarc a b:rv%1n d:rv%1?.NEW > PRN
a:pkarc a b:rv%1n d:rv%1?.NEW > PRN
a:pkarc v b:rv%1 > PRN
a:pkarc v b:rv%1n > PRN
dir b: > PRN
a:
copy rv%1s.ver b:
```

For this implimentation to work, the following should be in place:

program disk in default drive
blank disk in B: for archived data
research vessel data in D:
printer on to provide audit trail

R esearch V essel AN alysis

Documentation to run : **SELECT**

This is a batch file to take research vessel data in the new format (RVXnnn?.NEW) and select subsets of this data on the basis of species, strata, and time. The selection criteria must be completed 1 at a time, ie. species then strata.

Files that are subsets by species are named RVXnnn?.SPP where Xnnn is the cruise designation and SPP is the 3 letter species code. Files selected for strata have the extention .SEL. The extention found on a file only indicates the last selection program through which it passed. Selections for time of day rename the cruise.

This batch file calls four programs. These are:

1. SELSP, SELST, SELTM are short UTAH Fortran programs that query the user as to the cruise to be processed and the selection criteria; it then creates command files to control the sort routine, one for each of the four data card types (set,catch,length, and biological), additional procedure files are created to process the sort (select) and archive functions.
2. TRIM is a public domain assember language utility that strips trailing blanks and blank lines from files,
3. SORT is the commercial program 'SuperSort' that is used to select the appropriate subsets of the four data card types.
4. PKARC is an assembler shareware program that compresses and archives the data. The new subset of the data is compressed and archived. The new data is archived as SPXnnn.ARC if the selection was based on species, STXnnn.ARC if the selection was based on strata, and TMXnnn.ARC if based on time. All the above use Xnnn to designate the cruise ie. P244 or H159. There is no way of identifying what specific selections were done on an archived subset - only that the last selection was based on time, species, or strata.

In order to run this procedure type

SELECT Xnnn

where Xnnn is the cruise designation. After this step respond to the queries. Multiple runs are necessary if more than one type of selection is required.

Remember the space between the replaceable parameter Xnnn and SELECT.

Note printer must be on to provide a paper audit trail.

-xXx-

This is the batch file **RVSELECT.BAT**

```
echo processing of data for cruise %1 > PRN
ask do you wish to select for SPECIES ?  Y/N
IF ERRORLEVEL 1 GOTO STRATA
echo running SELSP ver 1.00 > PRN
SELSP
echo NO set data in SPECIES selection .... > PRN
echo beginning catch data .... > PRN
trim -0 <d:rv%1c.NEW >d:rv%1c.TMP
SORT CF=CSELSP > PRN
del d:rv%1c.TMP
echo beginning length data .... > PRN
trim -0 <d:rv%1l.NEW >d:rv%1l.TMP
SORT CF=LSELSP > PRN
del d:rv%1l.TMP
echo beginning biological data .... > PRN
trim -0 <d:rv%1b.NEW >d:rv%1b.TMP
SORT CF=BSELSP > PRN
del d:rv%1b.TMP
goto arc
:STRATA
ask do you wish to select by STRATA ? Y/N
IF ERRORLEVEL 1 GOTO TIME
echo running SELST ver 1.00 > PRN
SELST
prosel %1
goto arc
:TIME
ask do you wish to select by TIME ? Y/N
IF ERRORLEVEL 1 GOTO ARC
echo running SELTM ver 1.00 > PRN
SELTM
:ARC
sparc
```

For this implimentation to work the following should be in place:

program disk in default drive
blank disk in B: for archived data
research vessel data in D:
printer on to provide audit trail

It is possible to run only the program **SELST** and then run the procedure **PROSEL.**

In order to run this procedure type

PROSEL Xnnn

where Xnnn is the cruise designation. Multiple runs are necessary if more than one type of selection is required.

Remember the space between the replaceable parameter Xnnn and PROSEL.

This is the batch file **PROSEL.BAT** (PROcess SELection)

```
echo beginning set data .... > PRN
trim -0 <d:rv%1s.NEW >d:rv%1s.TMP
SORT CF=SSELST > PRN
del d:rv%1s.TMP
echo beginning catch data .... > PRN
trim -0 <d:rv%1c.NEW >d:rv%1c.TMP
SORT CF=CSELST > PRN
del d:rv%1c.TMP
echo beginning length data .... > PRN
trim -0 <d:rv%1l.NEW >d:rv%1l.TMP
SORT CF=LSELST > PRN
del d:rv%1l.TMP
echo beginning biological data .... > PRN
trim -0 <d:rv%1b.NEW >d:rv%1b.TMP
SORT CF=BSELST > PRN
del d:rv%1b.TMP
```

This batch file and those above make use of such public domain utilities as TRIM and ASK. These are available in machine language code on most bulletin boards.

The Fortran program **RVSET.FOR**

```
***** UTAH Fortran 1.0 (Mod 2) ** Compiling File: A:RVSET.FOR *****

0001 $OPTIONS X,E,L=250,S=250
     C      PROGRAM TO CREATE COMMAND FILES FOR SUPERSORT TO
     C      SORT RVDATA FILES
     C
     C            RVSET        ver  1.00
     C                         Douglas Clay
     C                         MARINE AND ANADROMOUS FISHERIES DIVISION
     C                         GULF FISHERIES CENTER, MONCTON
     C
0002        DIMENSION FILE (4)
0003        IOW = 0
0004        IOR = 1
     C
0005        WRITE (IOW,1)
0006 1      FORMAT (' NAME OF CRUISE TO PROCESS > ',Z)
0007        READ (IOR,2) FILE
0008 2      FORMAT (4A1)
0009        CALL OPEN (2,'SETSORT')
0010        WRITE (2,3) FILE,FILE
0011 3      FORMAT ('list',/,'inp=90 , cr'          ,/,
            >                'key=9 11'             ,/,
            >                'work = d:'            ,/,
            >                'SO=D:RV',4A1,'S.TMP'  ,/,
            >                'OUT=D:RV',4A1,'S.SRT',/,
            >                'GO'                   ,//)
0012        CALL CLOSE (2)
0013        CALL OPEN (2,'CATSORT')
0014        WRITE (2,13) FILE,FILE
0015 13     FORMAT ('list',/,'inp=90 , cr'          ,/,
            >                'key=9 11 , 41 44'     ,/,
            >                'work = d:'            ,/,
            >                'SO=D:RV',4A1,'C.TMP'  ,/,
            >                'OUT=D:RV',4A1,'C.SRT',/,
            >                'GO'                   ,//)
0016        CALL CLOSE (2)
0017        CALL OPEN (2,'LENSORT')
0018        WRITE (2,23) FILE,FILE
0019 23     FORMAT ('list',/,'inp=95 , cr'          ,/,
            >                'key=9 11 , 22 25 , 32 32 , 37 39',/,
            >                'work = d:'            ,/,
            >                'SO=D:RV',4A1,'L.TMP'  ,/,
            >                'OUT=D:RV',4A1,'L.SRT',/,
            >                'GO'                   ,//)
0020        CALL CLOSE (2)
0021        CALL OPEN (2,'BIOSORT')
0022        WRITE (2,33) FILE,FILE
```

```
0023 33     FORMAT ('list',/,'inp=85 , cr'          ,/,
            >                'key=9 11,right 23,26,right',/,
            >                'key    +28,31,right 27,27,right',/,
            >                'work = d:'            ,/,
            >                'SO=D:RV',4A1,'B.TMP'  ,/,
            >                'OUT=D:RV',4A1,'B.SRT',/,
            >                'GO'                   ,//)
0024        CALL CLOSE (2)
0025        STOP
0026        END
** Generated Code =   938 (Decimal), 03AA (Hex) Bytes


       No Compile errors
```

The Fortran program **SELSP.FOR**

```
***** UTAH Fortran 1.0 (Mod 2) ** Compiling File: A:SELSP.FOR *****

0001 $OPTIONS X,E,L=250,S=250
     C      PROGRAM TO CREATE COMMAND FILES FOR SUPERSORT TO
     C      SELECT SPECIFIC SPECIES SUBSETS OF DATA FROM RVDATA FILES
     C
     C               SELSP      ver  1.00      12/jan/87
     C                          DOUGLAS CLAY , MAFD , DFO
     C                          GULF FISHERIES CENTER , MONCTON
     C
0002        DIMENSION FILE (4) , SPEC (3) , SEL (3)
     C
0003        IOW = 0
0004        IOR = 1
     C
0005        WRITE (IOW,1)
0006 1      FORMAT (' NAME OF CRUISE TO PROCESS > ',Z)
0007        READ (IOR,2) FILE
0008 2      FORMAT (4A1)
     C
0009           WRITE (IOW,*) ' 3 LETTER ALPHA CODE FOR SPECIES'
0010           READ (IOR,2) (SPEC(I),I=1,3)
0011           WRITE (IOW,*) ' NUMBERIC CODE 4 DIGITS include leading 0"s'
0012           READ (IOR,3) ISPEC
0013 3         FORMAT (A4)
0014           WRITE (IOW,*) ' SElect OR EXclude SPECIES'
0015           READ (IOR,2) (SEL(I),I=1,2)
     C
0016        CALL OPEN (2,'CSELSP')
0017        WRITE (2,13) FILE,FILE,SPEC,(SEL(I),I=1,2),ISPEC
```

```
0018 13     FORMAT ('list',/,'inp=90 , cr'          ,/,
            >                  'key=41 44'          ,/,
            >                  'work = d:'          ,/,
            >                  'SO=D:RV',4A1,'C.TMP' ,/,
            >                  'OUT=D:RV',4A1,'C.'3A1,/,
            >                   2A1'  FIELD 41,44 = "'A4'"',/,
            >                  'GO'                 ,//)
0019        CALL CLOSE (2)
0020        CALL OPEN (2,'LSELSP')
0021        WRITE (2,23) FILE,FILE,SPEC,(SEL(I),I=1,2),ISPEC
0022 23     FORMAT ('list',/,'inp=95 , cr'          ,/,
            >                  'key=22 25'          ,/,
            >                  'work = d:'          ,/,
            >                  'SO=D:RV',4A1,'L.TMP' ,/,
            >                  'OUT=D:RV',4A1,'L.'3A1,/,
            >                   2A1'  FIELD 22,25 = "'A4'"',/,
            >                  'GO'                 ,//)
0023        CALL CLOSE (2)
0024        CALL OPEN (2,'BSELSP')
0025        WRITE (2,33) FILE,FILE,SPEC,(SEL(I),I=1,2),ISPEC
0026 33     FORMAT ('list',/,'inp=85 , cr'          ,/,
            >                  'key= 23,26,right'   ,/,
            >                  'work = d:'          ,/,
            >                  'SO=D:RV',4A1,'B.TMP' ,/,
            >                  'OUT=D:RV',4A1,'B.'3A1,/,
            >                   2A1'  FIELD 23,26 = "'A4'"',/,
            >                  'GO'                 ,//)
0027        CALL CLOSE (2)
     C
0028        CALL OPEN (2,'SPARC.BAT')
0029        WRITE (2,99) FILE , FILE , SPEC , FILE , FILE , SPEC , FILE
0030 99     FORMAT ('SET pkarctmp = d:' ,/,  'D:'              ,/,
           >'echo pkarc u b:sp'4A1'  d:rv'4A1'?.',3A1,' > PRN',/,
           >'a:pkarc u b:sp'4A1'  d:rv'4A1'?.',3A1,' > PRN'   ,/,
           >'a:pkarc v b:SP'4A1' > PRN'                       ,/,
           >'dir b: > PRN'   ,/,  'A:')
0031        CALL CLOSE (2)
0032        STOP
0033        END
** Generated Code =  1374 (Decimal), 055E (Hex) Bytes


       No Compile errors
```

The Fortran program **SELST.FOR**

```
$OPTIONS X,E,L=250,S=250
C      PROGRAM TO CREATE COMMAND FILES FOR SUPERSORT TO
C      SELECT SPECIFIC STRATA SUBSETS OF DATA FROM RVDATA FILES
C
C              SELST      ver  1.00      12/jan/87
C                         DOUGLAS CLAY , MAFD , DFO
C                         GULF FISHERIES CENTER , MONCTON
C
       DIMENSION FILE (4) , SPEC (3) , STRATA (3) , NUMBER (10,3)
C
       DATA SPEC(1) /'T'/, SPEC(2) /'M'/, SPEC(3) /'P'/, S /'S'/,
      >           SS /'s'/
C
       IOW = 0
       IOR = 1
C
       WRITE (IOW,1)
1      FORMAT (' NAME OF CRUISE TO PROCESS > ',Z)
       READ (IOR,2) FILE
2      FORMAT (4A1)
C
       WRITE (IOW,*) ' SELECTION FROM MASTER OR SPECIES SUBSET? M/S'
       READ (IOR,2) SP
       IF (SP.EQ.S .OR. SP.EQ.SS) THEN
          WRITE (IOW,*) ' 3 LETTER ALPHA CODE FOR SPECIES'
          READ (IOR,2) (SPEC(I),I=1,3)
       ENDIF
C
          WRITE (IOW,*) ' SElect or EXclude '
          READ (IOR,2) (STRATA(I),I=1,2)
          WRITE (IOW,*) ' HOW MANY STRATA TO IDENTIFY : MAX 10'
          READ (IOR,*) ISTRAT
          WRITE (IOW,*) ' ENTER STRAT NUMBER : 1 PER LINE '
          DO 12 I = 1, ISTRAT
12        READ (IOR,2) (NUMBER (I,J),J=1,3)
C
       CALL OPEN (2,'SSELST')
       WRITE (2,3) FILE,SPEC,FILE,(STRATA(I),I=1,2)
3      FORMAT ('list',/,'inp=90 , cr'          ,/,
      >                 'work = d:'            ,/,
      >                 'SO=D:RV',4A1,'S.',3A1,/,
      >                 'OUT=D:RV',4A1,'S.SEL',/,
      >                 'KEY=6 8'              ,/,
      >                  2A1'  FIELD 6,8 =',Z)
       WRITE (2,30) (NUMBER(1,J),J=1,3)
30     FORMAT ('"',3A1,'" ',Z)
       IF (ISTRAT.GT.1) THEN
         DO 4 I = 2 , ISTRAT
4        WRITE (2,5) (NUMBER(I,J),J=1,3)
5        FORMAT (' &&',/,'OR FIELD 6,8 = "',3A1,'" ',Z)
       ENDIF
```

```
      WRITE (2,6)
6     FORMAT (/,'GO',//)
      CALL CLOSE (2)
C
      CALL OPEN (2,'CSELST')
      WRITE (2,13) FILE,SPEC,FILE,(STRATA(I),I=1,2)
13    FORMAT ('list',/,'inp=90 , cr'          ,/,
     >                 'key=6 8'              ,/,
     >                 'work = d:'            ,/,
     >                 'SO=D:RV',4A1,'C.',3A1,/,
     >                 'OUT=D:RV',4A1,'C.SEL',/,
     >                  2A1'  FIELD 6,8 = ',Z)
      WRITE (2,30) (NUMBER(1,J),J=1,3)
      IF (ISTRAT.GT.1) THEN
        DO 40 I = 2 , ISTRAT
40      WRITE (2,5) (NUMBER(I,J),J=1,3)
      ENDIF
      WRITE (2,6)
      CALL CLOSE (2)
C
      CALL OPEN (2,'LSELST')
      WRITE (2,23) FILE,SPEC,FILE,(STRATA(I),I=1,2)
23    FORMAT ('list',/,'inp=95 , cr'          ,/,
     >                 'key=6 8'              ,/,
     >                 'work = d:'            ,/,
     >                 'SO=D:RV',4A1,'L.'3A1 ,/,
     >                 'OUT=D:RV',4A1,'L.SEL',/,
     >                  2A1'  FIELD 6,8 = ',Z)
      WRITE (2,30) (NUMBER(1,J),J=1,3)
      IF (ISTRAT.GT.1) THEN
        DO 41 I = 2 , ISTRAT
41      WRITE (2,5) (NUMBER(I,J),J=1,3)
      ENDIF
      WRITE (2,6)
      CALL CLOSE (2)
C
      CALL OPEN (2,'BSELST')
      WRITE (2,33) FILE,SPEC,FILE,(STRATA(I),I=1,2)
33    FORMAT ('list',/,'inp=85 , cr'          ,/,
     >                 'key= 6 8 '            ,/,
     >                 'work = d:'            ,/,
     >                 'SO=D:RV',4A1,'B.'3A1 ,/,
     >                 'OUT=D:RV',4A1,'B.SEL',/,
     >                  2A1'  FIELD 6,8 = ',Z)
      WRITE (2,30) (NUMBER(1,J),J=1,3)
      IF (ISTRAT.GT.1) THEN
        DO 42 I = 2 , ISTRAT
42      WRITE (2,5) (NUMBER(I,J),J=1,3)
      ENDIF
      WRITE (2,6)
      CALL CLOSE (2)
C
```

```
      CALL OPEN (2,'PROSEL.BAT')
C     WRITING PROCEDURE TO DO THE SELECTION
      IF (SP.EQ.S .OR. SP.EQ.SS) THEN
        WRITE (2,70)
70      FORMAT ('echo beginning set data .... > PRN',          /,
     >          'SORT CF=SSELST > PRN',                       /,
     >          'echo beginning catch data .... > PRN',       /,
     >          'SORT CF=CSELST > PRN',                       /,
     >          'echo beginning length data .... > PRN',      /,
     >          'SORT CF=LSELST > PRN')
        WRITE (2,71)
71      FORMAT ('echo beginning biological data .... > PRN', /,
     >          'SORT CF=BSELST > PRN')
      ELSE
        WRITE (2,80)
80      FORMAT ('echo beginning set data .... > PRN',          /,
     >          'trim -0 <d:rv%1s.NEW >d:rv%1s.tmp',          /,
     >          'SORT CF=SSELST > PRN',/,'del d:rv%1s.tmp',   /,
     >          'echo beginning catch data .... > PRN',       /,
     >          'trim -0 <d:rv%1c.NEW >d:rv%1c.tmp',          /,
     >          'SORT CF=CSELST > PRN',/,'del d:rv%1c.tmp')
        WRITE (2,81)
81      FORMAT ('echo beginning length data .... > PRN',      /,
     >          'trim -0 <d:rv%1l.NEW >d:rv%1l.tmp',          /,
     >          'SORT CF=LSELST > PRN',/,'del d:rv%1l.tmp',   /,
     >          'echo beginning biological data .... > PRN', /,
     >          'trim -0 <d:rv%1b.NEW >d:rv%1b.tmp',          /,
     >          'SORT CF=BSELST > PRN',/,'del d:rv%1b.tmp')
      ENDIF
      CALL CLOSE (2)
C
      CALL OPEN (2,'SPARC.BAT')
      WRITE (2,99) FILE , FILE , FILE , FILE , FILE
99    FORMAT ('SET pkarctmp = d:' ,/,  'D:'          ,/,
     >'echo pkarc u b:st'4A1'  d:rv'4A1'?.SEL > PRN',/,
     >'a:pkarc u b:st'4A1'  d:rv'4A1'?.SEL > PRN'   ,/,
     >'a:pkarc v b:ST'4A1' > PRN'                   ,/,
     >'dir b: > PRN'   ,/,  'A:')
      CALL CLOSE (2)
      STOP
      END
```

Examples of some of the command files produced by these programs are as follows:

the command file **SETSORT** for use with 'SuperSort'

```
list
inp=90 , cr
key=9 11
work = d:
SO=D:RVa010S.TMP
OUT=D:RVa010S.SRT
GO
```

the command file **CSELSP** for use with 'SuperSort'

```
list
inp=90 , cr
key=41 44
work = d:
SO=D:RVP188C.TMP
OUT=D:RVP188C.PLA
SE  FIELD 41,44 = "0040"
GO
```

the command file **LSELST** for use with 'SuperSort'

```
list
inp=95 , cr
key=6 8
work = d:
SO=D:RVP079L.TMP
OUT=D:RVP079L.SEL
SE  FIELD 6,8 = "415"  &
OR FIELD 6,8 = "416"  &
OR FIELD 6,8 = "417"  &
OR FIELD 6,8 = "418"  &
OR FIELD 6,8 = "419"
GO
```

Appendix II a.

"CheckIT" User Notes

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Getting Started

(Recommended protocols for current implementation)

Ensure the CheckIT programs and assessory files (*.PAR, strata.DAT, etc.) are on Bernoulli Drive C:. If on an alternate default drive, change the parameter file CheckIT.PAR accordingly. The data to be edited should be on Bernoulli Drive D:. The file names should follow the form RVXnnn (S, C, L or B).DAT card types, where Xnnn is the cruise Id of the survey data to be edited.

Ensure that you are logged in the appropriate sub-directories.

Verify that the cruise (Id) to be edited and the date of the cruise are in the CRUZYR.PAR file (add if necessary) and confirm that the options selected in the parameter file CheckIT.PAR reflect your system and data specifications. The edit program CheckIT edits the data in the standardized format (*.NEW); however, all corrections should be made on the original data files (*.DAT). These 'corrected' original data files must then be 'standardized' again by running the program AltCol.

Running Edit System

1. CkClean

This batch file deletes extraneous files from Drive D: (i.e. *.BAK, *.TMP, *.err, etc.)

See Appendix A for listing of the CkClean batch file.

2. AltCol

This Turbo Pascal program standardizes the formats of the RVXnnn (S, C, L or B).DAT files creating RVXnnn (S, C, L or B).NEW files and ensures compatibility between the old (pre-1984) and new data formats.

3. CkSort Xnnn

This batch file uses "SuperSort" routines to sort the standardized data files into orders for the subsequent CheckIT edits.

When you reply to the prompt "test number to be run?" a "SuperSort" command file is created that sorts the data files into orders compatible with that specific CheckIT test.

Make sure to leave a space between the command CkSort and the replaceable parameter 'cruise Id' (i.e. CkSort Xnnn).

CkClean must be run before each run of CkSort.

See Appendix B for a listing of the CkSort batch file and the "SuperSort" command files.

4. After these procedures there are often garbled records of blank lines at the beginning of the file. With 'Wordstar' delete (using <ctrl> T) any blank lines or extraneous characters from the beginning of the standardized data files and add one blank line (= 2 CR) at the end of each of these files.

This step is necessary every time CkSort is run.

5. CheckIT

This Turbo Pascal program has 11 options - 8 of which are actual editing tests.

The CheckIT menu contains a description of the sort sequence required of the data files for each of the eight CheckIT tests. If you select a test for which the data files are incorrectly sorted, you can abort the test by replying <ctrl> C to abort at any prompt. At this point the files must be resorted correctly with CkSort by replying to the prompt 'test number to be run?'

Make changes/corrections to the RVXnnn (S, C, L or B).DAT files only.

Always run CkClean <u>before</u> running CkSort.

Remember that a space is required between CkSort and the replaceable parameter 'cruise Id' (Xnnn).

Remember to add or verify that a blank line (= 2 CR) exists at the end of each of the standardized data files.

See Appendix C for CheckIT menu and the parameter file CheckIT.PAR.

Procedure for Editing Length/Weight Data
CheckIT: Test #8

1. Run the Turbo Pascal program BioFreq for each of the species of interest. The options selected in the parameter file BioFreq.PAR should result in the production of files of length/weight values (one file per species). This program creates file names with the following protocols: XnnnSpec.XYW where Xnnn is the cruise Id and Spec is the 4 digit species code.

The standardized data files need to be sorted in the same sequence required for CheckIT test numbers 1 to 5. If the files are sorted in some other order, use CkSort and select any test number from 1 to 5.

2. RegPlt XnnnSpec.XYW

Run the batch file RegPlt for each of the species files created in the above step. This will provide scatter plots and regression equations for each of the length/weight distributions. This routine calls the programs REGAN and SCATER.

Remember that a space is required between RegPlt and the replaceable parameter filename (XnnnSpec.XYW).

See Appendix D for a list of the batch file RegPlt.

3. Locate any obvious outliers on the scatter plots (note that several plots are produced (with different X/Y scales). This is to facilitate examination at the extremes of the distributions.

4. Identify which biological records require editing by using the REGRESSION (test #8) output to cross-reference the specific line numbers of the outliers found on the above plots.

5. Outliers may be the result of errors in the length, weight or both. Use the REGRESSION test output to ascertain the possible cause in each case (note the predicted lengths and weights).

Beware of errors due to 'dropped digits' i.e. when a fish was actually 110 g rather than 10 g.

Beware of errors due to confusion of metric/imperial units on weighing scales and correct accordingly.

6. Correct or delete the errors on the original data files (*.DAT) as with the other tests.

7. Rerun the LENCAT (test #6) and BIOCAT (test #5) tests as changes will probably be required to the catch and length data files.

Merging Ageing and Biological Data

1. Run the batch file CkClean.

2. Confirm that the format of the age file is correct - these records are not comma delimited (see Appendix E: for sample).

3. Copy the age file to be added (one species per file) to the data drive (D:) using the following naming protocol: XnnnAGE.Spp.

Where Xnnn is the cruise Id (i.e. H166 for cruise 166 on the Lady Hammond) and Spp is a three character abbreviation for the species being merged (i.e. WPF for window pane flounder). (See Appendix E: for a sample of file H166AGE.WPF.)

4. CkAge Xnnn Spp

Run the batch file CkAge, this file uses 'SuperSort' to sort the age file (XnnnAGE.Spp) by fish number.

Make sure to leave a space between the command CkAge and the first replaceable parameter, 'cruise Id' (Xnnn), and the second replaceable parameter, the abbreviation for the species (Spp) that was aged (i.e. CkAge Xnnn Spp).

The number of records sorted should match the number of fish aged.

See Appendix F for listing of the batch file and the 'SuperSort' command file.

5. CkSelect Xnnn Spp

Run the batch file CkSelect; this file uses 'SuperSort' to select the biological records for the species that is to be merged from the standardized biological data file and then sort these records by fish number.

Make sure to leave a space between the command CkSelect and the first replaceable parameter, 'cruise Id' (Xnnn), and the second replaceable parameter, the abbreviation for the species (Spp) that was aged (i.e. CkSelect Xnnn Spp).

See Appendix G for listing of the batch file and the 'SuperSort' command files.

This batch file calls the routine SELSP. The reply to the prompts for: "Name of cruise to process", "3 letter alpha code for species", and "Numeric species code - 4 digits including leading 0's" are the same as those used with the starting command CkSelect Xnnn Spp.

Enter SE to select records.

After this the Turbo Pascal program FILES is called by the batch file. This interactive program proceeds as follows:

Remember the drive designations when prompted for file names.

When prompted: "Please enter the full name of the age file",
reply: D:XnnnSRT.Spp, where Xnnn is the cruise Id and Spp is the 3 character species code.

When prompted: "Please enter the full name of the fish file",
reply: D:RVXnnnB.Spp.

When prompted: "Please enter the full name of the target merge file",
reply: D:Merge.

When prompted: "Please enter the full name of the error file",
reply: D:Error.

When prompted: "Do you wish to produce an error message file (Y/N)?",
reply: Y

When prompted: "There are ___ errors in these files"
"There are ___ warning(s) for these files"
"There are ___ reason(s) to panic"
"Do you wish to merge the files now (Y/N)?"

reply: N (unless all responses above are zero).

With 'Wordstar' examine the error file and correct any problems on the original standardized file (i.e. *.NEW) before attempting to merge the sorted age and biological records. Run FILES after correcting any errors to get new error messages.

6. CkMerge Xnnn

Do not run CkClean before running CkMerge.

Run the batch file CkMerge; this file uses 'SuperSort' to exclude the biological records for the species that has been merged with the ages and then merges this file with the file with the ages.

Make sure to leave a space between the command CkMerge and the replaceable parameter, 'cruise Id' (Xnnn) (i.e. CkMerge Xnnn).

See Appendix H for a listing of the batch file CkMerge and the 'SuperSort' command file SpSort (this files is not created in the run and must be present on the system).

This batch file calls the routine SELSP. The replies to the prompts are the same as those used when you ran CkSelect except enter EX to exclude records and when prompted: "3 letter alpha code for species", you must enter OTH for other species. Enter the same numeric code as you did when running CkSelect.

The number of records excluded should match the number of records selected in CkSelect.

The single species biological file with the ages is then added to the larger biological file having all species except the species being merged.

With 'Wordstar' verify that the file created (RVXnnnB.TMP) is correct, then exit with command <ctrl> KQ. Ensure the union of the two files is also correct. Upon exiting from Wordstar the the *.TMP file is renamed RVXnnnB.ALL.

7. Copy D:RVXnnnB.ALL to D:RVXnnnB.NEW/V.

8. Compare the original RVXnnnB.DAT file with the standardized RVXnnnB.NEW file by typing one 'page' from each of these files (use <shift> Print Screen) and verify that the formats are identical.

If there are no differences, then copy D:RVXnnnB.NEW to D:RVXnnnB.DAT.

9. Run the batch file CkClean.

10. If the .DAT file was replaced in step 8 above, then run AltCol, otherwise do not run AltCol as you will lose your newly added ages.

11. Run the batch file CkSort Xnnn and proceed with the remaining edits in CheckIT.

Remember the space between the command CkSort and the replaceable parameter 'cruise Id' (i.e. CkSort Xnnn).

12. By this stage the research vessel data has passed through all of the editing tests in CheckIT. At this time the user should preview the summaries of the SET and CATCH cards by running DataLst.

Appendix A.

Batch file CkClean used in edit system.

```
del d:*.SRT
del c:*.OUT
del c:*.OU1
del c:*.OU2
del d:*.TMP
del d:*.BAK
del d:errors
del d:error
del d:merge
```

Appendix B.

Batch file CkSort used in edit system.

```
ren d:rv%1?.NEW rv%1?.TMP
rvset
sort cf=setsort
sort cf=catsort
sort cf=lensort
sort cf=biosort
ren d:rv%1?.SRT rv%1?.NEW
```

Appendix C.

The parameter file CheckIT.PAR used by the edit system CheckIT.

```
LST:          :  output file name   lst:  =  printer
d:            :  bioDrive
d:            :  lenDrive
d:            :  catDrive
d:            :  setDrive
c:            :  speciesDrive
c:            :  strataDrive
              :  PrintOptions
4             :  RightMargin
4             :  LeftMargin
60            :  LinesPerPage
80            :  CharPerLine
0.25          :  RegFuzzFactor for SPdistance
0.35          :  RegFuzzFactorW for L/W regression test
0.10          :  RegFuzzFactorL for L/W regression test
0.9           :  SetCatLow  {Set Catch Validation acceptable weight
1.1           :  SetCatHigh  ratio range as Catch / Set}
0.01          :  Tolerance
n             :  deBug1     Y/N  audit trail for line by line reading
n             :  deBug2     Y/N  tracing set and species
n             :  deBug3     Y/N  audit of regress,
N             :  deBug4     Y/N  invert listing
```

The on screen menu as it appears with the edit system CheckIT

```
     T e s t                  D e f a u l t        S o r t
                              F i l e              O r d e r

 1) Range Test     .........  Range.PAR       SORTED:SET/SPEC/FISH_NO
 2) Set Validation .........  Set.PAR           "
 3) Catch Validation .......  Cat.PAR           "
 4) Set/Catch Validation ...  SetCat.PAR        "
 5) Bio/Catch Validation ...  BioCat.PAR        "
 6) Len/Catch Validation ...  LenCat.PAR     SORTED:SPEC/SET/FISH_NO
 7) Biological Validation ..  Bio.PAR        SORTED:SPEC/FISH_NO/SET
 8) Regression Test ........  Reg.PAR           "
 9) Report   ...............  run DataLst
10) Plot Data   ............  run DataLst & BioFreq
99) EXIT   .................  return to DOS
```

Appendix D.

Batch file RegPlt used in the CheckIT edit system.

```
del REGAN.NEW
del REGAN.OUT
del REGAN.DAT
del SCATER.NEW
del SCATER.DAT
copy %1 REGAN.DAT/v
REGAN < REGAN.INP
print REGAN.OUT
ren REGAN.DAT SCATER.DAT
del SCATER.OUT
SCATER < SCATER.INP
print SCATER.OUT
del SCATER.OU1
SCATER < SCATER.IN1
print SCATER.OU1
del SCATER.OU2
SCATER < SCATER.IN2
print SCATER.OU2
del REGAN.DAT
del REGAN.NEW
del SCATER.NEW
del SCATER.DAT
```

Appendix E.

Sample age file (H166AGE.WPF) of ages read from hard parts.

```
9H1660143    1    995   99996
9H1660143    2     44    4826
9H1660143    3     64    6806
9H1660143    4     34    3836
9H1660143    5     51    4826
9H1660143    6     64    6806
9H1660143    7     54    5816
9H1660143    8     34    3836
9H1660143    9     34    3836
9H1660143   10     54    5816
```

Appendix F.

Batch file CkAge.BAT used in the edit system.

```
copy d:%1age.%2 d:age.TMP
sort cf=agesort
ren d:age.SRT %1srt.%2
```

Appendix G.

Batch file CkSelect.BAT used in the edit system.

```
copy d:rv%1b.NEW d:rv%1b.TMP/v
SELSP
SORT CF=BSELSP
ren d:rv%1b.%2 SpNoAge.TMP
sort cf=SpSort
ren D:SpNoAge.SRT rv%1b.%2
FILES
```

Appendix H.

```
copy d:rv%1b.NEW d:rv%1b.TMP/v
SELSP
SORT CF=BSELSP
copy d:merge + d:rv%1b.OTH d:rv%1b.TMP/v
ws4 d:rv%1b.TMP
copy d:rv%1b.TMP d:rv%1b.ALL
dir d:rv%1?.*
```

Command file SpSort used by 'SuperSort'.

```
list
inp=85 , cr
key=  28,31,right
work = d:
SO=D:SpNoAge.TMP
OUT=D:SpNoAge.SRT
GO
```

APPENDIX II b.

CheckIT program documentation

Purpose

This program is used to perform a data validation procedure on data files. The program accepts directives describing range and value attributes of data items and record descriptions containing an internal file name, the name, type and columnar location of each variable on the file with an optional specification of range and value checks to be performed.

A second set of file specific tests is also incorporated, these tests require that a file contain variables with a specific name and that the files required be previously defined.

This implimentation of CheckIT is a Pascal program designed to edit the research vessel data. Data for one cruise is stored in four files, each file corresponding to a card type.

1. SET cards	RV + 'Xnnn' + S.NEW
2. CATCH cards	RV + 'Xnnn' + C.NEW
3. LENGTH cards	RV + 'Xnnn' + L.NEW
4. BIOLOGICAL cards	RV + 'Xnnn' + B.NEW

PASCAL PROCEDURE DESCRIPTIONS

Various Pascal procedures or tests are included in the program which perform specified tests on the datafiles. Brief descriptions of these are given below.

SETCAT

The Pascal procedure SETCATCH compares the SET cards with the CATCH cards.

Three tests are performed on each set:

1. The number of fish species recorded on the catch cards must equal the number of fish species on the set card.

2. The number of invertebrate species recorded on the catch cards must equal the number of invertebrate species on the set card.

3. The sum of the catch weights for fish species on the catch cards must equal the total fish weight recorded on the set card.

Note: The files must be sorted by set.

BIOCAT

This procedure compares the CATCH cards with the BIOLOGICAL cards.

For each set:
If a biological card is present for a species, a catch card must also be present for that species. If a non-zero is encountered for the number sampled for sex, maturity, weight, or otoliths on the catch card for a species, biological records must also exist for that species. (species code < 1000 only)

Four tests are performed for each species by set:

1. The number sampled for sex on the catch card must equal the number of biological cards with sex information (sex = 0,1,2).

2. The number sampled for maturity on the catch card must equal the number of biological cards with maturity information (maturity <> 9).

3. The number sampled for weight on the catch card must equal the number of biological cards with weight information (weight <> 99999).

4. The number sampled for otoliths on the catch card must equal the number of biological cards with a "1" in the aging material column.

Note: The data must be sorted by species within set.

LENGTH

This procedure compares the CATCH, LENGTH, and BIOLOGICAL cards.

For each set:
If a biological card is present for a species, both catch and length cards must be present for that species.

If a length card is present for a species, a biological card need not be present but a catch card must be present for that species.

Five tests are performed for each species by set:

1. Each length on a biological card must have a corresponding length on a length card.

2. The number of biological cards for a species must not be greater than the number on the length card sampled for length on the catch card.

3. The number sampled for length on the catch cards must equal the number sampled over all length intervals on the length cards.

4. The number sampled for length on the length cards must equal the number sampled over all length intervals on the length cards.

5. The number caught on the catch cards must be within 10% of the number caught as calculated from the number sampled and the ratio on the length cards.

Note: The catch and biological files must be sorted by species within set. The length file must be sorted by sex within species within set.

SPTEST

This procedure checks for internal consistency on the CATCH cards.

The following six tests are performed:

1. The number sampled for length must not be less than the number sampled for sex.

2. The number sampled for length must not be less than the number sampled for maturity.

3. The number sampled for length must not be less than the number sampled for weight.

4. The number sampled for length must not be less than the number sampled for otoliths.

5. The number sampled for length must not be less than the number sampled for parasites.

6. The number sampled for length must not be less than the number sampled for stomachs.

SPDISTANCE incorporated in SPTEST

This procedure checks the distance calculation on the SET card.

The following test is performed:

1. The distance must be within the FuzzFactor listed in the parameter file of speed x time.

Command format

The directive file is composed of statements which may be several lines long. Command statements are identified by having the character in column 1 as '/'. It is considered good practice to leave column 1 blank except for starting a new statement. All statements will be converted to upper case when being read in.

example: /Read FILE=RANGE.PAR

Commands:

/List	redirects output to a specified file
/Read	reads the indicated file for further commands this file will be read until end-of-file or the /Close command is encountered.
/Close	close the active command file. If this is the level 1 command file then the program will terminate.
/Ranges	define range Ids and their associated value pairs.
/Values	define value Ids and their associated values.
/Varlist	define a record name, the number of lines in each data record and the list of variables in that record.
/Test	associate a system file name with an internal record name and read the data in that file performing the type checking and range and/or value checking indicated.
/Set	set the value of program parameters.
/Print	print Value/Range and/or File/Variable specifications.
/Validate	performs predefined tests which require the presence of certain variable names in each of the required record descriptions. The variables must also be in the required format or results are unpredictable.

Data Types

The program recognizes three data types I, R, C for Integer, Real and Character. Type checking consists of the conversion of the ASCII string into the desired item. Character items may be up to 10 characters long. Real and integer items must be convertable by the PASCAL conversion routines.

Command Format

This section provides detail on the format and parameters of each command.

/List File=u:ffffffff.ext/LST:/CON:
direct listable output to specified file/device. If the same file is specified twice in the same run previously written output will be lost.

/Values
ValName,Type(ValList)
.
.
ValName,Type(ValList)
ValName - a unique name which species this value list. Names of Values and Ranges are kept in the same list, a name consists of up to 10 characters using A-Z,0-9
Type - as defined above one of R I or C.
ValList - a list of values appropriate to the type for example (1,2,3,4) valid for I, R or C, or (1.1,2.2,3.3) valid for R or C, or (A,B,C,D) or ('A','B','C','D') valid for C.

Note that the length of a character type value is determined from the length of the first item in the list. All subsequent items must be of the same length. As illustrated in the last example a string may be enclosed in quotes "'", with this form any character may be included in the string. Most character strings not containing embedded spaces or punctuation will be correctly interpreted using the form (A,B,C,D).

ValName,Type,FROM('ffffffff.ext',LineN,NLines,ColB,NCols)
read a list of values from the designated file,the values are located on LineN of each record of NLines, starts in ColB and is NCols long.

/Range
RangeName,type,(RangePairList)
RangeName - as for ValName
Type - as defined above
RangePairList - as for ValList with the following condition the values must occur in low high pairs.

/Read File= u:ffffffff.ext
begin to read commands from the file named until end of file or until a /Close command is encountered. Note that end of file automatically forces a /Close to be inserted in the command stream. Files can be nested up to 5 deep including the primary file.

/Close
closes the current active command file and reverts to the

previous level. It is issued automatically when the program encounters an end of file.

/VarList NAME=RecordName{, LINES=n}
VarName,{LineNo,},ColB,ColLen,type{Checks=CheckName1{,..5}/
.
.
VarName,{LineNo,},ColB,ColLen,type{Checks=CheckName1{,..5}/

NAME= RecordName - Record identifier
LINES= n - number of lines in this record
VarName - Variable identifier unique for this record 1-10 characters in A..Z,0..9
LineNo - optional LineNumber in record will be used if present otherwise the previous line number is used. When initializing a record the default is 1.
ColB - Beginning column location, may be a + if variable starts just after the previously defined variable.
ColLen - Length of the Variable field in characters.
Type - I, R or C as described above. Type R can further be scaled by using Rn where n = power of 10 to divide by. This is useful where numbers are recorded without decimal points imbedded.
Checks= - optional Keyword followed by 1 to 5 value, range or special test names. The variable must pass any one range or value check to be accepted. The special checks are

SpDistance - ensures that the Distance = Speed * TimeDur relationship is correct for SET data. This test requires that the record have the following variables defined DISTANCE as R1, TIMEDUR as R, SPEED as R1.

SpNoMeas - ensures that the numbers reported as measured follow a logical sequence. Requires the following variables of type I on a record for CATCH data. NUMBERSP, LENGTH, SEX, MATURITY, WEIGHT, OTOLITHS, PARASITES, STOMACH.

Note that the special check must occur after all required variables have been defined. See example below.

/ - indicates the end of one variable definition note that variable definitions all start on a separate line and the first starts on the line after the command.

/Print {Values,} {Files}
Dump to the listing file a formatted listing of the Values/Ranges and/or Files/Variables specifications.

/Test NAME= RecordName, FILE=u:ffffffff.ext

NAME= a previously defined record name
FILE= an existing data file.
This command will initialize the reading of a data file and will cause validation testing of each record on a line by line basis. If any errors are found the line will be printed along with error diagnostics.

```
/Validate
     SetCatch,SET=SetRecordName=u:fffffffff.ext,
             CATCH=CatchRecordName=u:fffffffff.ext/
     Lengths,LENGTH=LengthRecordName=u:ffffffff.ext,
             BIO=BioRecordName=u:ffffffff.ext,
             CATCH=CatchRecordName=u:ffffffff.ext/
     Regress,BIO=BioRecordName=u:ffffffff.ext,
             SPECIES=SpeciesRecordName=u:ffffffff.ext/
```

SetCatch
- Set Catch tests the of number species on Set = number species in Catch data. The program also compares the weight reported on the SET card with the sum of the weights reported on the catch cards. Note that the weight on the set card is in 10 kg. units while the catch is reported in kg. A pair of fuzz factors are defined as program constants to allow for legitimate variation. Requires that data be sorted by SET number.

Lengths
- Length measurements consistency test Bio and Length are consistent ie for any length Bio no is less than or equal to Length no and the total = what is recorded in the Catch data. Requires that data be sorted by SET no and SPECIES.

Regress
- perform regression test to validate

$$Length = a * Age ** b$$

and

$$Weight = a * Length ** b$$

relationships in the Biological data. The program has two predefined fuzz factors called RegFuzzFactor one for length and one for weight. These are set in the constants section which specifies the limits of acceptable variation as a ratio. At time of writing they were set to o.15 (15%) and 0.25 (25%). Measurements for the variables are in cm. for length, age in years and weight is in grams. Both files used in this analysis must be sorted by species.

Each test requires that the records be defined and that the appropriate data files exist. the following are the variable name and type requirements.

SetCatch

Set	SetNo,I	NoFish,I	NoInvert,I	WeightCat,R
Catch	SetNo,I	Species,I	NumberSp,I	WeightSp,R1

```
    Lengths
         Bio       SetNo,I  Species,I  RecordNo,I  Length,I
         Length    SetNo,I  Species,I  Grouping,I  StatrtLen,I
                   Len1,I (the first of 14 freq. measurements)
         Catch     SetNo,I  Species,I  Length,I

    Regress
         Bio     Species,I  Length,R   Age,R   Weight,R
         Species Species,I  a1,R b1,R  a2,R    b2,R
```

A N N O T A T E D E X A M P L E P R O G R A M

```
/VALUES
  VAL1,I(1,2,3,4,5,6)
  VAL2,C(1,2,4,5)
  SPECIES,I,FROM('SPECIES.DBA',1,2,1,4)
```

Three value items are defined here VAL1,VAL2 and SPECIES
VAL1 is of type I (integer) and the values associated with this name are 1,2,3,4,5,6
VAL2 is of type Character
SPECIES is of type I and is to be read from the file Species.DBA note that the species name is enclosed in quotation marks. Any string containing a separator character such a . , / ( ) must be in quotation marks for it to be recognized properly.

```
/RANGES
  1to31,I(1,31)
  1to12,I(1,12)
  Years,I(70,85)
  RAN1,I(1,3,5,7,12,15,19)
```

There are four range specifications 1to31 1to12 Years and Ran1. Note that serveral valid ranges may be specified as in Ran1. Note also that Ran1 will generate an error because the values are not all in low high pairs (1-3, 5-7, 12-15, and 19 which has no high value.

```
/VARLIST  NAME=BIODATA
  CRUISE,    2,4,C/
  STATION,   +,2,I/
  SETNO,     +,3,I/
  DATEDAY,   +,2,I,CHECKS=1TO31/
  DATEMON,   +,2,I,CHECKS=1TO12/
  DATEYR,    +,2,I,CHECKS=YEARS/
  ICNAFNAFO,+,3,I/
  EXPERIMENT,+,1,I/
  DEPTHGEAR ,+,3,I/
  TEMPGEAR  ,+,3,I/
  TIMEBEG,   +,3,I/
  BOTTOM,    +,1,I/
  SPECIES,   +,4,I,CHECKS=SPECIES/
```

This defines the record BIODATA. The variable Cruise starts in column 2 and is 4 characters long and is of type

Character. The next variable starts after Cruise indicated by the + for starting column.
The variables DATEDAY, DATEMON and DATEYR each have a Check associated with them. The variable SPECIES also has a check associated with it called SPECIES. Item names are kept in separate lists so that duplicate names may occur in a file list, and in the Value/Range list. As seen below names may be duplicated in several files.

```
/VARLIST  NAME=SETDATA, LINES=2
  CRUISE,    2,4,C/
  STATION,   +,2,I/
  SETNO,     +,3,I/
  DATEDAY,   2,6,2,I,CHECKS=1TO31/
  DATEMON,   +,2,I,CHECKS=1TO12/
  DATEYR,    +,2,I,CHECKS=YEARS/
```

This record is defined as having 2 lines. The definition of the items on the second line starts with DATEDAY, if there are three numeric parameters before the type specification then the first is the line number.

/PRINT VALUES FILES
Print a dump of the Value/Range definitionsas well as the Record/Variable definitions

/TEST NAME=BIODATA, FILE=RVP260B.NEW
Test the record BIODATA using data from the system File RVP260B.NEW. Note that the syntax of a file name is different here than what was used in the VALUES specification

/Close
Mark the end of this file. An End-Of-File will cause an implicit /CLOSE to be issued and this will appear on the listing. Lines appearing after a /CLOSE will be ignored.

S P E C I A L T E S T S E X A M P L E

```
/VALUES
  SPECIES,I,FROM('SPECIES.DBA',1,2,1,4)
/RANGES
  1to31,I(1,31)
  1to12,I(1,12)
  Years,I(70,85)
/VARLIST  Name=CATDATA
 NUMBERSP,     43,5,I/
 LENGTH,       56,4,I/
 SEX,          +,4,I/
 MATURITY,     +,3,I/
 WEIGHT,       +,3,I/
 OTOLITHS,     +,3,I/
 PARASITES,    +,3,I/
 STOMACH,      +,3,I/
 DUMMY,        +,1,C,checks=spNomeas/
/VARLIST  Name=SETDATA
 TIMEDUR,      24,2,R/
 SPEED,        29,3,R1/
 DISTANCE,     46,2,R1/
 DUMMY,        46,2,C,checks=spDistance/
/Test  Name=Setdata File=b:RVP260S.NEW
/Test  Name=Catdata File=b:RVP260C.NEW
/Close
```

The above example shows that the special test check must be made after the last required variable has been defined. Putting the Checks= on the same line as the definitions for DISTANCE or STOMACH respectively will result in the message that the variable is not defined and the test will be ignored.

V A L I D A T I O N T E S T E X A M P L E

****** Length and SetCatch test example ******

```
/VarList  Name=BioData
 SETNO,        9,2,I/ { Set No may be 2 or 3 depending on cruise}
 SPECIES,      31,4,I/
 RECORDNO,     35,1,I/
 LENGTH,       40,3,I/
/VARLIST  Name=SETDATA
 SETNO,        9,2,I/ {set no may be 2 or 3 depending on cruise}
 NOFISH,       71,2,I/
 NOINVERTS,    +,2,I/
 WEIGHTCAT,    +,4,R/
/VARLIST  Name=LENDATA
 SETNO,        9,2,I/  {note set no may be 2 or 3 depending on cruise}
 SPECIES,      21,4,I/
 NO_SAMPLED,   +,4,I/
 RECORDNO,     34,1,I/
 GROUPING,     +,1,I/
 STARTLEN,     +,3,I/
 LEN1,         +,3,I/
 LEN2,         +,3,I/
 LEN3,         +,3,I/
 LEN4,         +,3,I/
 LEN5,         +,3,I/
 LEN6,         +,3,I/
 LEN7,         +,3,I/
 LEN8,         +,3,I/
 LEN9,         +,3,I/
 LEN10,        +,3,I/
 LEN11,        +,3,I/
 LEN12,        +,3,I/
 LEN13,        +,3,I/
 LEN14,        +,3,I/
/VARLIST  Name=CATDATA
 SETNO,        9,2,I/ { note set no may be 2 or 3 depending on cruise}
 SPECIES,      39,4,I/
 NUMBERSP,     +,5,I/
 WEIGHTSP,     +,4,R1/
 LENGTH,       56,4,I/
/Print Files
/Validate
  Length,Lengths=Lendata='B:RVP260L.NEW',Catch=CatData='B:RVP260C.NEW',
         Bio=BioData='B:RVP260B.NEW'/
  SetCatch,Set=SetData='b:RVP260S.NEW',Catch=CatData='b:RVP260C.NEW'/
/Close
```

****** regression test example ******

```
/VALUES
  SPECIES,I,FROM('SPECIES.DBA',1,2,1,4)
/RANGES
  1to31,I(1,31)
  1to12,I(1,12)
  Years,I(70,85)
/Read  File=dcspecie.prg
/Read  file=dcbioin.prg
/SET  TESTWEIGHT=YES, TESTAGE=OFF
/Print Files
/Validate
  Regress,Bio=BioData='RVP260B.NEW',species=species='SPECIES.DBA'/
```

this example shows the variable lists being read in from files using the READ command
the SET command is used to select which of the regression tests is to be used - both may be run simultaneously.

contents of the READ files

```
/VARLIST  Name=species, Lines=2
 Species,     1,4,I/
 Divisor,     +,4,I/
 A1,          23,10,R/
 B1,          +,10,R/
 A2,          +,10,R/
 B2,          +,10,R/

/VarList  Name=BioData
 CARD_TYPE,    1,1,I/
 CRUISE,       +,4,C/
 STATION,      +,3,I/
 SET_NO,       +,2,I/ { Set No may be 2 or 3 depending on cruise}
 DATEDAY,      +,2,I/
 DATEMON,      +,2,I/
 DATEYR,       +,2,I/
 ICNAF_NAFO,   +,3,I/
 EXPERIMENT,   +,1,I/
 DEPTH_GEAR,   +,3,I/
 TEMP_GEAR,    +,3,I/
 TIME_BEG,     +,3,I/
 BOTTOM,       +,1,I/
 SPECIES,      +,4,I/  *
 RECORD_NO,    +,1,I/
 FISH_NO,      +,4,I/
 LENGTH,       +,3,R/  *
 SEX,          +,1,I/
 MATURITY,     +,1,I/
 WEIGHT,       +,5,R/  *
 STOMACH_CON,  +,1,I/
 ST_VOLUME,    +,5,I/
 ST_NO_SPEC,   +,2,I/
```

```
ST_PART,      +,2,I/
ST_SP_CODE,   +,4,I/
AGE_MATERIAL,+,1,I/
AGE_ANNULI,   +,2,I/
AGE_EDGE,     +,1,I/
AGE_CHECK,    +,3,I/
AGE,          +,2,R/  *
YEAR_CLASS,   +,2,I/
AGER,         +,1,I/
FREE,         +,2,I/
PARASITE,     +,3,I/
```

note that the variables necessary for the regression analysis have been marked with an * in the BIO file

U S A G E N O T E S

Regress - special files containing the regression coefficients for subgroups of species may be the best approach for partial analyses.

Processing line display - this display gives the line number of the file being processed. In those tests where more than one file is being accessed the display will flicker back and forth to the various line numbers.

Real number formats - this program should accept most Fortran compatible real number formats with the possible exception of numbers in E format.

Abnormal end of file - some problems may be encountered with the program detecting an end of file while processing a line. In this case the fix is to put an extra blank line at the end of the file in question. The message is FILE 'ffffff.ext' TOO SHORT. This message will also occur where a multiline file is short one line.

Upper Case - All Command input is converted to upper case prior to processing. It is assumed that no lower case values exist in the data.

Processing Speed - The speed at which lines of data are processed does not seem to be very dependant on the number of variables defined per line. In single file tests (eg: TEST command) approximatly 400 lines can be processed in one minute. With the multi file tests such as VALIDATE LENGTH the processing speed seems to be about 125 lines per minute on the longest file. Processing speed will be reduced as the number of errors encountered goes up because of the time required to format and produce the error report.

APPENDIX III

Sample program output for data analysis programs.

Output from the program **BIOFREQ:** frequencies by strata of parameters of measured fish.

```
R earch V essel AN alysis   BIOFREQ          pgm ver:3.0  01/07/8
Bio Data Frequency Dist. by Stratum          dat ver:1.20

For Cruise(s)  H172 (1987)
For Species    0012    White Hake
Run by TH                                    Date 10/ 2/89   13:20
                                             Page   1 of   1

Experiment Type(s) 1,2,3
For sex codes  ALL

For variable MATURITY
```

Stratum	433		437		438		439		ALL	
No. Sets	1		5		1		3		10	
CODE	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
1	1	100.0	26	24.5	2	100.0	14	13.2	43	20.0
2	0	0.0	20	18.9	0	0.0	13	12.3	33	15.3
4	0	0.0	7	6.6	0	0.0	34	32.1	41	19.1
5	0	0.0	0	0.0	0	0.0	3	2.8	3	1.4
6	0	0.0	0	0.0	0	0.0	21	19.8	21	9.8
8	0	0.0	53	50.0	0	0.0	21	19.8	74	34.4
TOTAL	1		106		2		106		215	

```
new page...

R earch V essel AN alysis   BIOFREQ          pgm ver:3.0  01/07/8
Bio Data Frequency Dist. by Stratum          dat ver:1.20

For Cruise(s)  H172 (1987)
For Species    0012    White Hake
Run by TH                                    Date 10/ 2/89   13:20
                                             Page   1 of   2

Experiment Type(s) 1,2,3
For sex codes  ALL

For variable WEIGHT          x 1 Kg
```

Stratum	433		437		438		439		ALL	
No. Sets	1		5		1		3		10	
CODE	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
0.0	1	100.0	16	15.1	1	50.0	0	0.0	18	8.4
0.1	0	0.0	26	24.5	1	50.0	3	2.8	30	14.0
0.2	0	0.0	7	6.6	0	0.0	2	1.9	9	4.2
0.3	0	0.0	8	7.5	0	0.0	0	0.0	8	3.7
0.4	0	0.0	5	4.7	0	0.0	4	3.8	9	4.2
0.5	0	0.0	7	6.6	0	0.0	3	2.8	10	4.7
0.6	0	0.0	3	2.8	0	0.0	2	1.9	5	2.3

0.7	0	0.0	0	0.0	0	0.0	3	2.8	3	1.4
0.8	0	0.0	1	0.9	0	0.0	4	3.8	5	2.3
0.9	0	0.0	3	2.8	0	0.0	6	5.7	9	4.2
1.0	0	0.0	4	3.8	0	0.0	3	2.8	7	3.3
.										
. sample file										
.										
6.0	0	0.0	1	0.9	0	0.0	0	0.0	1	0.5
6.4	0	0.0	1	0.9	0	0.0	0	0.0	1	0.5
6.9	0	0.0	0	0.0	0	0.0	1	0.9	1	0.5
7.5	0	0.0	1	0.9	0	0.0	0	0.0	1	0.5
7.8	0	0.0	1	0.9	0	0.0	0	0.0	1	0.5
7.9	0	0.0	0	0.0	0	0.0	1	0.9	1	0.5
8.3	0	0.0	0	0.0	0	0.0	2	1.9	2	0.9
9.8	0	0.0	0	0.0	0	0.0	1	0.9	1	0.5
10.2	0	0.0	1	0.9	0	0.0	0	0.0	1	0.5
TOTAL	1		106		2		106		215	

Listing files such as these can be made for maturity, age, length and weight. At the same time, data files of X-Y pairs can be made of length and weight or length and age.

The X-Y for length and weight for white hake cruise H172, all sexes, and experiment types 1,2, and 3 follows:

```
 Cruise H172 Species 0012 Sex Codes *          Experiment 1,2,3
021,00048
068,02100
019,00046
049,01100
023,00070
077,04500
080,04500
067,02500
072,03700
056,01700
062,02200
071,03300
085,07500
029,00040
052,01500
051,01500
088,06000
 .
 . sample file
 .
056,01400
030,00175
024,00100
023,00075
022,00050
018,00025
```

Output from the program **DataLst:** various character based reports.

R esearch V essel AN alysis DATALST pgm ver:1.11 30/12/88
R E P O R T:Set:Physical Parameters dat ver:1.20

For Cruise(s) H172 (1987)

Run by TH Date 10/ 2/89 9:16
Page 1

Experiment Type(s) 1,2,3
For sex codes ALL

STRAT	SET	DATE DD/MM	NAFO	EXP	GEAR	AUX	SPD	OBT	DIST	SRCE	TIME BEG	TIME DUR	DEPTH	DEPTH RAN
403	050	19/05	432	2	WIIA	RCLL	035	LOG	16	LORAN	0905	30	031	02
403	051	19/05	432	2	WIIA	RCLL	035	LOG	15	LORAN	1020	30	036	01
432	054	23/05	433	2	WIIA	RCLL	035	LOG	16	LORAN	0959	30	044	03
432	055	23/05	433	2	WIIA	RCLL	035	LOG	18	LORAN	1242	30	030	04
433	056	19/05	432	2	WIIA	RCLL	035	LOG	16	LORAN	1305	30	039	04
433	057	19/05	432	2	WIIA	RCLL	035	LOG	19	LORAN	1435	30	032	00
433	058	23/05	432	2	WIIA	RCLL	035	LOG	14	LORAN	0731	30	021	01
434	059	22/05	432	2	WIIA	RCLL	035	LOG	15	LORAN	1805	30	064	03
434	060	22/05	432	2	WIIA	RCLL	035	LOG	18	LORAN	1457	30	058	03
434	061	20/05	432	2	WIIA	RCLL	035	LOG	15	LORAN	0636	30	053	02
435	062	22/05	431	2	WIIA	RCLL	035	LOG	16	LORAN	1120	30	032	02
435	063	21/05	431	2	WIIA	RCLL	035	LOG	15	LORAN	0745	30	027	02
436	064	22/05	431	2	WIIA	RCLL	035	LOG	16	LORAN	0728	30	058	03
436	065	20/05	431	2	WIIA	RCLL	035	LOG	16	LORAN	1837	30	067	05
436	066	21/05	431	2	WIIA	RCLL	035	LOG	16	LORAN	0919	30	058	05
437	067	20/05	432	2	WIIA	RCLL	035	LOG	16	LORAN	0830	30	107	03
437	068	20/05	432	2	WIIA	RCLL	035	LOG	15	LORAN	1035	30	145	06
437	069	20/05	431	2	WIIA	RCLL	035	LOG	18	LORAN	1253	30	178	07
438	070	21/05	431	2	WIIA	RCLL	035	LOG	15	LORAN	1938	30	107	04
438	071	21/05	431	2	WIIA	RCLL	035	LOG	19	LORAN	1430	30	117	17
439	072	20/05	431	2	WIIA	RCLL	035	LOG	16	LORAN	1615	30	267	22
439	073	21/05	431	2	WIIA	RCLL	035	LOG	18	LORAN	1616	30	314	14
433	081	19/05	432	2	WIIA	RCLL	035	LOG	16	LORAN	1940	30	052	01
433	082	19/05	432	2	WIIA	RCLL	035	LOG	17	LORAN	2118	30	051	01
434	110	20/05	432	2	WIIA	RCLL	035	LOG	18	LORAN	0205	30	067	00
434	111	20/05	432	2	WIIA	RCLL	035	LOG	19	LORAN	0020	30	066	00
.														
. sample file														
.														
438	135	20/05	431	2	WIIA	RCLL	035	LOG	15	LORAN	2258	30	164	05
436	136	21/05	431	2	WIIA	RCLL	035	LOG	19	LORAN	0345	30	059	07
439	137	20/05	431	2	WIIA	RCLL	035	LOG	16	LORAN	2044	30	298	28
436	138	21/05	431	2	WIIA	RCLL	035	LOG	16	LORAN	2117	30	061	02
437	139	21/05	431	2	WIIA	RCLL	035	LOG	15	LORAN	2311	30	175	11
437	140	22/05	431	2	WIIA	RCLL	035	LOG	18	LORAN	0118	30	104	06
434	141	22/05	432	2	WIIA	RCLL	035	LOG	18	LORAN	1630	30	061	01
433	142	22/05	432	2	WIIA	RCLL	035	LOG	16	LORAN	2302	30	034	01
433	143	23/05	432	2	WIIA	RCLL	035	LOG	18	LORAN	0319	30	037	01
433	158	19/05	432	2	WIIA	RCLL	035	LOG	14	LORAN	1704	30	033	01

R esearch V essel AN alysis

R esearch V essel AN alysis DATALST pgm ver:1.11 30/12/88
R E P O R T:Set:Bio/Environ Parameters dat ver:1.20

For Cruise(s) H172 (1987)

Run by TH . Date 10/ 2/89 9:16
Page 2

Experiment Type(s) 1,2,3
For sex codes ALL

SET	DATE	TIME BEG	LAT	LONG	DPTH	WIND DIR	WIND FOR	TIDE	TMP SUR	TMP BOT	SAL BOT	BOT TYP	LGHT	INV #SP	FISH #SP	CAT WGHT
050	19/05	0905	4546	6138	031	W	02	UNWN	051	-13	999	CLAY	999	04	10	0007
051	19/05	1020	4550	6141	036	N	03	UNWN	046	-10	999	CLAY	999	04	10	0025
054	23/05	0959	4557	6232	044	NE	03	UNWN	050	-05	999	SANDC	999	06	12	0023
055	23/05	1242	4555	6302	030	NW	04	UNWN	057	020	999	CLAY	999	04	10	0026
056	19/05	1305	4600	6209	039	W	02	UNWN	048	-07	999	CLAY	999	07	08	0025
057	19/05	1435	4553	6214	032	E	UNK	UNWN	045	-08	999	CLAY	999	09	10	0008
058	23/05	0731	4608	6218	021	N	01	UNWN	048	017	999	GRAVL	999	03	10	0326
059	22/05	1805	4634	6114	064	SW	02	UNWN	049	-13	999	SANDF	999	04	08	0436
060	22/05	1457	4635	6142	058	SW	04	UNWN	041	-14	999	SANDC	999	10	09	0014
061	20/05	0636	4657	6120	053	NW	02	BOW	026	-03	999	SANDF	999	06	04	0669
062	22/05	1120	4708	6150	032	SW	04	UNWN	035	-06	999	GRAVL	999	08	07	0304
063	21/05	0745	4747	6109	027	W	03	UNWN	046	028	999	SANDC	999	07	08	0034
064	22/05	0728	4720	6057	058	SW	05	UNWN	043	-01	999	SANDF	999	07	07	0095
065	20/05	1837	4720	6027	067	SW	04	UNWN	035	003	999	SANDF	999	05	06	0059
066	21/05	0919	4747	6057	058	W	03	UNWN	036	-08	999	SANDF	999	02	07	0035
067	20/05	0830	4656	6058	107	N	03	UNWN	035	014	999	CLAY	999	06	07	0253
068	20/05	1035	4659	6044	145	W	03	UNWN	045	034	999	SANDC	999	05	14	1205
069	20/05	1253	4709	6024	178	W	06	UNWN	029	999	999	CLAY	999	04	15	0720
070	21/05	1938	4726	6030	107	SW	03	UNWN	040	015	999	SANDF	999	01	08	0223
071	21/05	1430	4757	6057	117	SW	04	UNWN	041	005	999	SANDF	999	03	06	0084
072	20/05	1615	4718	6011	267	W	07	UNWN	026	999	999	CLAY	999	06	11	0444
073	21/05	1616	4756	6047	314	SW	05	UNWN	037	999	999	CLAY	999	05	09	1172
081	19/05	1940	4607	6144	052	NE	02	STAR	047	-10	999	CLAY	999	04	07	0024
082	19/05	2118	4616	6132	051	N	02	PORT	047	-14	999	CLAY	999	07	11	0058
110	20/05	0205	4643	6139	067	W	04	UNWN	026	-05	999	SANDC	999	06	09	0216
111	20/05	0020	4644	6127	066	NW	04	UNWN	028	999	999	SANDF	999	09	08	0615
112	22/05	2115	4620	6149	045	SW	02	UNWN	051	-14	999	SANDF	999	06	06	0130
113	23/05	0100	4607	6159	038	N	04	UNWN	052	-02	999	GRAVL	999	10	10	0039
130	20/05	0436	4701	6133	035	W	04	UNWN	028	-04	999	GRAVL	999	08	07	0248
131	22/05	0309	4705	6111	051	S	06	UNWN	038	-12	999	SANDF	999	09	06	0173
132	22/05	0513	4717	6124	034	SW	05	UNWN	027	001	999	SANDF	999	05	08	0221
134	21/05	0556	4737	6103	034	W	02	UNWN	034	020	999	SANDC	999	04	07	0090
135	20/05	2258	4741	6034	164	SW	04	UNWN	034	999	999	CLAY	999	03	10	0176
136	21/05	0345	4736	6043	059	SW	05	UNWN	034	-07	999	SANDF	999	06	09	0119
137	20/05	2044	4730	6024	298	SW	04	UNWN	035	999	999	CLAY	999	01	07	0111
138	21/05	2117	4720	6039	061	SW	03	UNWN	044	-03	999	SANDF	999	05	05	0034
139	21/05	2311	4709	6038	175	SW	05	UNWN	040	999	999	SANDF	999	11	14	0215
140	22/05	0118	4704	6055	104	S	07	UNWN	032	014	999	CLAY	999	06	13	0277
141	22/05	1630	4631	6127	061	S	04	UNWN	052	-09	999	SANDF	999	07	10	0533
142	22/05	2302	4619	6208	034	W	03	UNWN	050	013	999	CLAY	999	07	08	0101
143	23/05	0319	4601	6208	037	NW	04	UNWN	054	-13	999	CLAY	999	06	11	0025
158	19/05	1704	4609	6210	033	N	05	UNWN	042	-14	999	GRAVL	999	09	11	0056

R esearch V essel AN alysis

The following is a sample of the general catch report, ie. includes all species.

R esearch V essel AN alysis DATALST pgm ver:1.11 30/12/88
R E P O R T:Catch dat ver:1.20

For Cruise(s) H172 (1987)
Con't from Species 9999 UNKNOWN
Run by TH Date 10/ 2/89 10: 0
Page 1

Experiment Type(s) 1,2,3
For sex codes ALL

STRA	SET	DATE DD/MM	SPECIES	EXP	NUM SP	WEIGHT SP	BASK SP	LEN	SEX	MAT	WEIGHT	OTOL	PRSTS	STOM
403	050	19/05	COD - A	2	00001	0001	00.1	0001	0001	001	001	001	000	000
403	050	19/05	PLA	2	00005	00.5	00.1	0005	0005	004	004	000	000	000
403	050	19/05	FLW	2	00003	00.5	00.1	0003	0003	003	003	000	000	000
403	050	19/05	HER	2	00023	0001	00.1	0023	0006	000	006	000	000	000
403	050	19/05	CAP	2	00002	00.1	00.1	0002	0001	000	001	000	000	000
403	050	19/05	BRILL	2	00003	0.01	00.1	0003	0000	003	003	000	000	000
403	050	19/05	W-SKA	2	00001	0002	00.1	0001	0001	000	001	000	000	000
403	050	19/05	L-SCU	2	00001	00.5	00.1	0001	0000	000	001	000	000	000
403	050	19/05	LUMPFIS	2	00001	0001	00.1	0001	0000	000	001	000	000	000
403	050	19/05	SNAKEBL	2	00001	00.1	00.1	0001	0000	000	001	000	000	000
403	050	19/05	SNO-CRA	2	00001	00.1	00.1	0000	0000	000	000	000	000	000
403	050	19/05	LBA	2	00006	0002	00.1	0000	0000	000	000	000	000	000
403	050	19/05	STARFIS	2	00014	0001	00.1	0000	0000	000	000	000	000	000
403	050	19/05	UNKNOWN	2	00000	0002	00.1	0000	0000	000	000	000	000	000
403	051	19/05	COD - A	2	00011	0011	00.5	0011	0008	008	008	000	000	000
403	051	19/05	PLA	2	00042	0006	00.2	0042	0042	024	024	000	000	000
403	051	19/05	YEL	2	00002	0001	00.1	0002	0002	002	002	000	000	000
403	051	19/05	FLW	2	00004	0001	00.1	0004	0004	002	002	000	000	000
403	051	19/05	HER	2	00007	0001	00.1	0007	0004	001	004	000	000	000
403	051	19/05	CAP	2	00016	0001	00.1	0016	0004	004	004	000	000	000
403	051	19/05	BRILL	2	00003	00.1	00.1	0003	0002	003	003	000	000	000
403	051	19/05	W-SKA	2	00001	0002	00.1	0001	0001	000	001	000	000	000
403	051	19/05	L-SCU	2	00003	0001	00.1	0003	0002	001	002	000	000	000
403	051	19/05	O-POUT	2	00002	0001	00.1	0002	0002	000	002	000	000	000
403	051	19/05	SNO-CRA	2	00077	0010	00.8	0000	0000	000	000	000	000	000
403	051	19/05	LBA	2	00001	0001	00.1	0000	0000	000	000	000	000	000
403	051	19/05	SEA MOU	2	00002	00.1	00.1	0000	0000	000	000	000	000	000
403	051	19/05	BRITTLE	2	00000	06.0	00.5	0000	0000	000	000	000	000	000
. sample file														
433	143	23/05	FLW	2	00006	0003	00.1	0006	0006	006	006	000	000	000
433	143	23/05	4 B RCK	2	00001	0.75	00.1	0001	0001	001	001	000	000	000
433	143	23/05	BRILL	2	00004	.530	00.1	0004	0004	004	003	000	000	000
433	143	23/05	W-SKA	2	00004	0002	00.1	0004	0004	000	004	000	000	000
433	143	23/05	L-SCU	2	00005	0001	00.1	0005	0005	005	005	000	000	000
433	143	23/05	SEA RAV	2	00002	0002	00.1	0002	0002	000	002	000	000	000
433	143	23/05	SNAKEBL	2	00003	.145	00.1	0003	0003	003	003	000	000	000

433	143	23/05	O-POUT	2	00006	0003	00.1	0006	0005	005	005	000	000	000
433	143	23/05	CRK	2	00002	0.15	00.1	0000	0000	000	000	000	000	000
433	143	23/05	T-CRAB	2	00005	0.47	00.1	0000	0000	000	000	000	000	000
433	143	23/05	LBA	2	00007	0004	00.2	0000	0000	000	000	000	000	000
433	143	23/05	SEA MOU	2	00080	0002	00.1	0000	0000	000	000	000	000	000
433	143	23/05	ECHINOD	2	00000	0008	00.4	0000	0000	000	000	000	000	000
433	143	23/05	SUNSTAR	2	00027	0002	00.1	0000	0000	000	000	000	000	000
433	158	19/05	COD - A	2	00044	0040	01.3	0044	0020	020	020	002	000	000
433	158	19/05	PLA	2	00026	0005	00.2	0026	0026	016	016	000	000	000
433	158	19/05	YEL	2	00002	0001	00.1	0002	0002	002	002	000	000	000
433	158	19/05	FLW	2	00016	0003	00.1	0016	0016	012	012	000	000	000
433	158	19/05	HER	2	00001	0.01	00.1	0001	0001	000	001	000	000	000
433	158	19/05	CAP	2	00003	0.03	00.1	0003	0003	000	003	000	000	000
433	158	19/05	W-SKA	2	00005	03.5	00.1	0005	0005	000	005	000	000	000
433	158	19/05	L-SCU	2	00007	01.5	00.1	0007	0005	000	005	000	000	000
433	158	19/05	SEA RAV	2	00001	0001	00.1	0001	0001	000	001	000	000	000
433	158	19/05	ALLIGAT	2	00002	.005	00.1	0002	0000	000	002	000	000	000
433	158	19/05	O-POUT	2	00002	0001	00.1	0002	0002	000	002	000	000	000
433	158	19/05	CRK	2	00005	0001	00.1	0000	0000	000	000	000	000	000
433	158	19/05	T-CRAB	2	00008	0001	00.1	0000	0000	000	000	000	000	000
433	158	19/05	LBA	2	00039	0014	0001	0000	0000	000	000	000	000	000
433	158	19/05	SEA MOU	2	00002	00.1	00.1	0000	0000	000	000	000	000	000
433	158	19/05	EGG-BUC	2	00002	00.1	00.1	0000	0000	000	000	000	000	000

next page ...

R esearch V essel AN alysis DATALST pgm ver:1.11 30/12/88
R E P O R T:Catch dat ver:1.20

For Cruise(s) H172 (1987)
Con't from Species 4211 EGG-BUC
Run by TH Date 10/ 2/89 10: 0
Page 24

Experiment Type(s) 1,2,3
For sex codes ALL

STRA	SET	DATE DD/MM	SPECIES	EXP	NUM SP	WEIGHT SP	BASK SP	LEN	SEX	MAT	WEIGHT	OTOL	PRSTS	STOM
433	158	19/05	SUNSTAR	2	00020	0003	00.2	0000	0000	000	000	000	000	000
433	158	19/05	URC	2	00018	00.1	00.1	0000	0000	000	000	000	000	000
433	158	19/05	SEA CUC	2	00002	00.5	00.1	0000	0000	000	000	000	000	000
433	158	19/05	ALGAE/S	2	00000	0002	00.2	0000	0000	000	000	000	000	000

R esearch V essel AN alysis

The following is a subset catch report for American plaice only.

R esearch V essel AN alysis DATALST pgm ver:1.11 30/12/88
R E P O R T:Catch dat ver:1.20

For Cruise(s) H172 (1987)
Subset for Species 0040 American Plaice
Run by TH Date 10/ 2/89 9:40
Page 1

Experiment Type(s) 1,2,3
For sex codes ALL

STRA	SET	DATE DD/MM	SPECIES	EXP	NUM SP	WEIGHT SP	BASK SP	LEN	SEX	MAT	WEIGHT	OTOL	PRSTS	STOM
403	050	19/05	PLA	2	00005	00.5	00.1	0005	0005	004	004	000	000	000
403	051	19/05	PLA	2	00042	0006	00.2	0042	0042	024	024	000	000	000
432	054	19/05	PLA	2	00004	0001	00.1	0004	0004	003	003	000	000	000
432	055	19/05	PLA	2	00006	0001	00.1	0006	0006	006	006	000	000	000
433	056	19/05	PLA	2	00016	0002	00.1	0016	0016	014	014	000	000	000
433	057	19/05	PLA	2	00011	0002	00.1	0011	0011	008	008	000	000	000
433	058	19/05	PLA	2	00022	0003	00.1	0022	0022	014	014	000	000	000

. sample file

436	136	19/05	PLA	2	00060	0020	00.6	0060	0060	036	036	000	000	000
436	138	19/05	PLA	2	00037	0016	00.5	0037	0037	023	023	000	000	000
437	139	19/05	PLA	2	00008	0001	00.1	0008	0008	007	007	000	000	000

next page ...

R esearch V essel AN alysis DATALST pgm ver:1.11 30/12/88
R E P O R T:Catch dat ver:1.20

For Cruise(s) H172 (1987)
Subset for Species 0040 American Plaice
Run by TH Date 10/ 2/89 9:40
Page 2
Experiment Type(s) 1,2,3
For sex codes ALL

STRA	SET	DATE DD/MM	SPECIES	EXP	NUM SP	WEIGHT SP	BASK SP	LEN	SEX	MAT	WEIGHT	OTOL	PRSTS	STOM
437	140	19/05	PLA	2	00196	0038	01.0	0196	0196	054	054	000	000	000
433	142	19/05	PLA	2	00387	0034	01.2	0262	0262	046	046	000	000	000
433	143	19/05	PLA	2	00055	0006	00.2	0055	0055	032	032	000	000	000
433	158	19/05	PLA	2	00026	0005	00.2	0026	0026	016	016	000	000	000

R esearch V essel AN alysis

The following is a sample of the subset length report, ie. includes only winter skate.

R esearch V essel AN alysis DATALST pgm ver:1.11 30/12/88
R E P O R T:Length dat ver:1.20

For Cruise(s) H172 (1987)
Subset for Species 0204 Winter Skate
Run by TH Date 10/ 2/89 10:48
Page 1

Experiment Type(s) 1,2,3
For sex codes ALL

STRAT	SET	DATE DD/MM	SPECIES	SEX	START LEN	GROUP	INT	RATIO	NO. SAMP	#in LF on Rec	#Caught on Rec
403	050	19/05	W-SKA	M	050	1	1	1.00	0001	1	1.00
					TOTAL					1	1.00
403	051	19/05	W-SKA	F	050	1	1	1.00	0001	1	1.00
					TOTAL					1	1.00
432	055	19/05	W-SKA	F	040	1	1	1.00	0001	1	1.00
					TOTAL					1	1.00
433	057	19/05	W-SKA	M	020	1	1	1.00	0001	1	1.00
					TOTAL					1	1.00
433	058	19/05	W-SKA	M	020	1	1	1.00	0003	1	1.00
433	058	19/05	W-SKA	M	030	1	1	1.00	0003	1	1.00
433	058	19/05	W-SKA	M	050	1	1	1.00	0003	1	1.00
433	058	19/05	W-SKA	F	050	1	1	1.00	0001	1	1.00
					TOTAL					4	4.00
434	059	19/05	W-SKA	F	040	1	1	1.00	0001	1	1.00
					TOTAL					1	1.00
434	060	19/05	W-SKA	C	030	1	1	1.00	0007	4	4.00
434	060	19/05	W-SKA	C	040	1	1	1.00	0007	2	2.00
434	060	19/05	W-SKA	C	050	1	1	1.00	0007	1	1.00
					TOTAL					7	7.00
. sample file											
433	158	19/05	W-SKA	M	030	1	1	1.00	0001	1	1.00
433	158	19/05	W-SKA	F	040	1	1	1.00	0004	4	4.00
					TOTAL					5	5.00

R esearch V essel AN alysis

The following is a sample of the detailed biological report, ie. includes all details of one species, Atlantic sea raven.

R esearch V essel AN alysis DATALST pgm ver:1.11 30/12/88
R E P O R T:Biological--DETAILED dat ver:1.20

For Cruise(s) H172 (1987)
Subset for Species 0320 Atlantic Sea Raven
Run by TH Date 10/ 2/89 11:45
Page 2

Experiment Type(s) 1,2,3
For sex codes ALL

STRAT	SET	DATE	SPECIES	NUMBER	LENGTH	WEIGHT	SEX	MAT	AGE	YEAR	DFN
432	054	23/05	SEA RAV	0000	041	01650	F	NO	99	00	N
432	054	23/05	SEA RAV	0000	036	00850	F	NO	99	00	N
432	054	23/05	SEA RAV	0000	030	00700	M	NO	99	00	N
432	054	23/05	SEA RAV	0000	032	00700	M	NO	99	00	N
433	058	23/05	SEA RAV	0000	028	00700	F	NO	99	00	N
433	058	23/05	SEA RAV	0000	026	00500	F	NO	99	00	N
434	059	22/05	SEA RAV	0000	028	00450	F	NO	99	00	N
434	060	22/05	SEA RAV	0000	033	00800	F	NO	99	00	N
434	061	20/05	SEA RAV	0000	030	01000	F	NO	99	00	N
434	061	20/05	SEA RAV	0000	038	01350	F	NO	99	00	N
434	061	20/05	SEA RAV	0000	043	01200	M	NO	99	00	N
434	061	20/05	SEA RAV	0000	034	01250	F	NO	99	00	N
435	062	22/05	SEA RAV	0000	032	00470	M	NR	99	00	N
435	062	22/05	SEA RAV	0000	041	01200	M	R	99	00	N
435	063	21/05	SEA RAV	0000	031	00580	F	R	99	00	N
436	064	22/05	SEA RAV	0000	037	00900	M	NO	99	00	N
436	064	22/05	SEA RAV	0000	038	01150	F	NO	99	00	N
436	066	21/05	SEA RAV	0000	039	01700	F	R	99	00	N

. sample file

434	141	22/05	SEA RAV	0000	036	01000	F	NO	99	00	N
434	141	22/05	SEA RAV	0000	039	01400	F	NO	99	00	N
433	143	23/05	SEA RAV	0000	031	00700	M	NO	99	00	N
433	143	23/05	SEA RAV	0000	034	01000	F	NO	99	00	N
433	158	19/05	SEA RAV	0000	028	00530	M	NO	99	00	N

The following is a sample of the summary biological report, ie. includes a 'table of contents' of one species.

R esearch V essel AN alysis DATALST pgm ver:1.11 30/12/88
R E P O R T:Biological--SUMMARY dat ver:1.20

For Cruise(s) H172 (1987)
Subset for Species 0501 Lumpfish
Run by TH

Date 10/ 2/89 11:54
Page 1

Experiment Type(s) 1,2,3
For sex codes ALL

STRAT	SET	DATE	SPECIES	#OBSERVED
403	050	19/05	LUMPFISH	1
432	054	23/05	LUMPFISH	1
435	063	21/05	LUMPFISH	3
436	064	22/05	LUMPFISH	1
436	065	20/05	LUMPFISH	2
436	066	21/05	LUMPFISH	2
437	068	20/05	LUMPFISH	1
438	071	21/05	LUMPFISH	2
433	081	19/05	LUMPFISH	1
435	134	21/05	LUMPFISH	1

DataLst can also produce a file of set by set location coordinates (longitude and latitude) and the number of fish in a length range of a species. This file is for use with the program AtlMap and follows the format below.

N073 White Hake . Length = 5 to 30cm
nos

-61.63333	45.73333	0.0
-61.68333	45.83333	0.0
-62.16667	46.00000	0.0
-62.25000	45.86667	0.0
-61.26667	46.53333	1.0
-61.68333	46.60000	0.0
-61.28333	46.93333	0.0
-60.95000	46.95000	4.0
-60.76667	46.96667	75.0
-60.40000	47.13333	6.0
-60.51667	47.51667	0.0
-60.23333	47.28333	7.0
-61.70000	46.13333	0.0
-61.53333	46.28333	2.0
-61.45000	46.73333	0.0
-61.85000	46.31667	0.0
-61.98333	46.11667	0.0
-60.60000	47.68333	0.0
-60.68333	47.63333	0.0
-60.36667	47.53333	18.0

Note the longitudes are negative as the convention states Longitudes west of Greenwich and Latitudes south of the equator are negative. All coordinates are in decimals of degrees, ie. 0.50 degrees is 30 minutes.

Output from the program **CatStat:** abundance index for a year with individual strata estimates.

R esearch V essel AN alysis CATSTAT pgm ver:2.41 26 may 1988
Abundance Estimates / Numbers & Weight dat ver:1.20

For Cruise(s) H172 (1987)
For Species 0012 White Hake
Run by TH Date 10/ 2/89 13:52
Page 1

Experiment Type(s) 1 2
Transformation options Weight = None Numbers = None

Strat	Set	# Sets	Weight...of....Fish Abs	Std	Stratum	Number...of....Fish Abs	Std	Stratum
403	050		0	0.0	0	0	0.0	0
	051		0	0.0	0	0	0.0	0
	mean	2	0	0.0	0	0	0.0	0
	SD		0	0.0	0	0	0.0	0
432	054		0	0.0	0	0	0.0	0
	055		0	0.0	0	0	0.0	0
	mean	2	0	0.0	0	0	0.0	0
	SD		0	0.0	0	0	0.0	0
433	056		0	0.0	0	0	0.0	0
	057		0	0.0	0	0	0.0	0
	058		0	0.1	12589	1	1.3	125892
	081		0	0.0	0	0	0.0	0
	082		0	0.0	0	0	0.0	0
	112		0	0.0	0	0	0.0	0
	113		0	0.0	0	0	0.0	0
	142		0	0.0	0	0	0.0	0
	143		0	0.0	0	0	0.0	0
	158		0	0.0	0	0	0.0	0
	mean	10	0	0.0	1259	0	0.1	12589
	SD		0	0.0	3981	0	0.4	39811
.								
. sample file								
.								
435	062		0	0.0	0	0	0.0	0
	063		0	0.0	0	0	0.0	0
	130		0	0.0	0	0	0.0	0
	132		0	0.0	0	0	0.0	0
	134		0	0.0	0	0	0.0	0
	mean	5	0	0.0	0	0	0.0	0
	SD		0	0.0	0	0	0.0	0
436	064		0	0.0	0	0	0.0	0
	065		0	0.0	0	0	0.0	0
	066		0	0.0	0	0	0.0	0
	136		0	0.0	0	0	0.0	0
	138		0	0.0	0	0	0.0	0
	mean	5	0	0.0	0	0	0.0	0
	SD		0	0.0	0	0	0.0	0

R esearch V essel AN alysis CATSTAT pgm ver:2.41 26 may 1988
Abundance Estimates / Numbers & Weight dat ver:1.20

For Cruise(s) H172 (1987)
For Species 0012 White Hake
Run by TH Date 10/ 2/89 13:52
Page 2

Experiment Type(s) 1 2
Transformation options Weight = None Numbers = None

Strat	Set	# Sets	Weight...of....Fish Abs	Std	Stratum	Number...of....Fish Abs	Std	Stratum
437	067		3	3.3	137695	2	2.2	91796
	068		41	47.8	2007283	15	17.5	734372
	069		208	202.2	8486076	374	363.6	15258618
	139		86	100.3	4210399	1133	1321.8	55469565
	140		4	3.9	163194	7	6.8	285589
	mean	5	68	71.5	3000930	306	342.4	14367988
	SD		85	83.2	3492415	489	568.7	23864890
438	070		0	0.0	0	0	0.0	0
	071		0	0.0	0	0	0.0	0
	135		1	0.6	8308	2	2.3	33232
	mean	3	0	0.2	2769	1	0.8	11077
	SD		0	0.3	4797	1	1.3	19187
439	072		216	236.3	7070000	112	122.5	3665926
	073		414	402.5	12045184	257	249.9	7477325
	137		53	58.0	1734768	29	31.7	949213
	mean	3	228	232.2	6949984	133	134.7	4030821
	SD		181	172.3	5156256	115	109.6	3279317
TOTAL								
No. Sets	42	Tot Cat	1026		9954942	Tot Cat	1932	18422476
Total SD			266		8657448		606	27203205
No. Strata	9	Avg/Set(w)	25.1(21.6)			Avg/Set(w)	50.5(40.0)	
Miss.strata	17	:70.02% area			33202098	<corrected>		61443337

Notes: Tot Cat 1026 is the total number of individuals of that species caught under the requested conditions of the above output.

Avg/Set(w) 25.1(21.6) is the mean number of individuals caught per tow, the round brackets give the same estimate weighted by stratum area.

Miss.Strata 17 :70.02% this lists the number of strata not surveyed from the list in the file STRATA.DAT, corrected estimates of the survey population are given assuming the unsurveyed area comprises the same population as the surveyed area.

Output from the program **MALKey2:** catch at age of sampled fish, survey catch, and total Gulf population estimates. Included in these tables are the mean length and weights for fish in each table.

R esearch V essel AN alysis MALKEY2 Pgm ver:3.6 08/06/89
Age/Maturity Length Key Statistics Dat ver:1.01

Page 1 of 3
Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
Length data from Cruise P188 (1977) Avg wt and len from mean of fish sampled for age [L.Freq.] 1

Experiment type : [Key] 1,2
For Species 0012 White Hake
For sex codes ALL
For variable LENGTH Absolute Frequencies

Age	01	02	03	04	05	06	07	08	09
LENGTH	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.
013	0	1	0	0	0	0	0	0	0
022	1	1	0	0	0	0	0	0	0
025	1	1	0	0	0	0	0	0	0
028	0	2	1	0	0	0	0	0	0
031	0	4	0	0	0	0	0	0	0
034	0	4	13	1	0	0	0	0	0
037	0	3	9	6	0	0	0	0	0
040	0	1	12	7	1	0	0	0	0
043	0	0	5	17	0	0	0	0	0
046	0	0	3	18	4	1	0	0	0
049	0	0	0	7	5	0	0	0	0
052	0	0	1	8	4	2	1	0	0
055	0	0	2	2	3	3	1	0	0
058	0	0	0	1	8	0	4	0	0
061	0	0	1	0	0	2	0	1	0
064	0	0	0	0	1	3	3	1	0
067	0	0	0	0	1	0	0	0	1
070	0	0	0	0	1	0	0	0	0
073	0	0	0	0	0	1	1	1	1
088	0	0	0	0	0	0	0	0	0
091	0	0	0	0	0	0	0	0	1
103	0	0	0	0	0	0	0	0	0
TOTAL	2	17	47	67	28	12	10	3	3
Avg Len	22.5	31.2	39.8	45.0	54.0	58.8	60.2	66.7	77.0
Avg wt g	88	267	511	730	1288	1648	1685	2467	4333
% Sex M	100.0	47.1	48.9	46.3	32.1	50.0	70.0	100.0	66.7

Notes: TOTAL is the actual number of fish assessed for age.
Avg Len is the average length of fish aged at that age.
Avg wt g is the average weight of the fish aged at that age.
% Sex M is the % males of the fish aged at that age.

R esearch V essel AN alysis

R esearch V essel AN alysis MALKEY2 Pgm ver:3.6 08/06/89
Age/Maturity Length Key Statistics Dat ver:1.01

Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
Length data from Cruise P188 (1977) Avg wt and len from mean of fish sampled for age [L.Freq.] 1

Experiment type : [Key] 1,2
For Species 0012 White Hake
For sex codes ALL
For variable LENGTH Absolute Frequencies

Age	10	11	12	14	ALL
LENGTH	Freq.	Freq.	Freq.	Freq.	Freq.
013	0	0	0	0	1
022	0	0	0	0	2
025	0	0	0	0	2
028	0	0	0	0	3
031	0	0	0	0	4
034	0	0	0	0	18
037	0	0	0	0	18
040	0	0	0	0	21
043	0	0	0	0	22
046	0	0	0	0	26
049	0	0	0	0	12
052	0	0	0	0	16
055	0	0	0	0	11
058	0	0	0	0	13
061	0	0	0	0	4
064	1	0	0	0	9
067	0	0	0	1	3
070	0	0	1	0	2
073	0	0	0	0	4
088	0	0	1	0	1
091	0	0	0	0	1
103	0	1	0	0	1
TOTAL	1	1	2	1	194
Avg Len	64.0	102.0	80.0	66.0	46.9
Avg wt g	1800	9800	4500	2000	1001
% Sex M	0.0	0.0	100.0	100.0	48.5

Notes: Absolute Frequencies refers to the actual fish that were aged of the fish caught on the cruise.

R esearch V essel AN alysis MALKEY2 Pgm ver:3.6 08/06/89
Age/Maturity Length Key Statistics Dat ver:1.01

Page 3 of 3
Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
For variable LENGTH Absolute Frequencies

LENGTH	No. Aged	Total in Len Freq	Total in Area	Avg Age	Avg Wt g	Sex M %
013	1	1	14531	2.0	0	0
022	2	2	36608	1.5	88	100
025	2	2	33702	1.5	110	50
028	3	3	57091	2.3	208	66
031	4	5	110069	2.0	225	50
034	18	38	795630	2.8	301	33
037	18	37	965884	3.2	390	50
040	21	34	1105387	3.4	505	57
043	22	29	914827	3.8	602	64
046	26	25	680685	4.1	762	38
049	12	12	361263	4.4	879	58
052	16	14	440836	4.6	1095	31
055	11	7	194675	4.9	1300	36
058	13	13	552635	5.5	1506	46
061	4	4	122888	5.8	1700	100
064	9	9	242421	6.9	2050	44
067	3	4	135162	9.3	2267	66
070	2	3	100623	8.5	2750	50
073	4	4	104495	7.5	3125	50
088	1	2	53736	12.0	6000	99
091	1	1	30848	9.0	7300	0
103	1	1	30848	11.0	9800	0
Total	194	250	7084842	4.3	1001	48

Notes: Avg Wt g is the mean weight of the aged fish at that length.

on the next page
TOTAL Length Frequencies refers to the fish caught on the survey and measured for length.

R esearch V essel AN alysis MALKEY2 Pgm ver:3.6 08/06/89
Age/Maturity Length Key Statistics Dat ver:1.01

Page 1 of 3
Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
Length data from Cruise P188 (1977) L/W coeff a: 0.005486
b: 3.087907

Experiment type : [Key] 1,2 [L.Freq.] 1
For Species 0012 White Hake Avg wt and len from mean
For sex codes ALL of fish in this key.
For variable LENGTH TOTAL Length Frequencies

Age	01	02	03	04	05	06	07	08	09
LENGTH	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.
013	0	1	0	0	0	0	0	0	0
022	1	1	0	0	0	0	0	0	0
025	1	1	0	0	0	0	0	0	0
028	0	2	1	0	0	0	0	0	0
031	0	5	0	0	0	0	0	0	0
034	0	8	27	2	0	0	0	0	0
037	0	6	18	12	0	0	0	0	0

.
. sample file
.

new page

R esearch V essel AN alysis MALKEY2 Pgm ver:3.6 08/06/89
Age/Maturity Length Key Statistics Dat ver:1.01

Page 3 of 3
Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
For variable LENGTH TOTAL Length Frequencies

LENGTH	No. Aged	Total in Len Freq	Total in Area	Avg Age	Avg Wt g	Sex M %
013	1	1	14531	2.0	15	0
022	2	2	36608	1.5	77	100
025	2	2	33702	1.5	114	50

.
. sample file
.

070	2	3	100623	8.5	2734	50
073	4	4	104495	7.5	3112	50
088	1	2	53736	12.0	5542	99
091	1	1	30848	9.0	6146	0
103	1	1	30848	11.0	9010	0
Total	194	250	7084842	4.3	870	48

R esearch V essel AN alysis

R esearch V essel AN alysis MALKEY2 Pgm ver:3.6 08/06/89
Age/Maturity Length Key Statistics Dat ver:1.01

Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
Length data from Cruise P188 (1977) L/W coeff a: 0.005486
b: 3.087907

Experiment type : [Key] 1,2 [L.Freq.] 1
For Species 0012 White Hake Avg wt and len from mean
For sex codes ALL of fish in this key.
For variable LENGTH TOTAL Gulf Population (*1000)

Age	01	02	03	04	05	06	07	08	09
LENGTH	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.
013	0	15	0	0	0	0	0	0	0
022	18	18	0	0	0	0	0	0	0
025	17	17	0	0	0	0	0	0	0
028	0	38	19	0	0	0	0	0	0
031	0	110	0	0	0	0	0	0	0
034	0	177	575	44	0	0	0	0	0
037	0	161	483	322	0	0	0	0	0
040	0	53	632	368	53	0	0	0	0
043	0	0	208	707	0	0	0	0	0
046	0	0	79	471	105	26	0	0	0
049	0	0	0	211	151	0	0	0	0
052	0	0	28	220	110	55	28	0	0
055	0	0	35	35	53	53	18	0	0
058	0	0	0	43	340	0	170	0	0
061	0	0	31	0	0	61	0	31	0
064	0	0	0	0	27	81	81	27	0
067	0	0	0	0	45	0	0	0	45
070	0	0	0	0	50	0	0	0	0
073	0	0	0	0	0	26	26	26	26
088	0	0	0	0	0	0	0	0	0
091	0	0	0	0	0	0	0	0	31
103	0	0	0	0	0	0	0	0	0
TOTAL	35	588	2088	2422	934	303	322	84	102
No Aged	2	17	47	67	28	12	10	3	3
Avg Len	23.4	33.3	38.8	43.9	54.6	58.8	60.0	65.7	75.8
Avg wt g	94	294	469	677	1340	1676	1744	2292	3710
Bio t	3	173	979	1639	1251	507	562	192	378
% Sex M	100.0	47.1	48.9	46.3	32.1	50.0	70.0	100.0	66.7

Notes: TOTAL is the number in thousands estimated to be present in the survey area.
Avg Len is the mean length at age estimated from the length weight regression (a & b listed in header).
Bio t is the biomass at age in tonnes.
TOTAL Gulf Population estimated numbers of fish in thousands in the survey area.

R esearch V essel AN alysis

R esearch V essel AN alysis MALKEY2 Pgm ver:3.6 08/06/89
Age/Maturity Length Key Statistics Dat ver:1.01

Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
Length data from Cruise P188 (1977) L/W coeff a: 0.005486
b: 3.087907

Experiment type : [Key] 1,2 [L.Freq.] 1
For Species 0012 White Hake Avg wt and len from mean
For sex codes ALL of fish in this key.
For variable LENGTH TOTAL Gulf Population (*1000)

Age	10	11	12	14	ALL
LENGTH	Freq.	Freq.	Freq.	Freq.	Freq.
013	0	0	0	0	15
022	0	0	0	0	37
025	0	0	0	0	34
028	0	0	0	0	57
031	0	0	0	0	110
034	0	0	0	0	796
037	0	0	0	0	966
040	0	0	0	0	1105
043	0	0	0	0	915
046	0	0	0	0	681
049	0	0	0	0	361
052	0	0	0	0	441
055	0	0	0	0	195
058	0	0	0	0	553
061	0	0	0	0	123
064	27	0	0	0	242
067	0	0	0	45	135
070	0	0	50	0	101
073	0	0	0	0	104
088	0	0	54	0	54
091	0	0	0	0	31
103	0	31	0	0	31
TOTAL	27	31	104	45	7085
No Aged	1	1	2	1	194
Avg Len	64.0	103.0	79.3	67.0	45.9
Avg wt g	2073	9010	4184	2388	926
Bio t	56	278	435	108	6562
% Sex M	0.0	0.0	100.0	100.0	48.5

R esearch V essel AN alysis

R esearch V essel AN alysis MALKEY2 Pgm ver:3.6 08/06/89
Age/Maturity Length Key Statistics Dat ver:1.01

Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
For variable LENGTH TOTAL Gulf Population (*1000)

LENGTH	No. Aged	Total in Len Freq	Total in Area	Avg Age	Avg Wt g	Sex M %
013	1	1	14531	2.0	15	0
022	2	2	36608	1.5	77	100
025	2	2	33702	1.5	114	50
028	3	3	57091	2.3	161	66
031	4	5	110069	2.0	221	50
034	18	38	795630	2.8	294	33
037	18	37	965884	3.2	382	50
040	21	34	1105387	3.4	486	57
043	22	29	914827	3.8	607	64
046	26	25	680685	4.1	748	38
049	12	12	361263	4.4	909	58
052	16	14	440836	4.6	1092	31
055	11	7	194675	4.9	1298	36
058	13	13	552635	5.5	1530	46
061	4	4	122888	5.8	1787	100
064	9	9	242421	6.9	2073	44
067	3	4	135162	9.3	2388	66
070	2	3	100623	8.5	2734	50
073	4	4	104495	7.5	3112	50
088	1	2	53736	12.0	5542	99
091	1	1	30848	9.0	6146	0
103	1	1	30848	11.0	9010	0
Total	194	250	7084842	4.3	926	48

Notes: Avg Wt g is the mean weight at that length calculated from the length weight regression (the a & b are listed in the header of the preceeding pages).

R esearch V essel AN alysis

Output from the program **MALKey3:** both strata and survey variance estimates and set by set catch at age.

R esearch V essel AN alysis MALKEY3 pgm ver:3.01 19/04/89
Age/Maturity Length Key Statistics dat ver:1.01

Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
Length data from Cruise P188 (1977)

Experiment type : [key] 1,2 [L.Freq.] 1
For Species 0012 White Hake
For sex codes ALL
For variable STRATA/SET Catch Numbers At Age

Age STRAT/SET	01 Freq.	02 Freq.	03 Freq.	04 Freq.	05 Freq.	06 Freq.	07 Freq.	08 Freq.	09 Freq.
421/001	0.0	0.0	0.4	1.5	1.3	0.5	0.2	0.0	0.0
421/002	0.0	0.0	0.2	1.1	1.0	0.1	0.0	0.0	0.0
421/avg	0.0	0.0	0.3	1.3	1.2	0.3	0.1	0.0	0.0
421/CV%	0.0	0.0	44.8	21.1	17.8	112.2	141.4	0.0	0.0
420/003	0.0	0.0	0.7	1.1	0.6	1.6	1.2	0.7	0.2
420/007	0.0	0.0	0.7	1.2	1.4	1.1	0.1	0.5	0.0
420/avg	0.0	0.0	0.7	1.1	1.0	1.4	0.6	0.6	0.1
420/CV%	0.0	141.4	4.2	5.8	52.4	23.1	127.3	21.6	141.4
422/008	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.1	0.0
422/009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
422/011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
422/avg	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
422/CV%	0.0	0.0	0.0	0.0	173.2	173.2	173.2	173.2	0.0
424/010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
424/031	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
424/034	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
424/avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
424/CV%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
417/013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
417/014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
417/avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
417/CV%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
419/019	0.0	0.0	0.3	0.6	0.8	0.6	0.4	0.2	0.0
419/020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
419/avg	0.0	0.0	0.2	0.3	0.4	0.3	0.2	0.1	0.0
419/CV%	0.0	0.0	141.4	141.4	141.4	141.4	141.4	141.4	0.0

R esearch V essel AN alysis MALKEY3 pgm ver:3.01 19/04/89
Age/Maturity Length Key Statistics dat ver:1.01

Page 2 of 8
Key Run by JM Date 1/ 1/80 8:54
Cruise(s) in Key P188 (1977)

L.Freq. Run by JM Date 1/ 1/80 8:55
Length data from Cruise P188 (1977)

Experiment type : [key] 1,2 [L.Freq.] 1
For Species 0012 White Hake
For sex codes ALL
For variable STRATA/SET Catch Numbers At Age

Age STRAT/SET	01 Freq.	02 Freq.	03 Freq.	04 Freq.	05 Freq.	06 Freq.	07 Freq.	08 Freq.	09 Freq.
418/021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
418/022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
418/avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
418/CV%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
415/023	0.0	4.8	21.3	22.3	4.2	0.7	0.2	0.0	0.0
415/024	0.0	0.0	1.3	4.7	0.2	0.1	0.1	0.0	0.0
415/avg	0.0	2.4	11.3	13.5	2.2	0.4	0.1	0.0	0.0
415/CV%	0.0	141.4	125.0	92.0	126.6	103.3	86.0	0.0	0.0
416/030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
416/032	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
416/avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
416/CV%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

. sample file
. new page

433/038	0.0	0.0	0.0	0.0	3.5
433/039	0.0	0.0	0.0	0.4	6.7
433/avg	0.0	0.0	0.0	0.2	5.1
433/CV%	0.0	0.0	0.0	141.4	44.7
434/040	0.0	0.0	0.0	0.0	0.0
434/041	0.0	0.0	0.0	0.0	0.0
434/044	0.0	0.0	0.0	0.0	0.0
434/avg	0.0	0.0	0.0	0.0	0.0
434/CV%	0.0	0.0	0.0	0.0	0.0

. sample file

ALL/ALL	0.9	1.0	3.2	1.5	270.6
Tot/avg	0.01	0.03	0.05	0.02	3.59
Tot/CV%	45.12	0.00	20.12	61.58	27.97

Output from the program **CatMap:** location and catch of a species for a single cruise. The file name is in the form XnnnSppp.PTS, where Xnnn is the cruise ID and Sppp is the four digit numeric code for the species. The following file, N0730043.PTS, is the catch of yellowtail from the RV Needler 73.

RV survey N073: Yellowtail Flounder catch (kgs) 1986
kgs

-60.51667	47.51667	3.0
-60.40000	47.13333	0.7
-60.76667	46.96667	0.4
-61.53333	46.28333	0.3
-60.95000	46.95000	0.3
-60.60000	47.68333	0.3
-60.36667	47.53333	0.3
-60.23333	47.28333	0.2
-60.68333	47.63333	0.2
-61.70000	46.13333	0.2
-61.85000	46.31667	0.2
-62.13333	46.31667	0.1
-61.68333	45.83333	0.1
-61.28333	46.93333	0.0
-61.68333	46.60000	0.0
-61.45000	46.73333	0.0
-61.45000	46.50000	0.0
-61.98333	46.11667	0.0
-61.63333	45.73333	0.0
-62.16667	46.00000	0.0
-61.26667	46.53333	0.0
-62.25000	45.86667	0.0

Note the longitudes are negative as the convention states Longitudes west of Greenwich and Latitudes south of the equator are negative. All coordinates are in decimals of degrees, ie. 0.50 degrees is 30 minutes.

Output from the program **PikAMap**. This program outputs several files, one of them, for the select option of the program writes a subset of the starting file. Another, from the editor option of the program, outputs each point by segment and produces a scater map of each segment. The segment size is selected by the user.

R esearch V essel AN alysis PikAMap pgm ver: 2.0 15/JAN/8
Segment No. 1 Date run: 89/ 7/17 10:

Rec Num	Dist m.	LO/LA	Rec Num	Dist m.	LO/LA	Rec Num	Dist m.	LO/LA
1	no dist.	/	2	4735.9	/	3	1872.0	/
4	5149.7	/	7	6520.7	/	8	936.0	/
9	6114.9	/	10	6520.5	/	11	2990.4	/
12	6075.9	/	13	9804.3	/	14	8195.3	/
15	8233.3	/	16	1490.6	/	18	13040.0	/
19	4240.6	/	20	1489.6	/	22	4380.8	/
23	3594.6	/	24	2678.2	/	25	2679.7	/
27	2679.2	/	28	3592.8	/	29	2362.9	/
30	4662.1	/	31	5355.7	/	32	2974.1	/
33	3586.0	/	34	1459.0	/	35	4202.4	/
37	4720.1	/	38	1459.2	/	39	4654.4	/
40	2748.4	/	41	2103.9	/	42	5057.0	/
43	4766.6	/	44	4219.9	/	45	2100.7	/
46	3504.7	/	47	5334.7	/	48	4447.6	/
49	1458.7	/	50	1458.7	/			

Mean distance between points 3636.59m.

Total distance of segment 178193.06

segment number 1 initial num 49 num written 43 num skipped 6

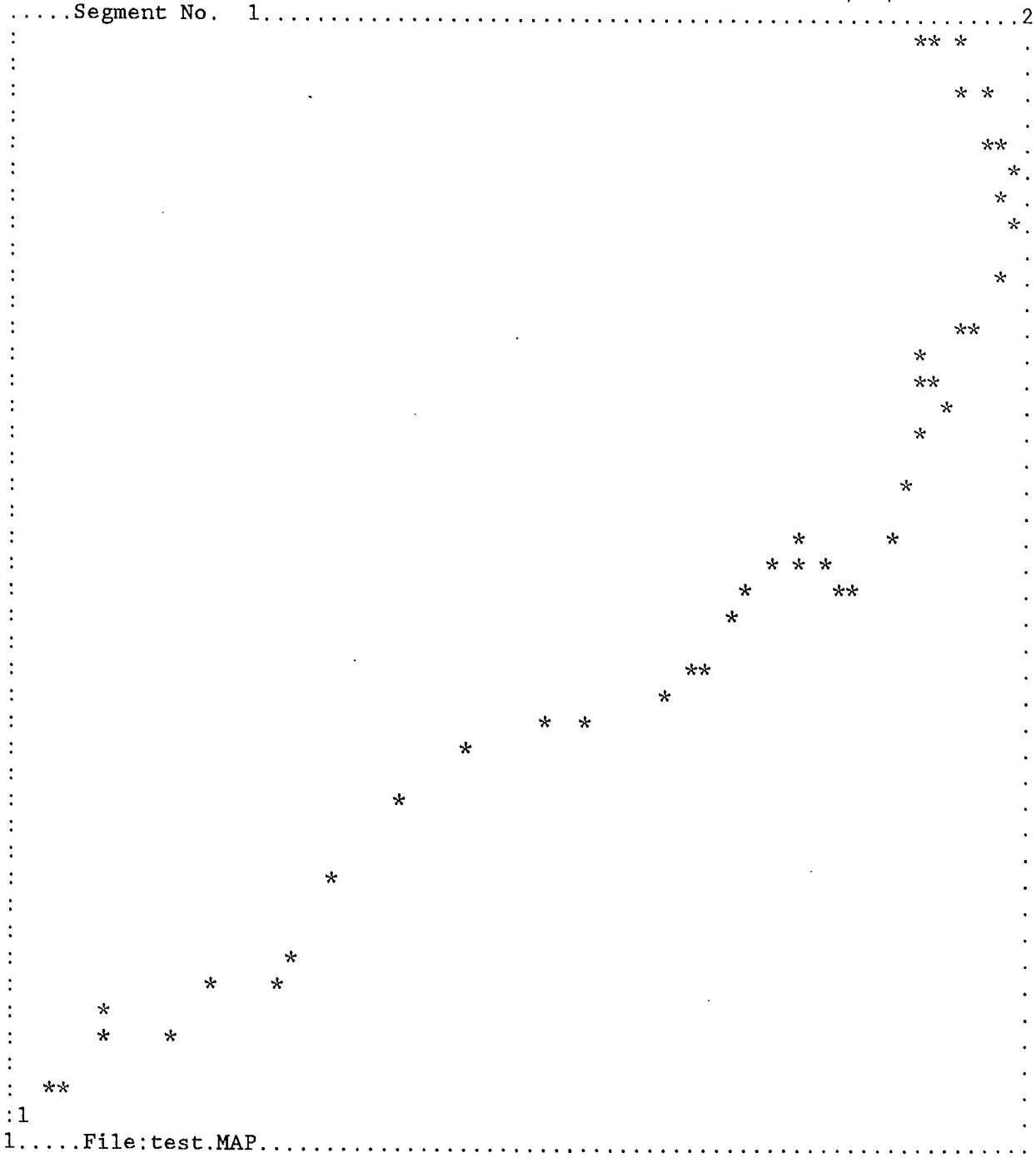
Minimum distance 50.0

NOTES ON FOLLOWING MAPS

The bottom left corner and top right corner contain the numbers 1 and 2 respectively, these correspond to the maximum and minimum longitudes and latitudes of the map segment. The numeral '1' in the map itself indicates the first or starting point of that segment. An important feature of this program is visual editing, the user can quickly determine if some unlikely point is in the data file and can then check its validity.

R esearch V essel AN alysis

R esearch V essel AN alysis PikAMap pgm ver: 2.0 15/JAN/89
Date run: 89/ 7/17 10: 2am



(1) Maximum Longitude:-65.90517
Minimum Latitude : 45.20737

First Point:-65.90517 45.20737
Last Point :-64.53448 45.88306
:32.07 :52.98
No. of points: 49

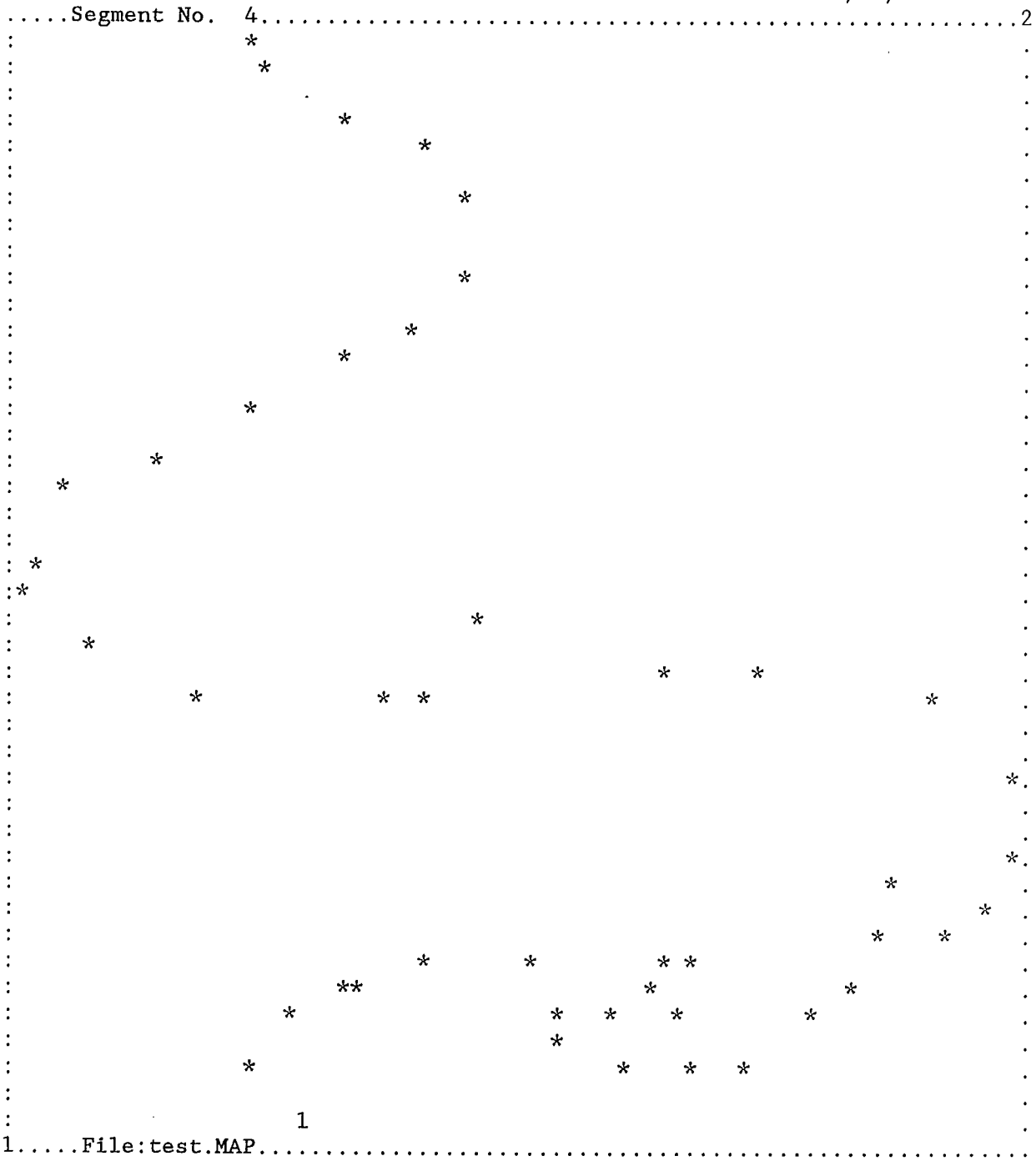
(2) Minimum Longitude:-64.53448
Maximum Latitude : 45.97892

Difference Long:0.018276
Lat :0.017146

Total Distance:178.193 km
Mean distance:3636.593 m

R esearch V essel AN alysis

R esearch V essel AN alysis PikAMap pgm ver: 2.0 15/JAN/89
Date run: 89/ 7/17 10: 2am



(1) Maximum Longitude:-61.46552
Minimum Latitude : 45.22558

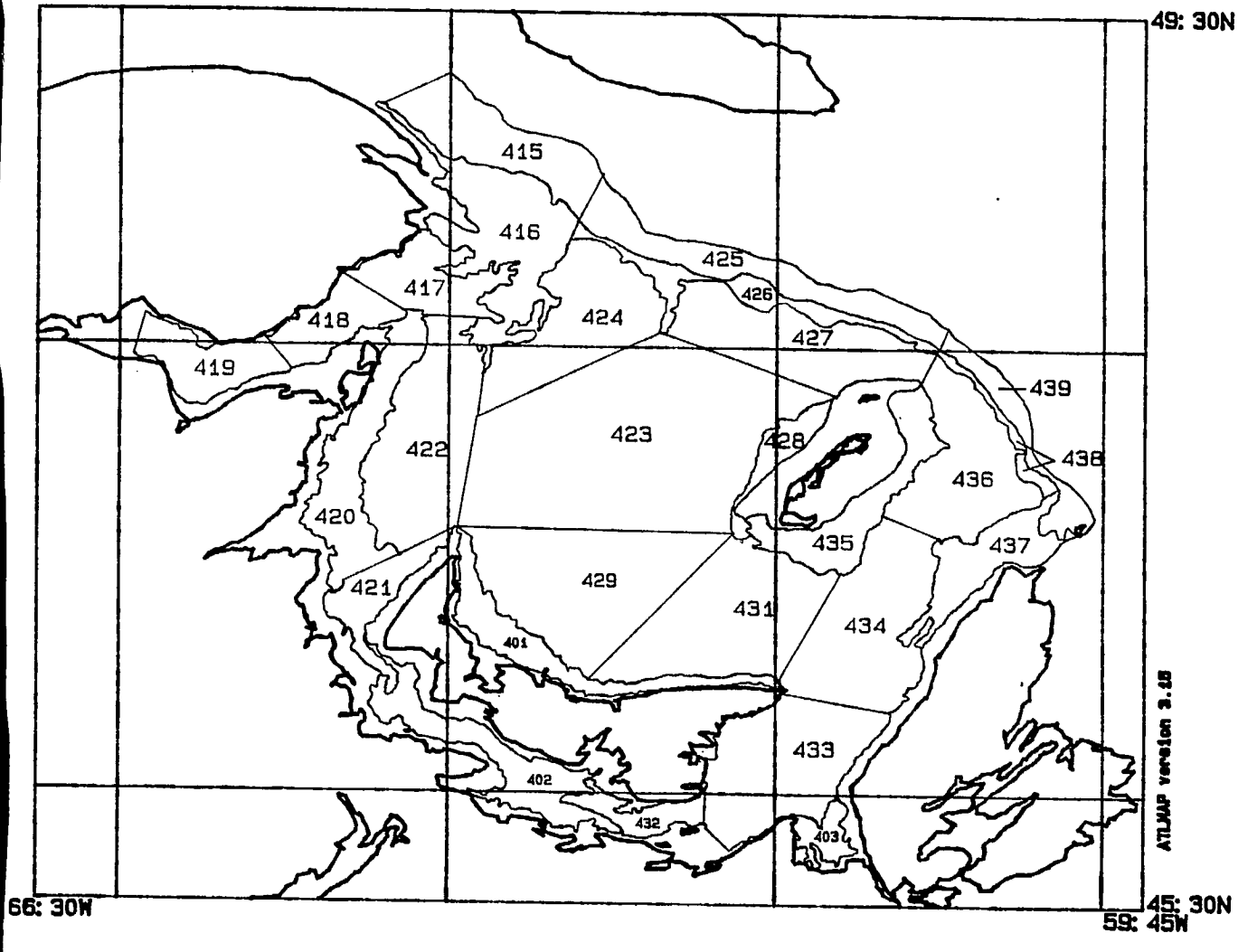
First Point: 61.31035 45.22558
Last Point :-61.34483 45.57037
:20.69 :34.22
No. of points: 49

(2) Minimum Longitude:-60.9482
Maximum Latitude : 45.5703

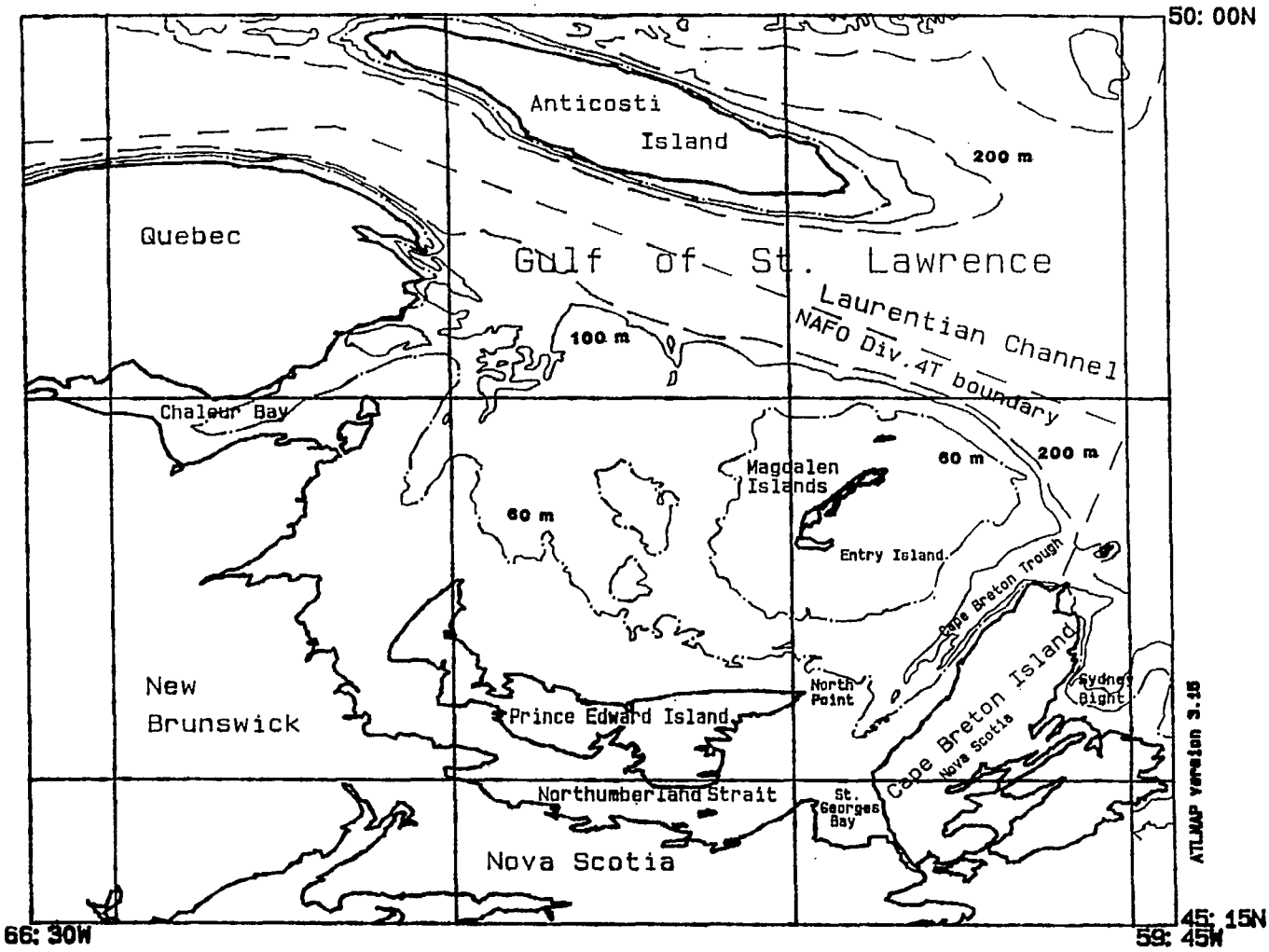
Difference Long:0.006897
Lat :0.007662

Total Distance:126.942 km
Mean distance:2590.643 m

Output from the program **AtlMap**. This program outputs a map on an HP plotter. Pen colours, thicknesses, etc are selected by the user and must be mounted in the plotter as required.



Map of stratum boundaries with labels marking each stratum.



Map of southern Gulf of St. Lawrence with location labels, depth contours, and NAFO division line.