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Volume IV

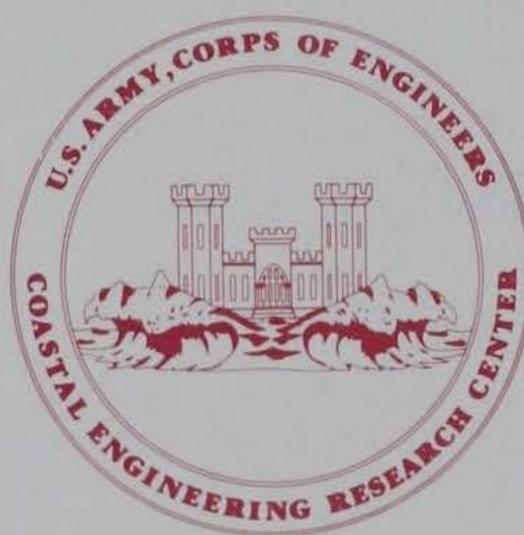
BPAS User's Guide: Analysis Module SURVY2

by

Marilyn V. Fleming and Timothy J. Lawler

TECHNICAL REPORT NO. 82-1 (IV)

JUNE 1982



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| Automated data processing | Beach profile changes | | | | | | | |
| Beach evaluation program | Computer programs | | | | | | | |
| Beach profile analysis system | Survey data analysis | | | | | | | |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) | | | | | | | | |
| <p>A package of computer programs for editing, analyzing, and displaying beach profile survey data has been developed. The eight-volume package, named the Beach Profile Analysis System (BPAS), consists of an overview of the BPAS program, two editing programs, five analysis programs, and supporting appendixes.</p> <p style="text-align: right;">(continued)</p> | | | | | | | | |

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The first editing program checks for missing or unreasonable data, surveying or note-reducing errors, and improper arrangement of data cards. The second editing program assumes that most errors have been corrected and, while it does some minor editing, its major function is to sort, reformat, and store the data on the selected permanent storage media. It is also used to update or extract data from existing files and performs some preliminary data analysis.

The analysis programs compute changes in shoreline position, selected contour positions, sand level, sand volume, and statistical trends and correlations. The results are plotted in a number of ways for display purposes. Output can be specified for English or metric units and can be referenced to any horizontal or vertical datum. Contour positions, including the shoreline position, are interpolated linearly between adjacent surveyed points on the profile. If a survey does not cross the datum elevation, but does reach a specified minimum elevation (e.g., +2 feet MSL), the shoreline position can be extrapolated using the two seawardmost points. Before computing volume changes, common bonds are established relative to the landward and seaward extent of the surveys on each profile line. The computed area under each profile is then expressed in terms of a "unit volume" for a shore-normal slice that is one unit wide. Rates of change in shoreline position and unit volume are computed by linear regression analysis.

The BPAS package has been designed for use primarily on the CDC 6600 computer, although much of the coding was done in standard FORTRAN for use on other systems.

PREFACE

This report is published to provide coastal engineers with the documentation of a package of computer programs for editing, analyzing, and displaying beach profile survey data. This package, named the Beach Profile Analysis System (BPAS), was needed for the analysis of a large data bank of field and laboratory profile surveys. The work was carried out under the U.S. Army Coastal Engineering Research Center's (CERC) Beach Profile Studies work unit, Shore Protection and Restoration Program, Coastal Engineering Area of Civil Works Research and Development.

This report (Vol. IV), the fourth of eight volumes, contains user instructions for the analysis module SURVY2, which produces plots and tables of contour positions.

The report was prepared by Marilyn V. Fleming and Timothy J. Lawler, Systems Analysts, under the supervision of P. Pierce, Chief, ADP Office, with the assistance of Allan E. DeWall, Geologist, under the supervision of C.J. Galvin, former Chief, Coastal Processes Branch, and Mr. R.P. Savage, Chief, Research Division.

Instrumental insight concerning a previous version of the Beach Profile Analysis System was provided by B. Sims. Programing was accomplished by M. Fleming and T. Lawler with the assistance of D. French, J. Alquist, R. Hylton, and F. Wilson.

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Technical Director of CERC was Dr. Robert W. Whalin, P.E., upon publication of this report.

Comments on this publication are invited.

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TED E. BISHOP
Colonel, Corps of Engineers
Commander and Director

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CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U.S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

| Multiply | by | To obtain |
|--------------------|-------------------------|---|
| inches | 25.4 | millimeters |
| | 2.54 | centimeters |
| square inches | 6.452 | square centimeters |
| cubic inches | 16.39 | cubic centimeters |
| feet | 30.48 | centimeters |
| | 0.3048 | meters |
| square feet | 0.0929 | square meters |
| cubic feet | 0.0283 | cubic meters |
| yards | 0.9144 | meters |
| square yards | 0.836 | square meters |
| cubic yards | 0.7646 | cubic meters |
| miles | 1.6093 | kilometers |
| square miles | 259.0 | hectares |
| knots | 1.852 | kilometers per hour |
| acres | 0.4047 | hectares |
| foot-pounds | 1.3558 | newton meters |
| millibars | 1.0197×10^{-3} | kilograms per square centimeter |
| ounces | 28.35 | grams |
| pounds | 453.6 | grams |
| | 0.4536 | kilograms |
| ton, long | 1.0160 | metric tons |
| ton, short | 0.9072 | metric tons |
| degrees (angle) | 0.01745 | radians |
| Fahrenheit degrees | 5/9 | Celsius degrees or Kelvins ¹ |

¹To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use formula: $C = (5/9) (F - 32)$.

To obtain Kelvin (K) readings, use formula: $K = (5/9) (F - 32) + 273.15$.

BEACH PROFILE ANALYSIS SYSTEM (BPAS)

Volume IV. BPAS User's Guide: Analysis Module SURVY2

by
Marilyn V. Fleming and Timothy J. Lawler

I. INTRODUCTION

This report, the fourth of eight volumes, provides user instructions for processing analysis module SURVY2, a part of the Beach Profile Analysis System (BPAS) (Fig. 1). The BPAS is a package of computer programs which edit and analyze beach profile data. The objective of the analysis is to compute and display changes in unit volume, shoreline position, and profile geometry. SURVY2 displays beach profile changes, through time, at a locality by providing plots and tables of the changes in distance to selected beach contours. The means of these distances through time at a locality are also computed and displayed, along with linear regression analysis of the change in shoreline position through time.

Volumes I and VIII contain information concerning data collection, formatting and restrictions, and program computations, assumptions, and error messages not repeated in this volume. It is recommended that Volumes I and VIII be used in conjunction with this volume. Volume II, which is a user's guide for processing the editing routines, EDIT1 and EDIT2, contains guidelines for the initial preparation of survey data. These guidelines are not repeated in this volume. Other volumes available in the series are:

(a) Volume III, "BPAS User's Guide: Analysis Module SURVY1," which produces comparative plots of beach profiles.

(b) Volume V, "BPAS User's Guide: Analysis Module BEACH," which produces plots and tables of unit volume and shoreline position changes.

(c) Volume VI, "BPAS User's Guide: Analysis Module VOLCTR," which produces tables and plots of change in unit volume between specific contour segments.

(d) Volume VII, "BPAS User's Guide: Analysis Module ELVDIS," which produces tables and plots of change and maximum and minimum elevations at specific distances.

Each of these volumes contains instructions for processing only the module with which it is concerned.

II. PROGRAM DESCRIPTION

The survey input data processed by program SURVY2 (Fig. 2) are assumed to have already been processed through the editing routines, EDIT1 and EDIT2. These edit routines perform a thorough edit and a partial analysis of the data. The result of this preliminary analysis is contained on the first record in the survey data input file, the header record. The information on the header record, along with information specifying desired outputs and optional data specifications, is used to determine whether the data will exceed the program capabilities. If capabilities will be exceeded or the job has been improperly set up, SURVY2 will print an appropriate error message and stop execution after this initial test. Otherwise, the program will continue.

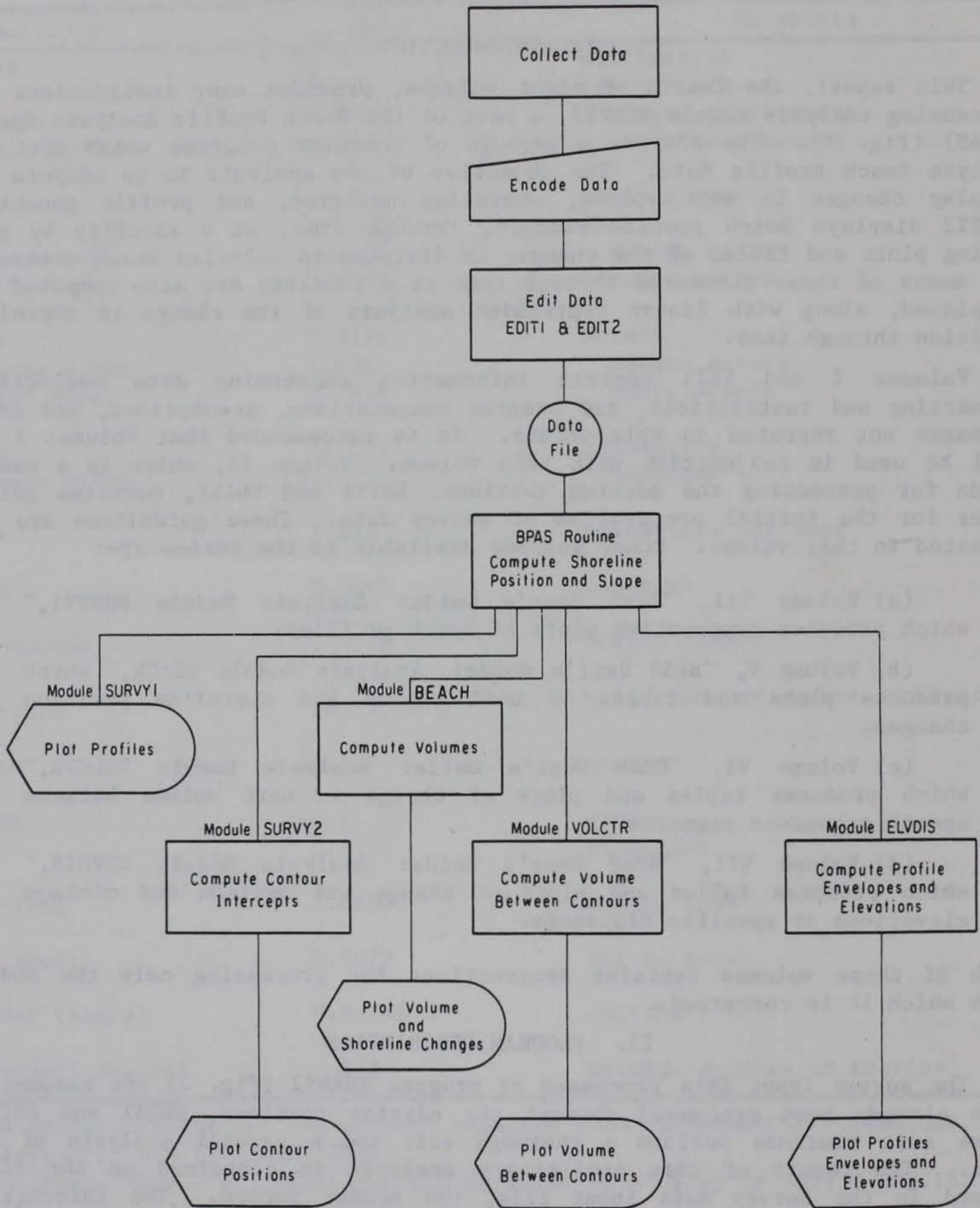


Figure 1. Beach Profile Analysis System.

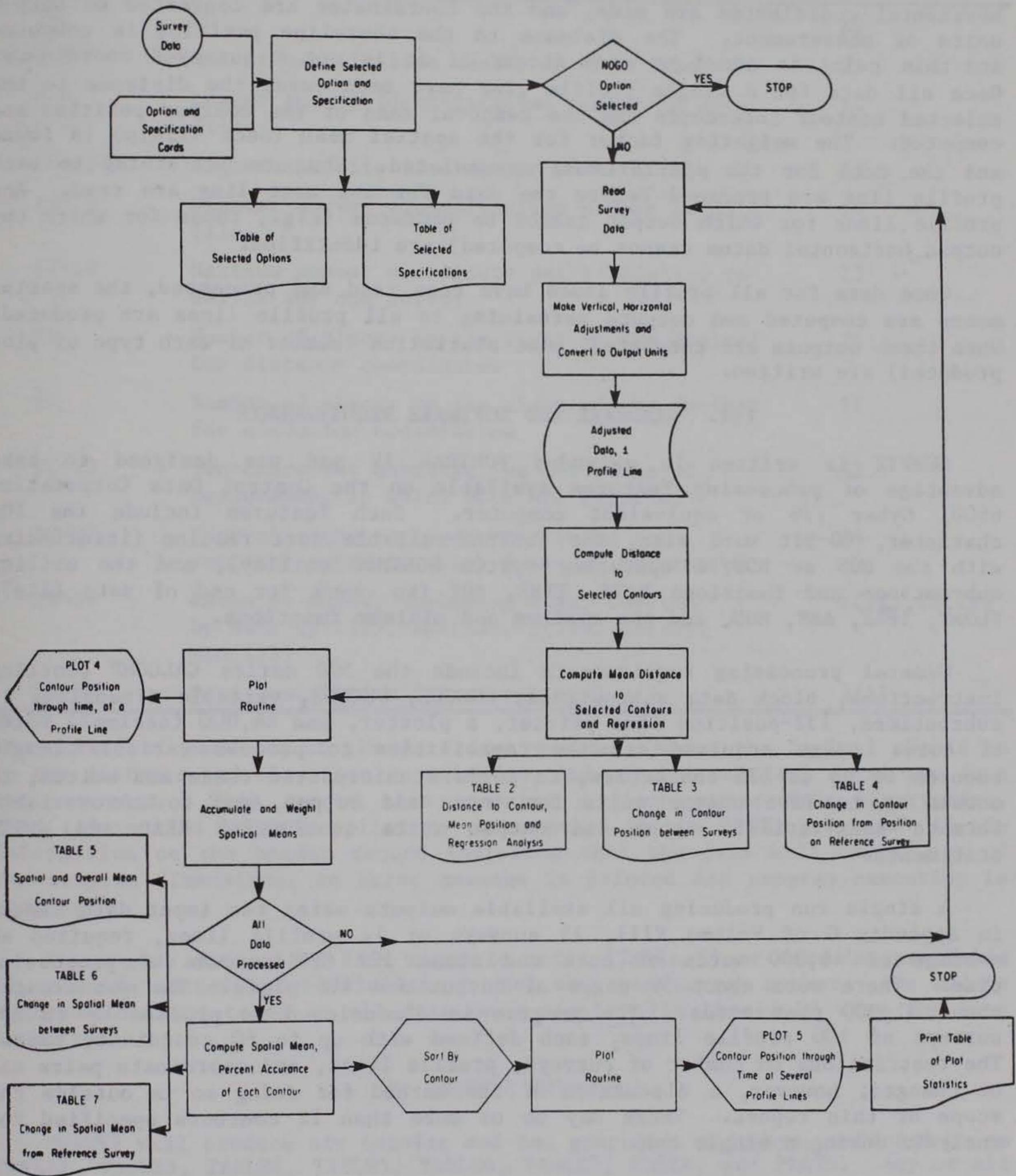


Figure 2. Analysis module SURVY2.

SURVY2 reads the survey input data, finds the position of selected contours, and produces the requested plot or table outputs. Records are read from the survey input data file, requested adjustments to the vertical or horizontal coordinates are made, and the coordinates are converted to output units of measurement. The distance to the shoreline position is computed and this point is added to each record if it is not a surveyed coordinate. Once all data for a single profile line have been read, the distance to the selected contour intercepts and the temporal mean of the contour position are computed. The weighting factor for the spatial mean (Sec. VI,4,p) is found and the data for the spatial mean accumulated. Outputs pertaining to each profile line are produced before the data for the next line are read. Any profile lines for which output cannot be produced (e.g., those for which the output horizontal datum cannot be computed) are identified.

Once data for all profile lines have been read and processed, the spatial means are computed and outputs pertaining to all profile lines are produced. When these outputs are completed, plot statistics (number of each type of plot produced) are written.

III. HARDWARE AND SOFTWARE REQUIREMENTS

SURVY2 is written in extended FORTRAN IV and was designed to take advantage of processing features available on the Control Data Corporation 6600, Cyber 176 or equivalent computer. Such features include the 10-character, 60-bit word size, the FORTRAN-callable sort routine (interfacing with the NOS or NOS/BE operating system SORTMRG utility), and the utility subroutines and functions DATE, TIME, EOF (to check for end of data file), FLOAT, IFIX, ABS, MOD, and the maximum and minimum functions.

General processing requirements include the 500 series CALCOMP plotting instructions, block data subroutines, ENCODE, DECODE, variable dimensions in subroutines, 132-position line printer, a plotter, and 66,000 (decimal) words of core. Also required are the capabilities to process variable length records of up to 635 characters, to perform unformatted reads and writes, to access up to five unique units for input and output, and to use variable formats and variable input and output units in FORTRAN READ and WRITE statements.

A single run producing all available outputs using the input data listed in Appendix G of Volume VIII, 15 surveys of 12 profile lines, required an average of 46,000 words of core and about 122 CPU seconds of processing time. There were about 50 pages of output and 468 plots. The job created about 31,000 plot cards. The program is dimensioned to process up to 150 surveys of 100 profile lines, each defined with up to 60 coordinate pairs. The restrictions on number of surveys, profile lines, and coordinate pairs can be changed; however, a discussion of the method for doing so is outside the scope of this report. There may be no more than 12 contours specified for analysis during a single run.

IV. INPUT DATA

The input data consist of survey records which have been carefully edited and properly formatted by the EDIT1 and EDIT2 programs (see Vol. II). The first record in the survey data file, the header record (Table 1), supplies the range of profile line numbers, survey numbers, and dates. It specifies in

Table 1. Format of the header record.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-2 | 00 | A2 |
| 3-5 | Lowest profile line number in data file | I3 |
| 6-9 | Lowest survey identification number in data file | I4 |
| 10-12 | Highest profile line number in data file | I3 |
| 13-16 | Highest survey identification number in data file | I4 |
| 17-19 | Maximum number coordinate pairs required to define any one survey | I3 |
| 20 | Number of places to the right of the decimal for distance coordinates | I1 |
| 21 | Number of places to the right of the decimal for elevation coordinates | I1 |
| 22-23 | Two-character abbreviation for units of measurement in which data are recorded | A2 |
| 24-27 | Four-character acronym describing the vertical datum to which data are referenced | A4 |
| 28-49 | Range of dates, including time, covered by data (yr(I2), mon(I2), d(I2), hr(I3), min(I2)) | 2(3I2,I3,I2) |
| 50-80 | Data description (31 characters) | 31A1 |

what units of measurement the data are recorded, where the decimal should be in the distance and elevation coordinates, and to what vertical datum the data are recorded. This record also contains a 31-character data description. This information is as supplied to or computed by the EDIT2 program. If the information on the header record indicates that the data will exceed any of the program dimensions, an error message is printed and program execution is stopped.

The survey data file, from magnetic media (Table 2) or card images (Table 3), must be sorted by profile line number and then survey number. The module ignores locality codes so all data on a single file should be from the same locality.

V. MODULE OUTPUTS

SURVY2 will produce six tabular and two graphical displays, referred to as TABLE2, TABLE3, TABLE4, TABLE5, TABLE6, TABLE7, PLOT4, and PLOT5. Any or all of these may be produced during a single run. In addition, tables of selected options and specifications are produced by each run of each analysis module. These tables may be produced and examined before survey data are processed (see Sec. VI,1). The plot statistics are produced by the analysis modules when plot output has been requested. A footnote or plot legend, "X EXTRAPOLATED DATUM," will appear only if the user has elected to allow extrapolation

Table 2. Format of final data file, recorded on magnetic media.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-2 | Locality code | A2 |
| 3-5 | Profile line number | I3 |
| 6-9 | Survey identification number | I4 |
| 10-15 | Date of survey | 3I2 |
| 16-20 | Time of survey | I3,I2 |
| 21-23 | Number of coordinate pairs in the record | I3 |
| 24-28 | Minimum elevation on the record | I5 |
| 29-35 | Blank | 7X |
| 36-end | Distance and elevation coordinate pairs, five positions per coordinate, no decimal | I5 |

Table 3. Format of final data file--card image data.

| Position No. | Entry description | FORTRAN format |
|---|--|----------------|
| First card in each record | | |
| 1-2 | Locality code | A2 |
| 3-5 | Profile line number | I3 |
| 6-9 | Survey identification number | I4 |
| 10 | Card number (1) | A1 |
| 11-16 | Date of survey | 3I2 |
| 17-21 | Time of survey | I3,I2 |
| 22-24 | Number of coordinate pairs in the record | I3 |
| 25-29 | Minimum elevation this record | I5 |
| 30-40 | Blank | |
| 41-80 | First four distance, elevation coordinate, five columns each coordinate, no decimals ¹ | 8I5 |
| Second and following cards in each record | | |
| 1-9 | Same as for first card | |
| 10 | Card number (1-9, then A-Z) | A1 |
| 11-80 | Seven distance, elevation coordinate pairs, five positions each coordinate | 14I5 |

¹Position of decimal is defined on the header record (see Table 5).

NOTE.--If there are exactly four coordinate pairs (first card only needed, filled to position 80), the second and the last card in the record must be a blank card.

of the shoreline position (see Sec. VI,3,g). The position of every contour computed using an extrapolated datum is identified by an "X."

In TABLE5, TABLE6, and TABLE7, mean distances for which a contour was not defined at all profile lines are identified with an "*." The number of profile lines considered in the computations appears in table headings. The analysis of up to 12 contours may be performed during a single run of the module. Unless otherwise specified, all table and plot outputs deal with the seawardmost position of the selected contours.

Whenever a contour position, change in position, or mean position cannot be computed, blanks appear in table outputs and a dashline connects defined points on plot outputs. No information is displayed on plot outputs before the first defined position is found or after the last one has been plotted. If a contour position is defined during only one survey, the contour is not represented on plot outputs.

Surveys are identified by date. If desired, the time of the survey is also written. When there is more than one profile line involved, the date used is that associated with the profile line having the largest line number.

Time-elapsed is the independent variable for regression analysis and the independent axis for plot outputs. At the user's option, this may be expressed in hours, days, months, or years. When months are selected, only 1 year's data are displayed on each plot. Enough plots will be output to depict all data. Sample outputs shown in the following figures have been photo-reduced.

1. Table of Options Selected (Fig. 3).

This table, produced after all option cards have been read by the program, prints the value assigned to each variable which can be defined on an option card. This table should be examined to ensure that the values assigned to these variables are as anticipated.

```

                                O P T I O N S
                                *****
                                MAH RUN 02/11/81 AT 16.13.49.

ANALYSIS MODULE SELECTED== SURVY2
USER SELECTED RUN ID== MAH
LOCALITY DESCRIPTOR IS TEST BEACH
EACH SURVEYED LINE WILL BE CALLED A PROFILE
INPUT DISTANCES ARE COMPUTED FROM THE BENCHMARK
INPUT DISTANCES TO FT X 10**=0; ELEVATIONS TO FT X 10**=1
VERTICAL DATUM IS MSL
A CORRECTION OF 0.000 FT WILL BE MADE TO EACH VERTICAL COORDINATE.
TIME WILL APPEAR ON OUTPUT. 24-HOUR SYSTEM WILL BE USED.

HORIZONTAL DATUM IS
THE SHORELINE POSITION ON
REFERENCE SURVEY
THERE ARE NO MORE THAN 8 PROFILE LINES.
THE INITIAL SURVEY OF EACH PROFILE LINE WILL BE THE REFERENCE SURVEY.

A CONVERSION FACTOR OF 1.00000 WILL BE USED TO GO FROM INPUT UNITS (FT) TO OUTPUT UNITS (FT)
A CONVERSION FACTOR OF .03704 WILL BE USED TO GO FROM SQUARE FT TO YDS/PY

EXTRAPOLATION WILL BE DONE TO MSL IF THE LAST SURVEYED POINT REACHED A MINIMUM ELEVATION OF 2.000 FT

SURVEY INPUT DATA WILL BE READ FROM UNIT 7 IN THIS FORMAT==
(BX, I3, I4, J12, I3, I2, I3, F5, 0, 7X, I20F5, 0)

```

Figure 3. Sample SURVY2 output--table of options selected.

2. Table of Specifications Selected (Fig. 4).

This table is produced after all special processing and output selection specifications have been read by the program. Anticipated processing specifications and outputs should be compared with those actually selected.

3. TABLE2 (Fig. 5).

This table displays the distance to the seawardmost intercept of each of the selected contour intercepts during surveys at a profile line. Optionally, the distance to 10 additional landward intercepts will be written. Also displayed is the mean position of each contour intercept during all surveys of the line and the percentage of surveys during which the contour intercept is defined. The table will optionally display results of least squares regression and correlation analysis of the change in shoreline position (the zero contour) through time. There will be one table output for each profile line. If no multiple intercepts are to be displayed, up to 39 surveys of a line will be written on each page.

4. TABLE3 (Fig. 6).

The change between surveys in position of the selected contour intercepts at each profile line is shown on this table. There will be one table for each profile line with up to 19 surveys depicted on each page.

5. TABLE4 (Fig. 7).

This table shows the change in position of selected contour intercepts from their position on the selected reference survey. There will be one table for each profile line with up to 39 surveys represented on each page.

6. TABLE5 (Fig. 8).

This table shows the spatial means of the selected contour positions during each survey at all profile lines. Also displayed are the overall mean positions of the contours (for all surveys at all profile lines) and the percentage of times the contour intercept is defined. There is only one table with data for up to 39 surveys written on each page.

7. TABLE6 (Fig. 9).

This table depicts the change in the average position of selected contour intercepts from one survey to the next. The average used is the spatial mean of the contour position (from TABLE5). There is one table with up to 19 surveys shown on each page.

8. TABLE7 (Fig. 10).

This table shows the change in the average position of selected contour intercepts from the averages during the selected reference survey. The average positions used are again the spatial means of the contour positions (from TABLE5). There is one table and up to 39 surveys written on each page.

SPECIFICATIONS SELECTED FOR ANALYSIS MODULE SURVY2

MAH RUN 02/11/81 AT 16.13.49.

TABLE 2 WILL BE OUTPUT.
 TABLE 3 WILL NOT BE OUTPUT.
 TABLE 4 WILL BE OUTPUT.
 TABLE 5 WILL NOT BE OUTPUT.
 TABLE 6 WILL NOT BE OUTPUT.
 TABLE 7 WILL NOT BE OUTPUT.
 MULTIPLE INTERCEPTS WILL BE WRITTEN ON TABLE 2.
 EQUATION OF REGRESSION LINE FOR ZERO CONTOUR (FT/ DAY) WILL BE WRITTEN.
 CONTOURS SELECTED FOR TABLE OUTPUTS ARE (FT ABOVE MBL) ---
 -2.00, -1.00, 0.00, 1.00, 2.00, 3.00, 4.00, 5.00, 6.00, 8.00, 10.00, 12.00.
 CONTOURS TO BE PLOTTED ON PLOT 4 (FT ABOVE MBL) ---
 -2.00, -1.00, 0.00, 1.00, 2.00, 3.00, 4.00, 5.00, 6.00, 8.00, 10.00, 12.00.
 SHORELINE POSITION ONLY FOR PLOT 5
 TIME MEASURED AND DISPLAYED IN DAYS

| | PLOT 4 | PLOT 5 |
|---------------------|--------|--------|
| HORIZONTAL AXIS | | |
| MINIMUM | 0.00 | 0.00 |
| INCREMENT | 180.00 | 180.00 |
| LENGTH | 5.00 | 5.00 |
| VERTICAL AXIS | | |
| MINIMUM | 150.00 | 50.00 |
| INCREMENT | 50.00 | 50.00 |
| LENGTH | 6.00 | 4.00 |
| OFFSET | 0.00 | 25.00 |
| LINES PER PLOT | 1.00 | 2.00 |
| OVERLAP | NO | NO |
| FACTORING | YES | NO |
| MULTIPLE INTERCEPTS | YES | |

PLOT COMMANDS WILL BE WRITTEN ON UNIT 3

Figure 4. Sample SURVY2 output--table of specifications and outputs.

DISTANCE (M) TO CONTOUR ON BEACH AT PROFILE LINE 10
 AT TEST BEACH
 6 JAN 75 = 16 DEC 76

HORIZONTAL DATUM IS
 THE SHORELINE POSITION ON
 6JAN75

| CONTOUR (M) ABOVE MSL | -1.00 | -.50 | 0.00 | .50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 |
|----------------------------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 6JAN75 | | 4.55 | 0.00 | 4.55 | 9.23 | 13.04 | 19.07 | 22.20 | 28.43 | 36.29 | 38.70 | 40.84 |
| 3MAR75 | | 2.71 | -1.36 | 5.43 | 11.64 | 18.36 | 24.39 | 27.80 | 32.41 | 37.39 | 40.54 | 42.68 |
| 28APR75 | | 7.99 | 2.99 | 2.53 | 8.08 | 13.03 | 19.80 | 27.87 | 34.06 | 37.65 | 39.97 | 41.77 |
| 2JUN75 | | 9.17 | 3.96 | 1.38 | 5.68 | 12.67 | 20.30 | 27.67 | 34.01 | 37.70 | 40.05 | 42.00 |
| 2JUL75 | | | 3.91 | 1.53 | 7.28 | 13.25 | 19.20 | 25.13 | 31.08 | 36.20 | 39.67 | 41.54 |
| 9SEP75 | | 7.28 | 3.07 | 1.27 | 5.89 | 11.27 | 16.51 | 21.56 | 28.46 | 36.86 | 40.12 | 42.08 |
| 28OCT75 | | 11.61 | 7.54 | 1.19 | 7.86 | 16.86 | 22.73 | 25.76 | 29.83 | 36.37 | 39.63 | 41.99 |
| 26NOV75 | | 7.22 | 3.28 | .65 | 5.06 | 9.56 | 14.06 | 19.24 | 24.26 | 33.26 | 39.77 | 41.87 |
| 5JAN76 | 12.21 | 7.86 | 2.77 | 2.51 | 7.71 | 12.86 | 17.70 | 21.79 | 28.74 | 30.65 | 40.01 | 41.96 |
| 11MAR76 | | 8.48 | 4.06 | .48 | 5.48 | 10.48 | 15.48 | 20.48 | 25.00 | 30.31 | 38.00 | 40.03 |
| 7APR76 | | 12.28 | 6.79 | 1.30 | 4.75 | 11.42 | 16.75 | 20.54 | 24.79 | 29.59 | 37.28 | 39.78 |
| 9JUN76 | | 7.02 | 1.33 | 4.27 | 9.67 | 15.04 | 19.04 | 23.04 | 27.04 | 31.54 | 39.46 | 41.44 |
| 8JUL76 | | -2.74 | -8.16 | -18.54 | -16.51 | -19.69 | -22.04 | -24.12 | -27.41 | -31.10 | -37.92 | -40.48 |
| 27SEP76 | | 1.06 | -5.88 | -11.19 | -15.50 | -19.29 | -23.20 | -28.29 | -31.84 | -33.38 | -37.63 | -40.23 |
| 16DEC76 | | 13.78 | 5.96 | 1.85 | 9.41 | 16.28 | 22.87 | 29.32 | 31.82 | 34.32 | 36.90 | 39.49 |
| MEAN POSITION | 12.21 | 7.02 | 2.02 | 3.19 | 8.65 | 14.34 | 19.54 | 24.32 | 29.08 | 34.17 | 39.04 | 41.21 |
| PERCENT OCCUR | 6.67 | 93.33 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

REGRESSION ANALYSIS = SHORELINE POSITION (Y) VS. TIME (X)
 SLOPE OF REGRESSION LINE IS -.0924 M / MONTH INTERCEPT AT 3.0538 M
 R SQUARED VALUE IS .0222 R VALUE IS .1488

Figure 5. Sample SURVY2 output--TABLE2.

CHANGE IN DISTANCE (FT) TO CONTOUR POSITIONS AT PROFILE LINE 1
 AT TEST BEACH
 (DISTANCE = DISTANCE ON PREVIOUS SURVEY)
 6JAN75/1000 = 15DEC76/0900

HORIZONTAL DATUM IS
 THE SHORELINE POSITION ON
 6JAN75/1000

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| CONTOUR (FT) ABOVE MSL | -2.00 | -1.00 | 0.00 | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 8.00 | 10.00 | 12.00 |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 6JAN75/1000 | | | | | | | | | | | | |
| 3MAR75/1100 | 4.00 | 4.03 | 4.07 | 4.10 | 4.26 | 4.54 | 2.27 | -0.29 | -2.85 | 3.52 | 4.68 | 1.51 |
| 28APR75/1100 | 7.00 | 6.75 | 8.65 | 10.55 | 11.85 | 12.90 | 16.50 | 20.17 | 23.83 | 15.27 | -4.61 | -1.84 |
| 2JUN75/1100 | 16.57 | 11.36 | 7.62 | 7.62 | 8.21 | 8.86 | 9.36 | 5.00 | -3.80 | -8.73 | -0.08 | -1.20 |
| 2JUL75/1000 | | | 14.60 | 13.26 | 10.69 | 6.45 | 2.77 | 5.83 | 13.32 | 18.26 | 19.70 | 4.26 |
| 9SEP75/1500 | | | 4.78 | 4.47 | 5.40 | 8.50 | 11.06 | 11.33 | 11.61 | 9.54 | 22.40 | -0.66 |
| 28OCT75/0700 | 43.86 | 27.63 | -3.33 | -15.43 | -18.36 | -20.71 | -22.94 | -22.07 | -19.56 | -6.88 | -6.80 | -1.02 |
| 25NOV75/1100 | -50.76 | -34.79 | -4.08 | 7.76 | 11.25 | 14.06 | 16.88 | 17.23 | 15.93 | 8.48 | -17.67 | 4.61 |
| 5JAN76/1100 | .76 | .80 | .84 | .87 | -0.31 | -1.88 | -3.44 | -5.00 | -6.56 | -13.46 | 1.43 | -1.33 |
| 11MAR76/0800 | 3.20 | -0.77 | -5.87 | -10.97 | -15.66 | -18.59 | -21.12 | -22.04 | -22.28 | -12.41 | -3.43 | -2.67 |
| 6APR76/1400 | -1.60 | 2.79 | 7.44 | 12.67 | 14.37 | 14.19 | 14.29 | 12.68 | 10.10 | 1.73 | 2.73 | 1.21 |
| 8JUN76/1300 | -16.38 | -25.31 | -21.21 | -17.67 | -10.60 | -5.84 | -2.86 | .22 | 1.84 | -1.68 | -11.96 | -1.96 |
| 7JUL76/1200 | 12.34 | 20.32 | 16.83 | 13.33 | 8.46 | 6.18 | 4.79 | 3.20 | 2.85 | 2.24 | 2.98 | 3.63 |
| 27SEP76/0900 | -11.56 | -5.32 | -7.79 | -5.43 | -6.30 | -6.00 | -0.79 | 3.72 | 7.38 | 10.15 | -0.27 | -0.81 |
| 15DEC76/0900 | 12.86 | -1.21 | -6.39 | -14.01 | -20.23 | -26.88 | -31.50 | -35.21 | -35.56 | -21.86 | 1.98 | .57 |

Figure 6. Sample SURVY2 output--TABLE3.

CHANGE IN DISTANCE(FT) TO CONTOUR POSITIONS AT PROFILE LINE 1
 AT TEST BEACH
 (DISTANCE = DISTANCE ON 6JAN75/1000)
 6JAN75/1000 = 15DEC76/0900

HORIZONTAL DATUM IS
 THE SHORELINE POSITION ON
 6JAN75/1000

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| CONTOUR (FT) ABOVE MSL | -2.00 | -1.00 | 0.00 | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 8.00 | 10.00 | 12.00 |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 6JAN75/1000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3MAR75/1100 | 4.00 | 4.03 | 4.07 | 4.10 | 4.26 | 4.54 | 2.27 | -0.29 | -2.85 | 3.92 | 4.68 | 1.51 |
| 28APR75/1100 | 11.00 | 10.78 | 12.71 | 14.65 | 16.11 | 17.44 | 18.77 | 19.88 | 20.98 | 18.79 | 0.07 | -0.33 |
| 2JUN75/1100 | 27.57 | 22.14 | 20.33 | 22.26 | 24.32 | 26.30 | 28.13 | 24.88 | 17.18 | 10.05 | -0.01 | -1.53 |
| 2JUL75/1000 | | | 34.93 | 35.53 | 35.01 | 32.75 | 30.91 | 30.70 | 30.50 | 28.32 | 19.68 | 2.73 |
| 4SEP75/1500 | 39.14 | 39.43 | 39.71 | 40.00 | 40.41 | 41.25 | 41.96 | 42.04 | 42.11 | 37.85 | 42.08 | 2.08 |
| 28OCT75/0700 | 83.00 | 67.06 | 36.38 | 24.97 | 22.05 | 20.54 | 19.02 | 19.96 | 22.55 | 30.98 | 35.28 | 1.06 |
| 25NOV75/1100 | 32.24 | 32.27 | 32.30 | 32.34 | 32.30 | 34.60 | 35.89 | 37.19 | 38.48 | 39.45 | 17.61 | 5.67 |
| 5JAN76/1100 | 33.00 | 33.07 | 33.14 | 33.21 | 32.99 | 32.72 | 32.46 | 32.19 | 31.92 | 25.99 | 19.04 | 4.33 |
| 11MAR76/0800 | 36.20 | 32.30 | 27.27 | 22.24 | 17.33 | 14.14 | 11.34 | 10.14 | 9.64 | 13.58 | 15.61 | 1.67 |
| 6APR76/1400 | 34.60 | 35.09 | 34.71 | 34.90 | 31.70 | 28.33 | 25.63 | 22.83 | 19.73 | 15.31 | 18.34 | 2.88 |
| 8JUN76/1300 | 18.22 | 9.78 | 13.51 | 17.24 | 21.09 | 22.48 | 22.77 | 23.05 | 21.57 | 13.63 | 6.38 | 0.92 |
| 7JUL76/1200 | 30.56 | 30.10 | 30.33 | 30.97 | 29.55 | 28.86 | 27.56 | 26.25 | 24.42 | 15.88 | 9.36 | 4.56 |
| 27SEP76/0900 | 19.00 | 24.78 | 22.55 | 25.14 | 28.25 | 22.46 | 26.77 | 29.97 | 31.80 | 26.03 | 9.09 | 3.74 |
| 15DEC76/0900 | 31.86 | 23.57 | 16.16 | 11.13 | 3.02 | -4.22 | -4.73 | -5.24 | -2.76 | 4.16 | 11.07 | 4.32 |

Figure 7. Sample SURVY2 output--TABLE4.

AVERAGE DISTANCE (M) TO CONTOUR POSITIONS FOR 10 PROFILE LINES
 AT TEST BEACH
 6 JAN 75 - 16 DEC 76

HORIZONTAL DATUM IS
 THE SHORELINE POSITION ON
 6 JAN 75

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| CONTOUR (M) ABOVE MSL | -1.00 | -.50 | 0.00 | .50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 |
|----------------------------|---------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| 6JAN75 | | 4.25 | 0.00 | -4.27 | -8.99 | -14.24 | -19.33 | -24.23 | -29.50 | -36.01 | -39.66 | -41.88 |
| 3MAR75 | | 3.46 | -.30 | -4.37 | -9.29 | -14.76 | -21.23 | -25.99 | -30.88 | -36.55 | -39.97 | -42.27 |
| 28APR75 | | 6.66 | 2.45 | -2.05 | -6.85 | -11.46 | -17.13 | -23.55 | -30.41 | -36.24 | -40.00 | -42.32 |
| 2JUN75 | | 8.03 | 2.74 | -2.20 | -6.63 | -11.58 | -17.65 | -23.99 | -30.22 | -36.61 | -40.09 | -42.25 |
| 2JUL75 | | | 3.49 | -.91 | -5.95 | -11.60 | -17.23 | -23.09 | -28.82 | -35.04 | -39.61 | -42.05 |
| 9SEP75 | 7.72 * | 7.04 * | 3.36 X | -1.31 X | -6.01 | -10.89 | -15.76 | -21.35 | -27.80 | -35.84 | -40.02 | -42.48 |
| 28OCT75 | 10.62 * | 10.44 | 4.75 | -.78 | -6.59 | -12.58 | -17.78 | -21.83 | -27.45 | -35.37 | -39.75 | -42.18 |
| 26NOV75 | 7.67 * | 9.16 | 4.29 | -.41 | -5.02 | -9.72 | -14.91 | -19.79 | -25.35 | -32.17 | -39.37 | -41.85 |
| 5JAN76 | 12.35 * | 6.92 | 2.75 | -1.69 | -6.22 | -10.91 | -15.60 | -21.26 | -26.70 | -33.26 | -39.66 | -41.86 |
| 11MAR76 | 14.05 * | 8.73 | 4.25 | -.02 | -5.12 | -10.49 | -15.44 | -20.52 | -25.78 | -32.03 | -38.85 | -41.16 |
| 7APR76 | | 11.53 | 5.61 | -.43 | -5.75 | -11.27 | -16.55 | -21.15 | -25.56 | -31.96 | -38.54 | -40.89 |
| 9JUN76 | | 9.24 | 3.84 | -1.02 | -6.11 | -11.53 | -16.73 | -22.55 | -27.04 | -33.26 | -38.99 | -41.76 |
| 8JUL76 | 12.93 * | 8.65 | 3.35 | -1.70 | -6.47 | -12.22 | -17.17 | -22.76 | -27.10 | -32.62 | -38.39 | -41.06 |
| 27SEP76 | | 6.51 | .52 | -4.74 | -9.26 | -13.04 | -17.75 | -23.47 | -29.27 | -33.96 | -38.70 | -41.33 |
| 16DEC76 | | 11.48 | 4.74 | -2.16 | -9.55 | -14.88 | -19.98 | -25.59 | -28.75 | -33.81 | -37.58 | -40.56 |
| MEAN POSITION | 10.89 | 8.01 | 3.06 | -1.87 | -6.92 | -12.08 | -17.35 | -22.74 | -28.04 | -34.32 | -39.28 | -41.73 |
| PERCENT OCCUR | 9.33 | 92.67 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

X EXTRAPOLATED DATUM
 AVERAGES WEIGHTED BY DISTANCE BETWEEN PROFILE LINES
 * CONTOUR NOT DEFINED ON ALL LINES.

Figure 8. Sample SURVY2 output--TABLE5.

CHANGE IN AVERAGE DISTANCE (M) TO CONTOUR POSITIONS FOR 10 PROFILE LINES
 AT TEST BEACH
 (DISTANCE = DISTANCE ON PREVIOUS SURVEY)
 6 JAN 75 - 16 DEC 76

HORIZONTAL DATUM IS
 THE SHORELINE POSITION ON
 6JAN75

| CONTOUR (M) ABOVE MSL | -1.00 | -.50 | 0.00 | .50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 |
|-------------------------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|
| 6JAN75 | | | | | | | | | | | | |
| 3MAR75 | | -.74 | -.30 | -.10 | -.30 | -.52 | -1.90 | -1.76 | -1.38 | -.53 | -.32 | -.39 |
| 28APR75 | | 3.20 | 2.76 | 2.31 | 2.44 | 3.30 | 4.10 | 2.44 | .47 | .31 | -.02 | -.05 |
| 2JUN75 | | 1.37 | .29 | -.15 | .22 | -.12 | -.52 | -.44 | .19 | -.37 | -.09 | .07 |
| 2JUL75 | | | .75 | 1.29 | .68 | -.02 | .42 | .90 | 1.40 | 1.57 | .48 | .20 |
| 9SEP75 | | | -.11 | -.39 | -.06 | .71 | 1.47 | 1.73 | 1.02 | -.80 | -.41 | -.43 |
| 28OCT75 | 2.90 * | 2.47 | 1.36 | .52 | -.58 | -1.69 | -2.02 | -.47 | .35 | .47 | .27 | .30 |
| 26NOV75 | -2.95 * | -1.29 | -.46 | .38 | 1.57 | 2.86 | 2.87 | 2.03 | 2.10 | 3.21 | .38 | .33 |
| 5JAN76 | 4.69 * | -2.23 | -1.54 | -1.28 | -1.20 | -1.20 | -.69 | -1.46 | -1.34 | -1.09 | -.29 | -.01 |
| 11MAR76 | 1.70 * | 1.80 | 1.50 | 1.66 | 1.11 | .42 | .16 | .74 | .92 | 1.23 | .81 | .70 |
| 7APR76 | | 2.80 | 1.36 | -.41 | -.64 | -.78 | -1.10 | -.63 | .21 | .07 | .31 | .26 |
| 9JUN76 | | -2.29 | -1.78 | -.59 | -.36 | -.26 | -.19 | -1.41 | -1.47 | -1.30 | -.45 | -.86 |
| 8JUL76 | | -.58 | -.48 | -.68 | -.36 | -.69 | -.44 | -.20 | -.06 | .63 | .60 | .69 |
| 27SEP76 | | -2.15 | -2.84 | -3.04 | -2.79 | -.82 | -.58 | -.71 | -2.17 | -1.34 | -.31 | -.27 |
| 16DEC76 | | 4.98 | 4.22 | 2.58 | -.29 | -1.84 | -2.23 | -2.12 | .52 | .15 | 1.12 | .77 |

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AVERAGES WEIGHTED BY DISTANCE BETWEEN PROFILE LINES
 * CONTOUR NOT DEFINED ON ALL LINES.

Figure 9. Sample SURVY2 output--TABLE6.

CHANGE IN AVERAGE DISTANCE (M) TO CONTOUR POSITIONS FOR 10 PROFILE LINES
 AT TEST BEACH
 (DISTANCE = DISTANCE ON 6JAN75)
 6 JAN 75 - 16 DEC 76

HORIZONTAL DATUM IS
 THE SHORELINE POSITION ON
 6JAN75

| CONTOUR (M) ABOVE | MSL | -1.00 | -.50 | 0.00 | .50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 |
|------------------------|-----|-------|------|------|------|------|------|-------|-------|-------|------|------|------|
| 6JAN75 | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3MAR75 | | | -.79 | -.30 | -.10 | -.30 | -.52 | -1.90 | -1.76 | -1.38 | -.53 | -.32 | -.39 |
| 28APR75 | | | 2.41 | 2.45 | 2.21 | 2.14 | 2.78 | 2.20 | .68 | -.91 | -.23 | -.34 | -.44 |
| 2JUN75 | | | 3.78 | 2.74 | 2.07 | 2.36 | 2.66 | 1.68 | .25 | -.72 | -.60 | -.43 | -.37 |
| 2JUL75 | | | | 3.49 | 3.36 | 3.04 | 2.64 | 2.10 | 1.15 | .68 | .97 | .05 | -.17 |
| 9SEP75 | | | 3.72 | 3.38 | 2.96 | 2.99 | 3.35 | 3.57 | 2.88 | 1.70 | .17 | -.37 | -.60 |
| 28OCT75 | | | 6.19 | 4.75 | 3.48 | 2.41 | 1.66 | 1.55 | 2.41 | 2.05 | .64 | -.10 | -.30 |
| 26NOV75 | | | 4.90 | 4.29 | 3.86 | 3.97 | 4.52 | 4.41 | 4.44 | 4.15 | 3.85 | .28 | .03 |
| 5JAN76 | | | 2.67 | 2.75 | 2.58 | 2.77 | 3.33 | 3.73 | 2.98 | 2.80 | 2.75 | -.00 | .02 |
| 11MAR76 | | | 4.47 | 4.25 | 4.24 | 3.88 | 3.75 | 3.88 | 3.72 | 3.73 | 3.99 | .81 | .72 |
| 7APR76 | | | 7.28 | 5.61 | 3.84 | 3.24 | 2.96 | 2.78 | 3.09 | 3.94 | 4.05 | 1.12 | .98 |
| 9JUN76 | | | 4.98 | 3.84 | 3.25 | 2.89 | 2.71 | 2.60 | 1.68 | 2.46 | 2.76 | .67 | .12 |
| 8JUL76 | | | 4.40 | 3.35 | 2.57 | 2.52 | 2.02 | 2.16 | 1.48 | 2.40 | 3.39 | 1.26 | .82 |
| 27SEP76 | | | 2.25 | .52 | -.48 | -.27 | 1.20 | 1.57 | .76 | .23 | 2.05 | .95 | .55 |
| 16DEC76 | | | 7.23 | 4.74 | 2.10 | -.55 | -.64 | -.65 | -1.36 | .75 | 2.20 | 2.08 | 1.31 |

AVERAGES WEIGHTED BY DISTANCE BETWEEN PROFILE LINES

Figure 10. Sample SURVY2 output--TABLE7.

9. PLOT4 (Fig. 11).

PLOT4 shows the distance to the selected contour intercepts during surveys at a profile line. All or a subset of the selected contours can be plotted. The user controls which of the contours are to be plotted; all of those selected are drawn on each plot (see Fig. 11,a). Optionally, more landward intercepts of contours will also be plotted. The more landward positions are represented in a scatter format with each contour represented by a different symbol. There will be at least one plot for each profile line. If time is in months, there will be as many plots per profile as there are years in the data file. Figure 11(b) is specifically designed to show the change in shoreline position.

10. PLOT5 (Fig. 12).

This plot shows change in contour position at one or more profile lines (Fig. 12,a). Only one contour is represented on a single plot but several profile lines may be shown. The number of plots produced depends on the number of profiles represented on each and, if time is in months, the number of years covered by the data. Figure 12(b) is specifically designed to show change in shoreline position.

11. PLOT Statistics (Fig. 13).

At the end of each run for which PLOT4 or PLOT5 output was requested, there is a printed table of the number of sets of axes drawn for each type of plot. This information may be used to determine how many plots to expect.

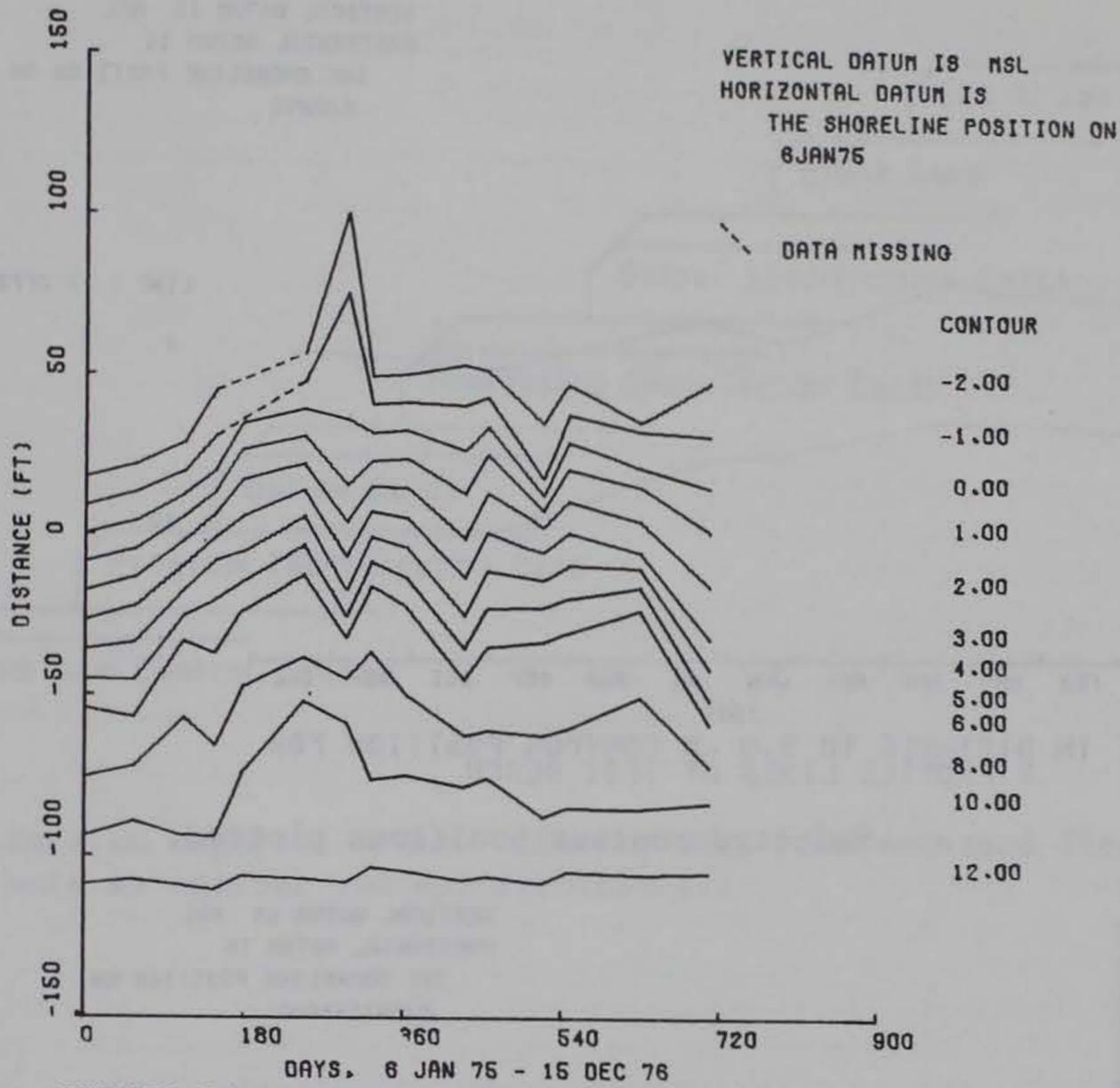
VI. JOB STRUCTURE

The job structure for each of the analysis modules is the same (Fig. 14). The only required system separators are those following the system job control cards and signaling the end of the job. The Appendix contains record layouts for each of the option, processing, and output specification cards used by module SURVY2. If the option and processing specification cards are absent, the module assigns default values. The output specification cards are required only to identify which outputs are desired; there is a default set of specifications for each SURVY2 output. The format and defaults for the output specification cards are described in paragraph 5 of this section. Note that the option and specification cards must be followed by a blank card to signal the end of the cards to be read.

The following contains formats for the records needed to run the module. It is recommended that data be right-justified; i.e., the rightmost character or number always occupies the rightmost position in the field. This will ensure that extra zeros are not added to the end of numeric entries when they are read by the module.

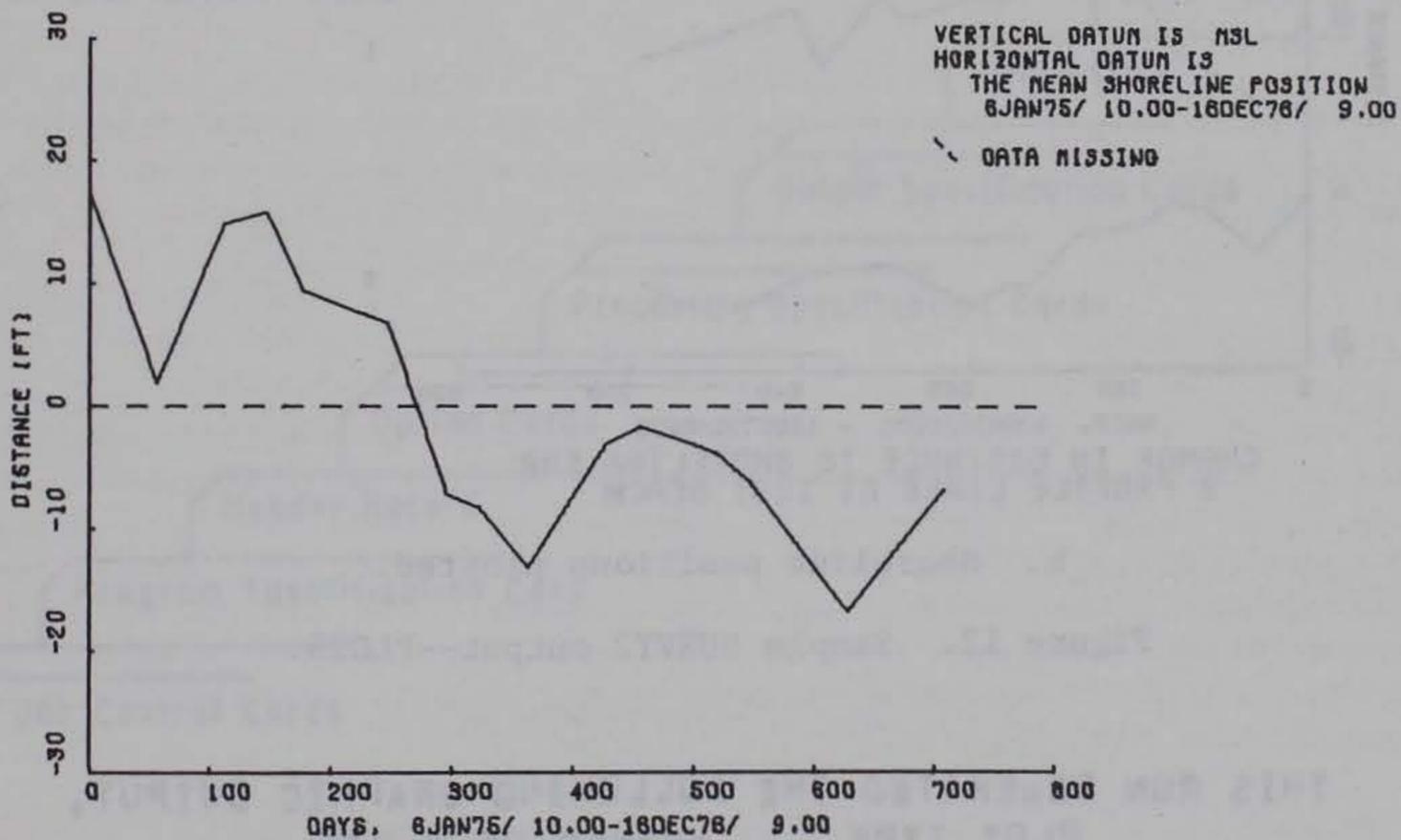
1. Program Identification Cards.

The program identification card (Table 4) is mandatory. It allows the user to assign a name to each run, defines which analysis module is to be processed, and provides the option to halt execution after the table of selected options and processing specifications has been printed.



CHANGE IN DISTANCE TO CONTOUR POSITIONS AT
PROFILE LINE 1 TEST BEACH

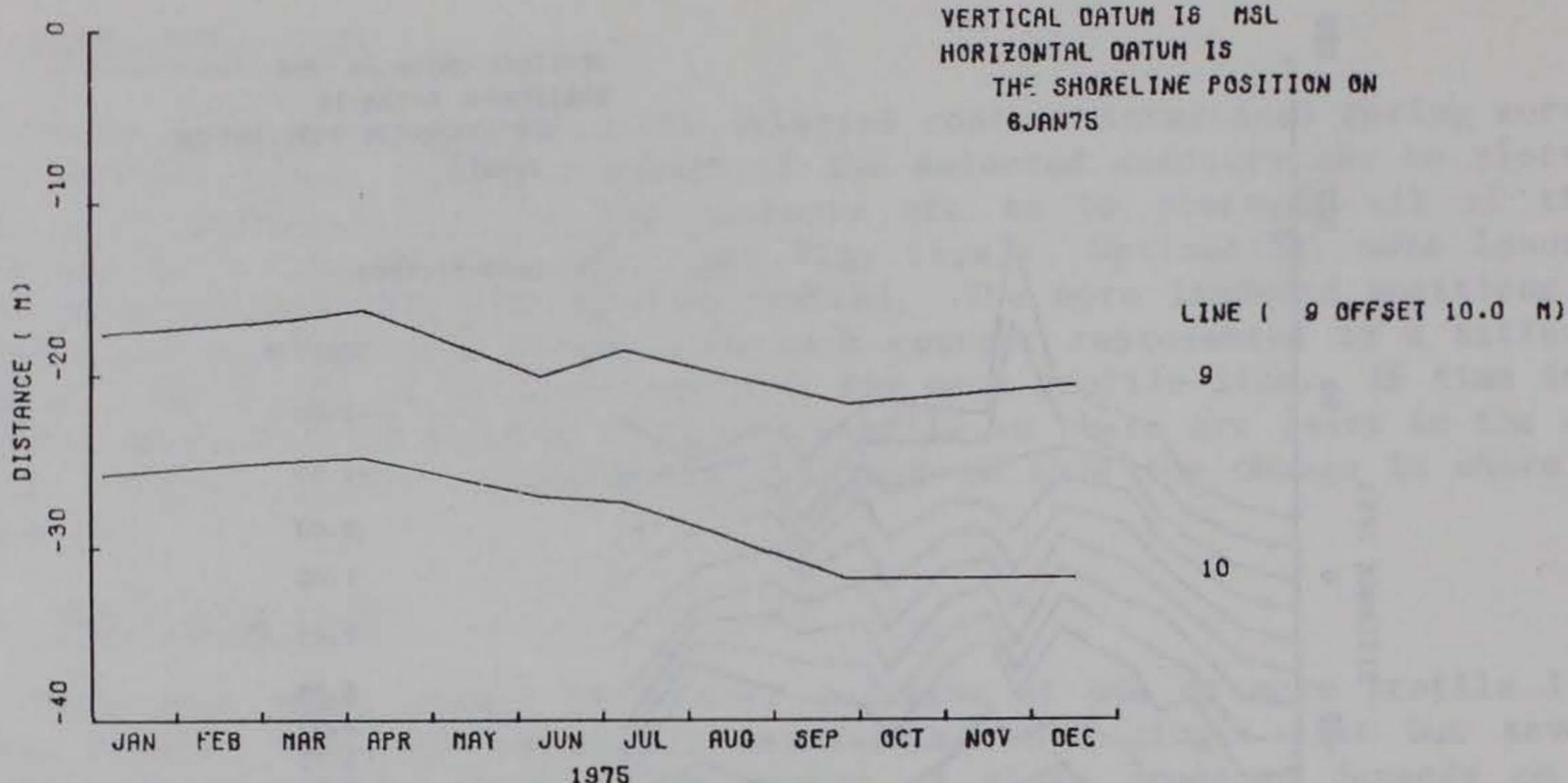
a. Selected contour positions plotted.



CHANGE IN DISTANCE TO SHORELINE AT
PROFILE LINE 2 TEST BEACH

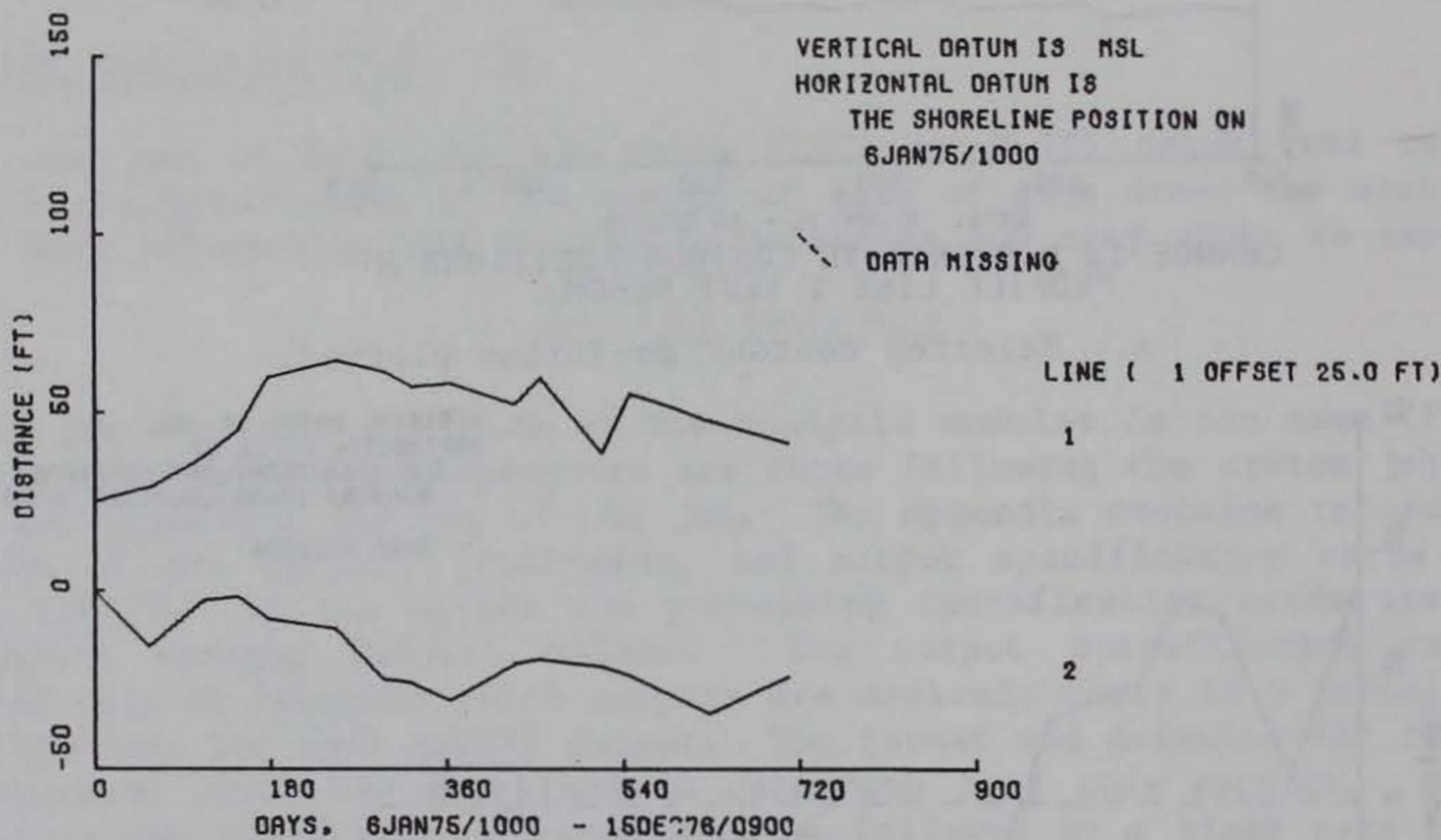
b. Shoreline positions plotted.

Figure 11. Sample SURVY2 output--PLOT4.



CHANGE IN DISTANCE TO 3.0 M CONTOUR POSITION FOR
2 PROFILE LINES AT TEST BEACH

a. Selected contour positions plotted.



CHANGE IN DISTANCE TO SHORELINE FOR
2 PROFILE LINES AT TEST BEACH

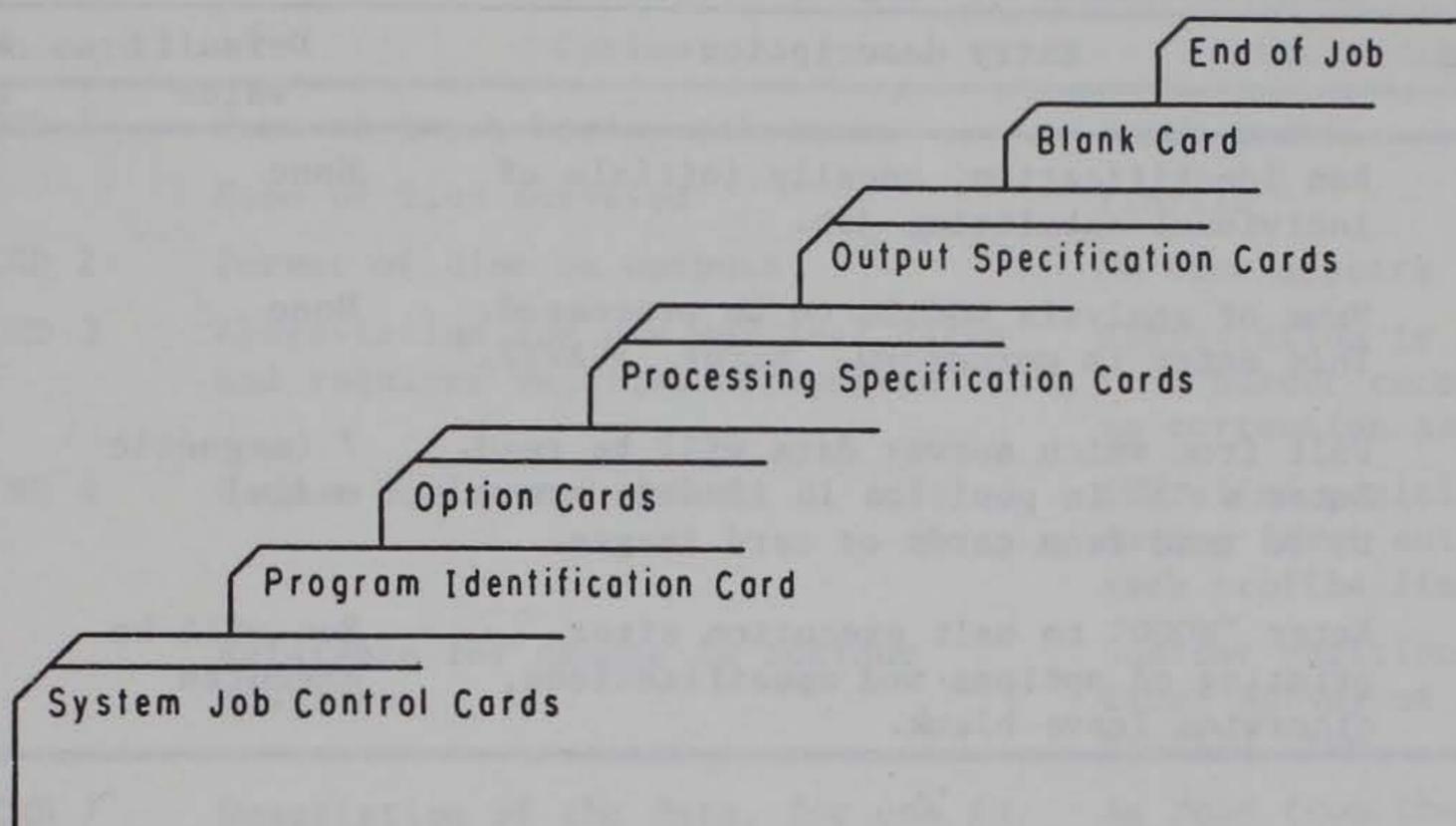
b. Shoreline positions plotted.

Figure 12. Sample SURVY2 output--PLOT5.

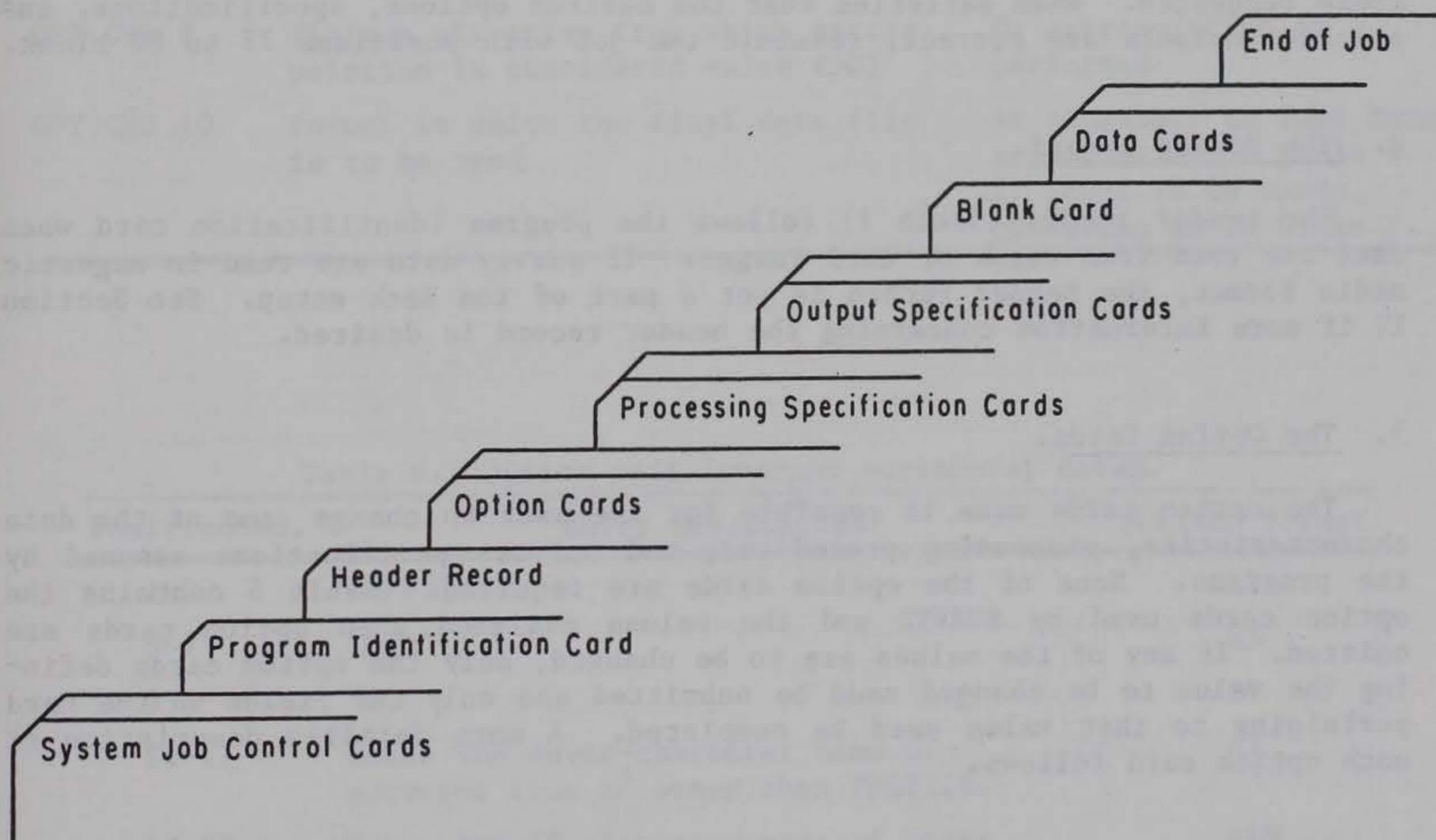
THIS RUN GENERATED THE FOLLOWING GRAPHIC OUTPUT.

| PLOT TYPE | NUMBER OF PLOTS |
|-----------|-----------------|
| 4 | 2 |
| 5 | 1 |

Figure 13. Sample SURVY2 output--table of plot statistics.



(1) Data on magnetic media. (Survey data file not read from same unit as options and specifications.)



(2) Data on cards or card images. (Survey data file will be read from the same unit as the options and specifications.)

Figure 14. Job structure.

Table 4. Program identification card.

| Position No. | Entry description | Default value | FORTRAN format |
|--------------|--|----------------------|----------------|
| 1-6 | Run identification, usually initials of individual submitting job. | None | A6 |
| 8-13 | Name of analysis module to be processed. This entry is <i>mandatory</i> . Enter "SURVY2." | None | A6 |
| 15-16 | Unit from which survey data will be read. Enter a "5" in position 16 if data are to be read from cards or card images. | 7 (magnetic media) | I2 |
| 77-80 | Enter "NOGO" to halt execution after printing of options and specifications, otherwise leave blank. | Run will be executed | A4 |

It is recommended that a printout of selected options and specifications, with further execution suppressed, be the first run for each analysis attempted. To do this, prepare the job and submit it with NOGO in positions 77 to 80 of the program identification card. The printed options (Fig. 3) and specifications (Fig. 4) should be carefully examined to be sure they match those requested. When satisfied that the desired options, specifications, and selected outputs are correct, resubmit the job with positions 77 to 80 blank.

2. The Header Record.

The header record (Table 1) follows the program identification card when data are read from cards or card images. If survey data are read in magnetic media format, the header record is not a part of the deck setup. See Section IV if more information concerning the header record is desired.

3. The Option Cards.

The option cards make it possible for the user to change some of the data characteristics, processing procedures, and output specifications assumed by the programs. None of the option cards are required. Table 5 contains the option cards used by SURVY2 and the values assigned when option cards are omitted. If any of the values are to be changed, only the option cards defining the value to be changed need be submitted and only the fields on the card pertaining to that value need be completed. A more detailed description of each option card follows.

a. Option Card 1--Input Horizontal Datum (Table 6). OPT CRD 1 defines the name of the lines surveyed (e.g., profile, range, transect) and the name of the input horizontal datum (e.g., bench mark, base line). If the card is omitted or the pertinent field left blank, the line will be labeled a PROFILE line and the input horizontal datum will be called the BENCH MARK.

Table 5. SURVY2 analysis options and their defaults.

| Option card | Option | Default value |
|-------------|---|--|
| OPT CRD 1 | Name of input horizontal datum | Bench mark |
| | Name of line surveyed | Profile |
| OPT CRD 2 | Format of time on outputs | No time appears |
| OPT CRD 3 | Abbreviation for new vertical datum and required vertical correction | Abbreviation is as read from header record and no correction is made. |
| OPT CRD 4 | Output horizontal datum | Shoreline position during first survey of each profile line |
| | Reference for change in contour position | Contour position during first survey of each profile line |
| OPT CRD 7 | Description of the data, for use in titles | As read from the header record |
| OPT CRD 8 | Linear units in which output is to appear | As read from the header record |
| | Conversion factor to change input linear units to output linear units | 1.0 |
| OPT CRD 9 | Minimum elevation from which extrapolation is considered valid (>0) | No extrapolation is performed |
| OPT CRD 10 | Format in which the final data file is to be read | As necessary to read data as formatted in Table 3 if input is on cards, otherwise as in Table 2. |

Table 6. Option card 1--input horizontal datum.

| Position No. | Entry description | FORTTRAN format |
|--------------|---|-----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "1" | I1 |
| 11-17 | Enter the seven-character name of surveyed line if other than PROFILE. | A7 |
| 19-28 | Enter the 10-character name of input horizontal datum if other than BENCH MARK. | A10 |

b. Option Card 2--Display of Time (Table 7). The date of a survey always appears on outputs, but the time of the survey does not. OPT CRD 2 allows the user to define the type of time, if any, which is to appear on outputs. If the card is omitted or blank, only the date will appear. If the time of day (24-hour clock) or the time, hours, and hundredths option is selected, both date and time will be written on outputs. If the latter time option is selected, the minutes will be converted to hundredths of an hour and time displayed as a decimal number.

Table 7. Option card 2--display of time.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "2" | I1 |
| 11 | Enter the code for the type of time to be written on printed outputs: 0 - no time is written 1 - 24-hour clock time 2 - decimal time | I1 |

NOTE.--Date of survey is always displayed on output.

c. Option Card 3--Output Vertical Datum (Table 8). OPT CRD 3 allows the user to change the vertical datum to which the survey data are referenced. If the card is omitted or left blank, the vertical datum will be as defined on the header record and there will be no change to the vertical coordinates. If a change is desired, enter the four-character abbreviation of the new vertical datum and the amount, in selected *output units*, which must be *added* to each vertical coordinate to make the adjustment.

Table 8. Option card 3--output vertical datum.

| Position No. | Entry description | FORTRAN format |
|--------------|--|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "3" | I1 |
| 11-14 | Enter the four-character abbreviation for output vertical datum if other than that on header record. | A4 |
| 15-25 | Enter the amount, in <i>output units</i> , to be <i>added</i> to each vertical coordinate. | F10.3 |

d. Option Card 4--Output Horizontal Datum (Table 9). OPT CRD 4 allows the user to select the reference horizontal datum to which the output is to be adjusted. If this card is omitted or left blank, the shoreline position

Table 9. Option card 4--output horizontal datum.

| Position No. | Entry description | FORTRAN format |
|---------------------------------|---|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "4" | I1 |
| 11-13 (IXDTM = 5 only) | Enter the number of profile lines. <i>Used only when the output horizontal datum is to be user-supplied.</i> If left blank, the number of profile lines will be as defined on the header record. ¹ The program will expect to read an adjustment for the number of lines entered here. | I3 |
| 15 (IXDTM) | Enter the type of output horizontal datum selected: 1 or blank - shoreline position during first or defined reference survey of each line. 3 - mean shoreline position. 4 - no adjustment to distance coordinates. 5 - user-supplied. Adjustments entered on SUP 4A cards. | I1 |
| 16-19 (IXDTM = 1 only) | Enter the reference survey number. If blank, program uses the first survey of each line, which may or may not be the same for all profile lines. All profile lines not surveyed during the selected reference are eliminated from processing. | I4 |
| 16-38 (IXDTM = 5 only) | Enter the first line of description of user-supplied horizontal datum. | 2A10,A3 |
| 39-67 (IXDTM = 5 only) | Enter the second line of description of user-supplied horizontal datum. | 2A10,A9 |
| 77-80 (IXDTM = 3, 4, or 5 only) | Enter the reference survey number for computing change in contour position. | I4 |

¹The header record contains the largest and smallest profile line number. If there is not a profile line associated with each number between, this field should not be left blank.

during the first survey of each profile line is the output horizontal datum. The distance to the shoreline during the first survey at each profile is computed and this amount is *subtracted* from each distance coordinate. The first survey also supplies the reference contour position. Other choices for the output horizontal datum are: (1) the shoreline position during a survey other than the first, (2) the mean shoreline position, (3) the input horizontal datum (i.e., bench mark--in this case the distance coordinates are unaltered), and (4) a user-supplied correction. If the reference is not user-supplied, use the OPT CRD 4, format 1, shown in the Appendix; otherwise, use OPT CRD 4, format 2.

If the correction is supplied, the user must provide SUP 4A (Table 10) cards to define the amount, in output units, which is to be *subtracted* from each distance coordinate at each profile line. The SUP 4A cards must immediately follow OPT CRD 4, be sequentially numbered, and cannot be included if the output horizontal datum adjustment is not user-supplied. While there need not be an entry on the SUP 4A cards for every profile line in the data set, only those represented will be processed by SURVY2.

Table 10. Supplementary option cards 4A--distance to output horizontal datum, user-supplied.

| Position No. | Entry description | FORTRAN format |
|--------------|--|----------------|
| 1-3 | "SUP" | A3 |
| 5-6 | "4A" | A2 |
| 7-9 | Sequential card number | I3 |
| 11-13 | Profile line number | I3 |
| 14-23 | Corresponding adjustment in output units, to be <i>subtracted</i> from each distance coordinate. | F10.3 |
| 24-26 | Profile line number | I3 |
| 27-36 | Corresponding adjustment | F10.3 |
| 37-39 | Profile line number | I3 |
| 40-49 | Corresponding adjustment | F10.3 |
| 50-52 | Profile line number | I3 |
| 53-62 | Corresponding adjustment | F10.3 |
| 63-65 | Profile line number | I3 |
| 66-75 | Corresponding adjustment | F10.3 |

When the output horizontal datum is the mean shoreline position, the input horizontal datum, or some user-supplied datum, the reference for change in selected contour position will be the position during the first survey of each profile line. If another survey is to supply the reference position, it may be specified. When the output horizontal datum is a selected reference survey, the same reference survey will be used for change in contour position. This cannot be changed.

The output horizontal datum option has proven to be useful for plotting profiles with horizontal datums well inland of the active beach, or for comparing lines with datums at varying distances from the shoreline. By adjusting the horizontal datum, profiles are effectively "lined up" at the shoreline, dune crest, or other selected reference distance. Care must be taken to ensure that the horizontal datum exists on the reference survey of each profile line. For example, under default conditions, the reference survey is the first survey of each profile line and the horizontal datum is the distance to the zero elevation at the time of that survey. If this position is not defined (i.e., the survey did not extend far enough seaward), the profile line is eliminated from the data set and any output from that particular line is suppressed.

Care must also be taken to ensure that subsequent runs of the data file have the same reference. When data are extracted from larger sets or new data are added to existing sets, it is possible that the first survey of a line will change; it is certain that the mean shoreline position will change. Under these circumstances, the user should record the distance to the horizontal datum for the original data set and supply it on SUP 4A card during subsequent runs.

e. Option Card 7--Data Description (Table 11). The description of the data (e.g., locality or site name) contained on the header record will appear on each output. If the user wishes to change this description, OPT CRD 7 may be used. If the card is omitted or left blank, the data description will be as defined on the header record.

Table 11. Option card 7--data description.

| Position No. | Entry description | FORTRAN format |
|--------------|--|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "7" | I1 |
| 11-41 | Enter the 31-character data description which supersedes the description on the header record. | 3A10,A1 |

f. Option Card 8--Linear Output Units (Table 12). OPT CRD 8 is used to define the linear output units. If the card is omitted or left blank, the linear output units will be the same as the input. If output units are to be meters or centimeters and the input is in feet, the conversion factor is supplied by the program; otherwise, the user must supply the required conversion factor. Each distance and elevation read from the input survey file will be multiplied by this factor.

g. Option Card 9--Extrapolation to Zero Elevation (Table 13). Since the shoreline position is of major interest in the analysis of beach profile data, there may be cases when the user decides that extrapolating the distance to the zero elevation is valid. In this case, OPT CRD 9 can be used to specify the elevation, in output units relative to the output vertical datum, that the last surveyed point must reach before the shoreline position can be extrapolated. If the card is omitted or left blank, no extrapolation occurs. When

Table 12. Option card 8--linear output units.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "OPT" | A3 |
| 5-9 | "CRD" | A3 |
| 9 | "8" | I1 |
| 11-12 | Enter the abbreviation for linear output units of measurement. If blank, these will be as defined on the header record. | A2 |
| 13-22 | Enter the conversion factor. Input units are multiplied by this number to convert to output units. This field may be blank if: <ul style="list-style-type: none"> (a) Input and output units are the same (factor set to 1). (b) Input units are FT, output units are M (factor set to 0.3048). (c) Input units are FT, output units are CM (factor set to 30.48). | F10.3 |

Table 13. Option card 9--extrapolation to zero elevation.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "9" | I1 |
| 11-20 | Enter the maximum elevation above the output vertical datum, in output units, which the last surveyed point must reach in order that the shoreline position (datum intercept) be extrapolated. If this is blank or zero, the shoreline position will not be extrapolated. | F10.3 |

any computation is performed using data for which the shoreline position was extrapolated, output of the results of that computation is flagged. No extrapolation will be performed for profiles where the last line segment is not sloping seaward.

h. Option Card 10--Format of Input Data (Table 14). If the format specified for card image data (Table 3) or magnetic media data (Table 2) does not fit the format of the user's input data, an alternate format may be specified using OPT CRD 10. Knowledge of FORTRAN format specifications is required to use this option effectively. All the data elements but the locality code are used in the analysis computations. Thus, while this card can be used to change the field length, order, or format in which data elements are read, all elements must be present. The expected order of the variables is shown in Tables 2 and 3; the order in which the variables are

Table 14. Option card 10--format of input data.

| Position No. | Entry description | FORTRAN format |
|--------------|--|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 8-9 | "10" | I2 |
| 11-80 | Enter the survey data format. If this card is blank or omitted, data will read as follows: (a) Input unit is 5 (2X,I3,I4,1X,3I2, I3,I2,F5.0,11X,8F5.0/(10X,13F5.0)). (b) Input unit is 7 (2X,I3,I4,3I2,I3, I2,I3,F5.0,7X,120F5.0). | 7A10 |

read may be changed by using the FORTRAN tab or T format specification. The T format specification is described in most FORTRAN texts and reference manuals, e.g., Stuart (1970)¹.

4. Processing Specification Cards.

These cards are used to define special physical characteristics or processing requirements of the data. When they are omitted, the program assumes that the data conform to certain specifications and assigns default values based on these assumptions. Table 15 shows the processing specifications available for the processing of program SURVY2 and the default values assigned to them. When processing specification cards used for other analysis modules are included in the SURVY2 setup, they are ignored and there is no effect on processing. A more detailed description of each specification follows.

Table 15. SURVY2 processing specifications and their defaults.

| Specification | Description | Default value | |
|---------------|---|--|-------------------|
| | | Contour No. | Contour elevation |
| CONTOUR | Selects contours for analysis and assigns a sequential number and an elevation to each contour selected. | 1 | -2.0 |
| | | 2 | -1.0 |
| | | 3 | 0.0 |
| | | 4 | 1.0 |
| | | 5 | 2.0 |
| | | 6 | 3.0 |
| | | 7 | 4.0 |
| | | 8 | 5.0 |
| | | 9 | 6.0 |
| | | 10 | 8.0 |
| | | 11 | 10.0 |
| | | 12 | 12.0 |
| DISTNCE | Defines distances between <i>physically</i> adjacent profile lines for weighting spatial means (in output units). | Profile lines are assumed to be equidistant. | |

¹Stuart, F., *FORTRAN Programming*, John Wiley & Sons, Inc., 1970.

a. CONTOUR Specification (Table 16). This specification allows the user to select the contours to be analyzed if they differ from the default. There may be no more than 12 contours selected and no more than two CONTOUR cards. If seven or fewer contours are selected, there may be no more than one CONTOUR card. Each contour is assigned a sequential number when it is entered. All the contours defined on these cards will appear on requested table outputs; however, the user may select specific contours to appear on plot outputs. The elevations should be entered in output units of measurement relative to the output vertical datum.

Table 16. Format of CONTOUR specification card.

| Position No. | Entry description | FORTRAN format |
|--------------|--|----------------|
| 1-7 | "CONTOUR" | A7 |
| 9 | Sequential card number | I1 |
| 11-12 | Number of contours to process ¹ (card 1 only) | I2 |
| 15-21 | Contour elevation, expressed as output units above the output vertical datum | F7.2 |
| 24-30 | Contour elevation | F7.2 |
| 33-39 | Contour elevation | F7.2 |
| 42-48 | Contour elevation | F7.2 |
| 51-57 | Contour elevation | F7.2 |
| 60-66 | Contour elevation (card 1 only) | F7.2 |
| 69-75 | Contour elevation (card 1 only) | F7.2 |

¹If this card is used, this field must be completed.

b. DISTNCE Specification (Table 17). Volume VIII, Appendix B, explains the method used to weight the contours when the spatial mean of their position is computed. Essentially, the distance between adjacent profile lines is used to determine how much weight is given to values computed at each line. The greater the space between profile lines, the more weight is given to values computed at the line. The DISTNCE specification card is used to define distances between profile lines for weighting. Note that *the order in which profile lines are entered on these cards must correspond to the physical position of the lines (e.g., if profile line 33 is between profile lines 4 and 5, data must be entered for 4, 33, and 5, respectively)*. There are two weights given to values computed at each line--one is half the distance to the profile line on the left and the other is half the distance to the line on the right. Since profile lines at either end of the study site are adjacent to only one profile, the user has to determine the second weight to be associated with these lines. This value is not halved; the user should determine how far, in the direction opposite the adjacent profile line, values computed at the end lines can be considered valid. There will be one more distance entered than there are profile lines. Distances should be entered in *output* units of measurement. Profile lines are assumed to be parallel. When no DISTNCE specification is supplied, the profile lines are assumed to be equidistant and the computed mean contour position is a simple mean. There should be as many DISTNCE cards as needed to define the characteristics for the number of profiles specified on the first card. Supplying more or less cards will result in an error.

Table 17. DISTNCE specification card--distance between profile lines to be used in weighting.

| Position No. | Entry description | FORTRAN format |
|--------------|--|----------------|
| 1-7 | "DISTNCE" | A7 |
| 8-9 | Sequential card number | I2 |
| 11-13 | Number of profile lines to process (card 1 only; this field must be completed). | I3 |
| 14-23 | On card 1, enter distance-along-beach values computed for the first line are valid (see text). On other cards, enter distance between last line entered on previous card and first on this card. | F10.3 |
| 24-26 | Profile line number ¹ | I3 |
| 27-36 | Distance between adjacent profile lines | F10.3 |
| 37-39 | Profile line number | I3 |
| 40-49 | Distance between adjacent profile lines | F10.3 |
| 50-52 | Profile line number | I3 |
| 53-62 | Distance between adjacent profile lines | F10.3 |
| 63-65 | Profile line number | I3 |
| 66-75 | Distance between adjacent profile lines | F10.3 |
| 76-78 | Profile line number | I3 |
| Final entry | Distance-along-beach values computed for last profile line are valid (see text). | F10.3 |

¹Profile line numbers must be entered in physical (geographic) *not* numeric order.

NOTE.--Do not enter data for more profile lines than indicated on card 1.

5. Output Specification Cards.

SURVY2 will produce six tabular and two graphical displays: TABLE2, TABLE3, TABLE4, TABLE5, PLOT4, and PLOT5. These outputs are described in detail in Section V. Any or all of the outputs may be produced during a single run. An output and any required specifications for the output are selected by entering an output specification card. One, and only one, card must be entered for each output selected.

a. Table Output.

(1) TABLE2. Table 18 describes the card format for selection of TABLE2 (Fig. 5) output. This table is the only one for which there are optional specifications. These specifications include the printing of multiple contour intercepts and results of regression analysis for the seawardmost intercept of the zero contour (the shoreline) with respect to time. The type of time (hours, days, months, or years) selected for this analysis must agree with that selected for any plot output.

Table 18. TABLE2--output specification card.

| Position No. | Entry description | FORTRAN format | Default value |
|--------------|---|----------------|----------------------------------|
| 1-5 | "TABLE" | A7 | None |
| 9 | "2" | I1 | None |
| 11-14 | Enter code for display of multiple intercepts: blank - no multiple intercepts displayed "MULT" - multiple intercepts will be displayed | A4 | No multiple intercepts displayed |
| 16-25 | Enter code for display of regression analysis: blank - no regression analysis of change in shoreline position "REGRESSION" - regression for change in shoreline position will be computed and displayed | A10 | No regression analysis |
| 27 | Enter code for type of time for regression analysis: ¹ "H" - time will be converted to hours "D" - time will be converted to days "M" - time will be converted to months "Y" - time will be converted to years | A1 | Time converted to months |

¹If PLOT4 or PLOT5 is output, the type of time selected must match that chosen for the independent axis.

(2) TABLE3 to TABLE7. These tables (Figs. 6 to 10) have no optional specifications. The format of the output specification card required for their selection is described in Table 19.

Table 19. TABLE3-TABLE7--output specification cards.

| Position No. | Entry description | FORTTRAN format | Default value |
|--------------|--|-----------------|---------------|
| 1-5 | "TABLE" | A5 | None |
| 9 | Enter appropriate table number (3, 4, 5, 6, or 7). | I1 | None |

b. Plot Output. Table 20 describes the format for the output specification cards for plot output (Figs. 11 and 12) and defines the defaults which will be assigned if positions 13 to 80 are not completed. A separate card must be prepared for each type of plot to be output. Except for the type of time specification and the plot output unit, it is not necessary that each type of plot have the same specifications when more than one type is output during a single run; format specifications for each type of plot are read and processed separately.

(1) Output Unit for Plot Commands. The plot commands may be written either to unit 3 (normally signaling card output) or 8 (normally signaling output to magnetic tape). The user must ensure that data written to these units are handled properly in the job control stream. All plot commands will be written to the unit defined on the last plot output specification card encountered.

(2) Default Plot Specification. If the defaults for values supplied in positions 13 to 80 are acceptable and the selected output units of measurement are feet, positions 13 to 80 need not be completed. However, if any plot specifications are to be supplied or output units are not feet, all fields must be completed. (The unit onto which plot commands are to be written may be changed without affecting other default specifications.)

(3) Shoreline Position Only Plot. The zero contour, the shoreline position, is often of particular interest. While PLOT4 and PLOT5 will depict changes in shoreline when the zero contour is selected for output, there are also versions of these plots designed to emphasize the fact that shoreline position changes are being displayed. The zero contour must be selected for output; if other contours are selected, they are ignored. It is not possible to produce the standard PLOT4 and PLOT5 outputs during the same run as that of the shoreline position version. This version has no default specifications and when it is requested, all plot specifications must be supplied. PLOT4 (Fig. 11,b) will draw a dashline at the zero distance and only one profile line may be drawn on a single axis. PLOT5 (Fig. 12,b) draws no dashline and, while several lines may be depicted on a single plot, there is no provision for differentiating lines when a zero offset is used.

Table 20. Format and defaults for PLOT4 and PLOT5 specification cards.

| Position No. | Entry description | FORTTRAN format | Default value | Used by PLOT4 | Used by PLOT5 |
|--------------|--|-----------------|---------------|---------------|---------------|
| 1-4 | "PLOT" | A7 | None | Yes | Yes |
| 9 | Plot number (4 or 5) | I1 | None | Yes | Yes |
| 11 | Output unit for plot commands: 3 - cards 8 - magnetic tape | I1 | 3 | Yes | Yes |
| 12 | 0 or blank - use defaults (can be used only if output units are feet) 1 - read plot specifications 2 - plot change in shoreline position only; read plot specifications | I1 | Use defaults | Yes | Yes |
| 13 | 0 - contour 1 displayed 1 - contour 1 not displayed | I1 | 0 | Yes | Yes |
| 14 | 0 - contour 2 displayed 1 - contour 2 not displayed | I1 | 0 | Yes | Yes |
| 15 | 0 - contour 3 displayed 1 - contour 3 not displayed | I1 | 0 | Yes | Yes |
| 16 | 0 - contour 4 displayed 1 - contour 4 not displayed | I1 | 0 | Yes | Yes |
| 17 | 0 - contour 5 displayed 1 - contour 5 not displayed | I1 | 0 | Yes | Yes |
| 18 | 0 - contour 6 displayed 1 - contour 6 not displayed | I1 | 0 | Yes | Yes |
| 19 | 0 - contour 7 displayed 1 - contour 7 not displayed | I1 | 0 | Yes | Yes |
| 20 | 0 - contour 8 displayed 1 - contour 8 not displayed | I1 | 0 | Yes | Yes |
| 21 | 0 - contour 9 displayed 1 - contour 9 not displayed | I1 | 0 | Yes | Yes |
| 22 | 0 - contour 10 displayed 1 - contour 10 not displayed | I1 | 0 | Yes | Yes |
| 23 | 0 - contour 11 displayed 1 - contour 11 not displayed | I1 | 0 | Yes | Yes |
| 24 | 0 - contour 12 displayed 1 - contour 12 not displayed | I1 | 0 | Yes | Yes |

Table 20. Format and defaults for PLOT4 and PLOT5 specification cards.--Continued

| Position No. | Entry description | FORTTRAN format | Default value | Used by PLOT4 | Used by PLOT5 |
|-----------------|--|-----------------|--------------------------|----------------|---------------|
| 25 ¹ | "H" - time displayed in hours "D" - time displayed in days "M" - time displayed in months (new plot each year) "Y" - time displayed in years Horizontal axis (time): When time is in months, 26 to 42 may be blank. When time is in years, the year should be expressed as 19xx: | A1 | Time displayed in months | Yes | Yes |
| 26-32 | origin | F7.2 | January | Yes | Yes |
| 33-38 | increment (units per inch on plot) | F6.1 | 2 months | Yes | Yes |
| 39-42 | length in inches | F4.1 | 6.0 | Yes | Yes |
| | Vertical axis (distance): | | | | |
| 43-50 | origin | F8.2 | -450.0 | Yes | Yes |
| 51-57 | increment (units per inch on plot) | F7.2 | 150.0 | Yes | Yes |
| 58-61 | length in inches | F4.1 | 5.0 | Yes | Yes |
| 62-63 | Lines per plot (maximum 10) | I2 | 1 | Yes (must = 1) | Yes |
| 64-69 | Offset | F6.2 | 0.0 | No | Yes |
| 70-75 | Overlap: "OVLAP" - plots will be overlapped blank - plots will not be overlapped | A6 | No overlap | No | Yes |
| 76 | Factoring: 0 - no factoring 1 - factor plots | I1 | No factoring | Yes | Yes |
| 77-80 | Plot multiple contour intercepts: "MULT" - yes blank - no | A4 | No multiples | Yes | No |

¹This selection (time) must be the same for both plot types and agree with time selected on TABLE2, if any.

(4) Horizontal Axis. There are four ways in which time may be represented on the horizontal axis: hours, days, months, or years (Fig. 15). When time is represented in months, the user has no control over the origin, length, or increment on the horizontal axis. Positions 26 to 42 may be left blank.

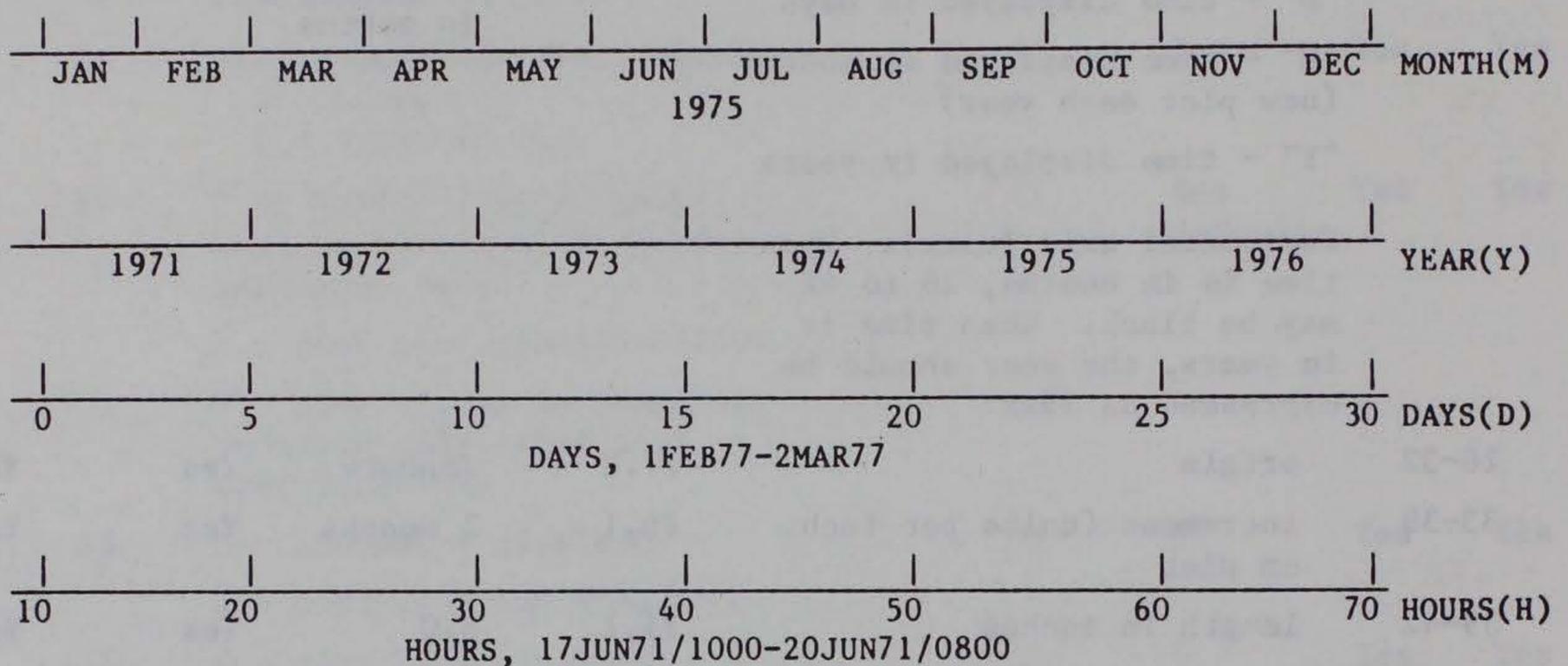


Figure 15. Types of time-elapsed axis available.

(5) Lines Per Plot. While data for only one profile line can be depicted on each PLOT4 output, data for up to 10 profiles may be displayed on each PLOT5 output. The number of lines per plot appears in the plot title describing how many profile lines are represented on the plot. It is possible, therefore, for the last plot for a given contour to contain data for less lines than indicated in the title.

(6) Offset (PLOT5 Only). When more than one profile is drawn on a single plot, the second and subsequent profiles may be offset. The offset will be added to vertical coordinates before additional lines are plotted. The offset may be positive or negative; no provision has been made for differentiating lines when a zero offset is used. The profile line with the largest number is drawn first and the others are offset.

(7) Overlap (PLOT5 Only). A new axis is automatically drawn when all data collected at a single profile line have been plotted. When the number of profiles drawn on a single plot (lines per plot) is greater than 1, the user may specify that plots be overlapped. The contour position at the last profile line drawn on each plot will be the first drawn on the next until all data for the contour have been plotted. The overlapped profile counts toward the number of lines per plot.

(8) Factoring. The factoring option is used to specify whether or not the final plot size is to be altered before being output. The user has no control over the factor used; this is determined by the length of the longer axis. When plots are factored, the x-axis will be no longer than 5 inches and

the y-axis no longer than 6 inches. Plot size will be increased if both axes are shorter and decreased if either is longer.

(9) Defining Axis Length, Increment, and Origin. The TABLE2 output from the module can be used to determine the best axis specifications. Since PLOT4 allows no offsetting, care should be taken that the length and increment allow sufficient space between the lines representing the various contours. If they do not, the elevations which label the lines may be overwritten. Distance to more landward contour positions must be considered when multiple intercepts are to be plotted. Allow an extra inch on both the horizontal and vertical axes so that the plot legend will not interfere with the plotted data. When a large number of plots are to be produced, some test plots should be run and examined before the final production run is submitted.

VII. SUMMARY

SURVY2 produces six tabular and two graphical displays. The major function of the module is to show the distance to defined contours and the changes in contour positions through time. Contour positions at specific profile lines and at a locality are displayed. If desired, special emphasis may be given to the movement of the zero contour, the shoreline position, including regression analysis of its change with time. The outputs have been designed so that they can be used in reports without being redrafted.

APPENDIX

SURVY2 RECORD LAYOUTS FOR OPTION, PROCESSING,
AND OUTPUT SPECIFICATION CARDS

Option Card 4, Format 1
 (must not be followed by SUP 4A cards)

(I1) (I4)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|-----|---|---|---|---|----|----|----|----|----|----|------------------|--|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|--|
| Use this format when horizontal datum is <u>not</u> user-supplied | | | | | | | | | | | | | | | Horizontal Datum | Reference Survey Number (if not first) Type 1 only | Horizontal Datum: 1 → Reference survey 3 → Mean shoreline 4 → Benchmark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | |
| OPT | | | | CRD | | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Fleming, Marilyn V.

Beach Profile Analysis System (BPAS). Volume IV. BPAS user's guide: analysis module SURVY2 / by Marilyn V. Fleming and Timothy J. Lawler.--Fort Belvoir, Va. : U.S. Army, Corps of Engineers, Coastal Engineering Research Center ; Springfield, Va. : available from NTIS, 1982.

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