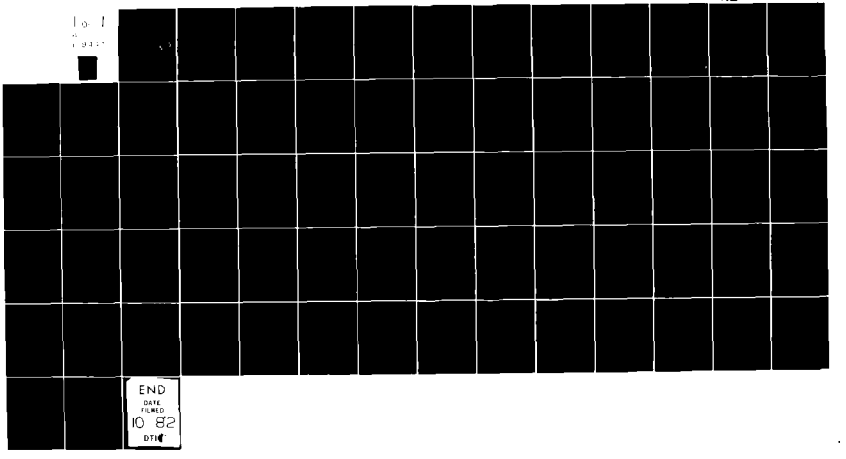
AD-A119 447 COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA F/G 8/6
BEACH PROFILE ANALYSIS SYSTEM (BPAS). VOLUME I. SYSTEM OVERVIEW--ETC(U)
JUN 82 M V FLEMING, A E DEWALL

UNCLASSIFIED CERC-TR-82-1-VOL-1 NL



END
DATE FILMED
10 82
DTIC

TR 82-1 (I)

AD A119447

Beach Profile Analysis System (BPAS)

Volume I

System Overview

by

Marilyn V. Fleming and Allan E. DeWall

TECHNICAL REPORT NO. 82-1 (I)

JUNE 1982

U.S. ARMY, CORPS OF ENGINEERS
COASTAL ENGINEERING
RESEARCH CENTER
Kingman Building
Fort Belvoir, Va. 22060

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER: TR 82-1 (I)	2. GOVT ACCESSION NO.: AD-A129 447
	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle): BEACH PROFILE ANALYSIS SYSTEM (BPAS) Volume I. System Overview	5. TYPE OF REPORT & PERIOD COVERED: Technical Report
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Marilyn V. Fleming, Allan E. DeWall	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Department of the Army, Coastal Engineering Research Center (CERRE-CS), Kingman Building, Fort Belvoir, Virginia 22060	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: C31194
11. CONTROLLING OFFICE NAME AND ADDRESS: Department of the Army, Coastal Engineering Research Center, Kingman Building, Fort Belvoir, Virginia 22060	12. REPORT DATE: June 1982
	13. NUMBER OF PAGES: 68
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	15. SECURITY CLASS. (of this report): UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Automated data processing
Beach evaluation program
Beach profile analysis system
Beach profile changes
Computer programs
Survey data analysis

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

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.

(continued)

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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. I), the first of eight volumes, contains an overview of the system programs, inputs, and outputs.

The report was prepared by Marilyn V. Fleming, Systems Analyst, 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.

The authors acknowledge the helpful discussions and review comments of Drs. C. Everts, C. Galvin, R. Hallermeier, and C. Vincent, and W. Birkemeier, M. Hemsley, T. Lawler, H.C. Miller, B. Sims, and P. Vitale.

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

Comments on this publication are invited.

Approved for publication in accordance with Public Law 166, 79th Congress, approved 31 July 1945, as supplemented by Public Law 172, 88th Congress, approved 7 November 1963.

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

CONTENTS

TABLES

FIGURES

CONTENTS

FIGURES--Continued

CONTENTS

FIGURES--Continued

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]

[1]To 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 I. System Overview

by
Marilyn V. Fleming and Allan E. DeWall

I. INTRODUCTION

This report, the first of eight volumes, describes the structure and use of the Beach Profile Analysis System (BPAS), a package of computer programs derived from computer programs developed over several years as a part of the Coastal Engineering Research Center (CERC) Beach Evaluation Program (BEP). In the course of the BEP, approximately 20,000 coastal profile line surveys were collected over a 15-year period at 23 localities along the U.S. east coast, gulf coast, west coast, and the coast of Lake Michigan (for background information, see Galvin, 1969[1]). These computer programs were also used to analyze laboratory survey data collected during CERC's Laboratory Effects in Beach Studies (LEBS) project (Stafford and Chesnutt, 1977[2]). The BPAS, the primary function of which is to compute and display shoreline and volmetric changes, was designed to analyze beach profile data and laboratory profile data with the objective of obtaining conclusions of value in coastal engineering. Volumes II to VIII are User's Guides and supporting information for the following routines:

(a) Volume II. BPAS User's Guide: The Editing Routines, EDIT1 and EDIT2 (Fleming and Lawler).

(b) Volume III. BPAS User's Guide: Analysis Module SURVY1 (Fleming and Lawler).

(c) Volume IV. BPAS User's Guide: Analysis Module SURVY2 (Fleming and Lawler).

(d) Volume V. BPAS User's Guide: Analysis Module BEACH (Fleming and Lawler).

(e) Volume VI. BPAS User's Guide: Analysis Module VOLCTR (Fleming and Lawler).

(f) Volume VII. BPAS User's Guide: Analysis Module ELVDIS (Fleming, Lawler, and French).

---

[1]GALVIN, C.J., "The CERC Beach Evaluation Program: Background," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished Sept. 1969.

[2]STAFFORD, R.P., and CHESNUTT, C.B., "Procedures Used in 10 Movable-Bed Experiments," Vol. I, MR 77-7, *Laboratory Effects in Beach Studies*, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., June 1977.

(g) Volume VIII. Support Appendixes for BPAS User's Guides (Fleming and DeWall).

Definitions of some of the coastal engineering terms used in these volumes are provided in Appendix A of Volume VIII. Volume III of the Shore Protection Manual (SPM) (U.S. Army, Corps of Engineers, Coastal Engineering Research Center, 1977[3]) provides a more comprehensive glossary. A bibliography of computer programs and explanatory documents developed for the BEP and LEBS from which the BPAS was derived is also provided.

II. SYSTEM OVERVIEW

1. Basic Input Data.

The BPAS computer programs were designed to edit and analyze survey data defining beach profiles and laboratory surveys. The basic data consist of pairs of distance and elevation measurements at stations along a profile line and the profile shape defined at the beach (Fig. 1). As a general rule, field surveys were made seaward from a semipermanent bench mark using a surveyor's transit or level, leveling rod, and measuring tape or stadia board. Horizontal distances were recorded from the bench mark, and elevations were recorded relative to a standard vertical datum, such as mean sea level (MSL).

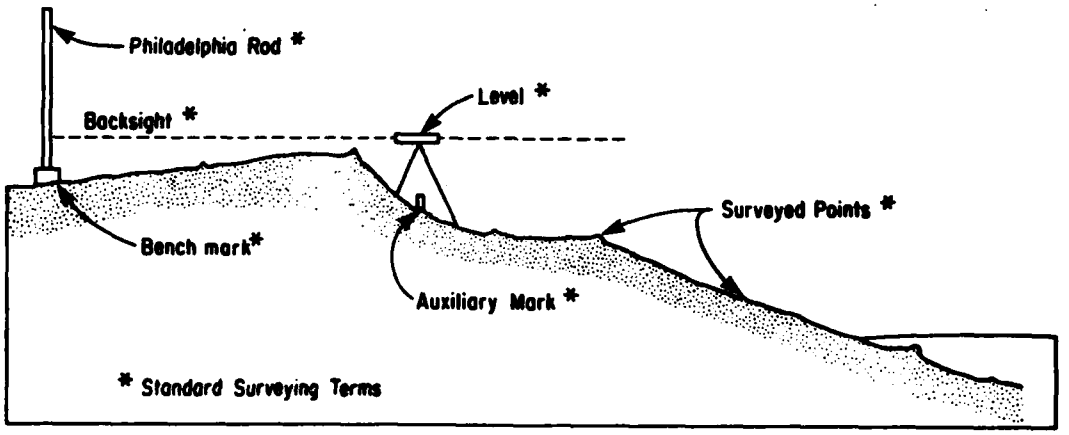


Figure 1. Essentials of typical profile survey.

After establishing the profile lines, careful surveys were made to obtain the initial beach profiles; i.e., initial cross sections of the beach in the direction of the profile line. In the field, periodic resurveys of each profile line were made at intervals varying from hourly to annually, with an

---

[3]U.S. ARMY, CORPS OF ENGINEERS, COASTAL ENGINEERING RESEARCH CENTER, *Shore Protection Manual*, 3d. ed., Vols. I, II, and III, Stock No. 008-022-00113-1, U.S. Government Printing Office, Washington, D.C., 1977, 1,262 pp.

average frequency of 8 to 12 surveys per year. Recently, special emphasis has been placed on obtaining surveys immediately before and after significant storms. Laboratory data were collected periodically according to the desired duration of the experiment.

Field data points have generally been recorded to the nearest foot (0.3 meter) of distance and the nearest tenth of a foot (0.03 meter) of elevation. Future data collection will be to the nearest one-half meter of distance and 5 centimeters of elevation; however, the BPAS allows data collection and analysis for field or laboratory model studies in either English or metric units.

The collected survey data were reduced and recorded on punchcards. Each survey record, defining one survey of one profile line, contains identifying information--locality, profile and survey number, date and time of survey, vertical datum to which data are referenced (Table 1) and units in which the data are recorded, and the distance and elevation coordinates. Appendix D in Volume VIII contains a listing of the survey data used to produce the sample outputs in this report.

Table 1. Vertical datum codes.

Code	Acronym	Description
0	SWL	Stillwater level
1	NGVD	National Geodetic Vertical Datum
2	MSL	Mean sea level
3	MTL	Mean tide level
4	MLW	Mean low water
5	MLLW	Mean lower low water
6	MHW	Mean high water
7	IGLD	International Great Lakes Datum
8	LWD	Low water datum
9	MLL	Mean lake level
A	User supplied	Other
D	Pier	Pier deck (or rail) is zero elevation

2. The BPAS.

The BPAS computer routines read the beach profile data (collected in the field or from the laboratory), edit the data, and perform requested analyses (Fig. 2). The initial editing routine, EDIT1, reads the input data file (Fig. 3) in the format described in Table 2 and performs a comprehensive edit. After the errors detected in the input data file have been corrected, the data are processed through the second editing routine, EDIT2. This program expects the input data in the same format as described for the EDIT1 routine and it performs a final edit and a preliminary analysis. The edited and partially analyzed data are written into another file, the final data file, for further analysis by the analysis routines. The final data file may be produced in one of two formats. One format, described in Table 3, was designed for punchcard or card image data (Fig. 4). The other (Table 4) was designed for data intended to be permanently stored on magnetic media; i.e., magnetic tape or disk. In either case, the first record in the final data file is the header record (Table 5) and the file should contain data from only one locality.

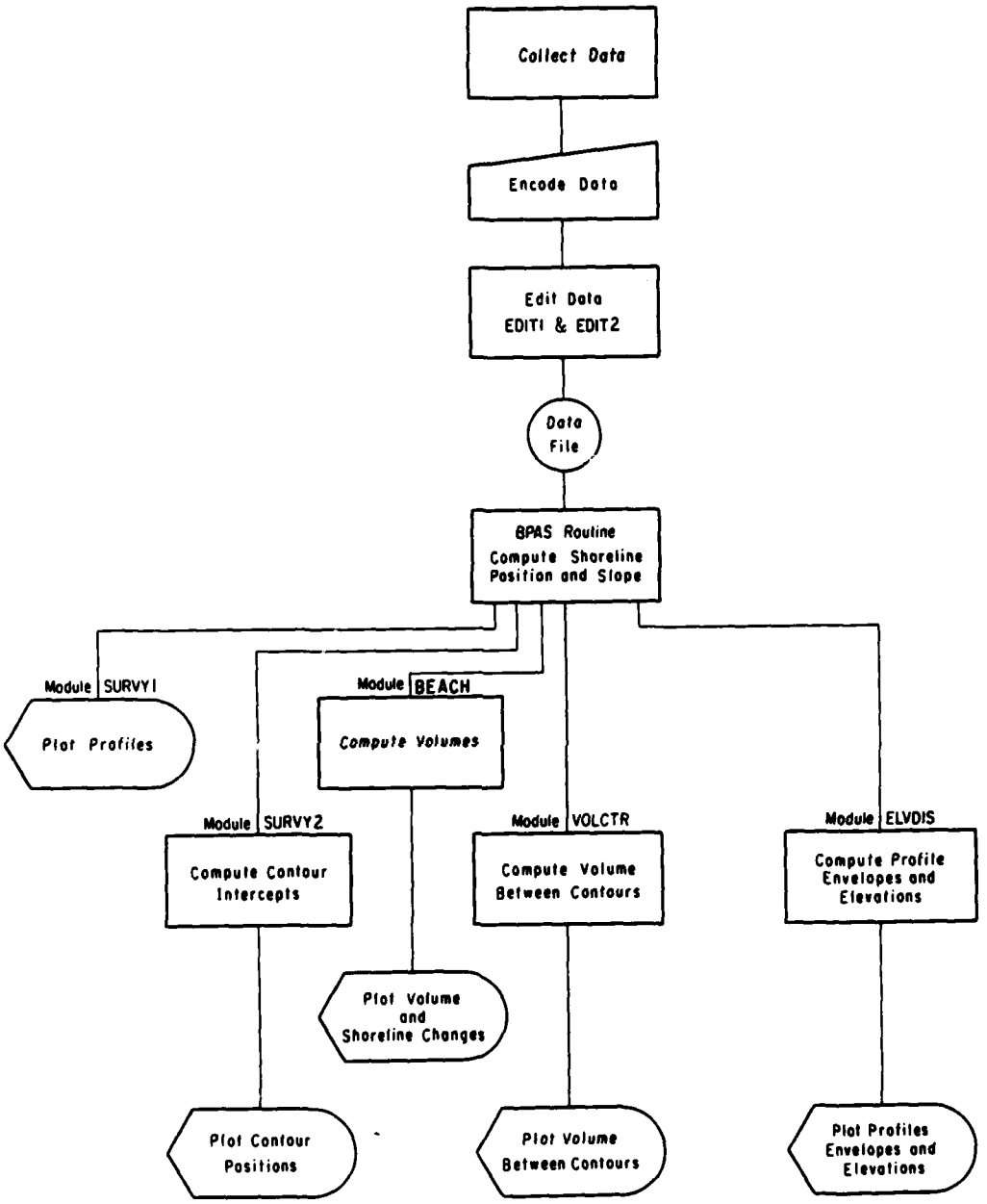


Figure 2. Beach Profile Analysis System.

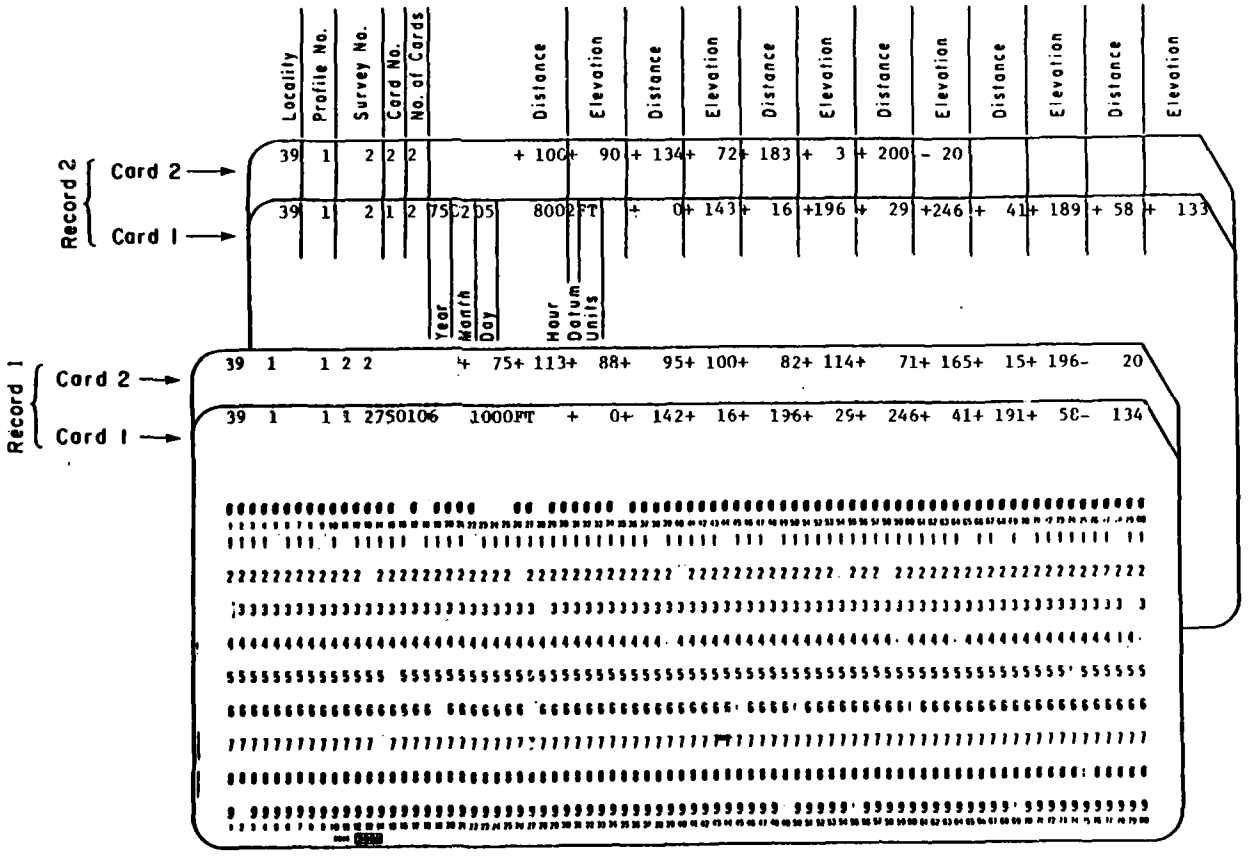


Figure 3. Format of input data file.

Table 2. Format of data in input data file.

Position No.	Entry description
	First card in each record
1-2	Locality code
3-5	Profile line number
6-9	Survey identification number
10-11	Card number (01)
12-13	Number of cards needed to complete the record
14-15	Year survey was performed
16-17	Month survey was performed
18-19	Day survey was performed
21-23	Hour survey was performed
24-25	Minute survey was performed
26	(Input) vertical datum code (Table 1)
27-28	Abbreviation for units of measurement in which data are recorded (FT, M, etc.)
31-35	Distance coordinate
36-40	Corresponding elevation coordinate
41-45	Distance coordinate
46-50	Corresponding elevation coordinate
51-55	Distance coordinate
56-60	Corresponding elevation coordinate
61-65	Distance coordinate
66-70	Corresponding elevation coordinate
71-75	Distance coordinate
76-80	Corresponding elevation coordinate
	Second and following cards in each record
1-2	Locality code
3-5	Profile line number
6-9	Survey identification number
10-11	Card number
12-13	Number of cards needed to complete the record
14-19	Blank
21-80	Six distance and elevation coordinate pairs, 5 positions per coordinate, no decimals.

Note.--The sign of the distance or elevation must be entered in the leftmost position if used (i.e., positions 21, 31, 41, 51, 61, 71 for distances; 26, 36, 46, 56, 66, 76 for elevation).

No decimals are entered; the placement of the decimal is defined elsewhere, as explained in User's Guides.

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

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

[1]Placement 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.

Table 4. Format of final data file, recorded on magnetic media.

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

Note.--Placement of decimal is defined on header record (see Table 5).

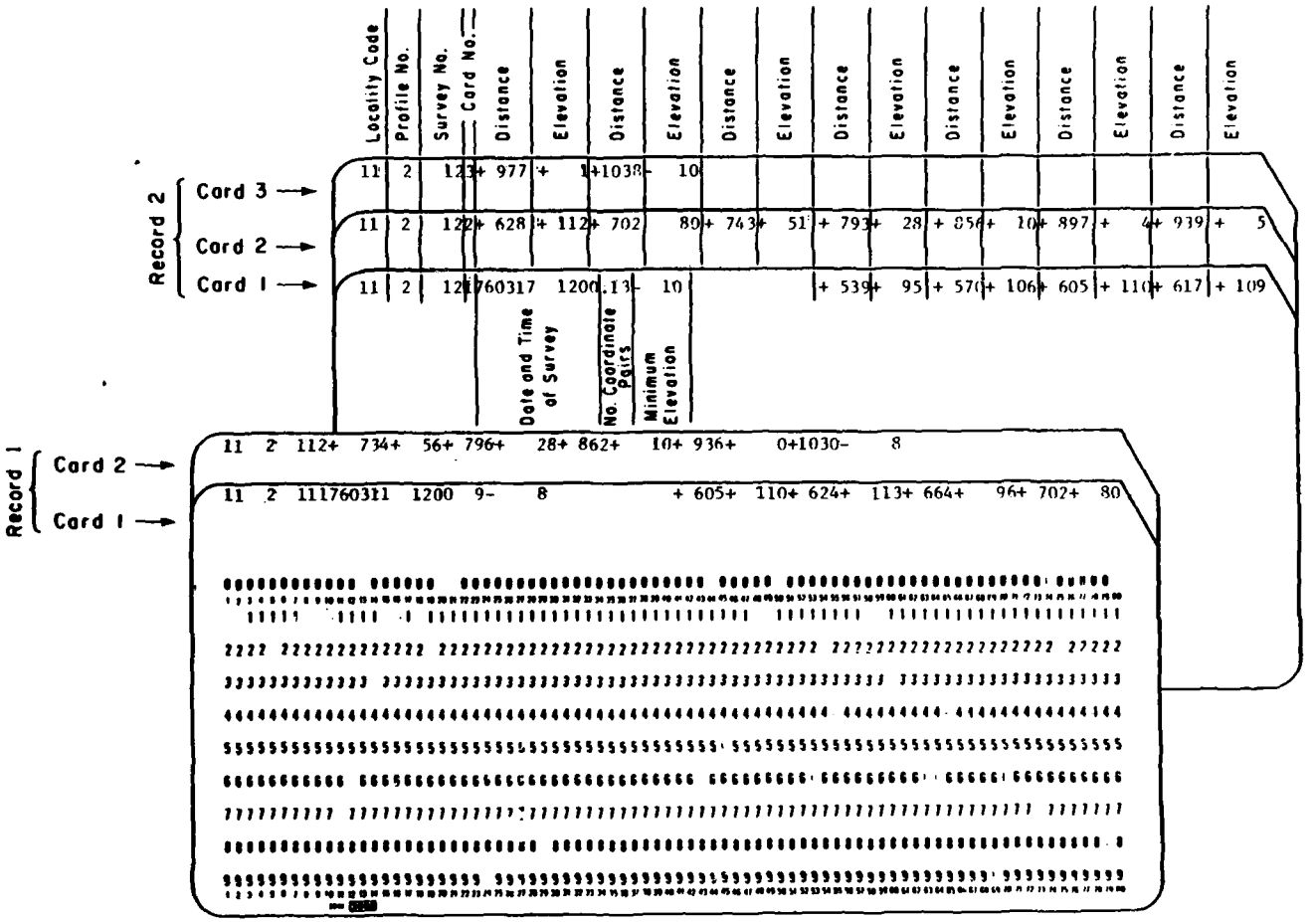


Figure 4. Format of final data file--card image data.

Table 5. Format of the header record.

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

The fundamental computations performed by the BPAS anslysis routines are as follows:

(a) Extrapolating shoreline position, if requested and required.

(b) Computing distances to given elevations.

(c) Determining the slope of the profile at the shoreline.

(d) Computing the temporal mean of distances to a contour position for a number of surveys of a profile line.

(e) Computing the spatial mean of distances to a contour position for a number of profile lines during a single survey.

(f) Computing the spatial-temporal mean of distances to a contour position of a number of surveys of a number of profile lines.

(g) Computing elevations at fixed distances.

(h) Determining the maximum and minimum elevations at fixed distances along a profile line.

(i) Computing unit volume--above the vertical datum, below the vertical datum, and within specified contour intervals.

(j) Computing the temporal mean of the unit volume for a number of surveys of a profile line.

(k) Computing correlation coefficient, least squares regression analysis and standard deviation.

(1) Determining elapsed time in hours, days, months, or years.

These computations, described in Appendix B of Volume VIII, are the basis of a comprehensive analysis of beach profile data. There are 12 basic tabular displays and 13 basic graphical displays produced by the 5 analysis routines.

3. Hardware and Software Requirements.

The programs in the BPAS were written in extended FORTRAN IV and designed to take advantage of processing features available on the Control Data Corporation Cyber 176, 6600, 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 DATA, 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 up to 66,000 (decimal) 60-bit words of core. Also required are the capabilities to process variable length records up to 635 characters long, to perform unformatted reads and writes, to access up to 7 unique units for input and output, and to utilize variable formats and variable input and output units in FORTRAN READ and WRITE statements.

The memory core and processing time requirements vary according to the amount of data and the program being run; these requirements are discussed for each program in the appropriate User's Guide. In the analysis modules, the program dimensions, initially set to handle up to 150 surveys of 100 profile lines defined with 60 coordinate pairs, are variable.

III. THE EDITING ROUTINES

1. EDIT1.

This program checks the input data file (Table 2) for two types of errors--those which may occur when the data are recorded or encoded, and those which may have been made by the surveyor. Although these conditions indicate possible errors, not all of them indicate an error in all cases.

a. Recording or Preparation Errors:

(1) Imbedded or trailing blanks in a coordinate field.

(2) A blank coordinate field followed by more coordinates.

(3) A distance coordinate followed by one which is less.

(4) A negative elevation coordinate followed by a positive one.

(5) An undefined vertical datum code or a vertical datum code which changes from one record to the next.

(6) Day of the month which is less than 1 or greater than 31.

(7) Identifying information (i.e., profile or survey number, survey date and time, etc.) for a record changing from one card to the next or a card which is missing or out of order.

(8) An hour of the day which is less than 00 or more than 23. (This error check is suppressed when the data are for an experiment using total hours elapsed as the time.)

(9) A minute of the hour which is less than 00 or more than 59.

(10) A month of the year which is less than 1 or more than 12.

(11) A year which is less than 31 or greater than 89 (arbitrary limit).

(12) A data point which cannot be represented within the range of the printer plot.

b. Possible Survey Errors. The expected values are supplied by the user. These should be carefully chosen to reduce the error messages for data not actually in error. Possible survey errors are as follows:

(1) An elevation change at the bench mark, or the first surveyed point, between consecutive surveys of a profile line which is greater than that expected.

(2) A first surveyed distance which is farther seaward than expected.

(3) A last surveyed elevation which is greater than expected.

(4) An elevation change between two consecutive surveyed points which is greater than expected.

(5) A distance from one surveyed point to the next which is greater than expected.

c. The Output. For demonstration, errors were deliberately placed in the input data to produce sample outputs in this section. The EDIT1 program will produce one of three types of output--a full edit, a partial edit, or an extensive error summary:

(1) The full edit produces the following information for each record in the input data file (Fig. 5) as well as a summary of the errors (Fig. 6):

(a) The record identifying information.

(b) The distance and elevation coordinates.

(c) A line-printer plot of the distance and elevation coordinates.

(d) A list of errors found in the record.

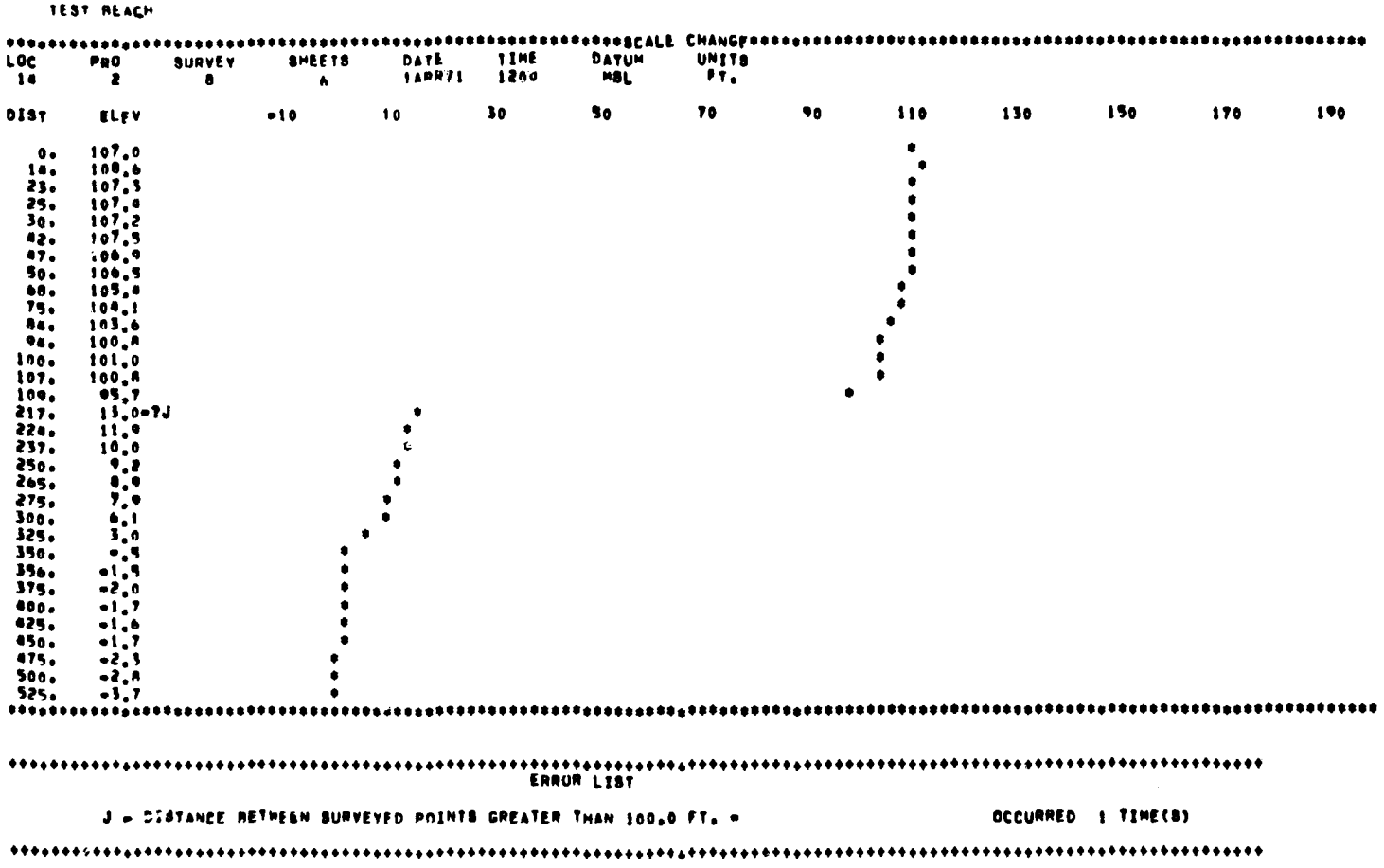


Figure 5. Sample EDIT1 output--printer plot (full or partial edit).

ERROR SUMMARY FOR LOCALITY 39 = TEST BEACH

ERROR TYPE	DESCRIPTION OF ERROR	OCCURRENCE OF ERROR
B	BLANKS FOUND IN ELEVATION VALUES	1
D	DISTANCE VALUES NOT IN ASCENDING ORDER	1
E	THE FIRST POINT ELEVATION CHANGE WAS GREATER THAN 1.00 FT.	1
G	FINAL ELEVATION GREATER THAN =1.00 FT.	9
H	ADJACENT ELEVATION VARIANCE GREATER THAN 10.00 FT.	4
J	DISTANCE BETWEEN SURVEYED POINTS IS GREATER THAN 50.00 FT.	8
K	CHANGE IN DATUM BETWEEN SURVEYS	1
		25 TOTAL ERRORS

LOCALITY	INITIAL CARDS	CONTINUATION CARDS
39	180	604

Figure 6. Sample EDIT1 output--summary page (full or partial edit).

(2) The partial edit produces the same type of output as the full edit (Figs. 5 and 6), but only for those records during which at least one error occurred.

(3) The extensive error summary (Fig. 7) produces a listing of each type of error that occurred, the profile line number and survey identification number for which it occurred, and the total number of times it occurred. No printer plots are output.

2. EDIT2.

Although the EDIT2 program performs some editing of the input data file, its major function is to perform preliminary analysis, produce preliminary outputs, and produce the header record (Table 3) and the final data file (Tables 4 and 5). It may also be used to produce a final data file by updating or extracting data from an existing file.

The printed outputs, all optional, available from program EDIT2 include:

(a) List of error messages.

(b) Tables of the maximum and minimum distance and elevation surveyed at each profile line (Fig. 8).

(c) Tables of the maximum and minimum surveyed distance and elevation during each survey for all the profile lines (Fig. 9).

(d) Overall maximum and minimum distance and elevation.

(e) Table of the surveyed distance and elevation coordinate pairs (Fig. 10).

(f) Table of the number of surveys taken at each profile line during each month of each year covered by the data (Fig. 11).

IV. THE ANALYSIS ROUTINES

After editing is completed, the data on the final data file may be processed through the selected analysis routine. The analysis part of the BPAS is composed of a main routine and several subroutines; the subroutines called during program execution depend on the analysis to be performed. The initial routines, those which read the options, specifications, and data and prepare the data for final analysis, are processed regardless of the analysis to be performed. These routines will be referred to as the BPAS routines and each set of subroutines required to perform a specific analysis will be called an analysis module and referred to by the appropriate name:

SURVY1--Produces various tabular and graphical displays of beach profiles.

SURVY2--Produces various tabular and graphical displays of beach contour position changes.

BEACH--Produces various tabular and graphical displays of beach shoreline and volmetric changes.

```
                    ERROR SUMMARY FOR LOCALITY 39 -  TEST BEACH
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

   ERROR TYPE B - BLANKS FOUND IN ELEVATION VALUES
                 PROFILE             SURVEY              OCCURRENCE
                 -------             ------              ----------
                     1                  1                     1
                 -------------------------------------------------
                                                                   TOTAL OF ERROR TYPE B IS    1

   ERROR TYPE D - DISTANCE VALUES NOT IN ASCENDING ORDER
                 PROFILE             SURVEY              OCCURRENCE
                 -------             ------              ----------
                     1                  1                     1
                 -------------------------------------------------
                                                                   TOTAL OF ERROR TYPE D IS    1

   ERROR TYPE E - THE FIRST POINT ELEVATION CHANGE WAS GREATER THAN    1.00 FT
                 PROFILE             SURVEY              OCCURRENCE
                 -------             ------              ----------
                     1                  8                     1
                 -------------------------------------------------
                                                                   TOTAL OF ERROR TYPE E IS    1

   ERROR TYPE G - FINAL ELEVATION GREATER THAN    -1.00 FT
                 PROFILE             SURVEY              OCCURRENCE
                 -------             ------              ----------
                     1                  5                     1
                     2                  5                     1
                     3                  5                     1
                     4                  5                     1
                     6                  5                     1
                     7                  5                     1
                     8                  5                     1
                     9                  5                     1
                    10                  5                     1
                 -------------------------------------------------
                                                                   TOTAL OF ERROR TYPE G IS    9

   ERROR TYPE H - ADJACENT ELEVATION VARIANCE GREATER THAN  10.00 FT
                 PROFILE             SURVEY              OCCURRENCE
                 -------             ------              ----------
                     1                  1                     2
                     1                 10                     2
```

Figure 7. Sample EDIT1 output--extensive error summary.

```
                    ------------------------------------------------------
                                                                          TOTAL OF ERROR TYPE H IS     4


    ERROR TYPE J = DISTANCE BETWEEN SURVEYED POINTS IS GREATER THAN      50.00 FT
                    PROFILE            SURVEY              OCCURRENCE
                    -------            ------              ----------
                       1                  1                     1
                       3                  9                     1
                       6                 12                     1
                       8                  8                     1
                       8                 10                     2
                      10                 11                     1
                      10                 12                     1
                    ------------------------------------------------------
                                                                          TOTAL OF ERROR TYPE J IS     8


    ERROR TYPE K = CHANGE IN DATUM BETWEEN SURVEYS
                    PROFILE            SURVEY              OCCURRENCE
                    -------            ------              ----------
                      68                 16                     1
                    ------------------------------------------------------
                                                                          TOTAL OF ERROR TYPE K IS     1
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                                                                             GRAND TOTAL OF ERRORS IS     25


LOCALITY      INITIAL      CONTINUATION
               CARDS          CARDS
   39           180            604
```

Figure 7. Sample EDIT1 output--extensive error summary.--Continued

MAXIMUM AND MINIMUM DISTANCE (FT)/ELEVATION (FT ABOVE MSL) FOR SURVEYS OF LINE 10 AT TEST BEACH

SURVEY	DATE	MIN X	MAX X	MIN Y	MAX Y
1	6JAN75	0.0	371.0	-2.4	21.6
2	3MAR75	0.0	361.0	-2.0	21.4
3	28APR75	0.0	379.0	-2.0	21.4
4	2JUN75	0.0	383.0	-2.0	21.6
5	2JUL75	0.0	362.0	0.0	21.7
6	9SEP75	0.0	382.0	-2.7	21.5
7	28OCT75	0.0	397.0	-3.1	21.4
8	26NOV75	0.0	382.0	-2.8	21.4
9	5JAN76	0.0	392.0	-3.6	21.3
10	11MAR76	0.0	380.0	-2.0	21.6
11	7APR76	0.0	400.0	-2.6	21.6
12	9JUN76	0.0	390.0	-3.2	21.5
13	8JUL76	0.0	350.0	-2.5	21.7
14	27SEP76	0.0	372.0	-2.8	21.4
15	16DEC76	0.0	400.0	-2.0	20.8

FOR ALL SURVEYS AT LINE 10

MIN X	MAX X	MIN Y	MAX Y
0.0	400.0	-3.6	21.7

COMMON LANDWARD BOUND IS 0.0
COMMON SEAWARD BOUND IS 350.0

Figure 8. Sample EDIT2 output--maximum and minimum distances, elevations at a profile line.

MAXIMUM AND MINIMUM DISTANCE (FT)/ELEVATION (FT ABOVE MSL) FOR LINES DURING SURVEY 1 AT TEST BEACH

LINE	DATE	MIN X	MAX X	MIN Y	MAX Y
1	6JAN75	0.0	196.0	-2.0	24.6
2	6JAN75	0.0	250.0	-2.3	20.9
3	6JAN75	0.0	300.0	-2.0	18.5
4	6JAN75	0.0	324.0	-2.0	22.7
5	6JAN75	0.0	353.0	-2.0	23.1
6	6JAN75	0.0	369.0	-2.2	19.3
7	6JAN75	0.0	366.0	-2.6	22.3
8	6JAN75	0.0	358.0	-2.0	22.2
9	6JAN75	0.0	362.0	-2.3	22.7
10	6JAN75	0.0	371.0	-2.4	21.6

FOR ALL LINES DURING SURVEY 1

MIN X	MAX X	MIN Y	MAX Y
0.0	371.0	-2.6	24.6

Figure 9. Sample EDIT2 output--maximum and minimum distances, elevations during a survey.

DISTANCE (FT)/ELEVATION (FT ABOVE MSL) AT TEST REACH

LINE 1

SRVY	1	SRVY	2	SRVY	3	SRVY	4	SRVY	5	SRVY	6	SRVY	7	SRVY	8
0.	14.2	0.	14.2	0.	14.3	0.	14.2	0.	14.2	0.	14.2	0.	14.2	0.	14.4
16.	19.8	16.	19.7	16.	19.7	16.	19.6	16.	19.7	16.	19.6	16.	19.7	16.	19.2
29.	24.6	29.	24.7	29.	24.7	29.	24.6	29.	24.7	26.	23.9	29.	24.7	29.	24.8
41.	19.1	41.	18.7	32.	24.3	32.	24.0	32.	24.2	29.	24.6	41.	18.7	41.	19.2
58.	13.4	59.	13.3	37.	20.5	37.	20.9	43.	18.6	32.	24.3	58.	13.5	58.	13.7
75.	11.3	100.	8.8	44.	17.3	44.	17.7	55.	14.3	37.	21.0	77.	11.2	88.	10.7
88.	9.5	105.	8.2	57.	13.8	57.	13.5	78.	11.2	52.	14.8	100.	10.5	100.	10.1
100.	8.2	113.	6.7	73.	11.4	75.	11.0	100.	10.3	59.	13.5	116.	10.5	150.	7.6
114.	7.1	155.	3.1	91.	9.2	90.	9.4	119.	8.9	80.	11.1	127.	9.0	200.	1.2
165.	1.5	200.	-2.0	100.	8.8	100.	8.9	148.	6.7	100.	10.5	157.	4.4	230.	-2.2
190.	-2.0			124.	7.9	128.	6.9	175.	3.8	126.	10.1	191.	1.2		
				141.	6.5	150.	5.4	200.	1.6	134.	8.4	200.	.6		
				161.	4.0	166.	4.6	219.	-.7	158.	6.9	222.	-.3		
				182.	1.3	182.	2.4			186.	3.8	243.	-.6		
				200.	-1.3	200.	-.2			200.	2.1	257.	-1.1		
				207.	-2.0	205.	-.7			236.	-2.1	279.	-2.0		
						225.	-2.1								

LINE 1

SRVY	9	SRVY	10	SRVY	11	SRVY	12	SRVY	13	SRVY	14	SRVY	15
0.	14.2	0.	14.2	0.	14.3	0.	14.3	0.	14.4	0.	14.3	0.	14.4
16.	19.4	25.	83.8	25.	22.8	29.	25.1	25.	23.3	25.	23.4	25.	24.2
29.	24.8	27.	84.7	28.	24.7	60.	13.0	30.	25.0	30.	24.9	29.	25.1
41.	19.8	30.	84.8	51.	24.9	100.	9.1	50.	16.3	50.	15.6	50.	15.5
62.	13.0	33.	84.5	33.	24.5	150.	5.7	75.	11.8	75.	11.7	75.	11.8
83.	11.2	37.	80.6	38.	21.1	180.	2.3	100.	9.4	90.	9.4	100.	9.6
100.	10.3	50.	15.7	50.	18.2	200.	-1.6	125.	7.5	95.	8.2	104.	8.4
110.	8.9	60.	13.1	62.	13.1	232.	-2.5	150.	5.9	150.	6.8	125.	5.5
155.	6.1	75.	11.6	75.	11.7			175.	3.5	166.	4.6	150.	2.7
200.	1.3	100.	10.0	100.	10.4			200.	1.0	175.	2.8	175.	1.4
229.	-2.0	125.	6.9	115.	8.2			225.	-1.9	200.	.5	200.	-.4
		150.	4.3	125.	7.5			250.	-3.5	201.	-.1	225.	-1.8
		175.	2.2	150.	5.5					211.	-.7	235.	-2.5
		200.	.4	175.	3.4					215.	-2.0		
		225.	-1.4	189.	2.2								
		243.	-2.9	200.	1.5								
				213.	0.0								
				225.	-1.3								
				233.	-2.3								

Figure 10. Sample EDIT2 output--surveyed distance, elevation coordinates.

NUMBER OF SURVEYS FOR EACH MONTH AND YEAR AT LINE 1
AT TEST BEACH

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1975	1	0	1	1	0	1	1	0	1	1	1	0	8
1976	1	0	1	1	0	1	1	0	1	0	0	1	7
TOTAL	2	0	2	2	0	2	2	0	2	1	1	1	15

Figure 11. Sample EDIT2 output--number of surveys taken at each profile line.

VOLCTR--Produces various graphical and tabular displays of unit volume changes between specific contours for consecutive surveys.

ELVDIS--Produces graphical and tabular displays of elevation changes at fixed horizontal distances on a profile line and the maximum and minimum elevation at fixed horizontal distances on a profile line.

A set of options (Table 6) was developed to give the user greater flexibility in the processing of the data. Each option applies only to appropriate analysis modules; however, any option provided during processing of a module not requiring them will be ignored. There is a suitable value, the default, given each option which will be used when the option is not provided. The specifications consist of items which are unique to each analysis module. These provide such information as desired output formats, processing specifications, which analysis module is to be processed, and which outputs are to be produced. The only specifications required are the analysis identification and output selection; all others will be set to a suitable value if not provided. The specifications and their default values, as well as available options, are discussed in detail in the appropriate User's Guides.

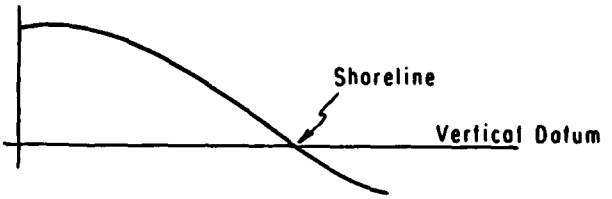
The data for which the BPAS was designed consist of beach profile data and the computations performed deal mainly with shoreline position changes and changes in unit volume above the vertical datum. This places the following restrictions on the data which can be processed by the system:

(a) Each survey must begin landward of the shoreline position.

(b) Distances to each successive surveyed point must be greater than or equal to the distance to the previous one.

Based on these restrictions, there are three types of profiles which can be analyzed by the system:

(a) Type 1. The profile extends from a point landward to a point seaward of the shoreline.



(b) Type 2. The profile extends only to the shoreline or the shoreline position can be extrapolated.

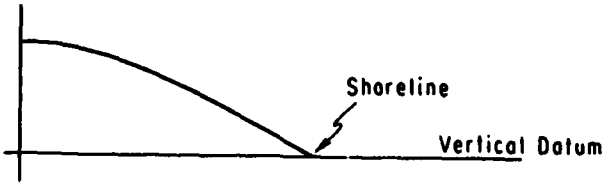


Table 6. Analysis options and their defaults.

Option	Default
Name of input horizontal datum	Bench mark
Name of line surveyed	Profile
Format of time on outputs	No time appears
Acronym for output vertical datum	As read from header record
Adjustment to be made to vertical coordinates to orient them to output vertical datum	0.0
Output horizontal datum	Shoreline position during first survey of each profile line
Amount by which horizontal coordinates must be adjusted to orient to output horizontal datum for each profile line	Distance to shoreline during first survey of each profile line
Unit volume to be used in computing changes in unit volume above vertical datum	Unit volume above vertical datum during first survey of each profile line
Landward bound to be used in computing unit volume above vertical datum for surveys at each profile line	Distance, *at or landward of* input horizontal datum, in common to all surveys of profile line
Unit volume to be used in computing changes in unit volume below vertical datum	No unit volume below datum computations will be performed
Seaward bound to be used in computing unit volume below vertical datum for surveys at each profile line	None
Description of data, for use in titles	As read from header record
Linear units in which output is to appear	As read from header record
Conversion factor to change input linear units to output linear units	1.0
Cubic units in which output is to appear	Cubic yards per foot if linear output is feet; cubic unit per unit otherwise
Conversion factor to change square output units to cubic output units	1/27 if output units are feet, 1.0 otherwise
Should the distance to shoreline be extrapolated	No
Minimum elevation from which extrapolation is considered valid	0.0
Format in which the final data file is to be read	Read data as formatted in Table 4 if input is card image; otherwise as in Table 5.

(c) Type 3. The profile does not extend to the shoreline and the shoreline position cannot be extrapolated.

1. The BPAS Routines.

These routines, common to all the analysis modules, read the option and specification cards, set suitable values for any not supplied, and produce a printed output of the options (Fig. 12) and specifications (Fig. 13). The user may opt to halt execution after these values are printed in order to verify and correct or change selected options and specifications. If execution is not halted, these routines go on to read the final data file, perform preliminary analysis and data preparation, create an interim data file, and call the appropriate analysis module.

The preliminary data analysis and preparation for each record include:

(a) Determining whether or not the shoreline position can be defined and if defined, computing the distance to the shoreline position and adding the position as a surveyed point.

(b) Determining whether the shoreline position was extrapolated and setting a flag if extrapolated.

(c) Computing the slope of the beach at the shoreline.

(d) Computing or finding the adjustment to be made to the distance coordinates to orient the coordinates to the selected output horizontal datum.

(e) Making any requested adjustment to the elevation coordinates to orient coordinates to the output vertical datum.

(f) Converting the distance and elevation coordinates to the requested linear output units and appropriately placing the decimal in the units.

(g) Determining the maximum elevation surveyed for each record.

(h) Computing the time elapsed since zero time in the appropriate units (hours, days, months, or years).

```
                    O P T I O N S          MAN RUN  02/12/81  AT  11.58.40.

ANALYSIS MODULE SELECTED-- BEACH

USER SELECTED RUN ID--    MAN

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 CO-ORDINATE.

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    2 PROFILE LINES.
THE INITIAL SURVEY OF EACH PROFILE LINE WILL BE THE REFERENCE SURVEY.

UNIT VOLUME ABOVE DATUM---

ZERO VOLUME ABOVE IS
THE UNIT VOLUME ON
REFERENCE SURVEY
THERE ARE NO MORE THAN    2 PROFILE LINES.
THE INITIAL SURVEY OF EACH PROFILE LINE WILL BE THE REFERENCE SURVEY.
PROFILE MUST BEGIN NO MORE THAN     120.000 FT SEAWARD OF BENCHMARK  TO BE CONSIDERED FOR VOLUME COMPUTATIONS.

VOLUME BELOW DATUM---

ZERO VOLUME BELOW IS
THE UNIT VOLUME ON
REFERENCE SURVEY
THERE ARE NO MORE THAN    2 PROFILE LINES.
REFERENCE SURVEY NUMBER IS   1R
PROFILE MUST  END  NO LESS THAN      1511.000 FT SEAWARD OF SELECTED HORIZONTAL DATUM TO BE CONSIDERED FOR VOLUME COMPUTATIONS.

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  YD3/FT

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

SURVEY INPUT DATA WILL BE READ FROM UNIT  7 IN THIS FORMAT--
(2X,I3,I4,3I2,I3,I2,I3,F5.0,F7.1,2(F5.0)
```

Figure 12. Sample output from the BPAS routines--options.

```
 SPECIFICATIONS SELECTED FOR ANALYSIS MODULE SURVY2            MAN RUN  03/11/81  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  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,
CONTOURS TO BE PLOTTED ON PLOT  4 (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,
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 13. Sample output from the BPAS routines--specifications.

(i) Converting the date and time read from each record into the appropriate format for output.

(j) Determining whether records should be eliminated from further processing.

No changes are made to the data in the final data file read by these routines. The data are altered appropriately as they are read and for each record qualifying for further analysis, the following is written into an interim data file:

(a) The profile line number.

(b) The survey identification number.

(c) The date and time of the survey (alphanumeric).

(d) The number of coordinate pairs (adjusted to include a coordinate pair identifying the shoreline position if it could be computed).

(e) The subscript of the coordinate pair identifying the shoreline position (if position exists).

(f) A flag indicating whether the shoreline position was extrapolated.

(g) The slope of the beach at the shoreline.

(h) The time elapsed since zero time.

(i) The year of the survey (numeric).

(j) The month of the survey (numeric).

(k) The minimum and maximum elevations in the record.

(l) The amount by which each distance coordinate was adjusted to orient the coordinate to the output horizontal datum.

(m) The adjusted distance and elevation coordinates.

The following pages provide a brief description of the processing and computations performed by each analysis module and the outputs they produce. It is stressed that these routines process data from the interim data file as created by the BPAS routines. All required adjustments will have been made to the distance and elevation coordinates before they are analyzed further. Also, some of the data may have been eliminated by the BPAS routines because further analysis is not possible and more may be eliminated by the analysis routines. When data are eliminated from processing, a message is written to explain which and why.

Some of the graphical displays have elapsed time on the horizontal axis. The user may have time displayed as hours, days, months, or years (Fig. 14). When months are chosen, 1 year of data will be displayed on each plot and

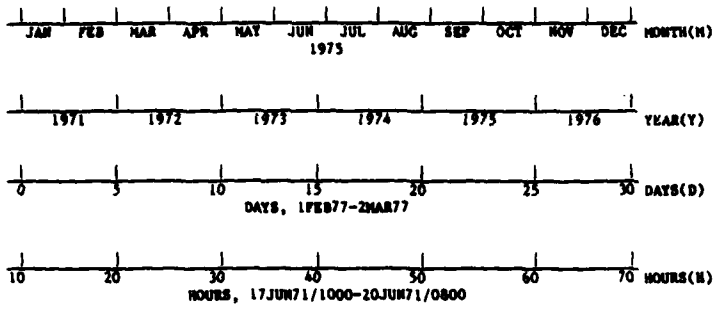


Figure 14. Types of time-elapsed axes available for graphical display

enough plots produced to display an entire range of data. Otherwise, the entire range of time covered by the data will be displayed on each plot. Also, some of the outputs display changes, described as a change from some reference value or a change from one survey to another. When changes are displayed, the reference value or the value during the earlier survey is subtracted from the value found during the current survey; a negative change suggests an erosional condition and a positive change suggests an accretional condition.

More detailed information concerning processing options and specifications and output selections and specifications is given in the appropriate User's Guides.

2. SURVY1.

This module does no data analysis other than that performed in the BPAS routines. It simply reads the data from the interim data file, sorts them, and produces the following outputs:

TABLE1--Distance to and slope of the profile at the shoreline for each survey of each profile line (Fig. 15).

KLJ RUN 01/21/81 AT 09.31.13. PAGE 1

DISTANCE TO AND SLOPE AT MSL FOR SURVEYS OF LINE 1 AT TEST BEACH
6JAN75/1000 - 19DEC76/0900

HORIZONTAL DATUM IS
THE SHORELINE POSITION ON
6JAN75/1000

DATE/TIME	DISTANCE(FT) TO MSL	SLOPE AT MSL
6JAN75/1000	0.000	-.113
3MAR75/1100	4.067	-.113
28APR75/1100	12.714	-.104
2JUN75/1100	20.330	-.100
2JUL75/1000	34.932	-.121
9SEP75/1500	39.714	-.117
28OCT75/0700	36.381	-.041
25NOV75/1100	32.303	-.113
5JAN76/1100	35.139	-.114
11MAR76/0800	27.270	-.072
6APR76/1400	34.714	-.115
6JUN76/1300	13.509	-.195
7JUL76/1200	30.335	-.116
27SEP76/0900	22.548	-.600
15DEC76/0900	16.159	-.072

Figure 15. Sample SURVY1 output--TABLE1.

PLOT1--Distance versus elevation plots of surveys of each profile line (Figs. 16 and 17). Up to 10 surveys of a profile line may be displayed on a single plot.

PLOT2--Distance versus elevation plots of profiles during each survey (Fig. 18). Up to 10 profile lines may be displayed on a single plot.

PLOT3--Distance versus elevation plots of consecutive surveys of profiles (Fig. 19). Comparative displays of up to 10 profile lines surveyed during consecutive surveys may be displayed on a single plot.

3. SURVY2.

Module SURVY2 reads data from the interim data file, then computes the distance to predefined contours, changes in contour position, and mean contour position for a number of profile lines during a given survey or for a single profile line during a number of surveys. If specified, the module will also compute and display the least squares fit regression line and correlation coefficient for distance to shoreline versus elapsed time. Outputs produced by SURVY2 are as follows:

TABLE2--Distance to selected contour positions during each survey of each profile line (Fig. 20). The seawardmost position is listed but in case of multiple intercepts, more landward positions will also be listed if requested (Fig. 21). The mean contour position and the percentage of the surveys for which the contour was defined at each profile line are displayed. This table will also display the correlation coefficient, the slope of the regression line and its intercept for the shoreline position versus time.

TABLE3--Change in distance to the seawardmost contour position from one survey of a profile line to the next (Fig. 22).

TABLE4--Change in distance to the seawardmost contour position from a specific survey of a profile line to each other (Fig. 23).

TABLE5--Average position of the seawardmost contour intercept at all profile lines during each survey. Also, the mean position of the contour at all profile lines for all surveys and the percentage of the surveys for which each contour was defined (Fig. 24).

TABLE6--Change in average position of the seawardmost contour intercept from a specific survey to each other (Fig. 25).

TABLE7--Change in average position of the seawardmost contour intercept from a specific survey to each other (Fig. 26).

PLOT4--Distance to seawardmost contour intercept versus elapsed time (Fig. 27). Up to 10 more landward, multiple intercepts will also be displayed if requested. The seawardmost intercepts are displayed with a solid line, the multiples as scatter plots. A special version of this output will generate plots of shoreline position only (Fig. 28). The distances to the position of up to 12 contours for each survey of a profile line will be displayed on each plot.

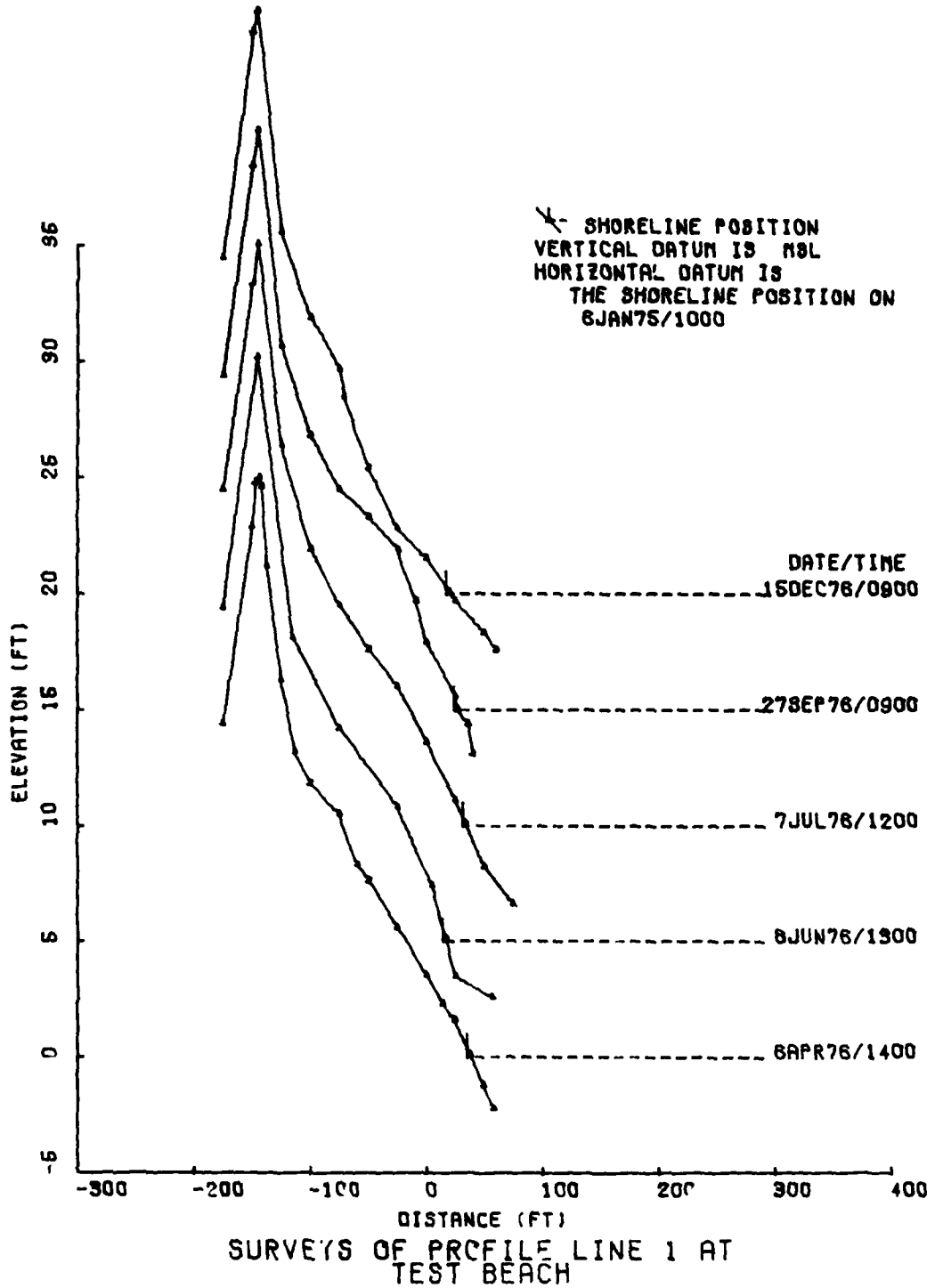


Figure 16. Sample SURVY1 output--PLOT1 (with offset).

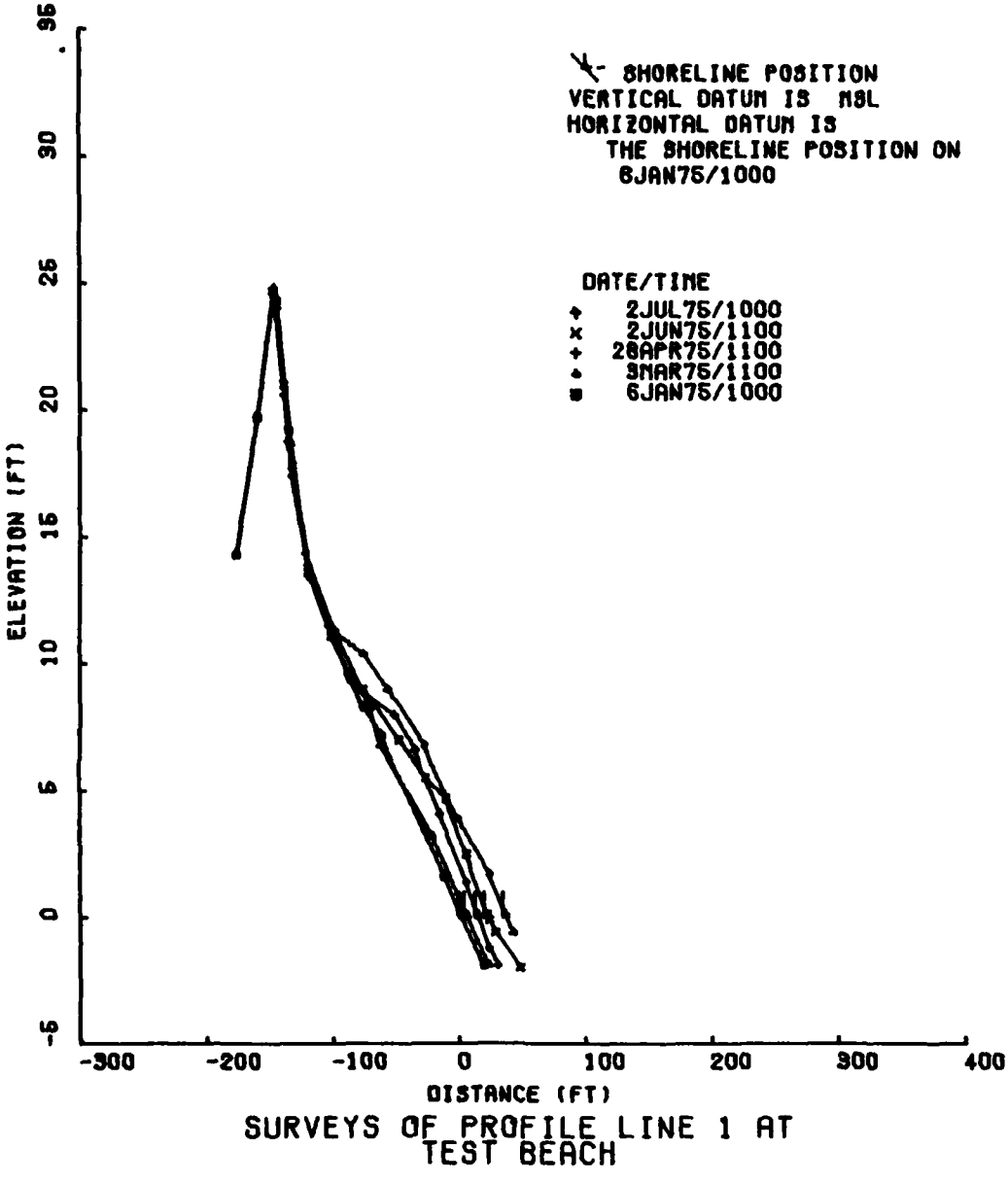


Figure 17. Sample SURVY1 output--PLOT1 (no offset).

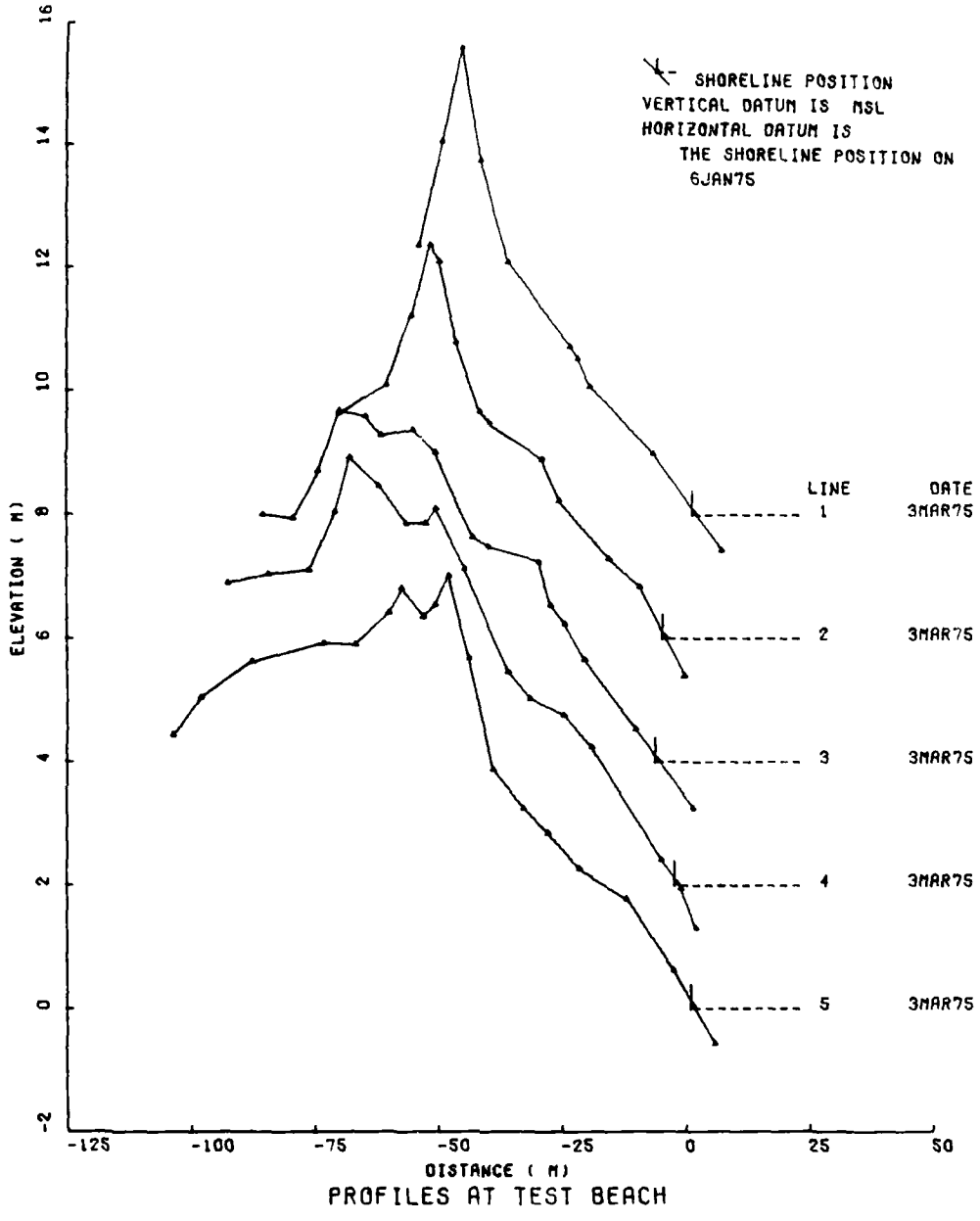


Figure 18. Sample SURVY1 output--PLOT2 (with offset).

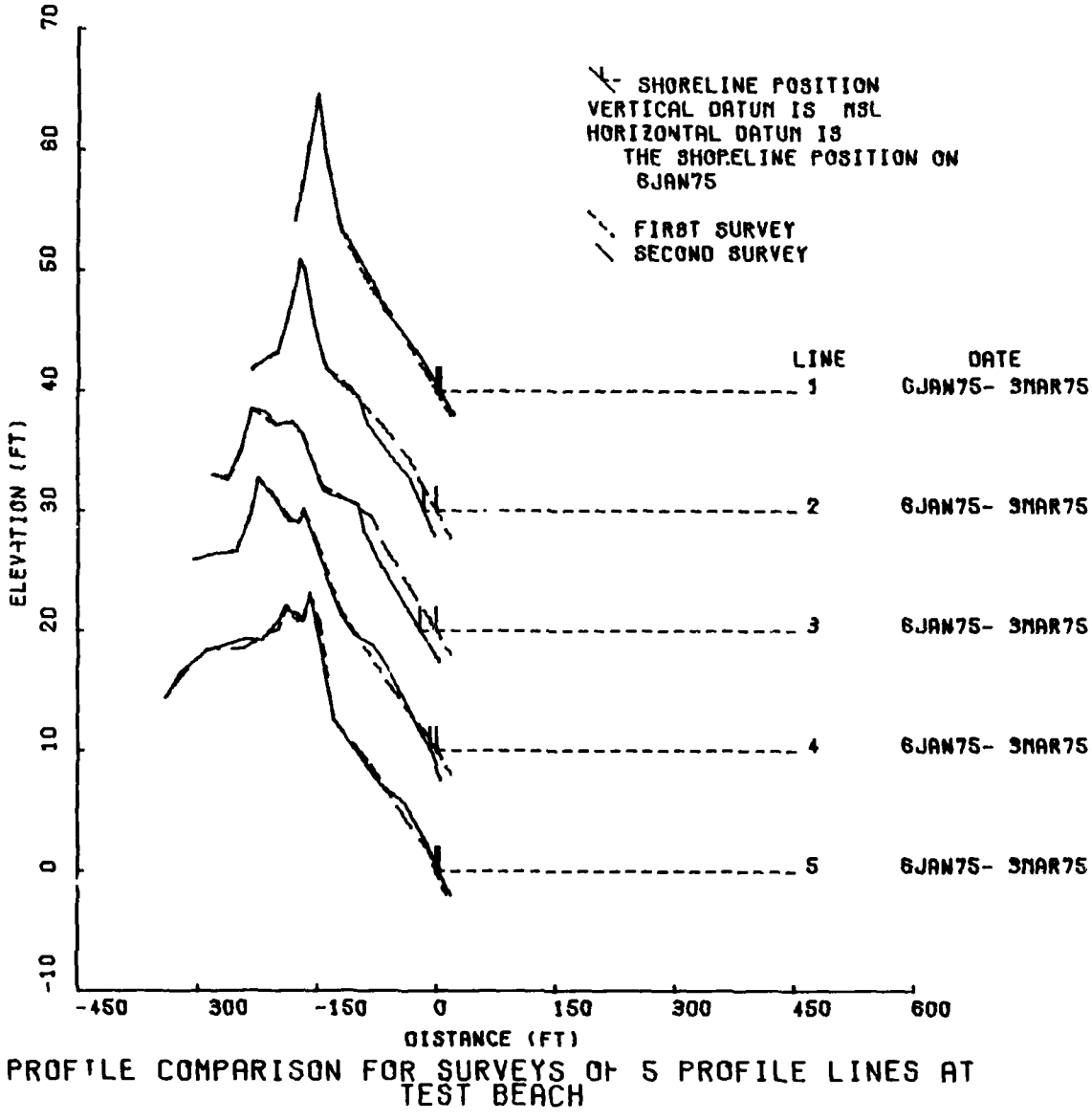


Figure 19. Sample SURVY1 output--PLOT3.

DISTANCE(M) TO CONTOURS 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	-15.04	-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	-7.06	-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	-25.74	-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	-18.64	-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 3.0938 M
R SQUARED VALUE IS .0222 R VALUE IS -.1488

Figure 20. Sample SURVY2 output--TABLE2 (seawardmost intercepts only).

DISTANCE(FT) TO CONTOURS ON BEACH AT PROFILE LINE 2
AT TEST BEACH
6JAN75/1000 • 15DEC76/0900

HORIZONTAL DATUM IS
THE SHORELINE POSITION ON
•JAN75/100n

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
6JAN75/100n	15.91	7.95	0.00	•7.95	•15.91	•23.13	•30.28	•41.42	•53.56	•78.83	•105.08	•139.10 •229.24
3MAR75/110n	•3.32	•9.49	•15.66	•21.83	•28.00	•37.30	•51.30	•62.29	•72.93	•89.70	•107.76	•139.11 •227.44
28APR75/110n	9.80	3.55	•2.70	•9.55	•16.78	•28.01	•37.70	•47.37	•56.70	•96.63	•119.83	•136.70 •229.04
2JUN75/110n	22.30	8.13	•1.70	•10.45	•19.26	•28.15	•36.85	•44.98	•52.27	•82.79	•121.20	•137.35 •229.04
2JUL75/100n			•8.08	•16.83	•25.58	•35.60	•48.60	•61.48	•74.06	•98.50	•116.45	•133.78 •226.78
9SEP75/150n	4.80	•1.45	•10.70	•20.70	•30.70	•41.52	•51.46	•61.16	•70.86	•91.74	•113.85	•136.70 •226.78
28OCT75/070n	•8.70	•14.37	•24.70	•35.17	•46.70	•56.84	•69.16	•79.80	•90.45	•108.93	•121.50	•133.80 •227.13
25NOV75/110n	•11.22	•18.53	•25.85	•33.29	•41.20	•49.12	•57.04	•64.95	•72.70	•104.67	•118.90	•133.45 •229.04
5JAN76/110n	•11.66	•21.20	•30.75	•38.32	•45.68	•53.03	•62.08	•72.83	•83.58	•105.04	•126.37	•139.68 •231.70
11MAR76/090n	•.04	•11.88	•20.50	•29.18	•38.70	•48.70	•59.09	•70.99	•82.79	•104.53	•124.70	•138.88 •228.30
6APR76/140n	4.37	•4.86	•19.20	•34.00	•45.99	•57.78	•68.49	•78.07	•86.89	•105.50	•124.30	•139.42 •226.04
8JUN76/140n	•4.40	•12.86	•21.32	•32.82	•46.35	•57.05	•67.44	•77.77	•87.97	•108.38	•127.20	•137.54 •228.98
7JUL76/120n	•3.70	•13.70	•23.70	•34.09	•45.99	•57.79	•68.66	•79.53	•90.80	•111.39	•127.02	•137.01 •229.43
27SEP76/100n	•14.59	•23.95	•34.38	•43.31	•52.24	•59.83	•66.08	•72.33	•78.58	•114.77	•130.90	•138.83 •229.43
15DEC76/090n	5.06	•9.65	•24.35	•40.63	•61.70	•86.88	•95.50	•104.12	•110.28	•120.48	•130.68	•138.42 •231.70
MEAN POSITION	.76	•8.78	•17.57	•27.21	•37.52	•48.14	•57.98	•67.94	•78.09	•101.46	•121.05	•137.32
PERCENT OCCUR	93.33	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 •.0388 FT / DAY

INTERCEPT AT •4.6229 FT
R SQUARED VALUE IS .5977 R VALUE IS .7731

Figure 21. Sample SURVY2 output--TABLE2 (all intercepts).

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

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	4.00	4.03	4.07	4.10	4.26	4.54	2.27	-.29	-2.85	3.52	4.68	1.51
3MAR75/1100	7.00	6.75	8.65	10.55	11.85	12.90	16.50	20.17	23.83	15.27	-4.61	-1.84
28APR75/1100	10.57	11.36	7.62	7.62	8.21	8.86	9.36	5.00	-3.80	-8.73	-.08	-1.20
2JUN75/1100			14.60	13.26	10.69	6.45	2.77	5.83	13.32	18.26	19.70	4.26
2JUL75/1000			4.78	4.47	5.40	8.50	11.06	11.33	11.61	9.54	22.40	-.66
9SEP75/1500	43.86	27.63	-3.33	-15.43	-18.36	-20.71	-22.94	-22.07	-19.56	-6.88	-6.80	-1.02
28OCT75/0700	-50.76	-34.79	-4.08	7.76	11.25	14.06	16.88	17.23	15.93	8.48	-17.67	4.61
25NOV75/1100	.76	.80	.84	.87	-.31	-1.88	-3.44	-5.00	-6.56	-13.46	1.43	-1.33
5JAN76/1100	3.20	-.77	-5.87	-10.97	-15.66	-18.59	-21.12	-22.04	-22.28	-12.41	-3.43	-2.67
11MAR76/0800	-1.60	2.79	7.44	12.67	14.37	14.19	14.29	12.68	10.10	1.73	2.73	1.21
6APR76/1400	-16.38	-25.31	-21.21	-17.67	-10.60	-5.84	-2.86	.22	1.84	-1.68	-11.96	-1.96
8JUN76/1300	12.34	20.32	16.83	13.33	8.46	6.18	4.79	3.20	2.85	2.24	2.98	3.63
7JUL76/1200	-11.56	-5.32	-7.79	-5.43	-6.30	-6.00	-.79	3.72	7.38	10.15	-.27	-.81
27SEP76/0900	12.86	-1.21	-6.39	-14.01	-20.23	-26.88	-31.50	-35.21	-35.56	-21.86	1.98	.57
15DEC76/0900												

Figure 22. Sample SURVY2 output--TABLE3.

CHANGE IN DISTANCE(FT) TO CONTOUR POSITIONS AT PROFILE LINE 1
AT TEST BEACH
(DISTANCE = DISTANCE ON 0JAN75/1000)
0JAN75/1000 = 15DEC76/0900

HORIZONTAL DATUM IS
THE SHORELINE POSITION ON
0JAN75/1000

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
0JAN75/1000	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	-.29	-8.85	3.52	4.68	1.51
28APR75/1100	11.00	10.78	18.71	14.45	16.11	17.44	18.77	19.88	20.98	18.79	.07	-.33
2JUN75/1100	27.57	32.14	20.33	22.26	24.32	26.30	28.13	24.88	17.18	10.05	-.01	-1.53
2JUL75/1000			30.93	35.53	39.01	32.75	30.91	30.70	30.50	28.32	19.68	2.73
9SEP75/1500	39.14	39.45	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	84.89	88.08	20.54	19.08	19.96	22.55	30.98	35.28	1.06
25NOV75/1100	32.24	32.27	32.30	32.34	33.30	34.60	35.89	37.19	38.48	39.45	17.61	5.67
5JAN76/1100	33.00	33.07	33.14	33.21	38.99	32.72	38.46	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	25.09	34.71	34.90	31.70	28.33	25.63	22.63	19.73	15.31	18.34	2.88
8JUN76/1300	18.22	9.78	13.51	17.24	21.09	22.48	22.77	23.08	21.57	13.63	6.38	.92
7JUL76/1200	30.56	30.10	30.33	30.57	29.55	28.66	27.56	26.25	26.42	15.88	9.36	4.56
27SEP76/0900	19.00	24.78	22.55	20.14	23.28	22.66	26.77	29.97	31.80	26.03	9.09	1.74
15DEC76/0900	51.86	23.57	16.16	11.13	8.02	-4.22	-4.73	-5.24	-5.76	4.16	11.07	4.32

Figure 23. 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
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		4.25	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		6.68	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 24. Sample SURVY2 output--TABLE5.

JDT RUN 05/19/82 AT 11.24.45. PAGE 1

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												
		-.78	-.30	-.10	-.30	-.62	-1.90	-1.76	-1.38	-.53	-.32	-.34
3MAR75												
		3.20	2.76	2.31	2.44	3.10	4.10	2.44	.47	.31	-.02	-.05
28APR75												
		1.37	.29	-.15	.22	-.12	-.52	-.44	.19	-.37	-.09	.07
2JUN75												
			.75	1.29	.68	-.02	.42	.90	1.40	1.57	.48	.20
2JUL75												
			-.11	-.39	-.06	.71	1.47	1.73	1.02	-.80	-.41	-.43
9SEP75												
	2.90 *	2.47	1.36	.52	-.58	-1.69	-2.02	-.47	.35	.47	.27	.30
28OCT75												
	-2.95 *	-1.29	-.46	.38	1.57	2.86	2.87	2.03	2.10	3.21	.38	.33
26NOV75												
	4.69 *	-2.23	-1.54	-1.28	-1.20	-1.20	-.69	-1.46	-1.34	-1.09	-.29	-.01
5JAN76												
	1.70 *	1.80	1.50	1.66	1.11	.42	.16	.74	.92	1.25	.81	.70
11MAR76												
		2.80	1.36	-.41	-.64	-.78	-1.10	-.63	.21	.07	.31	.26
7APR76												
		-2.29	-1.78	-.59	-.36	-.26	-.19	-1.41	-1.47	-1.30	-.45	-.86
9JUN76												
		-.58	-.48	-.66	-.36	-.69	-.44	-.20	-.06	.63	.60	.69
8JUL76												
		-2.15	-2.84	-3.04	-2.79	-.82	-.58	-.71	-2.17	-1.34	-.51	-.27
27SEP76												
		4.98	4.22	2.58	-.29	-1.84	-2.23	-2.12	.52	.15	1.12	.77
16DEC76												

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

Figure 25. Sample SURVY2 output--TABLE6.

JDT RUN 03/19/82 AT 11.24.45. PAGE 1

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 26. Sample SURVY2 output--TABLE7.

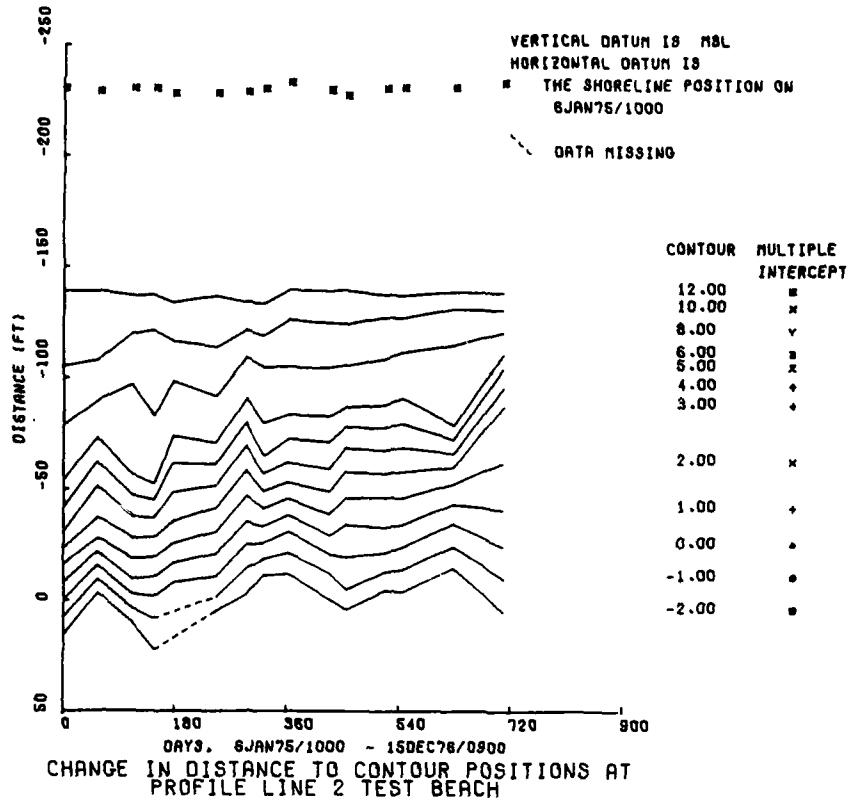


Figure 27. Sample SURVY2 output--PLOT4 (with position of multiple contour intercepts displays).

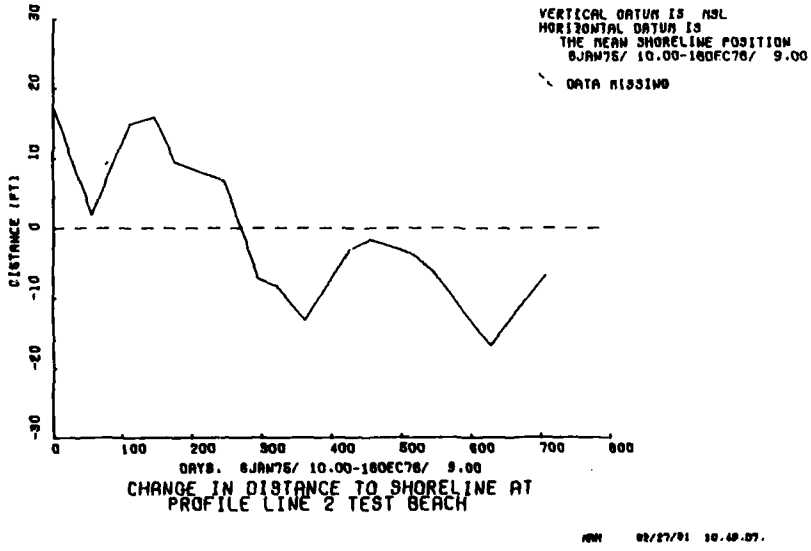


Figure 28. Sample SURVY2 output--PLOT4 (shoreline only).

PLOT5--Distance to the seawardmost intercept of selected contours versus elapsed time (Fig. 29). The special shoreline position plot is also available for this type of plot (Fig. 30). The distance to the position of a single contour during surveys of up to 10 profile lines may be displayed on each plot.

4. BEACH.

This analysis module reads data from the interim data file and computes common landward and seaward boundaries for all surveys of each profile line, unit volume above and below vertical datum, and changes in unit volumes and shoreline positions from the previous and reference values. It will also compute correlation coefficients and the slope and intercept of the linear regression line for unit volume and shoreline position changes. Outputs include:

TABLE8--For each profile line (Fig. 31):

(a) Distance to output horizontal datum from input horizontal datum.

(b) Distance to mean shoreline position from output horizontal datum.

(c) Mean unit volume above vertical datum.

(d) Mean unit volume below vertical datum.

(e) Boundaries for volume computations.

Then, for each survey of the profile line:

(a) Survey date and, optionally, time.

(b) Time elapsed between surveys of a profile line.

(c) Distance to shoreline position from the input horizontal datum.

(d) Distance to shoreline position from the output horizontal datum.

(e) Distance to the shoreline position from its position during the previous survey.

(f) Total unit volume above vertical datum.

(h) Change in unit volume above vertical datum from one survey to the next.

(i) Items f, g, and h are also displayed for unit volume below vertical datum when the option for such computations has been selected.

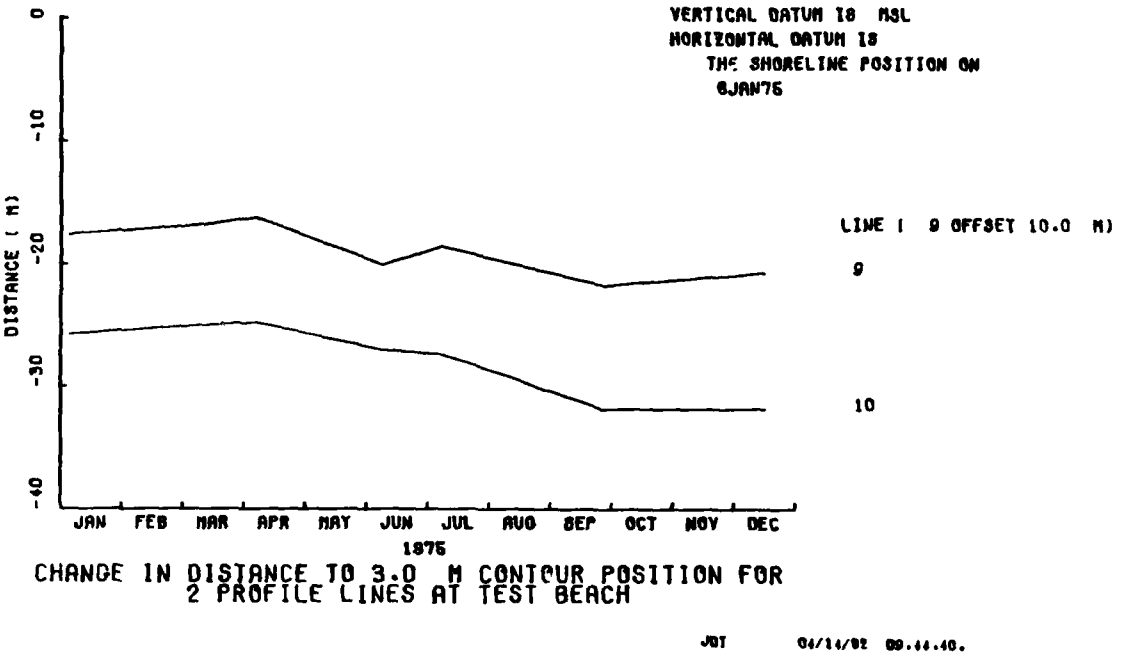


Figure 29. Sample SURVY2 output--PLOT5.

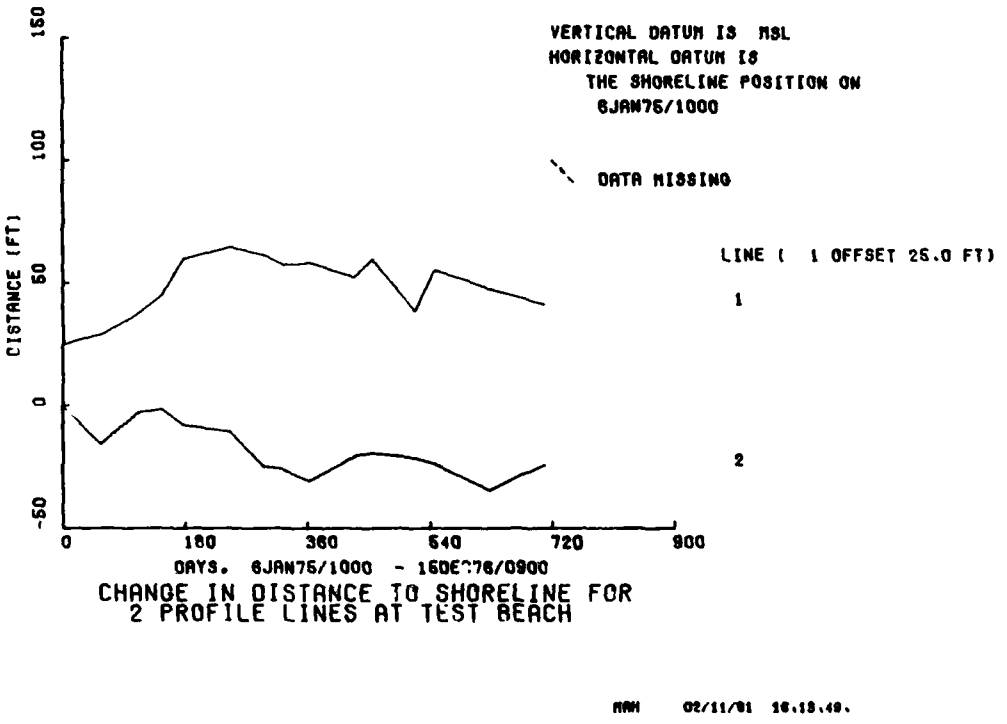


Figure 30. Sample SURVY2 output--PLOT5 (shoreline position only).

UNIT VOLUME (YD3/FT), DISTANCE (FT) TO SHORELINE AND CHANGES AT PROFILE LINE 8
AT TEST BEACH
6JAN75/ 10.00-16DEC76/ 9.00

REFERENCE HORIZONTAL DATUM IS THE SHORELINE POSITION ON 6JAN75/ 13.00

REFERENCE ZERO VOLUME ABOVE IS THE UNIT VOLUME ON 6JAN75/ 13.00

REFERENCE ZERO VOLUME BELOW IS THE UNIT VOLUME ON 6JAN75/ 13.00

DISTANCE FROM BENCHMARK TO HORIZONTAL DATUM 340.0 (FT)
DISTANCE TO MEAN SHORELINE POSITION FROM HORIZONTAL DATUM 10.8 (FT)
MEAN UNIT VOLUME ABOVE MSL 168.122 (YD3/FT)
MEAN UNIT VOLUME BELOW MSL 1296.221 (YD3/FT)

SURVEY DATE/TIME	MONTHS SINCE LAST SURVEY	SHORELINE POSITION DISTANCE FROM BENCHMARK	SHORELINE POSITION DISTANCE FROM HORIZONTAL DATUM	SHORELINE POSITION CHANGE FROM PREVIOUS SURVEY	UNIT VOLUME ABOVE DATUM CUBIC YD/FT	UNIT VOLUME ABOVE DATUM CHANGE FROM REFERENCE	UNIT VOLUME ABOVE DATUM CHANGE FROM PREVIOUS	UNIT VOLUME BELOW DATUM CUBIC YD/FT	UNIT VOLUME BELOW DATUM CHANGE FROM REFERENCE	UNIT VOLUME BELOW DATUM CHANGE FROM PREVIOUS
6JAN75/ 13.00	0.0	340.0	0.0		161.826	0.000		1296.091	0.000	
3MAR75/ 13.00	1.9?	351.7	11.7	11.7	162.659	.838	.838	1296.296	.206	.206
28APR75/ 13.00	1.8?	354.2	14.2	2.5	162.695	.270	-.565	1296.296	.206	0.000
2JUN75/ 18.00	1.1?	350.9	10.9	-3.7	163.997	2.173	1.902	1296.296	.206	0.000
2JUL75/ 18.00	1.0?	350.0	10.0	-1.9	162.906	1.080	-1.093	1296.296	.206	0.000
9SEP75/ 16.00	2.2?	361.0	21.0	3.0	166.466	4.641	3.561	1296.296	.206	0.000
28OCT75/ 9.00	1.6?	365.7	25.7	4.7	166.116	2.290	-2.351	1296.296	.206	0.000
26NOV75/ 10.00	.9?	365.9	25.9	.2	167.663	5.839	3.549	1296.296	.206	0.000
5JAN76/ 13.00	1.3?	354.6	14.6	-9.3	164.835	3.009	-.830	1296.296	.206	-.000
11MAR76/ 11.00	2.2?	363.4	23.4	8.8	169.163	7.339	2.330	1296.296	.206	0.000
7APR76/ 8.00	.9?	373.3	33.3	9.0	168.564	6.740	-.599	1296.296	.206	-.000
9JUN76/ 10.00	2.1?	365.2	25.2	-7.2	165.846	4.022	-2.718	1296.296	.206	.000
8JUL76/ 10.00	1.0	339.0	-1.0	-26.2	162.069	.244	-3.778	1296.077	-.013	-.219
27SEP76/ 14.00	2.6	331.9	-8.1	-7.1	156.989	-4.835	-5.079	1295.592	-.498	-.685
16DEC76/ 9.00	2.6?	368.1	28.1	36.2	163.683	1.019	6.693	1296.296	.206	.704

BOUNDARIES
ELEVATION AND DISTANCE

MSL TO 22.20 FT ABOVE MSL

MOST SEAWARD MSL INTERCEPT TO 0.00 FT FROM BENCHMARK

MSL TO -100.00 FT BELOW MSL

0.00 FT FROM BENCHMARK TO 10.00 FT FROM HORIZONTAL DATUM

Figure 31. Sample BEACH output--TABLE8.

In addition, when the TABLE8A specification (Fig. 32) is selected, the following will be computed and output for each profile line:

(a) Correlation coefficients for change in unit volume above the vertical datum to change in shoreline position from (1) the values during the previous survey and (2) the selected reference values.

(b) Correlation coefficients for change in unit volume above the vertical datum to change in unit volume below the vertical datum from (1) the unit volumes during the previous survey and (2) the selected reference unit volumes.

(c) Equation of the least squares fit regression line for change in shoreline position versus elapsed time.

(d) Equation of the least squares fit regression line for change in unit volume above the vertical datum from the selected reference unit volume versus elapsed time.

(e) Equation of the least squares fit regression line for change in unit volume below the vertical datum from the selected reference unit volume versus elapsed time.

PLOT7--Change in unit volume above the vertical datum from the selected reference volume (vertical axis) versus elapsed time (horizontal axis). Each profile line is represented on a separate plot (Fig. 33).

PLOT8--Same as PLOT7 except that change in unit volume below the vertical datum is on the vertical axis (Fig. 34).

PLOT9--Change in unit volume above the vertical datum from one survey of a profile line to the next (vertical axis) versus change in unit volume below the vertical datum from one survey of the profile line to the next (horizontal axis) (Fig. 35). This is a scatter plot and up to 10 profile lines, each represented by a different symbol, may be displayed on a single plot.

PLOT10--Change in unit volume above the vertical datum from one survey of a profile line to the next (vertical axis) versus change in shoreline position from one survey of the profile line to the next (horizontal axis) (Fig. 36). This is also a scatter plot. Up to 10 profile lines, each represented by a different symbol, may be displayed on a single axis.

5. VOLCTR.

Module VOLCTR reads the data from the interim data file, determines common boundaries for consecutive surveys of a profile line, and computes the change in unit volume within established horizontal segments of the profile from one survey to the next. A schematic of a segmented profile is provided in Appendix B (Fig. B-6), Volume VIII. These data are then sorted by survey pair and changes within the segments compared for all profile lines surveyed during the consecutive surveys; the average change (unweighted), total change, maximum change, and standard deviation of the unit volume change are computed for each

STATISTICAL CORRELATIONS FOR 15 SURVEYS OF PROFILE LINE 66
AT TEST BEACH
27JUL77/1400 = 22MAR79/1515

REFERENCE HORIZONTAL DATUM IS THE SHORELINE POSITION ON 28JUL77/1000

REFERENCE ZERO VOLUME ABOVE IS THE UNIT VOLUME ON 28JUL77/1000

REFERENCE ZERO VOLUME BELOW IS THE UNIT VOLUME ON 21OCT77/1430

CORRELATION COEFFICIENTS

	FROM PREVIOUS SURVEY	FROM REFERENCE
CHANGE IN UNIT VOLUME (YD3/FT) ABOVE MSL VS. SHORELINE POSITION (FT)	.4038	.7685
CHANGE IN UNIT VOLUME (YD3/FT) ABOVE MSL VS. CHANGE IN UNIT VOLUME (YD3/FT) BELOW MSL	.2447	.3396

EQUATION OF REGRESSION LINE (LEAST SQUARES FIT)

CHANGE IN SHORELINE POSITION VS. ELAPSED TIME

SLOPE OF REGRESSION LINE IS -.0575 FT/ DAY INTERCEPT AT -9.6411 FT

CHANGE IN UNIT VOLUME ABOVE MSL VS. ELAPSED TIME

SLOPE OF REGRESSION LINE IS -.0111 YD3/FT/ DAY INTERCEPT AT 1.2406 YD3/FT

CHANGE IN UNIT VOLUME BELOW MSL VS. ELAPSED TIME

SLOPE OF REGRESSION LINE IS .1144 YD3/FT/ DAY INTERCEPT AT -19.5600 YD3/FT

BOUNDARIES		
ELEVATION AND DISTANCE	MSL TO 23.50 FT ABOVE MSL	MSL TO -100.00 FT BELOW MSL
	MOST SEAWARD MSL INTERCEPT TO 120.00 FT FROM BENCHMARK	120.00 FT FROM BENCHMARK TO 1527.64 FT FROM HORIZONTAL DATUM

Figure 32. Sample BEACH output--TABLE8A.

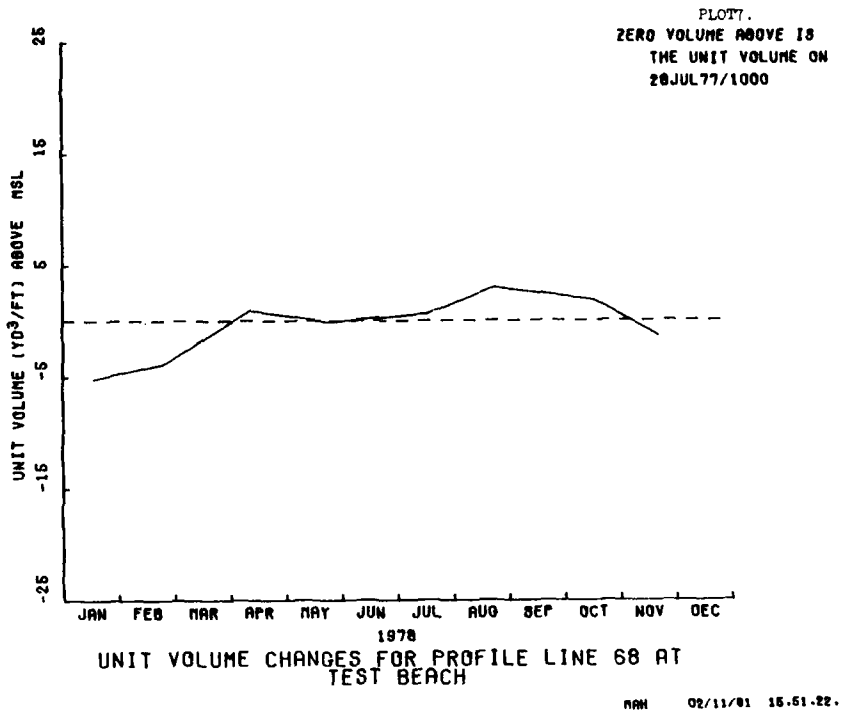


Figure 33. Sample BEACH output--PLOT7.

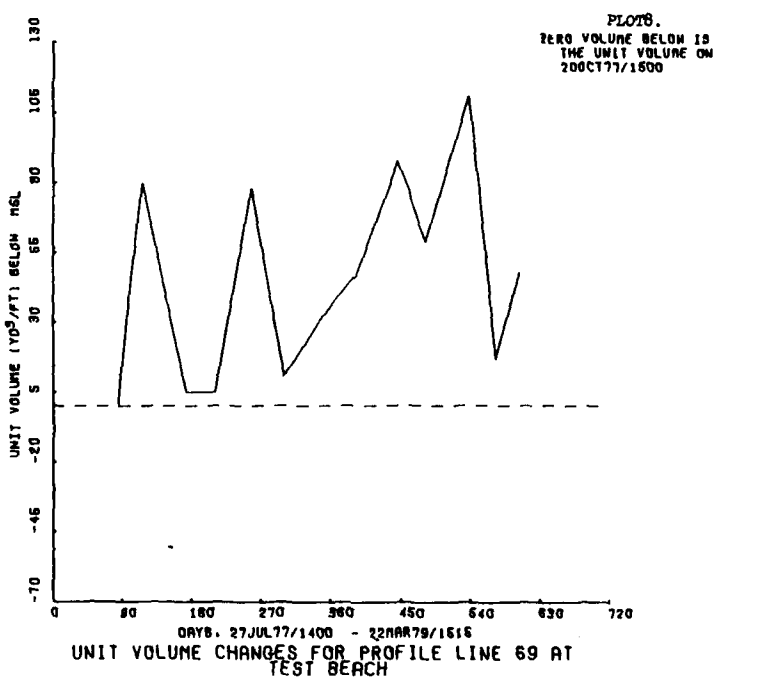


Figure 34. Sample BEACH output--PLOT8.

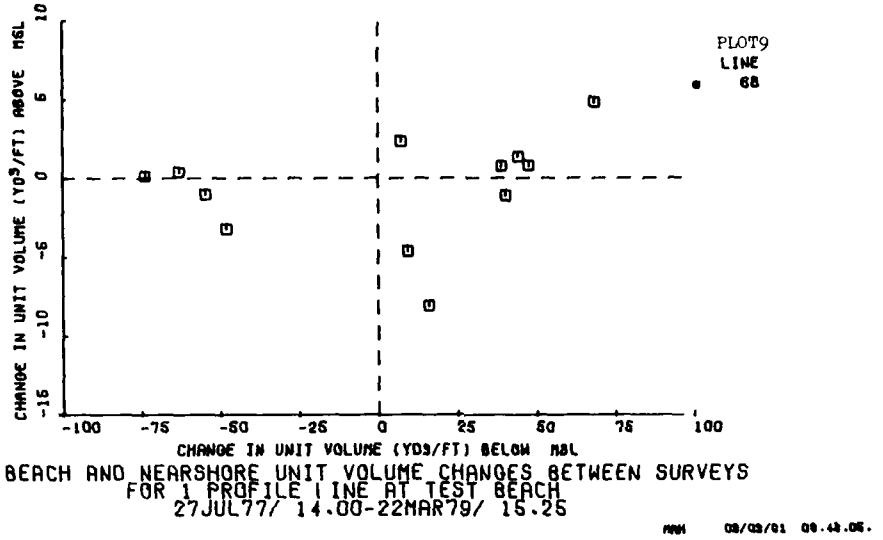


Figure 35. Sample BEACH output--PLOT9.

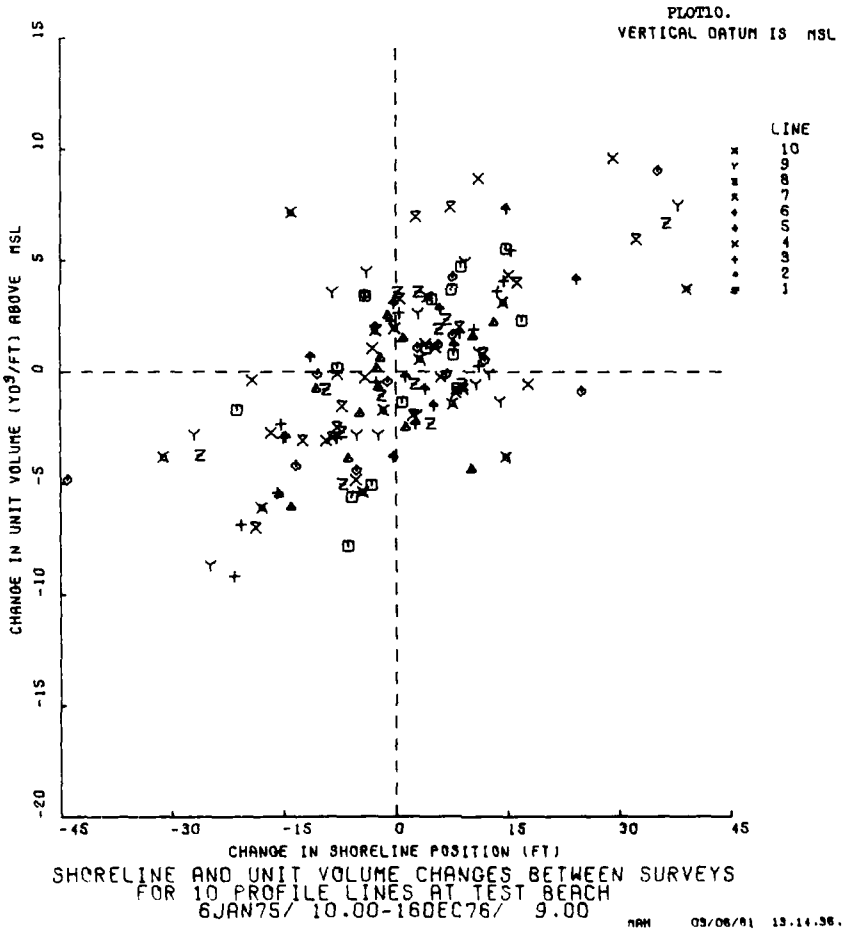


Figure 36. Sample BEACH output--PLOT10.

segment. The total, average, standard deviation, and maximum of the positive, negative, and total unit volume changes for all segments of each profile line are also computed. Outputs from this module include:

TABLE10--Total unit volume above and below the vertical datum for each survey of each profile line and boundaries, unit volume within established horizontal segments for consecutive surveys of the profile line, and changes in these unit volumes, total unit volume within the applicable segments for each of the two surveys, total change in the unit volume, and the boundaries for the unit volume computations (Fig. 37).

TABLE11--Unit volume changes between consecutive surveys for the profile lines surveyed during both surveys (Fig. 38). TABLE11 contains:

(a) Contours bounding the horizontal segments within which the unit volume changes are computed.

(b) Profile line number and change in unit volume in the established segments for the profile line.

(c) Total unit volume change at each segment for all the profile lines.

(d) Maximum change in magnitude, at each segment for all the profile lines considered.

(e) Average change within each segment for all profile lines.

(f) Standard deviation of the change within each segment, all profile lines.

(g) Percentage of profile lines for which there were sufficient data to compute a change for each segment.

(h) Total positive change at each profile line (sum all segments); sum, maximum, average, and standard deviation of these for all profile lines.

(i) Total negative change at each profile line (sum all segments); sum, maximum, average, and standard deviation of these for all profile lines.

(j) Total change at each profile line (sum all segments); sum, maximum, average, and standard deviation of these for all profile lines.

PLOT11--Change in unit volume from one survey of a profile line to the next (vertical axis) versus horizontal segment within which the unit volume change was computed (horizontal axis) (Fig. 39). Up to 10 comparative sets of surveys at a single profile line may appear on each plot.

PLOT12--Change in unit volume from one survey of a profile line to the next (vertical axis) versus horizontal segment within which the unit volume change was computed (horizontal axis) (Fig. 40). Up to 10 profile lines surveyed on both surveys may be displayed on each plot.

UNIT VOLUME(YDS/FT) CHANGE BY CONTOUR BETWEEN SURVEYS OF PROFILE LINE 1
AT TEST BEACH
6 JAN 75 - 15 DEC 76

HORIZONTAL DATUM IS
THE SHORELINE POSITION ON
6JAN75

TOTAL VOLUME ON 3MARTS ABOVE MSL	BELOW MSL	WITH DISTANCE BOUNDARIES OF	AND ELEVATION BOUNDARIES OF
76.708	14.161	-178.884 TO 81.716	-8.000 TO 84.700

CONTOUR (FT ABOVE MSL)	UNIT VOLUME(YDS/FT) BETWEEN CONTOURS ON 3MARTS (-178.89 TO 6.07) (0.00 TO 84.70)	ON 88APR75 (-178.89 TO 18.71) (0.00 TO 84.70)	CHANGE
0.00			DISTANCE BOUNDS
			ELEVATION BOUNDS
1.00	6.800	6.946	.155
2.00	6.869	6.668	-.01
3.00	6.937	6.396	-.458
4.00	6.867	6.107	-.960
5.00	6.139	5.815	-.079
6.00	4.705	5.519	-.815
7.00	4.288	5.203	-.921
8.00	4.027	4.778	-.743
9.00	3.791	4.003	-.210
10.00	3.467	3.290	-.177
11.00	3.130	2.976	-.154
12.00	2.793	2.684	-.109
13.00	2.455	2.432	-.023
14.00	2.170	2.187	.017
15.00	2.002	1.988	-.015
16.00	1.774	1.746	-.028
17.00	1.548	1.496	-.044

Figure 37. Sample VOLCTR output--TABLE10.

UNIT VOLUME(YDS/FT) CHANGE BY CONTOUR BETWEEN SURVEYS OF PROFILE LINE 1
AT TEST BEACH
6 JAN 75 - 15 DEC 76

HORIZONTAL DATUM IS
THE SHORELINE POSITION ON
6JAN75

CONTOUR (FT ABOVE MSL)	UNIT VOLUME(YDS/FT) BETWEEN CONTOURS ON 6JAN75	ON 15DEC76	CHANGE
17.00	1.311	1.265	-.046
18.00	1.089	1.078	-.011
19.00	.892	.881	-.007
20.00	.716	.705	-.011
21.00	.545	.556	.011
22.00	.375	.411	.036
23.00	.206	.266	.061
24.00	.048	.081	.040
25.00			
	70.705	75.475	4.670

Figure 37. Sample VOLCTR output--TABLE10.--Continued

UNIT VOLUME CHANGES (M3/ M) BETWEEN CONTOURS
FROM 2JUL75 TO 9SEP75
AT TEST BEACH

LINE	CONTOUR (M) ABOVE MSL												TOTAL		
	0.00	.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00	(+)	(-)	SUM
1	1.05 X	2.27	2.07	2.89	1.15	-.46	-.29	-.15	-.21	.08	-.00			10.10	-1.11	9.00
2	-.96	-.85	.80	1.27	-.10	-.39	.21	.26	.01					2.55	-2.29	.26
3	-.66	-.35	1.31	1.57	-2.02	-.33	-.51	-.36						2.88	-4.25	-1.38
4	.91	.94	1.09	1.12	-.07	-.20	-.72	.06	.05	-.10				4.18	-1.09	3.08
5	1.65	2.02	1.79	1.61	-.31	-.68	.32	-1.32	-.57	-.23				7.38	-3.11	4.27
6	-.03	-.92	-1.73	-2.17	-.02	.30	-1.15	-.22						.30	-6.24	-5.94
7	-3.81	-3.47	-.30	1.29	.07	-.27	.09	-.39	-.96	-.01				1.46	-9.21	-7.75
8	.69	2.06	2.97	1.91	.37	.32	.41	.44	.02					9.20	0.00	9.20
9	-1.22	-1.84	-.98	-.89	-.86	-.57	.10	-.25	-.75	-.06				.10	-7.43	-7.33
10	-.01	1.16	1.86	2.46	.08	-.00	-.28	-.08	-.16					5.56	-1.13	4.44
TOTAL	-2.39	1.01	9.49	11.06	-1.70	-2.87	-1.84	-2.02	-2.57	-.33	-.00			43.71	-35.86	7.85
MAX CHG	-3.81	-3.47	2.97	2.89	-2.02	-.68	-1.15	-1.32	-.96	-.23	-.00			10.10	-9.21	9.20
AVERAGE	-.24	.10	.95	1.11	-.17	-.29	-.18	-.20	-.32	-.07	-.00			4.37	-3.59	.78
STD DEV	1.56	1.91	1.54	1.52	.83	.35	.50	.47	.39	.11	0.00			3.56	3.11	6.31
% OCCUR	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	80.00	50.00	10.00					

X EXTRAPOLATED DATUM

Figure 38. Sample VOLCTR output--TABLE11.

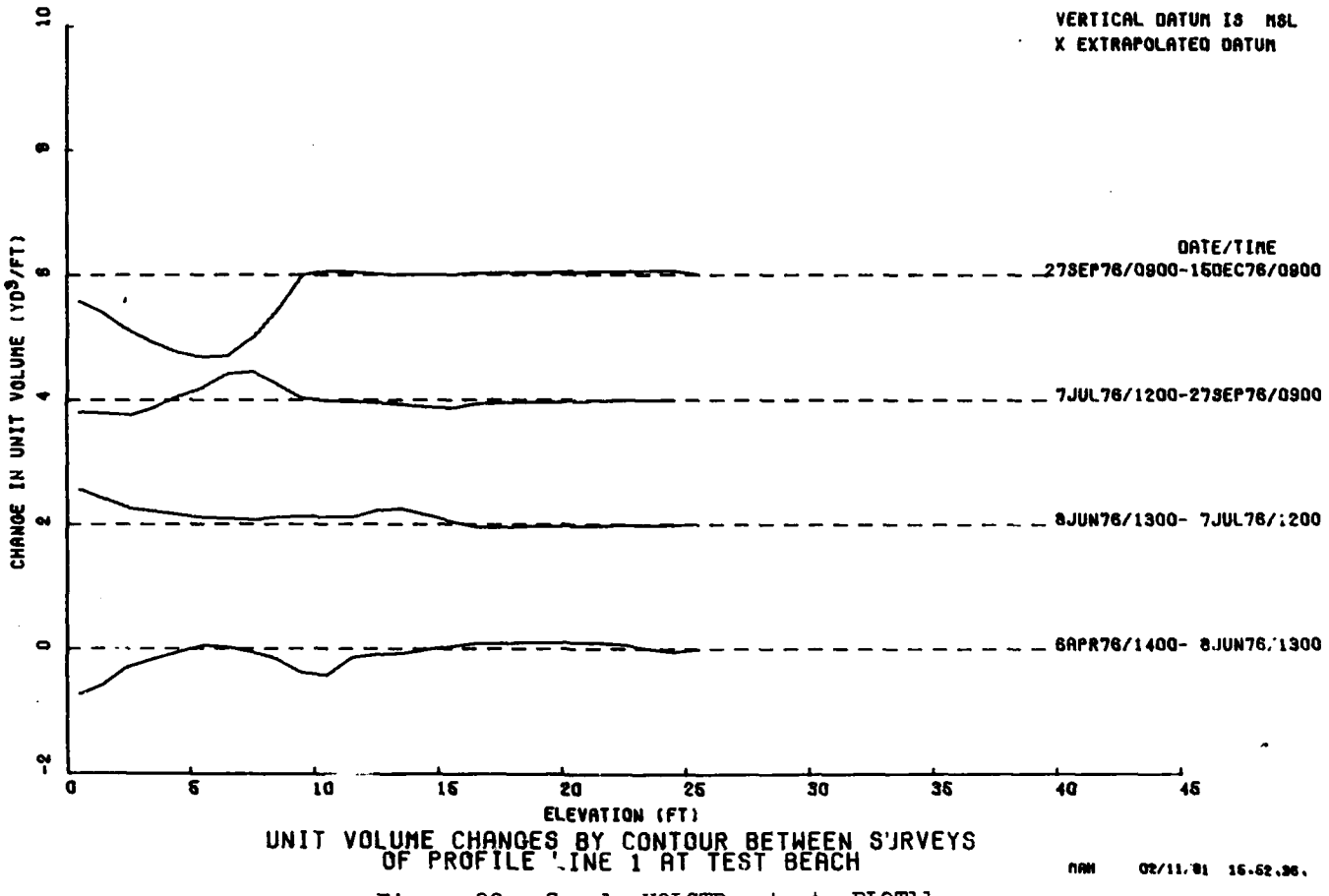


Figure 39. Sample VOLCTR output--PLOT11.

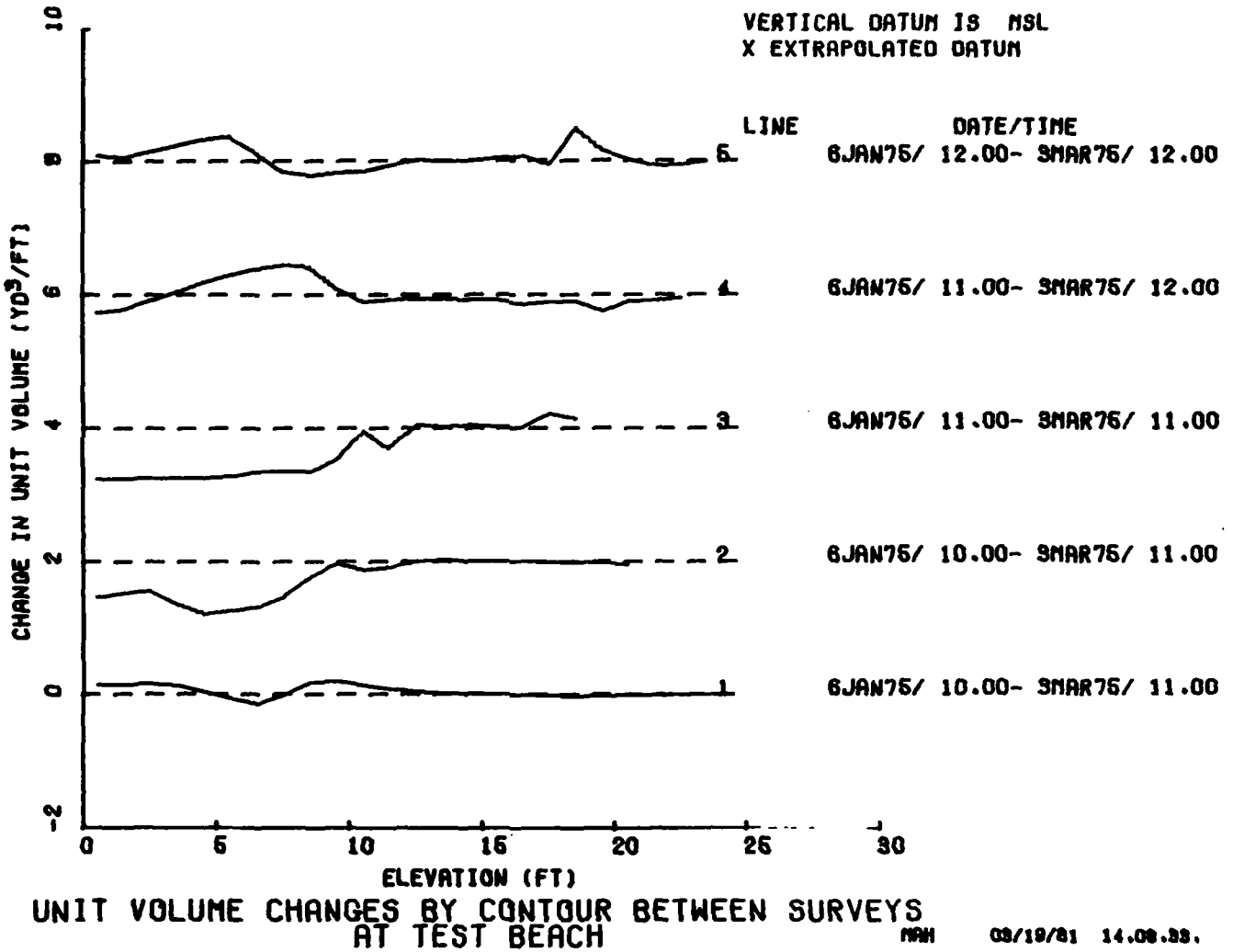


Figure 40. Sample VOLCTR output--PLOT12.

6. ELVDIS.

This analysis module computes maximum and minimum elevations at fixed horizontal distances along a profile line. These may be computed as the maximums and minimums for all surveys of the profile line or for each year. The elevation at fixed horizontal distances is also computed. Outputs are:

TABLE18--Elevations at fixed distances along a profile line (Fig. 41).

TABLE19--Maximum and minimum elevations at fixed distances along a profile line, yearly or for all data (Fig. 42). The date the maximum and the minimum occurred is also displayed.

PLOT19--Elevations at fixed distances along a profile line (vertical axis) versus elapsed time (Fig. 43). The elevations at up to 12 fixed distances during the surveys of 1 profile line only are displayed on each plot.

PLOT20--Maximum and minimum elevation (vertical axis) at each distance (horizontal axis) along a profile line (Fig. 44). Maximums and minimums may be yearly or for all data, but only one profile line may be displayed on each plot.

V. CONCLUSIONS

This volume has presented an overview of the BPAS, the input expected, the editing performed, and the outputs available. The programs were designed to provide a thorough edit and a comprehensive, fundamental analysis of coastal profile data.

The analysis routines provide a fairly complete picture of changes at study beaches and were designed to help in answering the following coastal engineering questions:

(a) What are the appropriate frequency of surveys and the appropriate number and spacing of profiles needed to obtain a useful picture of beach changes at a given locality?

(b) What is the extent of normal erosion and deposition cycles of beaches?

(c) At what point does erosion begin to affect the safety of nearby communities?

(d) How do changes on one beach correlate with changes at the same time on another beach?

(e) What are the long-term trends in beach erosion or accretion at the study beaches?

(f) What is the effect of shore protection structures on adjacent beaches?

MAH RUN 02/18/81 AT 15.42.22. PAGE 1

ELEVATIONS (FT ABOVE MSL) AT SPECIFIED DISTANCES ALONG PROFILE LINE 1
AT TEST BEACH
6JAN75/1000 = 15DEC76/0900

HORIZONTAL DATUM IS
THE SHORELINE POSITION ON
6JAN75/1000

DISTANCE (FT)	150.00	100.00	50.00	0.00	-50.00	-100.00	-150.00	-200.00	-250.00	-300.00	-350.00	-400.00
6JAN75/1000				0.00	5.53	10.85	24.33					
3MAR75/1100				.46	5.30	11.18	24.43					
28APR75/1100				1.78	7.55	10.75	24.43					
2JUN75/1100				2.91	6.88	10.65	24.33					
2JUL75/1000				3.51	8.20	11.19	24.43					
9SEP75/1500			-1.20	4.65	9.61	11.28	24.43					
28OCT75/0700		-1.97	-.39	2.40	8.80	11.16	24.43					
25NOV75/1100			-2.01	3.98	8.69	11.67	24.49					
5JAN76/1100			-1.92	3.62	8.02	11.60	24.50					
11MAR76/0800			-1.67	1.96	6.56	11.39	24.74					
6APR76/1400			-1.71	3.12	7.24	11.53	24.72					
8JUN76/1300			-2.40	2.49	7.18	11.22	24.83					
7JUL76/1200			-2.11	3.17	7.29	11.48	24.42					
27SEP76/0900				2.50	8.02	11.40	24.39					
15DEC76/0900			-2.03	1.16	4.96	11.51	24.94					

Figure 41. Sample ELVDIS output--TABLE18.

MAXIMUM AND MINIMUM ELEVATIONS (FT ABOVE MSL) AT SPECIFIED DISTANCES ALONG PROFILE LINE 1
AT TEST BEACH
6JAN75/1000 • 15DEC76/0900

HORIZONTAL DATUM IS
THE SHORELINE POSITION ON
6JAN75/1000

DISTANCE (FT)	MAXIMUM ELEVATION	DATE/TIME	MINIMUM ELEVATION	DATE/TIME
•178.29	14.40	25NOV75/1100	14.20	6JAN75/1000
•168.29	18.32	15DEC76/0900	17.40	25NOV75/1100
•158.29	22.24	15DEC76/0900	20.92	25NOV75/1100
•148.29	25.00	7JUL76/1200	24.14	6JAN75/1000
•138.29	20.81	8JUN76/1300	19.13	28APR75/1100
•128.29	16.90	8JUN76/1300	15.50	15DEC76/0900
•118.29	14.50	7JUL76/1200	13.00	8JUN76/1300
•108.29	12.70	7JUL76/1200	11.69	2JUN75/1100
•98.29	11.50	25NOV75/1100	10.47	2JUN75/1100
•88.29	10.92	6APR76/1400	9.28	6JAN75/1000
•78.29	10.50	9SEP75/1500	8.20	6JAN75/1000
•68.29	10.50	28OCT75/0700	7.26	3MAR75/1100
•58.29	10.19	9SEP75/1500	6.04	15DEC76/0900
•48.29	9.25	9SEP75/1500	4.78	15DEC76/0900
•38.29	8.10	25NOV75/1100	3.74	15DEC76/0900
•28.29	7.60	25NOV75/1100	2.70	15DEC76/0900
•18.29	6.68	9SEP75/1500	2.05	6JAN75/1000
•8.29	5.57	9SEP75/1500	.94	6JAN75/1000
1.71	4.46	9SEP75/1500	•.19	6JAN75/1000
11.71	3.31	9SEP75/1500	•1.32	6JAN75/1000
21.71	2.10	9SEP75/1500	•2.00	3MAR75/1100
31.71	.93	9SEP75/1500	•1.88	8JUN76/1300
41.71	•.22	28OCT75/0700	•2.16	8JUN76/1300
51.71	•.41	28OCT75/0700	•2.44	8JUN76/1300
61.71	•.56	28OCT75/0700	•2.86	7JUL76/1200
71.71	•.85	28OCT75/0700	•3.50	7JUL76/1200
81.71	•1.22	28OCT75/0700	•1.22	28OCT75/0700
91.71	•1.63	28OCT75/0700	•1.63	28OCT75/0700

Figure 42. Sample ELVDIS output--TABLE19.

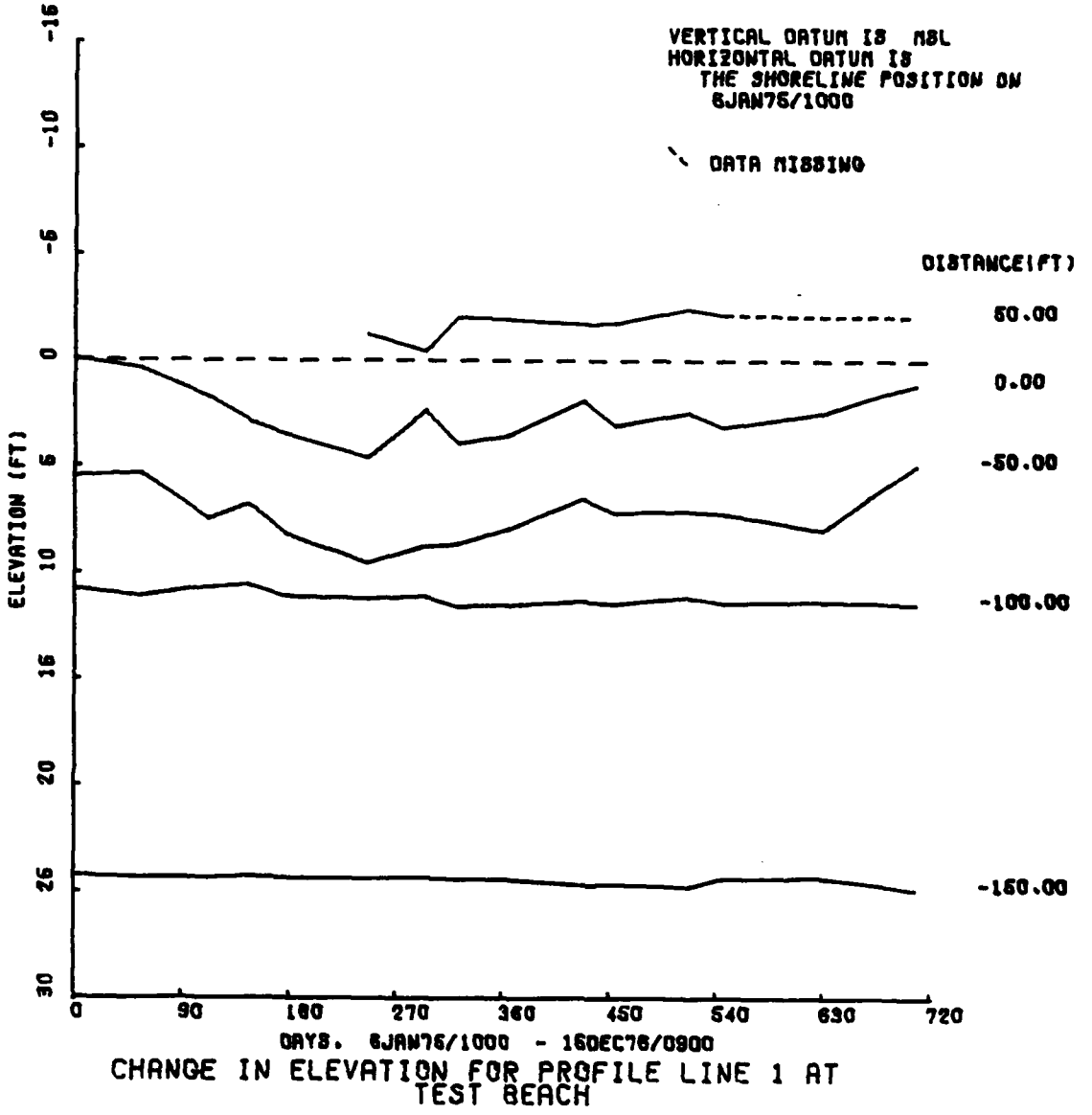


Figure 43. Sample ELVDIS output--PLOT19.

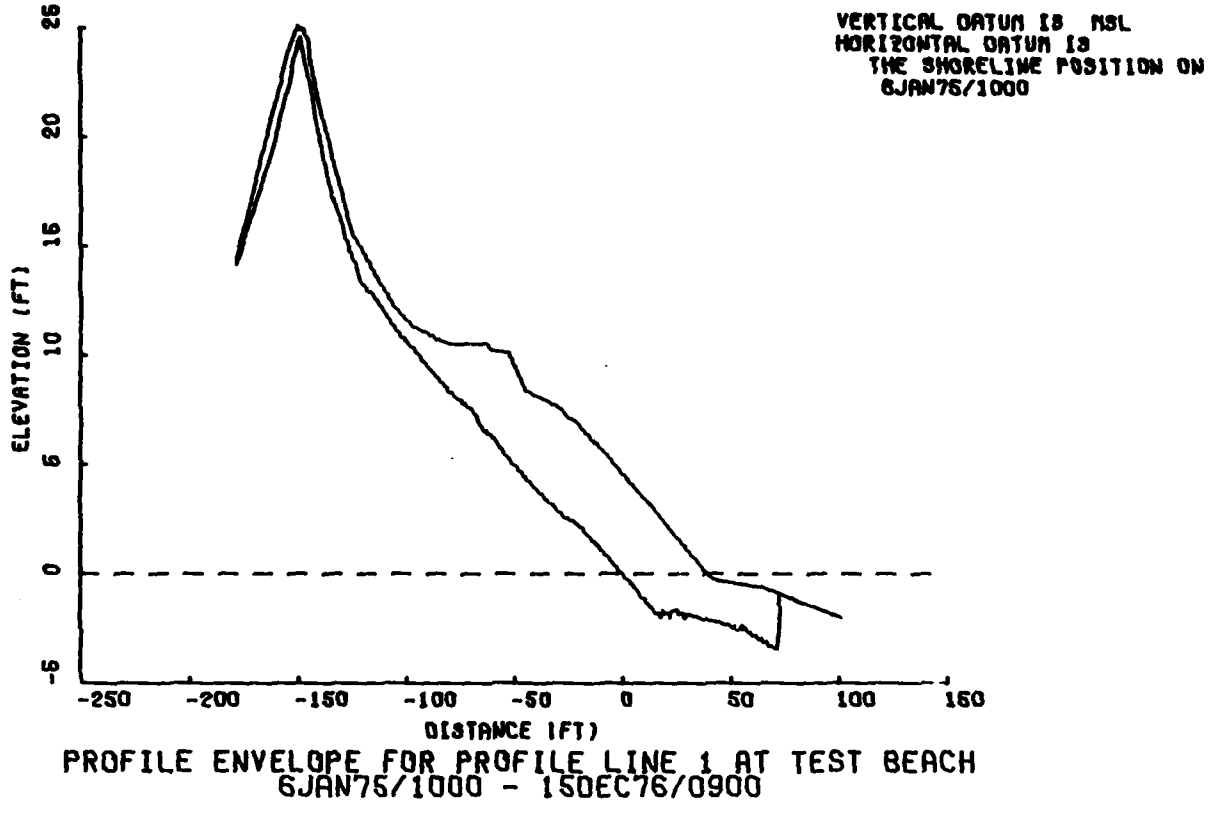


Figure 44. Sample ELVDIS output--PLOT20.

(g) What is the optimum design beach profile which could be reasonably constructed and maintained to provide storm protection and recreation?

(h) What is the optimum season and method for beach-fill placement which will maximize residence time of nourishment material?

(i) How well do other methods, such as remote sensing, quantify beach change?

Although the editing provided by the BPAS may be considered complete, this is never the case for the analysis functions. Already well into the development stage is a sixth analysis module, MEANS, which computes and displays the mean monthly and annual unit volume and shoreline position. It is anticipated that more analysis modules will be added to the system and, when they become operational, User's Guides will be published. The potential user should be able to use the information in this first volume to determine whether any of the existing editing and analysis functions provided by BPAS are of use. Once the applicable routines have been chosen, the appropriate User's Guides may be obtained to give complete processing instructions as well as the options and specifications available for each routine.

BIBLIOGRAPHY

ADAMS, E., "Computer Program 733S8R16M0 (PROENV)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., unpublished, Mar. 1973.

ADAMS, E., "Computer Program 733S8R16N0 (CHMSL)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., unpublished, Mar. 1973.

ADAMS, E., "Computer Program 733S8R16U0 (PROENY)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., unpublished, Mar. 1973.

BRUCE, S.M., "Computer Plotting Program CONPLT," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished, June 1972.

BRUCE, S.M., "Computer Program 733S8R14K0 (CONPLT)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished, Feb. 1972.

BUCHANAN, J.B., "Computer Program 733S8R14G0 (BPCPLT)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, unpublished computer program documentation, Feb. 1972.

BUCHANAN, J.B., "Computer Program 733S8R18EØ (PRINT)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., unpublished, June 1974.

JONES, J.C., "Logic and Internal Mechanics of Computer Programs Handling BEP Survey Data," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., unpublished, Mar. 1973.

MINTZ, L.P., "BEP Profile Analysis," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., unpublished, Mar. 1972.

MINTZ, L.P., "Computer Program 733S8R13Q0 (PRCHAR)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C. unpublished, Jan. 1972.

MINTZ, L.P., "Documentation of the Computer Program 733S8R13Q0 (PRCHAR)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished, Mar. 1972.

MINTZ, L.P., "Computer Program 733S8R17M0 (PROFCH)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., unpublished, Aug. 1973.

MINTZ, L.P., "PRCHAR and PROFCH, Computer Programs to Analyze Surveyed Beach Profiles," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., unpublished, Sept. 1973.

SEELIG, W.N., "Processing 4 August, 69 Format Beach Evaluation Program Scanning Sheets," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished, Sept. 1970.

SEELIG, W.N., "Computer Program 733X6R123A (SYLS69)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C. unpublished, Jan. 1971.

SEELIG, W.N., "Documentaton of the Program 733S8R123A (SYLS69)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished, Apr. 1972.

SIMS, B.R., "Beach Evaluation Program," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished, Feb. 1971.

SIMS, B.R., "Computer Program 733S8R123B (BEPROF)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished, Nov. 1969.

SIMS, B.R., "Computer Program 733S8R123D (PRFL2C)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished, Nov. 1970.

SIMS, B.R., "Computer Program 733S8123E (PRFL3A)," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D.C., unpublished, Nov. 1970.

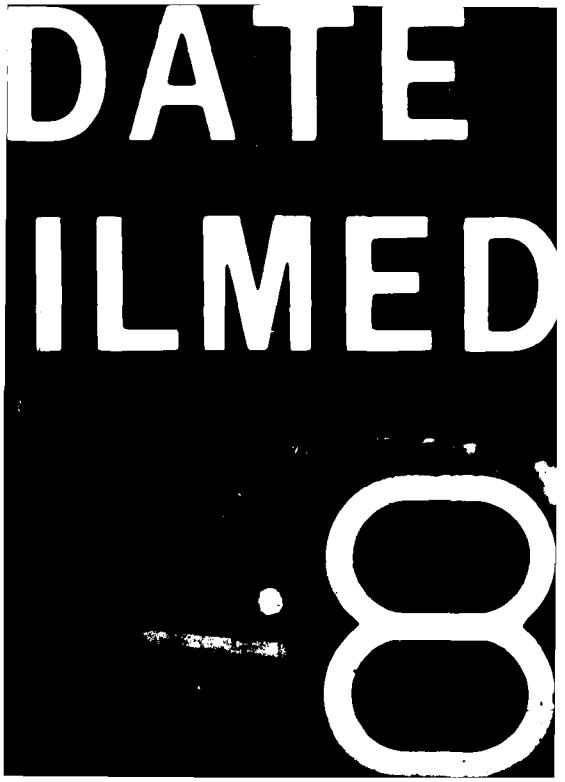
SMITH, B.A., "Beach Evaluation Computer Program Systems Flow Chart," U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., unpublished, Nov. 1973.

Fleming, Marilyn V.
Beach Profile Analysis System (BPAS). Volume I. The programs: structure, requirements, computations, and outputs / by Marilyn V. Fleming and Allan E. DeWall.--Fort Belvoir, Va. : U.S. Army, Corps of Engineers, Coastal Engineering Research Center ; Springfield, Va. : available from NTIS, 1982.
[68] p. ill. ; 27 cm.--(Technical report / Coastal Engineering Research Center; no. 82-1 v.(I)). Cover title.
An eight-volume package of computer programs for editing, analyzing, and displaying beach profile survey data is presented consisting of an overview of the Beach Profile Analysis System, two editing programs, five analysis programs, and supporting appendixes. The primary design is for use on the CDC 6600 computer, although much of the coding was done in standard FORTRAN for use on other systems.
1. Data processing. 2. Beach Profile Analysis System. 3. Beach profile changes. 4. Computer program. I. DeWall, Allan E. II. Title. III. Series: Technical report (Coastal Engineering Research Center (U.S.)); no. 82-1, v.I.
TC203 .U581tr no. 82-1, v.I 627

Fleming, Marilyn V.
Beach Profile Analysis System (BPAS). Volume I. The programs: structure, requirements, computations, and outputs / by Marilyn V. Fleming and Allan E. DeWall.--Fort Belvoir, Va. : U.S. Army, Corps of Engineers, Coastal Engineering Research Center ; Springfield, Va. : available from NTIS, 1982.
[68] p. ill. ; 27 cm.--(Technical report / Coastal Engineering Research Center; no. 82-1 v.(I)). Cover title.
An eight-volume package of computer programs for editing, analyzing, and displaying beach profile survey data is presented consisting of an overview of the Beach Profile Analysis System, two editing programs, five analysis programs, and supporting appendixes. The primary design is for use on the CDC 6600 computer, although much of the coding was done in standard FORTRAN for use on other systems.
1. Data processing. 2. Beach Profile Analysis System. 3. Beach profile changes. 4. Computer program. I. DeWall, Allan E. II. Title. III. Series: Technical report (Coastal Engineering Research Center (U.S.)); no. 82-1, v.I.
TC203 .U581tr no. 82-1, v.I 627

Fleming, Marilyn V.
Beach Profile Analysis System (BPAS). Volume I. The programs: structure, requirements, computations, and outputs / by Marilyn V. Fleming and Allan E. DeWall.--Fort Belvoir, Va. : U.S. Army, Corps of Engineers, Coastal Engineering Research Center ; Springfield, Va. : available from NTiS, 1982.
[68] p. ill. ; 27 cm.--(Technical report / Coastal Engineering Research Center; no. 82-1 v.(I)). Cover title.
An eight-volume package of computer programs for editing, analyzing, and displaying beach profile survey data is presented consisting of an overview of the Beach Profile Analysis System, two editing programs, five analysis programs, and supporting appendixes. The primary design is for use on the CDC 6600 computer, although much of the coding was done in standard FORTRAN for use on other systems.
1. Data processing. 2. Beach Profile Analysis System. 3. Beach profile changes. 4. Computer program. I. DeWall, Allan E. II. Title. III. Series: Technical report (Coastal Engineering Research Center (U.S.)); no. 82-1, v.I.
TC203 .U581tr no. 82-1, v.I 627

Fleming, Marilyn V.
Beach Profile Analysis System (BPAS). Volume I. The programs: structure, requirements, computations, and outputs / by Marilyn V. Fleming and Allan E. DeWall.--Fort Belvoir, Va. : U.S. Army, Corps of Engineers, Coastal Engineering Research Center ; Springfield, Va. : available from NTIS, 1982.
[58] p. ill. ; 27 cm.--(Technical report / Coastal Engineering Research Center; no. 82-1 v.(I)). Cover title.
An eight-volume package of computer programs for editing, analyzing, and displaying beach profile survey data is presented consisting of an overview of the Beach Profile Analysis System, two editing programs, five analysis programs, and supporting appendixes. The primary design is for use on the CDC 6600 computer, although much of the coding was done in standard FORTRAN for use on other systems.
1. Data processing. 2. Beach Profile Analysis System. 3. Beach profile changes. 4. Computer program. I. DeWall, Allan E. II. Title. III. Series: Technical report (Coastal Engineering Research Center (U.S.)); no. 82-1, v.I.
TC203 .U581tr no. 82-1, v.I 627


DATE
ILMED
8