

COASTAL OBSERVATION PROGRAMME - ENGINEERING (COPE)

NOAH CREEK - DOUGLAS SHIRE

For the Years 1976 to 1979

Beach Protection Authority

March 1984

All reasonable care and attention has been exercised in the collection, processing and compilation of the COPE data included in this report. However the accuracy and reliability of this information is not guaranteed in any way by the Beach Protection Authority and the Authority accepts no responsibility for the use of this information in any way whatsoever.

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ABSTRACT:

This report provides a summary of primary analyses of COPE data on wind, wave and beach processes observed at Noah Creek in the Douglas Shire in northern Queensland. The data were recorded by volunteer observers Sonja and Bill Sokolich, during the period April 1976 to the end of March 1979. The recordings were made daily during the three year period and the information published is considered representative and reliable.

OTHERS AVAILABLE IN THIS SERIES:

Coastal Observation Program - Engineering (COPE), Machans Beach - Mulgrave Shire, August 1979 (Report C 01.1).

Coastal Observation Program - Engineering (COPE), Baffle Creek - Miriam Vale Shire, October 1980 (Report C 02.1).

Coastal Observation Program - Engineering (COPE), Flying Fish Point - Johnstone Shire, November 1980 (Report C 03.1).

Coastal Observation Program - Engineering (COPE), Woodgate - Isis Shire, November 1980 (Report C 04.1).

Coastal Observation Programme - Engineering (COPE), Shelly Beach - Landsborough Shire, March 1984 (Report C 05.1).

Coastal Observation Programme - Engineering (COPE), Eurong - Maryborough City, March 1984 (Report C 06.1).

Coastal Observation Programme - Engineering (COPE), Lammermoor Beach - Livingstone Shire, March 1984 (Report C 07.1)

REFERENCES:

1. ROBINSON D.A. and JONES C.M.

Queensland Volunteer Coastal Observation Program - Engineering (COPE). 3rd Australian Conference on Coastal and Ocean Engineering, Melbourne, April 1979.

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1.0 INTRODUCTION

1.1 The Programme

The Beach Protection Authority requires basic data on the behaviour of Queensland's beaches in order to provide well founded advice on coastal management to local Authorities. The COPE project aims to collect information on wind, waves and beach behaviour in areas where extensive investigations are not practical and where otherwise little or no data exist.

The project is based on the recruitment of volunteer observers who are prepared to record a series of basic parameters once or twice daily for at least a three year period.

1.2 Site Selection

In selecting a site for a COPE station, consideration is given to:-

- (a) the general shoreline configuration and the possibility of extrapolation of data to other adjacent beaches;
- (b) the distribution of stations along Queensland's coastline;
- (c) the need to correlate the COPE data with planned or existing data collection programmes.

1.3 Instrumentation

Each COPE observer is supplied with a basic kit of recording instruments including:-

- 30 metre Tape
- Wind Meter
- Abney Level
- 1.5 metre Sighting Support
- Recording Forms
- Fluorescent Dye.

A graduated reference pole is installed on the beach to serve as the base point for all plan measurements and the control for vertical levelling.

1.4. Observers

The majority of COPE observers are volunteers who may be local business people, local residents or school children. Some stations are manned by Government employees who carry out the observations as part of their official duties.

1.5 Accuracy

Individual observers differ in their subjective assessment of the various parameters recorded as part of the COPE programme. Wave parameters such as type, height, and angle of approach together with surf zone width and the location of the vegetation line all require visual assessment, the accuracy of which will vary from observer to observer and from recording to recording.

Although the Authority is confident that all observers make their observations to the best of their ability and accepts these observations without adjustment, the existence of random and non - random errors in the recorded data is to be expected.

Problems associated with the use of data containing these errors are minimised in two ways. Firstly, regular visits are made to the COPE stations by the Authority's COPE Field Officer to provide a check on any bias introduced into the recordings by incorrect observation procedures. Secondly, it has been found that, with a large number of observations taken on a regular basis, a reasonable assessment can be made of the average climatologies of the observed parameters provided the observation errors are random. A minimum recording period of three years has been adopted for the analysis and publication of the data. Five day moving averages are applied to observations of the various beach width and foreshore slope parameters to smooth out random errors.

For these reasons, the Authority is of the opinion that published COPE data can be used with confidence provided the above inherent limitations are recognised.

1.6 Presentation of Data

The purpose of this report is to present COPE data for the three year period 1976 to 1979 in a useful statistical form. No attempt has been made to interpret the observed data.

If this three year period is representative of the long term average meteorological conditions, the wind, wave and beach movement climatologies presented can be regarded as typical. However, this recording period is too short to be representative in terms of the average occurrence of extreme events such as cyclones and floods, and this should be taken into account when consideration is being given to the influence of such events on trends of long term beach behaviour.

2.0 STATION PARTICULARS

2.1 Location

Noah Creek is located within the Douglas Shire and is 33 kilometres north of Mossman in northern Queensland. It forms part of a 15 kilometre gently curving stretch of the coastline between Cape Tribulation and Alexandra Bay and lies about 75 kilometres south of Cooktown. The location of the Noah Creek COPE station is shown in Figure 1.

2.2 Observers

This station has been manned by Sonja and Bill Sokolich, during the period April 1976 to March 1979. Sonja and Bill Sokolich are residents of Noah Creek who live near the COPE station.

2.3 Observed Parameters

The observer at this station usually recorded at 9.30 a.m. daily during the three year period 1976 to 1979.

This station has recorded:

- Wave Period
- Wave Height
- Wave Angle
- Wave Type
- Surf Zone Width
- Presence of Offshore Bar
- Wind Speed
- Wind Direction
- State of Tide
- Fixed Contour Level
- Distance to Fixed Contour
- Distance to Vegetation
- Foreshore Slope
- Longshore Current Speed
- Longshore Current Direction

In addition, a sand sample was collected at the station each month and a profile of the beach recorded monthly also.

2.4 Tidal Information

Tidal information for this station as presented below is essentially the same as that for Low Islets as there are no reliable tidal predictions for Noah Creek. Datum is Low Water Datum.

M.H.W.S. : 2.3 metres
 M.H.W.N.: 1.6 metres
 M.S.L. : 1.46 metres
 M.L.W.N.: 1.3 metres
 M.L.W.S. : 0.6 metres

2.5 Description of the Beach

The beach of the Noah Creek station exhibits the following characteristics:-

- Typical beach slopes: foreshore slope is in the range 1 in 20 – 1 in 30 (2° – 3°).
- Beach width: typically 25 to 30 metres from vegetation line.
- D50 sand size: 0.19 mm averaged over three years.
- *Adjoining Landform*: low frontal beach ridge and flat hind ridges which are still in their natural state.
- *Vegetation*: Beach bean (*Canavalia rosea*) herbland occurs on the seaward slope and crest of the frontal beach ridge. Horsetail she-oak (*Casuarina equisetifolia* var. *incana*) low woodland occurs on the crest and landward slope. Rain forest vegetation occurs on the hind ridges.

2.6 Supervision of Station

The observer was instructed in the recording program by the COPE Field Officer and the initial instruction period was followed up with visits to the station during the period of recordings presented in this report.

Installation and maintenance of the reference pole for this station has been carried out by the Douglas Shire Council. The Authority wishes to thank the Council for its assistance in all matters associated with the COPE project.

3.0 DATA

3.1 General

COPE data for this station for the three year period April 1976 to March 1979 are presented on the attached figures. The data have been analysed statistically and/or smoothed to reveal long term averages or trends. A brief description of each of the observed parameters is given below with the relevant figure references.

3.2 Wind

The observer recorded the wind speed at the beach using a hand held wind meter at 1.5 metres above beach level. Wind direction is estimated to the nearest compass sector.

A summary of annual wind speed and direction percentage occurrences are shown as a wind rose in Figure 2. Where applicable, morning and afternoon readings as well as the overall average are shown.

3.3 Waves

The average breaker height (trough to crest) is usually estimated to the nearest 0.1 metre. From experience this estimate has been found to be comparable with the equivalent deep water significant wave height.

The observer estimates the wave period by recording the time taken for eleven wave crests (the duration of 10 waves) to pass a point.

The wave direction is estimated as one of five direction sectors indicating the angle to the shoreline alignment from which the waves are approaching the beach. These sectors have been selected as:-

Sector 1	-	0°	to	60°
Sector 2	-	60°	to	85°
Sector 3	-	85°	to	95°
Sector 4	-	95°	to	120°
Sector 5	-	120°	to	180°

Note: 0° is the beach alignment to the left of the observer when facing seaward.

Statistical representations of the observed wave data include:-

- (a) the percentage of wave height recordings which exceed any given wave height for all directions combined (Figure 3).

- (b) the percentage occurrence of various combinations of wave heights and periods and directions (Figure 4 and Figure 5).
- (c) surf zone width with an indication of the existence or otherwise of an offshore bar in Figures 6 to 9.
- (d) tabulation of the occurrence of various wave heights, periods, types and directions (Tables 1 to 4).

3.4 Longshore Currents

The observer measured the distance parallel to the shoreline that a dye patch in the surf zone moved in one minute. Current direction is either upcoast or downcoast, upcoast being to the left when facing the sea from the beach.

The readings are converted to a velocity which is plotted on a daily basis (Figure 10 to Figure 13). Mean upcoast and downcoast components and the overall annual means are also presented.

3.5 Beach Profile Parameters

Beach profile parameters were measured using an Abney level, tape measure and reference pole. These include:

- distance from the reference pole to the 0.9 metre, relative to M.S.L., fixed contour level.
- distance from reference pole to the vegetation line (usually front face of fore-dune).
- the foreshore slope.

Changes in these parameters with time indicate how the beach moves in response to varying wave attack. Plots of these parameters are shown in Figures 14 to 17 which provide a visual representation of the data.

TABLE 1
MONTHLY AND ANNUAL
MEAN WAVE HEIGHT/MEAN WAVE PERIOD AND WAVE TYPE/WAVE DIRECTION
OCCURRENCES

YEAR 1976

MONTH	MEAN WAVE PERIOD (Secs)	MEAN WAVE HEIGHT (Metres)	Percentage Occurrences - Wave Type/Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY													
FEBRUARY													
MARCH													
APRIL	7.5	0.40	52.4	14.3	-	19.0	14.3	-	-	81.0	4.8	-	14.3
MAY	6.2	0.32	18.8	-	-	62.5	18.8	-	-	56.3	25.0	-	18.8
JUNE	7.6	0.29	65.2	-	-	17.4	17.4	-	-	65.2	17.4	-	17.4
JULY	5.8	0.80	20.8	8.3	-	50.0	20.8	-	-	54.2	25.0	-	20.8
AUGUST	4.9	0.33	34.8	-	-	8.7	56.5	-	-	26.1	17.4	-	56.5
SEPTEMBER	5.2	0.33	66.7	-	-	6.7	26.7	-	-	66.7	6.7	-	26.7
OCTOBER	5.4	0.22	8.0	4.0	-	12.0	76.0	-	3.8	16.4	3.8	-	76.0
NOVEMBER	6.0	0.02	-	-	-	4.0	96.0	-	-	4.0	-	-	96.0
DECEMBER	5.4	0.18	20.8	-	-	8.3	70.8	-	8.3	8.3	12.5	-	70.8
WHOLE YEAR	6.3	0.32	30.1	3.1	-	19.9	46.9	-	1.5	39.4	12.2	-	46.9

SP — Spilling
PL — Plunging
SP/PL — Combined Spilling and Plunging

TABLE 2.

MONTHLY AND ANNUAL

MEAN WAVE HEIGHT / MEAN WAVE PERIOD AND WAVE TYPE / WAVE DIRECTION
OCCURRENCES

YEAR 1977.

MONTH	MEAN WAVE PERIOD (Secs)	MEAN WAVE HEIGHT (Metres)	Percentage Occurrences - Wave Type / Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	5.3	0.44	21.4	3.6	-	21.4	53.6	-	-	28.5	17.9	-	53.6
FEBRUARY	5.7	0.29	19.0	-	-	23.8	57.1	-	4.8	38.1	-	-	57.1
MARCH	6.5	0.04	-	-	-	12.5	87.5	-	-	12.5	-	-	87.5
APRIL	5.8	0.71	8.3	-	-	91.7	-	-	-	100.0	-	-	-
MAY	6.9	0.39	45.8	-	-	16.7	37.5	-	-	62.5	-	-	37.5
JUNE	6.8	0.50	19.0	-	-	47.6	33.3	-	-	66.7	-	-	33.3
JULY	5.9	0.48	20.0	-	-	80.0	-	-	-	100.0	-	-	-
AUGUST	6.0	0.50	47.8	-	-	52.2	-	-	-	100.0	-	-	-
SEPTEMBER	5.1	0.43	-	-	-	44.4	55.6	-	-	44.4	-	-	55.6
OCTOBER	5.2	0.60	8.0	-	-	76.0	16.0	-	-	84.0	-	-	16.0
NOVEMBER	6.4	0.10	5.0	-	10.0	10.0	75.0	-	-	25.0	-	-	75.0
DECEMBER	5.7	0.12	-	11.5	-	19.2	69.2	-	-	30.8	-	-	69.2
WHOLE YEAR	5.8	0.39	17.7	1.7	0.9	37.5	42.2	-	0.4	55.3	2.1	-	42.2

SP - Spilling

PL - Plunging

SP/PL - Combined Spilling and Plunging

TABLE 3
MONTHLY AND ANNUAL
MEAN WAVE HEIGHT/MEAN WAVE PERIOD AND WAVE TYPE/WAVE DIRECTION
OCCURRENCES

YEAR 1978

MONTH	MEAN WAVE PERIOD (Secs)	MEAN WAVE HEIGHT (Metres)	Percentage Occurrences - Wave Type/Wave Direction											
			Wave Type					Wave Direction						
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm	
JANUARY														
FEBRUARY														
MARCH	6.1	0.18	35.7	-	-	17.9	46.4	-	-	53.6	-	-	46.4	
APRIL	5.0	0.30	44.0	-	-	28.0	28.0	-	-	56.0	16.0	-	28.0	
MAY	6.4	0.34	13.0	-	-	60.9	26.1	-	-	73.9	-	-	26.1	
JUNE	4.5	0.16	28.0	-	-	32.0	40.0	-	4.0	44.0	12.0	-	40.0	
JULY	6.0	0.28	4.3	-	-	47.8	47.8	-	-	52.2	-	-	47.8	
AUGUST														
SEPTEMBER	4.9	0.17	-	-	-	48.1	51.9	-	-	48.1	-	-	51.9	
OCTOBER	5.6	0.22	-	-	-	60.9	39.1	-	-	60.9	-	-	39.1	
NOVEMBER														
DECEMBER	2.5	0.20	100.0	-	-	-	-	-	100.0	-	-	-	-	
WHOLE YEAR	5.5	0.23	18.8	-	-	41.2	40.0	-	1.1	54.9	4.0	-	40.0	

SP – Spilling
PL – Plunging
SP/PL – Combined Spilling and Plunging

TABLE 4.

MONTHLY AND ANNUAL

MEAN WAVE HEIGHT /MEAN WAVE PERIOD AND WAVE TYPE / WAVE DIRECTION
OCCURRENCES

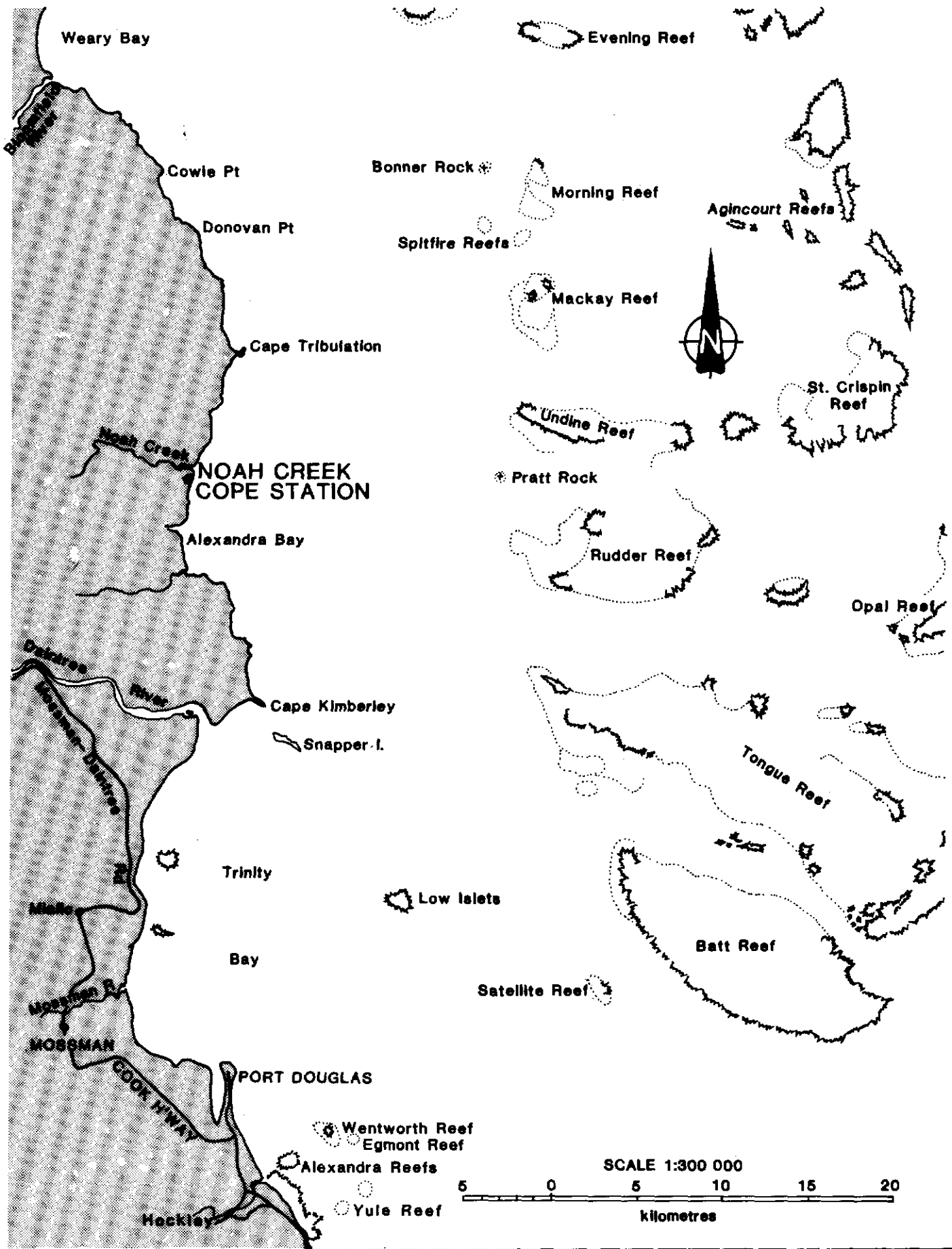
YEAR 1979.

MONTH	MEAN WAVE PERIOD (Secs)	MEAN WAVE HEIGHT (Metres)	Percentage Occurrences - Wave Type /Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	4.8	0.05	-	-	-	16.7	83.3	-	-	16.7	-	-	83.3
FEBRUARY	0	0	-	-	-	-	100.0	-	-	-	-	-	100.0
MARCH	5.9	0.13	-	-	-	38.1	61.9	-	-	38.1	-	-	61.9
APRIL													
MAY													
JUNE													
JULY													
AUGUST													
SEPTEMBER													
OCTOBER													
NOVEMBER													
DECEMBER													
WHOLE YEAR	5.6	0.06	-	-	-	18.6	81.4	-	-	18.6	-	-	81.4

SP - Spilling

PL - Plunging

SP/PL - Combined Spilling and Plunging



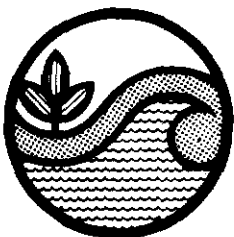
COPE

Noah Creek

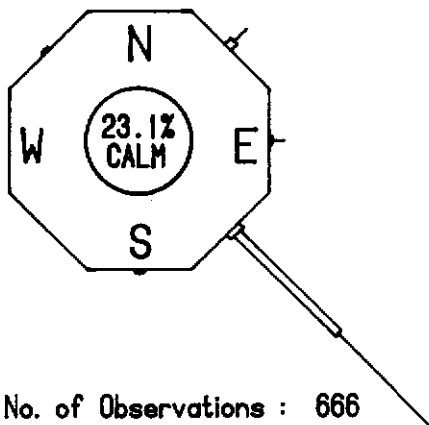
LOCALITY PLAN

Figure 1

C 08.1



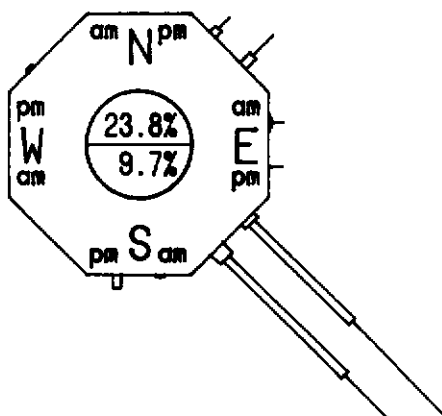
ALL OBSERVATIONS



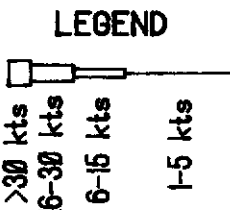
Total No. of Observations : 666

MORNING - AFTERNOON OBSERVATIONS

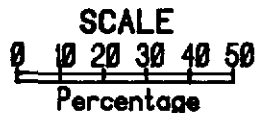
NOTES :
 Figures in Central Circle
 Represent Percentage
 of CALM Observations.
 Upper Figure for AM
 Lower Figure for PM



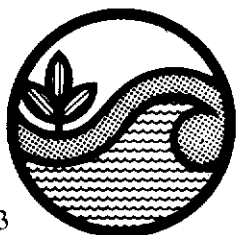
No. of Morning Observations : 635
 No. of Afternoon Observations : 31

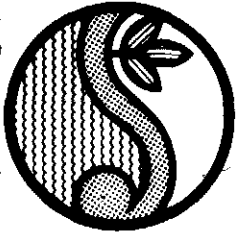


Mean Time :- Morning Obs : 0825 hrs
 Mean Time :- Afternoon Obs : 1452 hrs



WIND DATA - APR 1976 to MAR 1979





WAVE HEIGHT % EXCEEDENCE

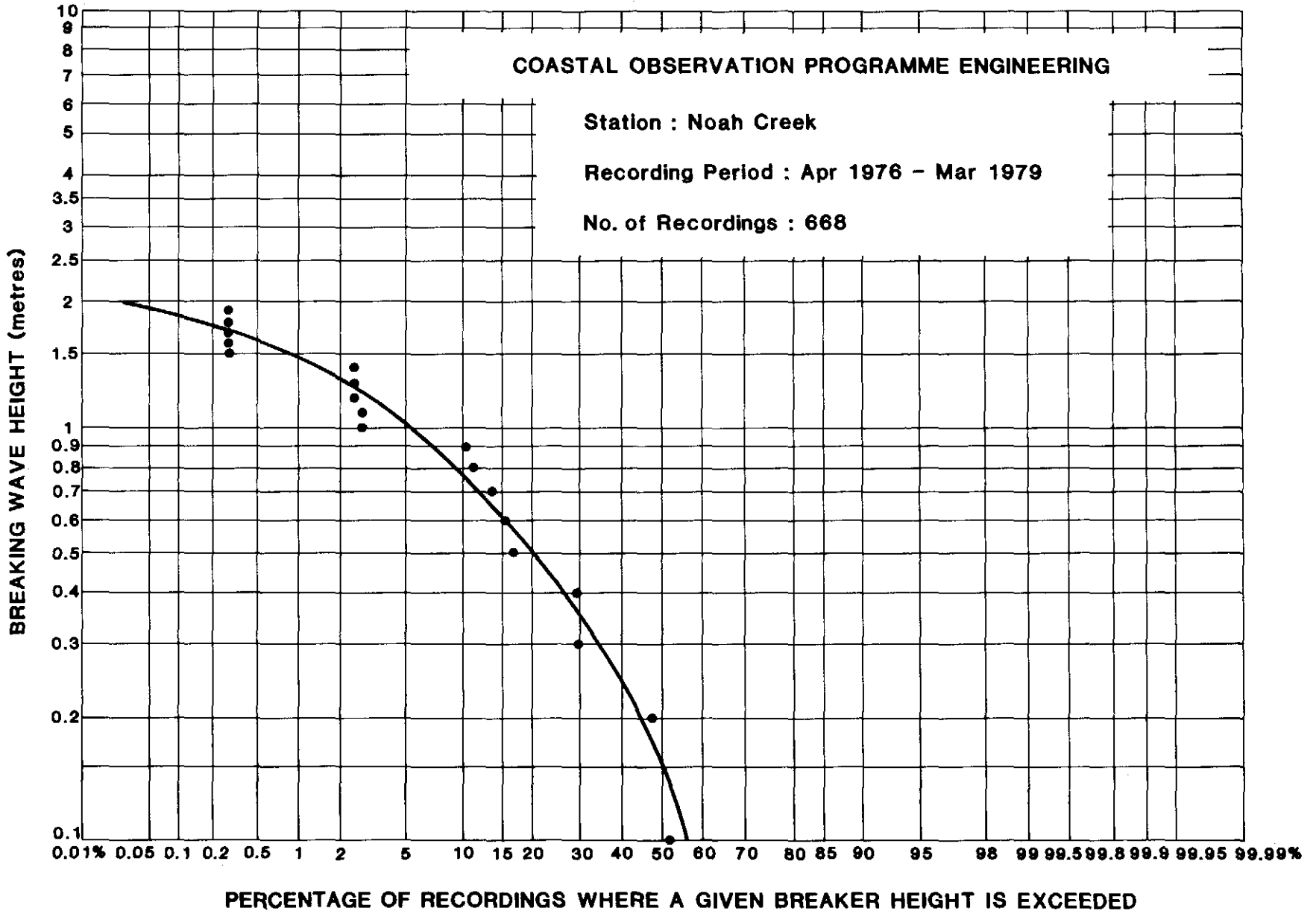
ALL DATA

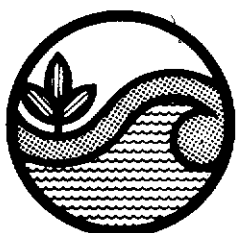
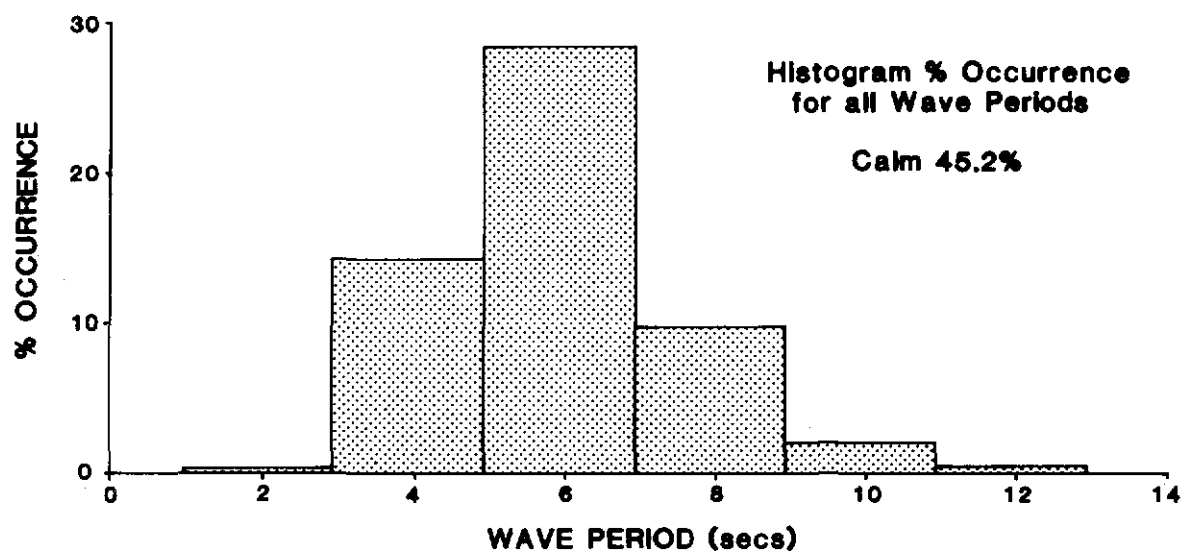
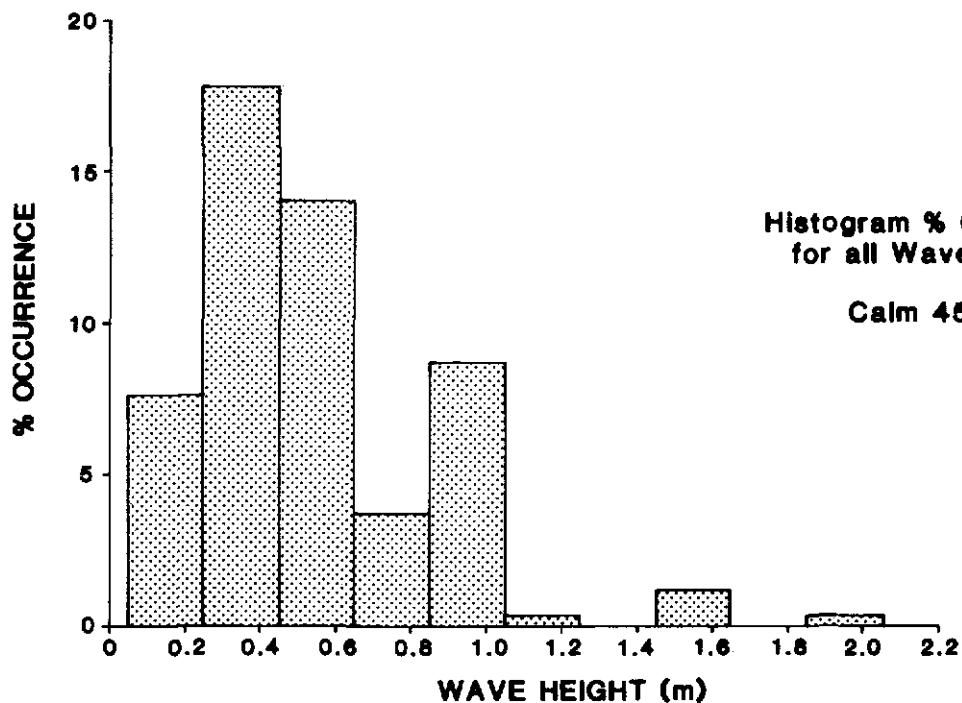
Noah Creek

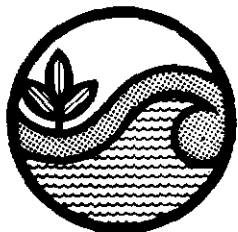
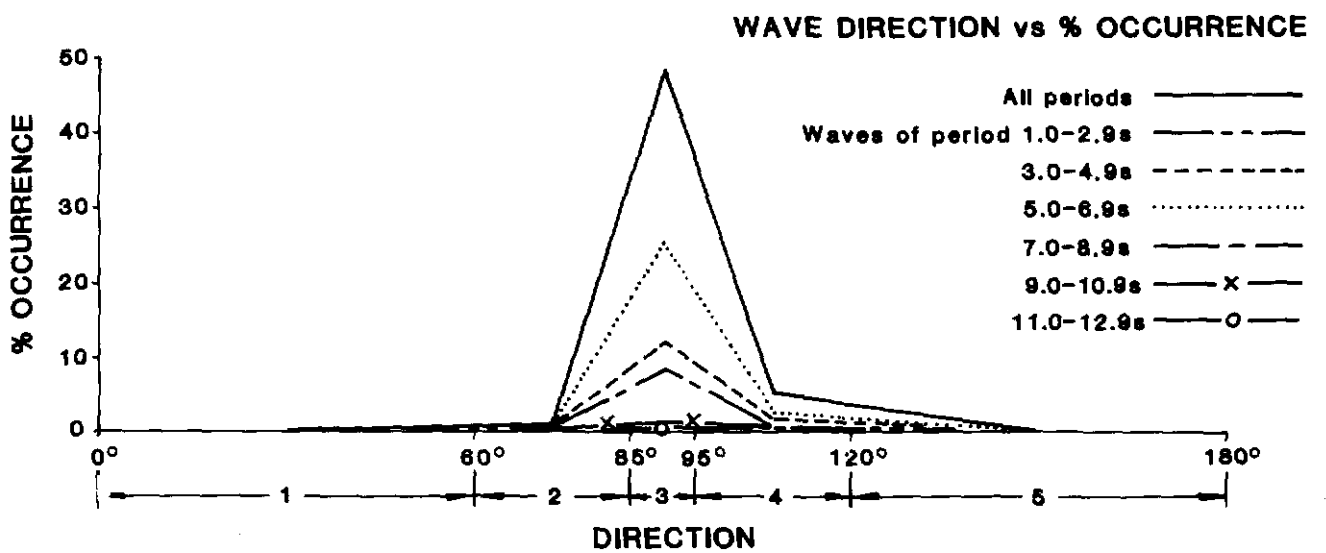
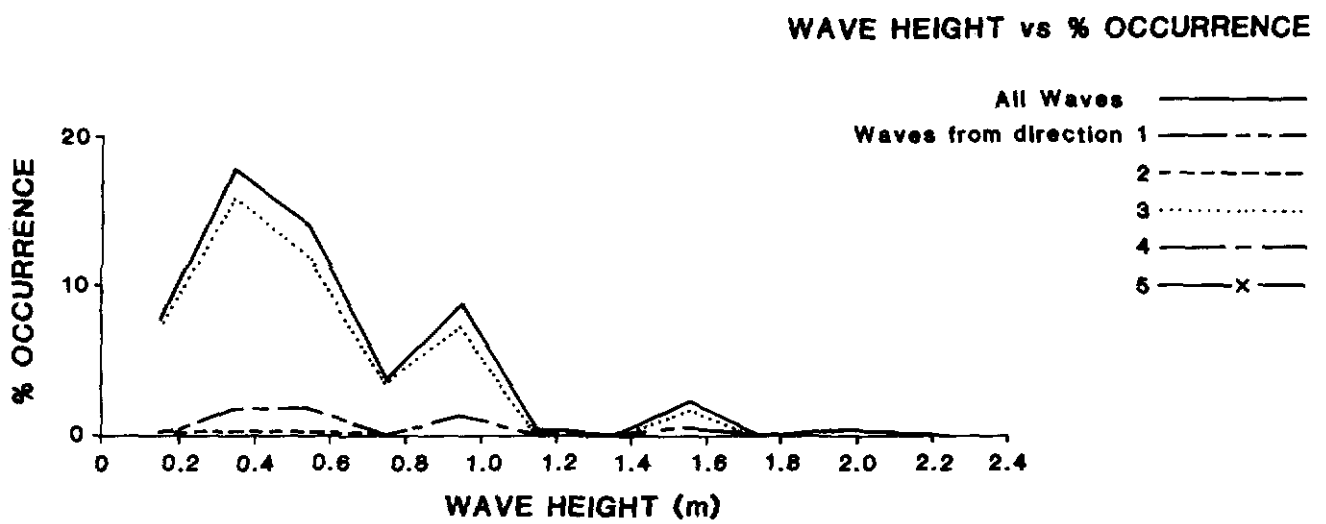
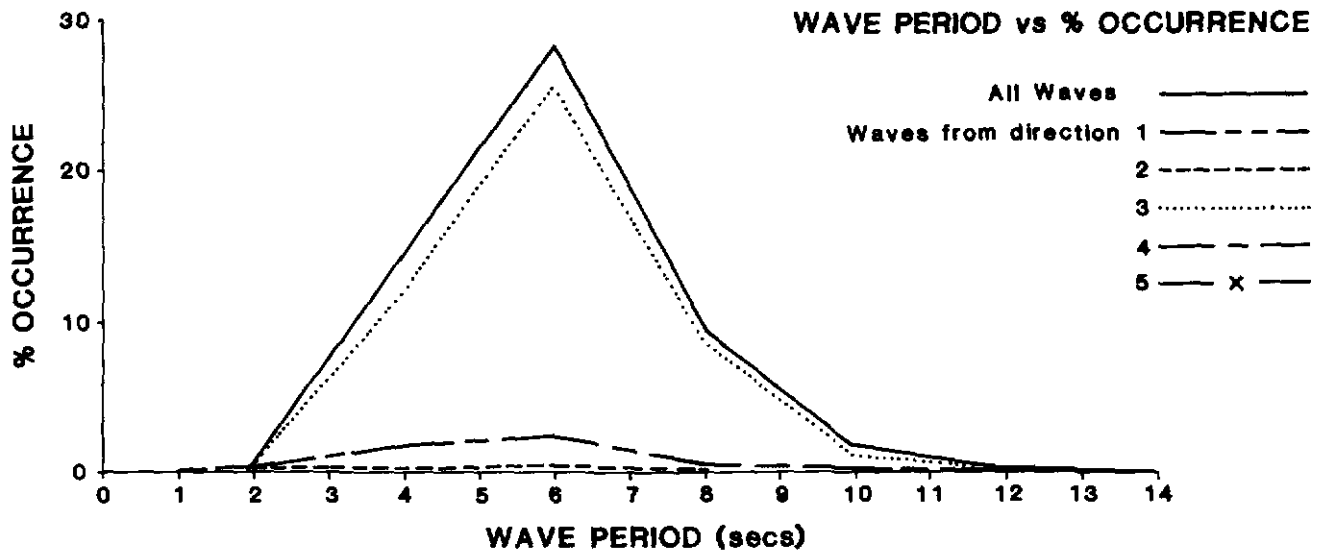
COPE

Figure 3

C 08.1







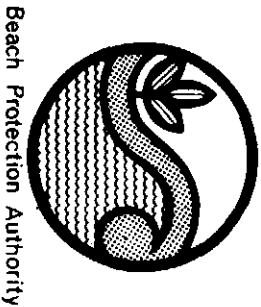
Beach Protection Authority

WAVE DIRECTION ANALYSIS ALL DATA

COPE

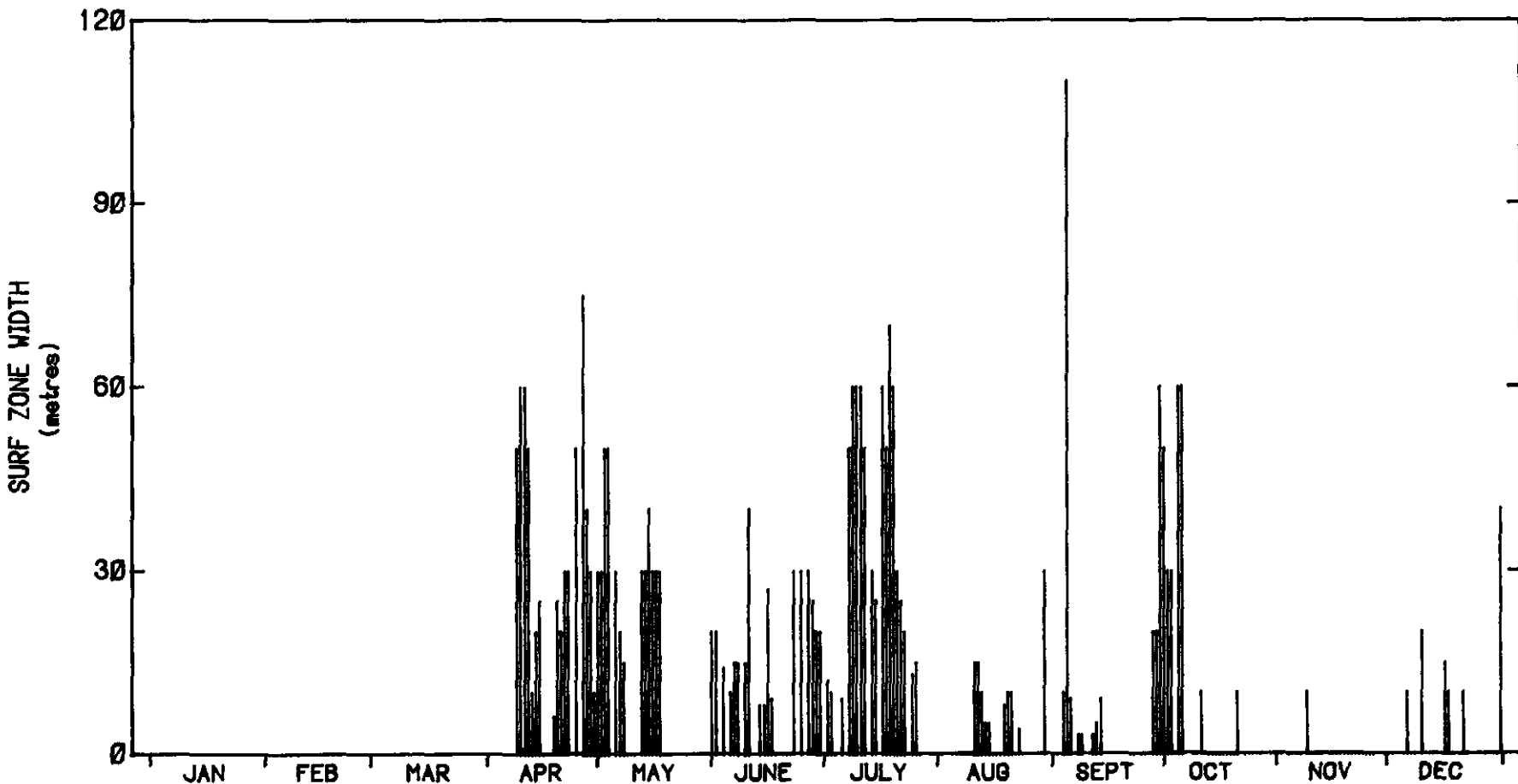
Noah Creek

Figure 5
C 08.1



Beach Protection Authority

SURF ZONE WIDTH - MORNING 1976



SURF ZONE WIDTH SUMMARY - 1976

No. of Observations : 195

MORNING OBSERVATIONS

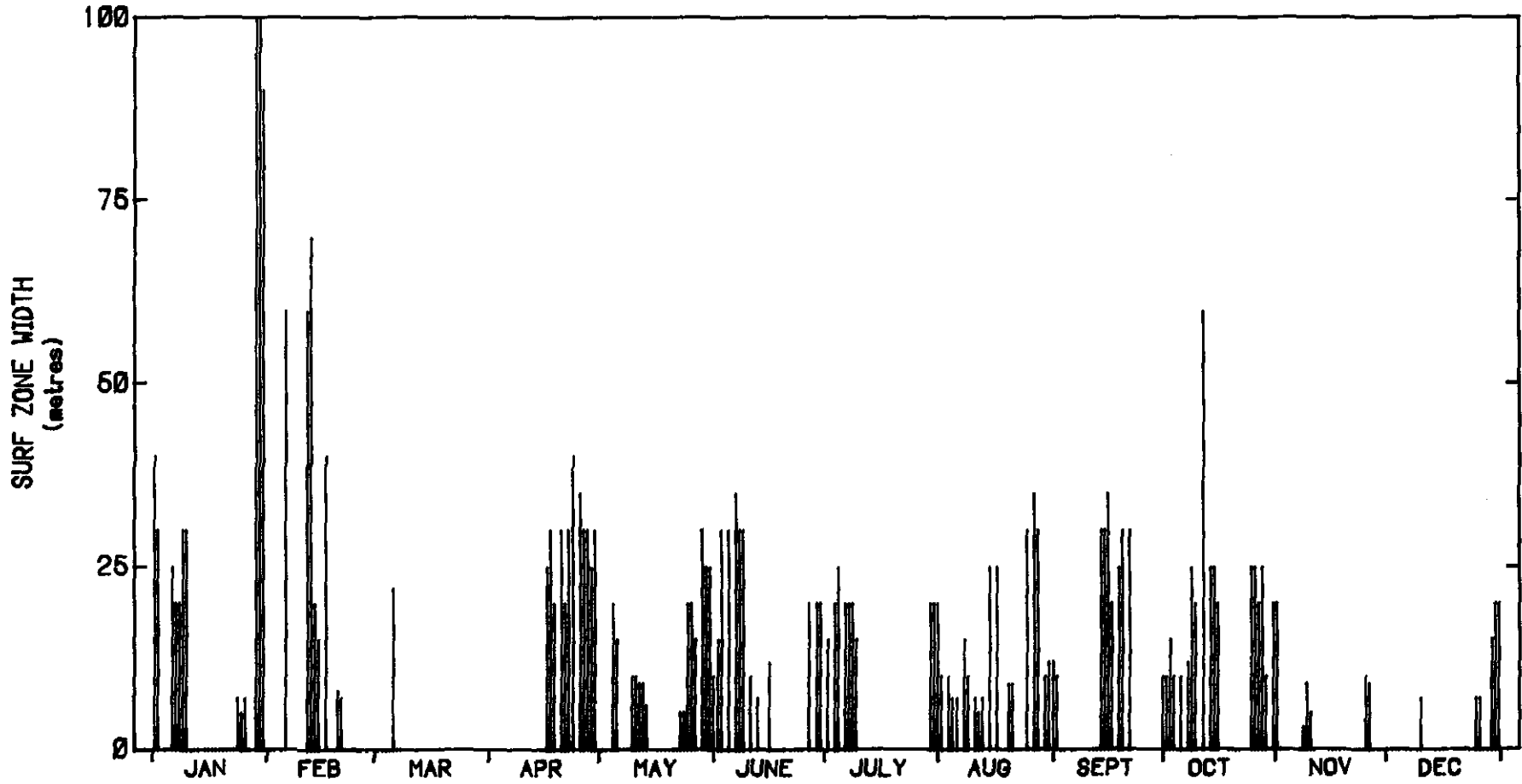
Mean Surf Zone Width = 14.4 m

Figure 6
C 08.1

COPE
Noah Creek



SURF ZONE WIDTH - MORNING 1977



SURF ZONE WIDTH SUMMARY - 1977

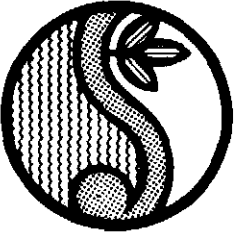
No. of Observations : 223

MORNING OBSERVATIONS

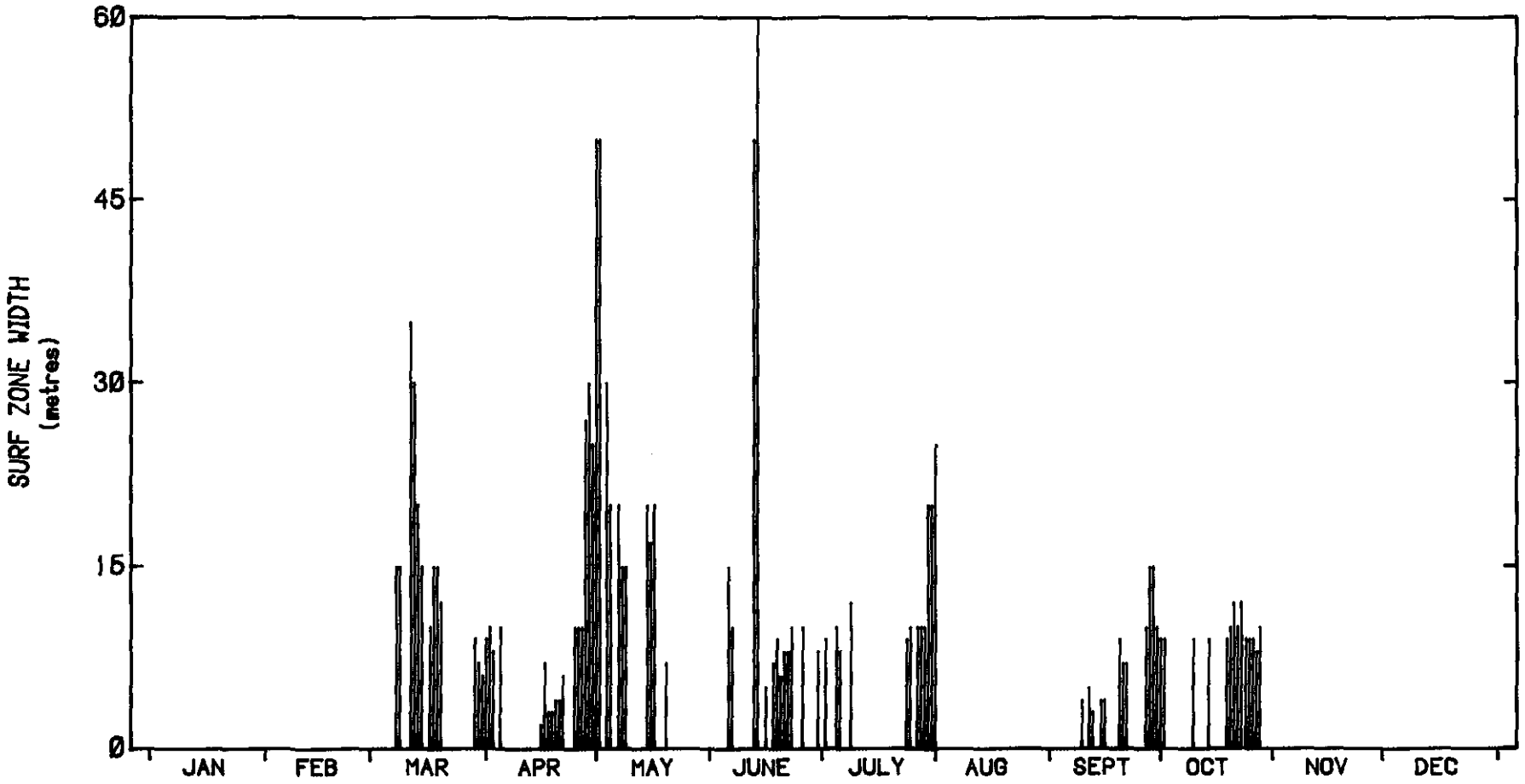
Mean Surf Zone Width = 12.7 m

Figure 7
C 08.1

COPE
Noah Creek



SURF ZONE WIDTH - MORNING 1978



SURF ZONE WIDTH SUMMARY - 1978

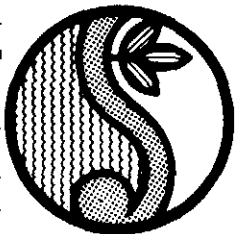
No. of Observations : 158

MORNING OBSERVATIONS

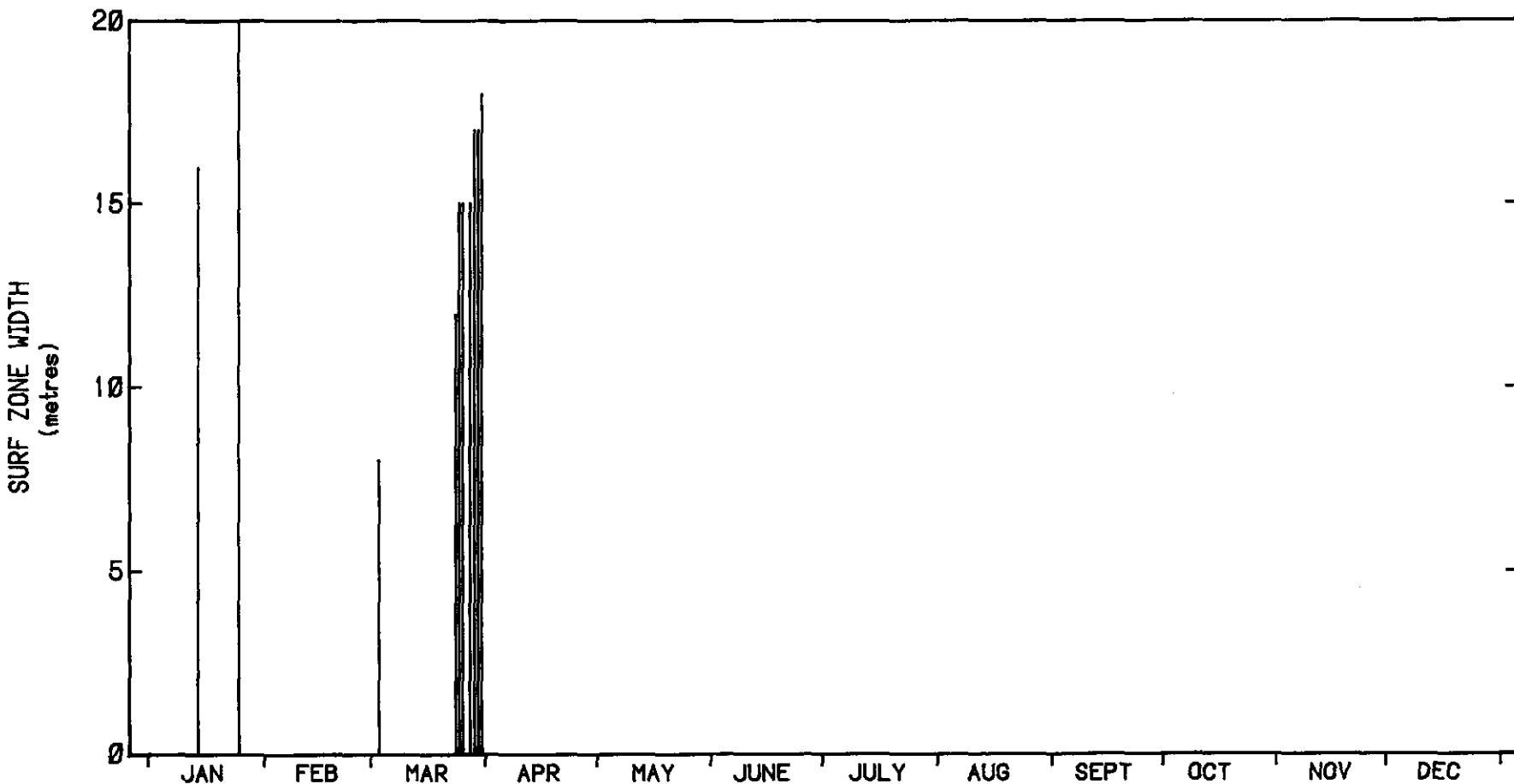
Mean Surf Zone Width = 7.8 m

Figure 8
C 08.1

COPE
Noah Creek



SURF ZONE WIDTH - MORNING 1979



SURF ZONE WIDTH SUMMARY - 1979

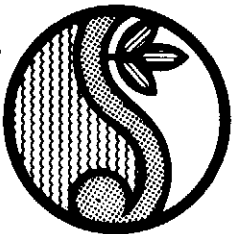
No. of Observations : 49

MORNING OBSERVATIONS

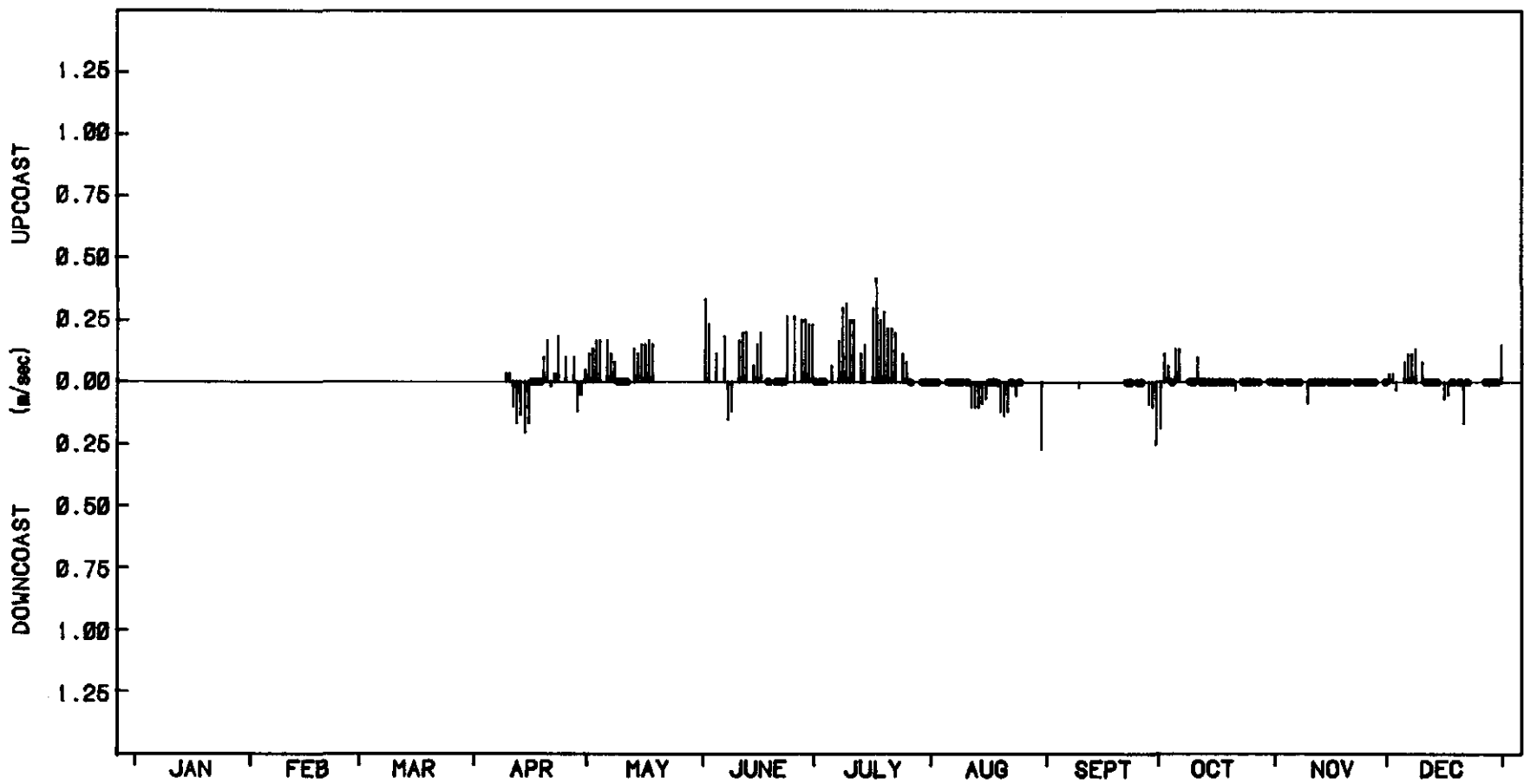
Mean Surf Zone Width = 3.1 m

Figure 9
C 08.1

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LITTORAL CURRENTS - MORNING 1976



LITTORAL CURRENT SUMMARY - 1976

Mean Vel = 0.040 m/sec (up)

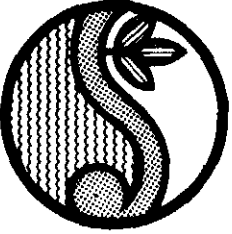
Mean Upcoast Vel = 0.161 m/sec

Mean Downcoast Vel = 0.107 m/sec

MORNING OBSERVATIONS - (187 recordings)

Figure 10
C 08.1

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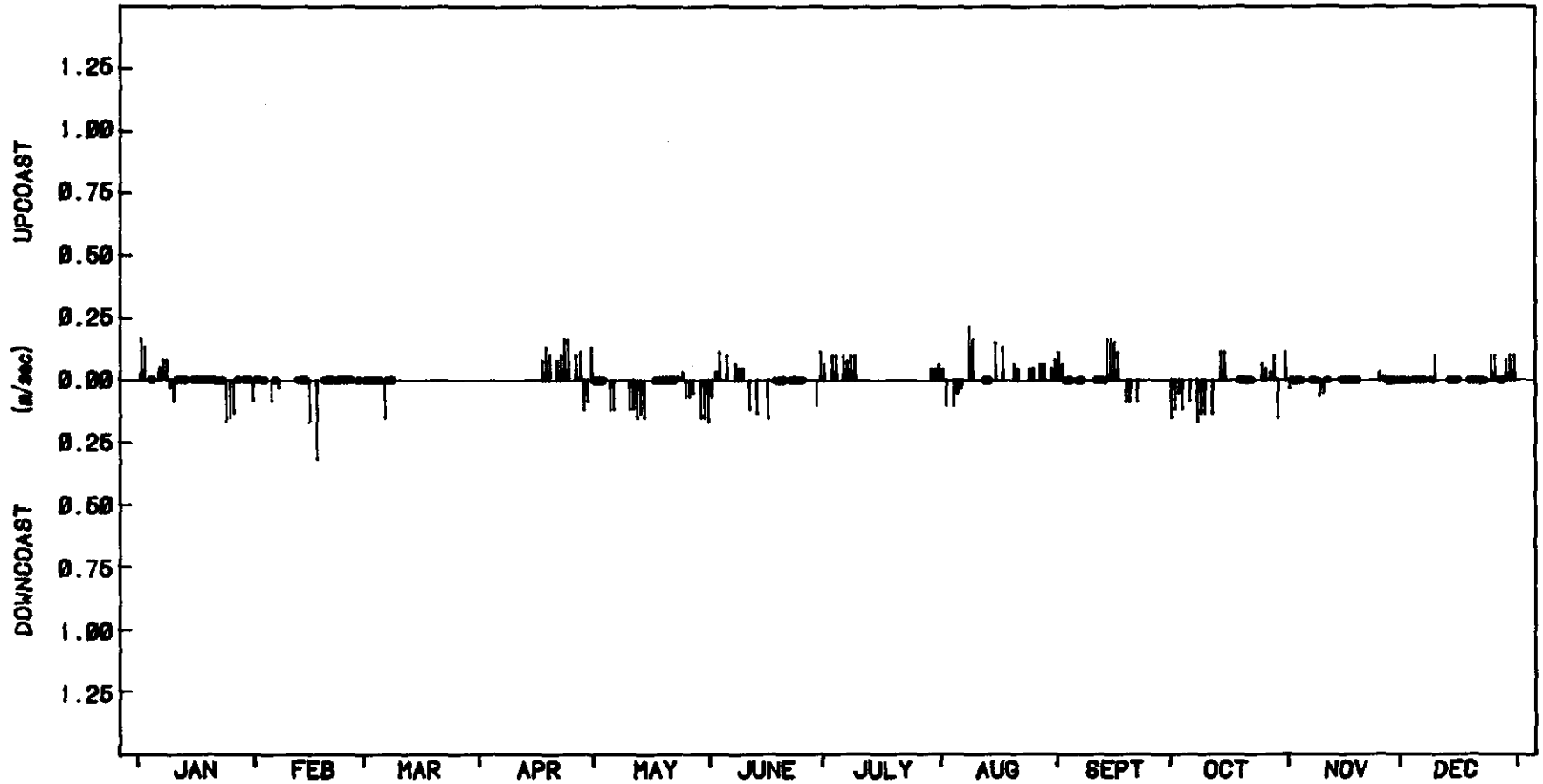
LITTORAL CURRENTS - MORNING 1977

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LITTORAL CURRENT SUMMARY - 1977

Mean Vel = 0.003 m/sec (up)

Mean Upcoast Vel = 0.093 m/sec

Mean Downcoast Vel = 0.110 m/sec

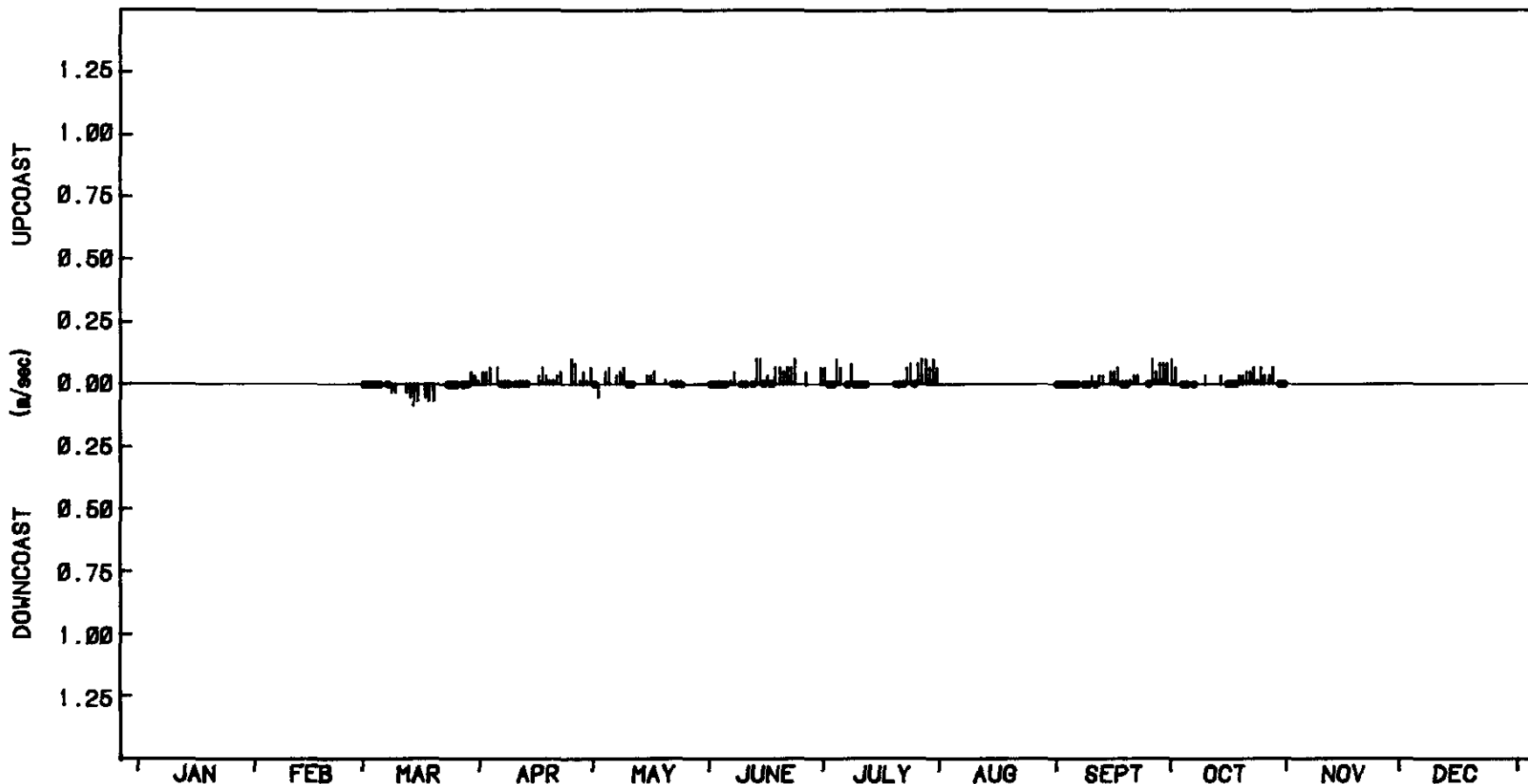
MORNING OBSERVATIONS - (220 recordings)

Figure 11
C 08.1

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LITTORAL CURRENTS - MORNING 1978



LITTORAL CURRENT SUMMARY - 1978

Mean Vel = 0.026 m/sec (up)

Mean Upcoast Vel = 0.056 m/sec

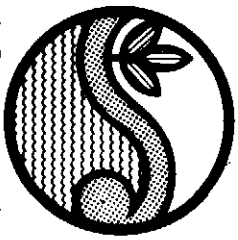
Mean Downcoast Vel = 0.053 m/sec

MORNING OBSERVATIONS - (157 recordings)

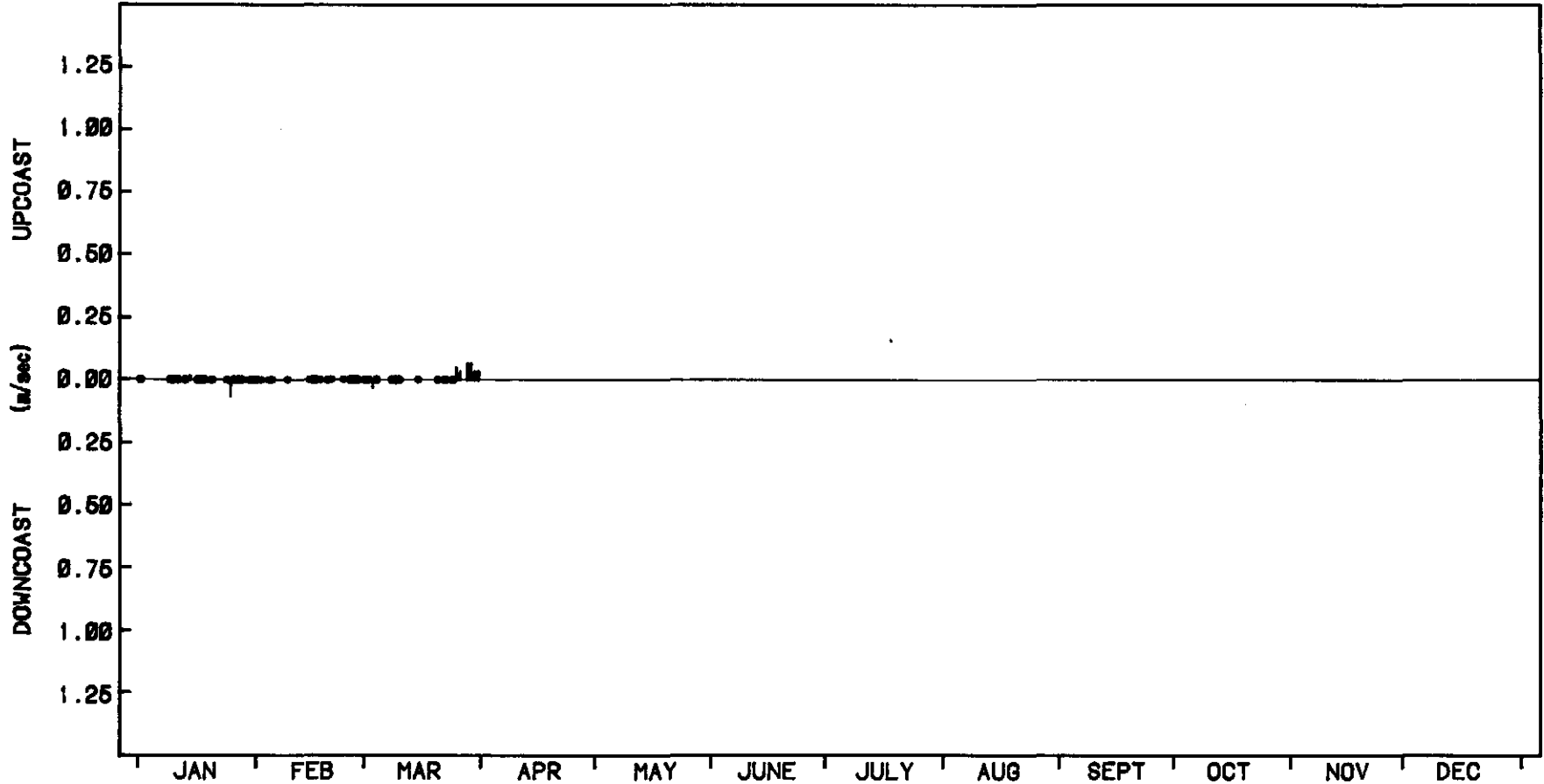
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Figure 12

C 08.1



LITTORAL CURRENTS - MORNING 1979



LITTORAL CURRENT SUMMARY - 1979

Mean Vel = 0.004 m/sec (up)

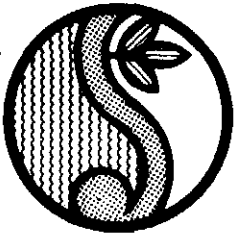
Mean Upcoast Vel = 0.043 m/sec

Mean Downcoast Vel = 0.050 m/sec

MORNING OBSERVATIONS - (49 recordings)

Figure 13
C 08.1

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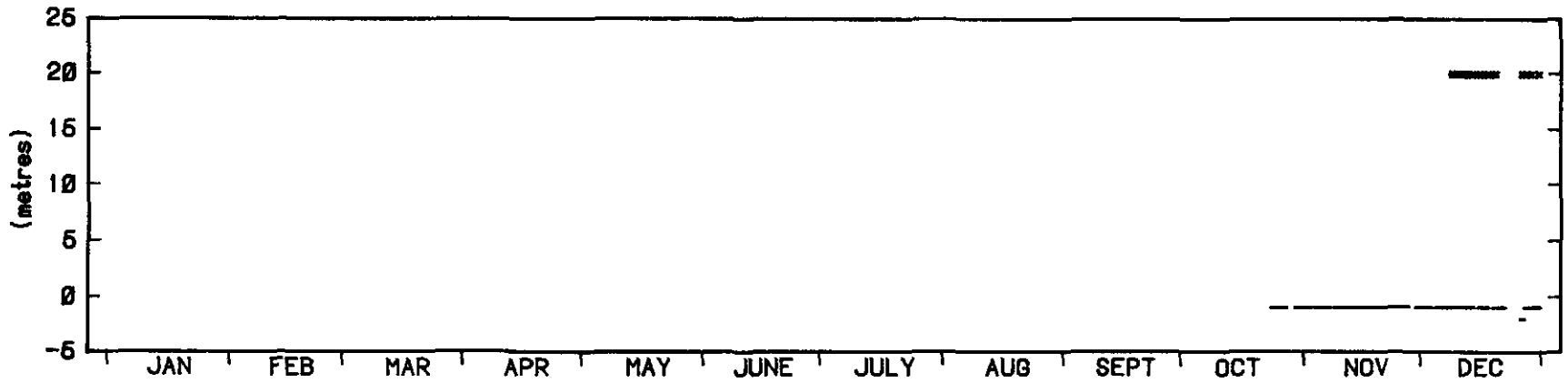
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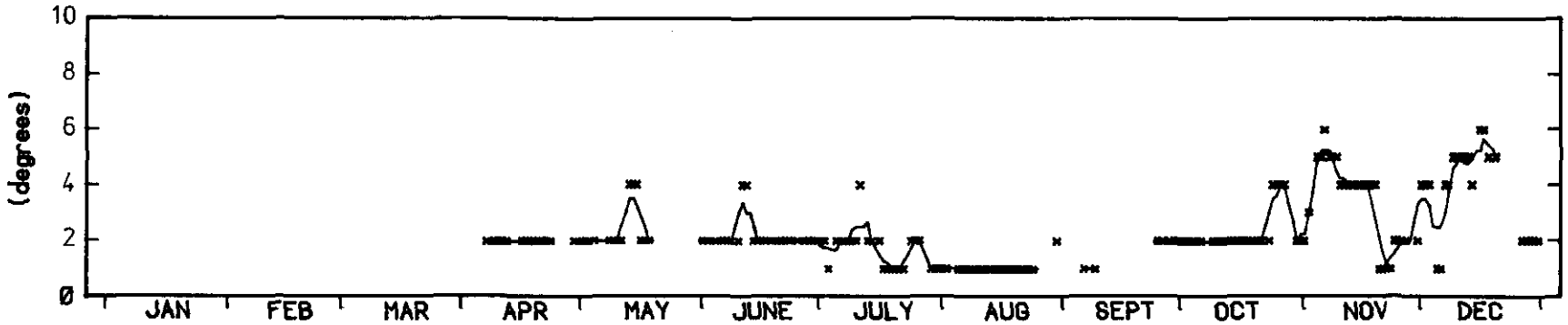
3003

BEACH PROFILE PARAMETERS - 1976



DISTANCE TO FIXED CONTOUR AND VEGETATION LINE - 1976

xxxx Indicates Distance to Fixed Contour : 14 Observations Fixed Contour Level is approx .9 m above MSL
 — Indicates Distance to Vegetation Line : 55 Observations



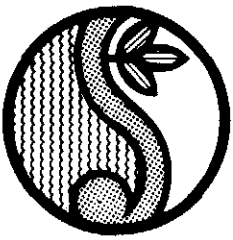
FORESHORE SLOPE - 1976

∩ Five Day Moving Average

No. of Observations : 178

Figure 14
C 08.1

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Noah Creek



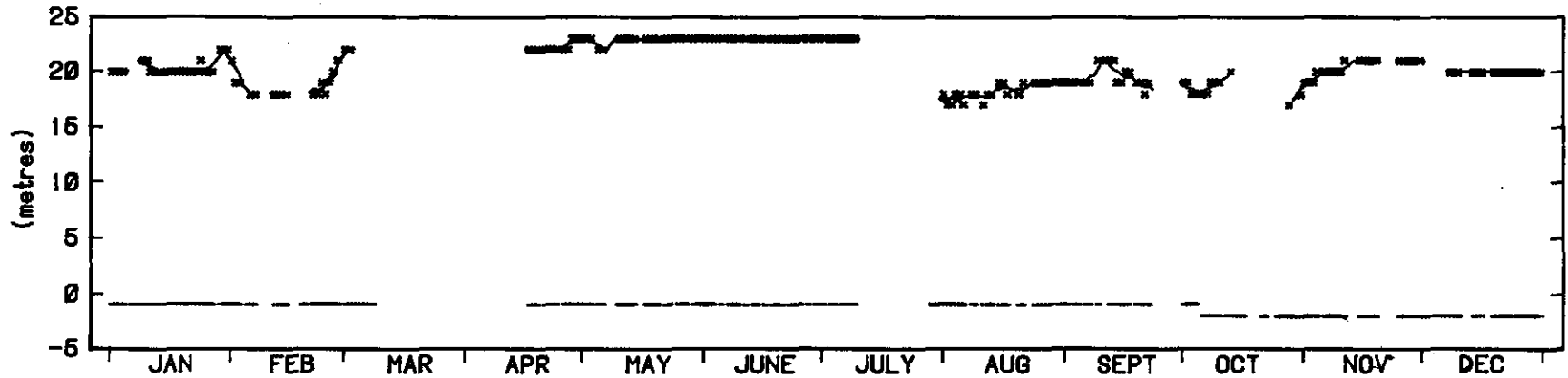
BEACH PROFILE PARAMETERS - 1977

COPE - Coastal Observation Programme Engineering

DOUGLAS SHIRE

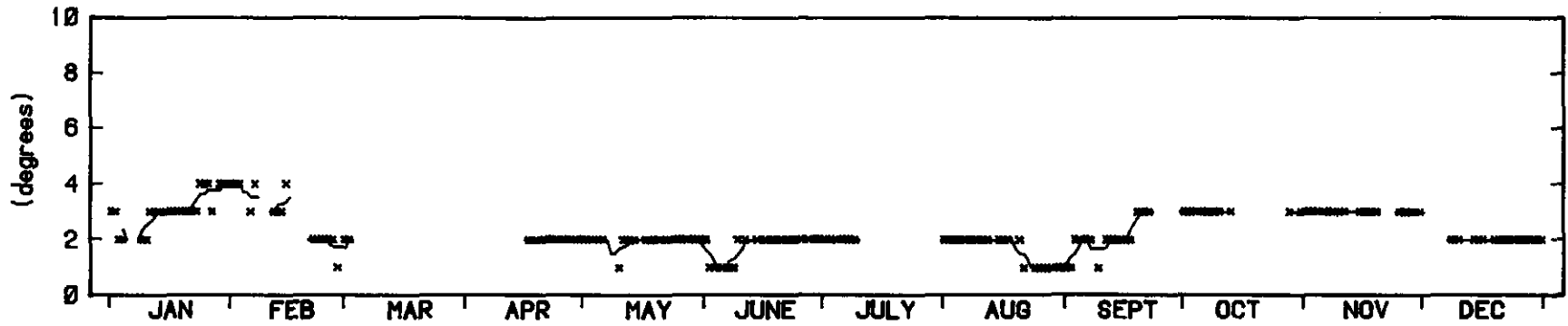
NOAH CREEK

3003



x x x x Indicates Distance to Fixed Contour : 199 Observations
 — Indicates Distance to Vegetation Line : 228 Observations

Fixed Contour Level is approx. 9 m above MSL

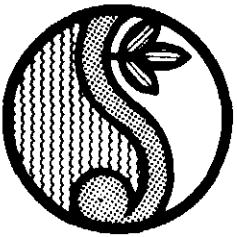


Five Day Moving Average

No. of Observations : 196

Figure 15
C 08.1

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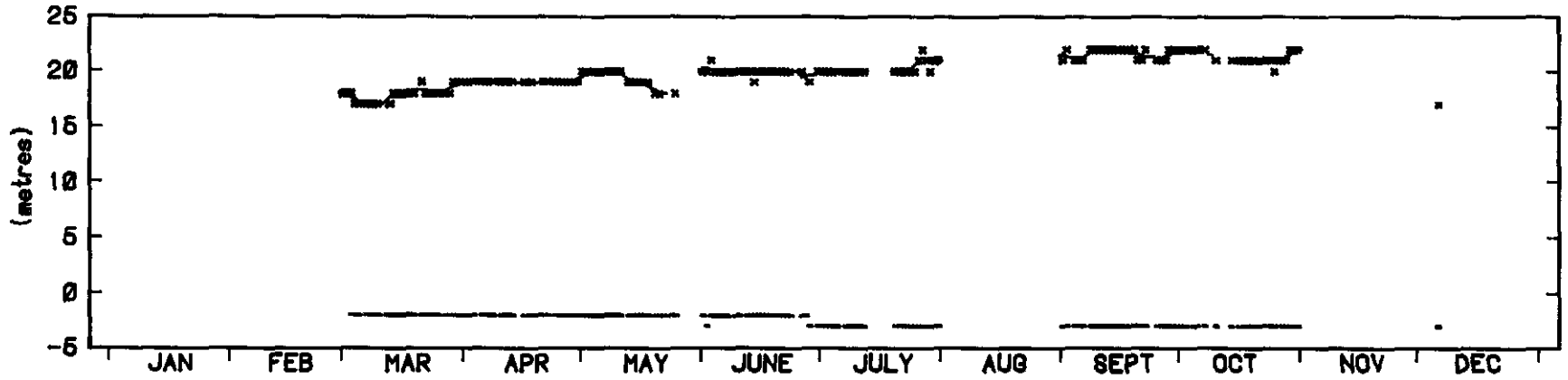
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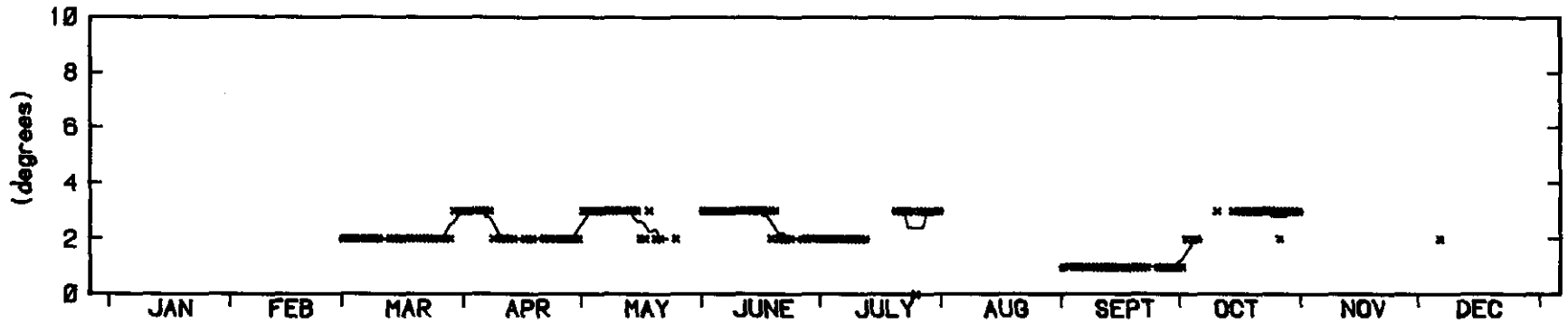
3003

BEACH PROFILE PARAMETERS - 1978



DISTANCE TO FIXED CONTOUR AND VEGETATION LINE - 1978

----- Indicates Distance to Fixed Contour : 166 Observations Fixed Contour Level is approx .9 m above MSL
 ———— Indicates Distance to Vegetation Line : 171 Observations



FORESHORE SLOPE - 1978

∩ Five Day Moving Average

No. of Observations : 166

Figure 16
C 08.1

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BEACH PROFILE PARAMETERS - 1979

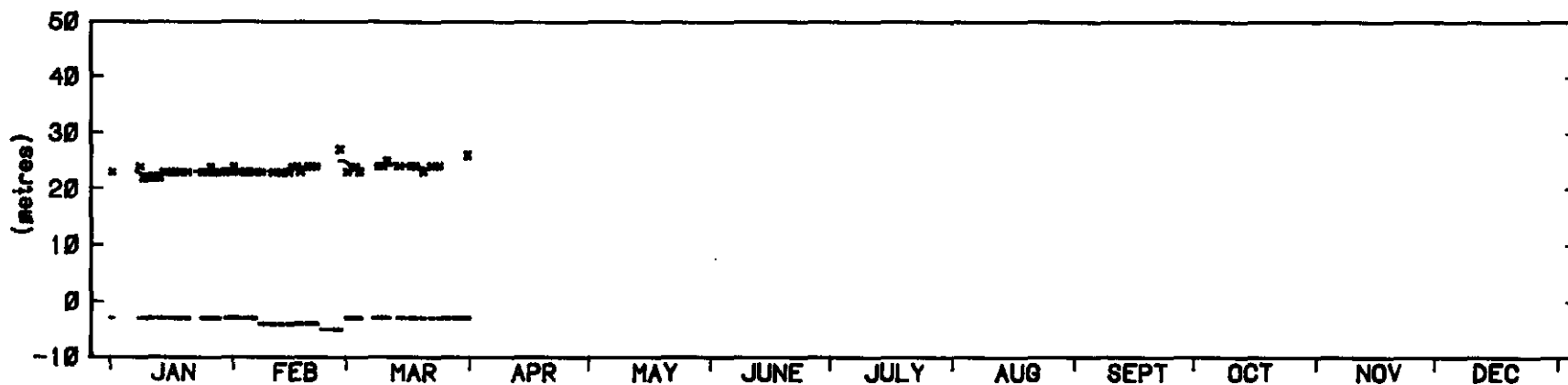
S. R. HAMPSON, Government Printer, Queensland

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DOUGLAS SHIRE

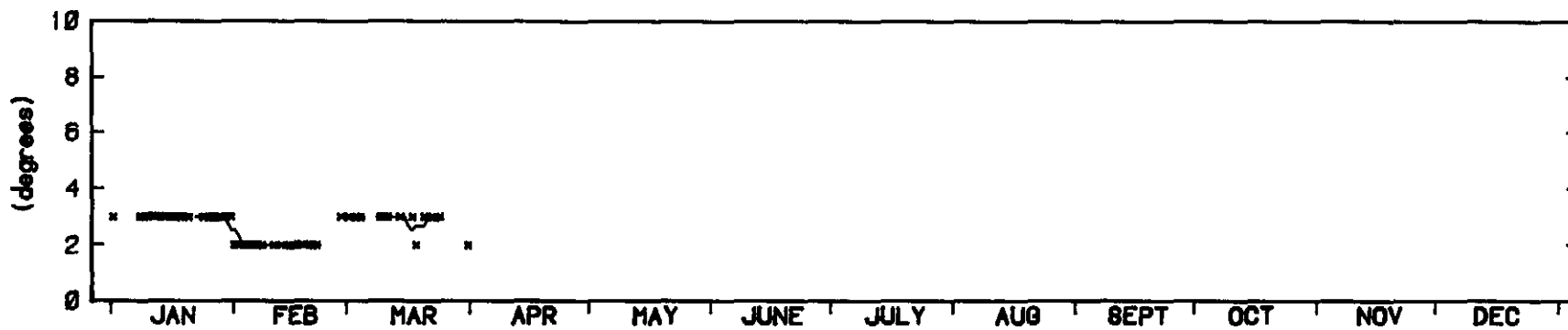
NOAH CREEK

3003



DISTANCE TO FIXED CONTOUR AND VEGETATION LINE - 1979

Indicates Distance to Fixed Contour : 47 Observations Fixed Contour Level is approx .8 m above MSL
 Indicates Distance to Vegetation Line : 59 Observations



FORESHORE SLOPE - 1979

Five Day Moving Average

No. of Observations : 47

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Figure 17

C 08.1