

**COASTAL OBSERVATION PROGRAMME - ENGINEERING (COPE)**

**NEWELL BEACH - DOUGLAS SHIRE**

**FOR THE YEARS 1976 TO 1979**

**REPORT NO. C19.1**

**Beach Protection Authority**

**March 1986**

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## DOCUMENTATION PAGE

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Newell Beach - Douglas Shire

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### **ABSTRACT:-**

This report provides a summary of primary analyses of COPE data on wind, wave and beach processes observed at Newell Beach in the Douglas Shire in northern Queensland. The data were recorded by volunteer observer Mr Noel Warby, and assistant observers Mr and Mrs L. King, during the period April 1976 to December 1979. The recordings were made daily during the three year period and the information published is considered representative of the long term conditions. Since 1982, a beach profile has been taken once or twice yearly by the COPE Field Officer and these profiles have been included in this report.

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Coastal Observation Programme - Engineering (COPE), Barwell Creek - Livingstone Shire, (Report C17.1).

Coastal Observation Programme - Engineering (COPE), Currigee - City of Gold Coast, (Report C18.1)

#### REFERENCES:

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Queensland Volunteer Coastal Observation Programme - Engineering (COPE). 3rd Australian Conference on Coastal and Ocean Engineering, Melbourne, April 1977.

2. PATTERSON, D.C. AND BLAIR, R.J.

Visually Determined Wave Parameters. 6th Australian Conference on Coastal and Ocean Engineering, Gold Coast, July 1983.

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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**

The COPE observers are supplied with a basic kit of recording instruments including:-

- 30 metre Tape
- Wind Meter
- Abney Level
- 1.5 metre Measuring stick
- 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 operated 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 period April 1976 to December 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, then the statistics presented on wind, wave and beach movements can be regarded as typical. However, this three year period may be considered 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**

Newell Beach is located in far north Queensland within the Douglas Shire. It lies approximately 6 kilometres north-east of Mossman and to the immediate north of the mouth of the Mossman River. The Great Barrier Reef lies approximately 30 kilometres offshore from this section of coastline. The location of the Newell Beach COPE station is shown in Figure 1.

### **2.2 Observers**

This station has been operated by Mr Noel Warby assisted by Mr and Mrs L. King, during the period April 1976 to December 1979. Mr Warby and Mr and Mrs King were residents of Newell Beach.

### **2.3 Observed Parameters**

The observers at this station usually recorded once daily at 9.00 a.m., but between August 1976 and November 1978 two recordings a day at 9.00 a.m and 5.00 p.m. were taken.

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
- Distance to Fixed Contour
- Distance to Vegetation Line
- Foreshore Slope
- Longshore Current Speed
- Longshore Current Direction.

In addition a sand sample was collected at the station each month, and since September 1976 a beach profile has usually been recorded monthly. Between November 1982 and January 1985 beach profiles were taken once or twice yearly.

#### 2.4 Tidal Information

Tidal information for this station as presented below is essentially the same as that for Mossman. Datum is Low Water Datum.

M.H.W.S. 2.13 metres  
 M.H.W.N. 1.51 metres  
 M.S.L. 1.28 metres  
 M.L.W.N. 1.06 metres  
 M.L.W.S. 0.44 metres

AHD is 1.28 metres above Low Water Datum

#### 2.5 Description of the Beach

Newell Beach has over this recording period shown accretion of the beach with subsequent growth of vegetation. It exhibits the following characteristics:-

- Typical beach slope: Foreshore slope is in the range 1 in 19 to 1 in 7 ( $3^{\circ}$  -  $8^{\circ}$ ).
- Beach width: Typically 10 to 25 metres measured from the seaward toe of the frontal beach ridge to Low Water Mark.
- D50 sand size: 0.77 mm averaged over three years.
- Adjoining Landform: Low frontal beach ridge consisting of coarse sand which is backed by relatively flat hind ridges.
- Vegetation: Herbland occurs on the seaward slope of the frontal beach ridge and includes goats foot convolvulus (Impomoea pes-caprae), beach bean (Canavalia rosea) and beach grass (Thuarea involuta). The crest and landward slope of the frontal ridge support scaevola (Scaevola taccada) together with beach hibiscus (Hibiscus tiliaceus), sea almond (Terminalia Cattappa), horsetail she-oak (Casuarina equisetifolia var. incana), coconut palms (Cocos nucifera) and other tropical tree species.

## 2.6 Supervision of Station

The observers were instructed in the recording programme 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 would like 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 period April 1976 to December 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 observers 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 observers estimate 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	-	61°	to	85°
Sector 3	-	86°	to	95°
Sector 4	-	96°	to	120°
Sector 5	-	121°	to	180°

Note: 0° is the beach alignment to the left of the observer when facing seaward, and at the COPE station this direction is approximately 10° east of true north.

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 (Figures 6 to 12).
- (d) tabulation of the occurrence of various wave heights, periods, types and directions (Tables 1 to 4).

### **3.4 Longshore Currents**

The observers 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 13 to Figure 19). 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 reference pole to the 0.5 metre fixed contour level (relative to A.H.D.), from 10.9.76 to 21.12.79.
- Distance from reference pole to the vegetation line.

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 20 to 23.

### **3.6 Monthly Beach Profiles**

Beach profiles are normally taken at the beginning of each month. However, should the beach undergo appreciable erosion or accretion during the month, then the observer is requested to take another beach profile. Monthly beach profiles are shown in Figures 24 and 25.

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

Newell Beach

Year 1976

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction											
			Wave Type					Wave Direction						
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm	
JANUARY														
FEBRUARY														
MARCH														
APRIL	4.7	0.34	68.8	-	-	31.2	-	-	-	-	87.5	12.5	-	-
MAY	5.0	0.28	85.7	-	-	-	14.3	-	-	-	82.1	3.6	-	14.3
JUNE	5.5	0.30	93.1	6.9	-	-	-	-	-	-	100.0	-	-	-
JULY	5.6	0.33	65.5	13.8	-	-	20.7	-	-	-	75.9	3.4	-	20.7
AUGUST	4.5	0.13	50.0	-	-	-	50.0	-	-	-	42.0	8.0	-	50.0
SEPTEMBER	4.2	0.09	22.4	2.0	-	-	75.6	-	-	-	24.4	-	-	75.6
OCTOBER	4.2	0.14	34.5	-	-	-	65.5	-	10.3	-	24.1	-	-	65.5
NOVEMBER	4.4	0.10	41.8	-	-	-	58.2	-	23.6	-	18.2	-	-	58.2
DECEMBER	4.7	0.18	70.0	-	-	-	30.0	-	26.7	-	41.7	1.6	-	30.0
WHOLE YEAR	4.8	0.18	54.0	1.9	0.0	1.3	42.8	0.0	9.4	45.5	2.3	0.0	42.8	

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**

Newell Beach

Year 1977

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	5.1	0.29	65.5	7.3	-	3.6	23.6	-	3.6	65.5	7.3	-	23.6
FEBRUARY	5.2	0.16	41.5	1.9	-	7.5	49.1	-	7.5	41.5	1.9	-	49.1
MARCH	4.0	0.07	30.6	4.1	4.1	-	61.2	-	12.2	24.5	2.1	-	61.2
APRIL	5.0	0.33	43.9	22.0	24.4	2.4	7.3	-	-	82.9	9.8	-	7.3
MAY	5.0	0.12	50.0	6.3	-	-	43.7	-	-	56.3	-	-	43.7
JUNE	5.2	0.24	79.2	-	-	10.4	10.4	-	-	85.4	4.2	-	10.4
JULY	5.1	0.26	73.3	-	-	17.8	8.9	-	-	91.1	-	-	8.9
AUGUST	4.9	0.27	72.7	7.3	-	12.7	7.3	-	-	85.4	7.3	-	7.3
SEPTEMBER	5.0	0.26	50.0	9.3	1.9	7.4	31.4	-	1.9	61.1	5.6	-	31.4
OCTOBER	4.4	0.27	77.8	-	3.7	5.5	13.0	-	-	63.0	24.0	-	13.0
NOVEMBER	4.3	0.10	24.5	2.0	2.0	2.0	69.5	-	2.0	22.4	6.1	-	69.5
DECEMBER	4.4	0.16	26.9	9.6	1.9	1.9	59.7	-	9.6	26.9	3.8	-	59.7
WHOLE YEAR	4.9	0.21	53.2	5.6	2.9	6.0	32.3	0.0	3.2	58.4	6.1	0.0	32.3

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**

Newell Beach

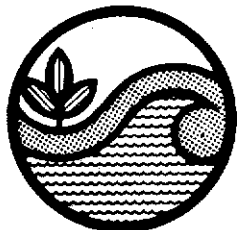
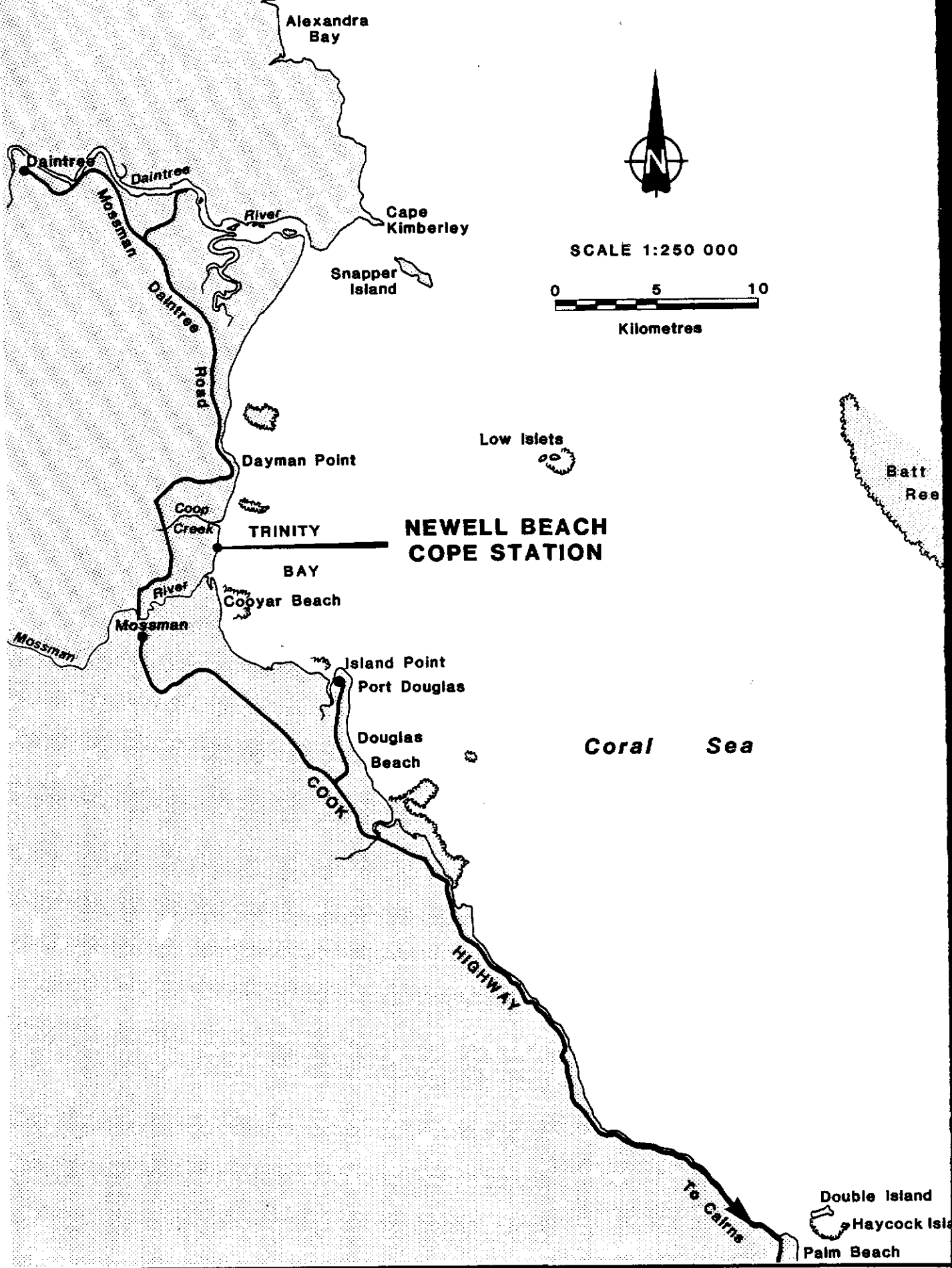
Year 1978

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	5.6	0.13	49.9	-	2.2	2.2	45.7	-	-	50.0	4.3	-	45.7
FEBRUARY	4.4	0.15	22.7	-	18.2	-	59.1	-	-	9.1	31.8	-	59.1
MARCH	5.5	0.15	55.0	-	2.5	2.5	40.0	-	12.5	42.5	5.0	-	40.0
APRIL	5.4	0.22	63.2	5.3	5.3	2.6	23.6	-	5.3	65.8	5.3	-	23.6
MAY	5.7	0.26	75.6	6.6	-	-	17.8	-	2.2	80.0	-	-	17.8
JUNE	5.1	0.12	59.5	-	2.4	-	38.1	-	2.4	57.1	2.4	-	38.1
JULY	4.7	0.24	73.7	10.5	-	-	15.8	-	5.3	78.9	-	-	15.8
AUGUST	4.8	0.26	82.7	7.7	-	-	9.6	-	1.9	86.6	1.9	-	9.6
SEPTEMBER	4.9	0.18	86.3	-	-	5.9	7.8	-	3.9	80.5	7.8	-	7.8
OCTOBER	5.0	0.32	72.7	11.4	6.8	9.1	-	-	4.5	91.0	4.5	-	-
NOVEMBER	4.5	0.22	51.2	2.4	4.9	4.9	36.6	-	14.6	36.6	12.2	-	36.6
DECEMBER	5.1	0.11	48.4	-	-	-	51.6	-	29.0	19.4	-	-	51.6
WHOLE YEAR	5.1	0.20	64.5	3.9	2.9	2.4	26.3	0.0	6.3	62.0	5.4	0.0	26.3

SP - Spilling

PL - Plunging

SP/PL - Combined Spilling and Plunging



Beach Protection Authority

## LOCALITY PLAN

**COPE**  
Newell Beach

**Figure 1**

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**TABLE 4**  
**MONTHLY AND ANNUAL**  
**MEAN WAVE HEIGHT/MEAN WAVE PERIOD AND WAVE TYPE/WAVE DIRECTION**  
**OCCURRENCES**

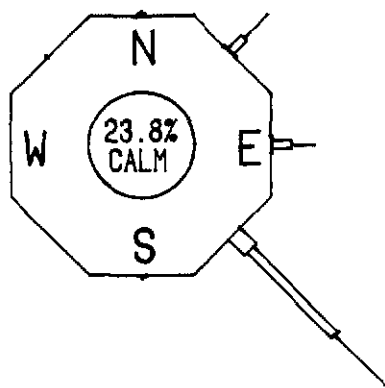
Newell Beach

Year 1979

MONTH	MEAN WAVE PERIOD (secs)	MEAN WAVE HEIGHT (metres)	Percentage Occurrence - Wave Type/Wave Direction										
			Wave Type					Wave Direction					
			SP	PL	Surge	SP/PL	Calm	1	2	3	4	5	Calm
JANUARY	5.4	0.37	23.3	13.3	10.0	3.4	50.0	-	10.0	40.0	-	-	50.0
FEBRUARY	-	-	-	-	-	-	-	-	-	-	-	-	-
MARCH	-	-	-	-	-	-	-	-	-	-	-	-	-
APRIL	-	-	-	-	-	-	-	-	-	-	-	-	-
MAY	-	-	-	-	-	-	-	-	-	-	-	-	-
JUNE	4.1	0.26	100.0	-	-	-	-	-	-	90.0	10.0	-	-
JULY	4.5	0.19	55.0	-	-	20.0	25.0	-	-	75.0	-	-	25.0
AUGUST	5.3	0.16	47.8	-	-	-	52.2	-	-	47.8	-	-	52.2
SEPTEMBER	4.9	0.36	71.4	17.9	-	-	10.7	-	10.7	67.9	10.7	-	10.7
OCTOBER	5.0	0.13	39.1	8.7	-	-	52.2	-	21.7	26.1	-	-	52.2
NOVEMBER	5.5	0.28	41.4	20.7	-	-	37.9	-	-	62.1	-	-	37.9
DECEMBER	5.3	0.18	23.1	15.4	-	-	61.5	-	-	34.7	3.8	-	61.5
WHOLE YEAR	4.9	0.25	48.2	10.6	1.5	2.5	37.2	0.0	5.5	54.3	3.0	0.0	37.2

SP - Spilling  
 PL - Plunging  
 SP/PL - Combined Spilling and Plunging

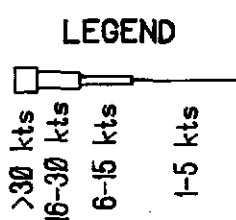
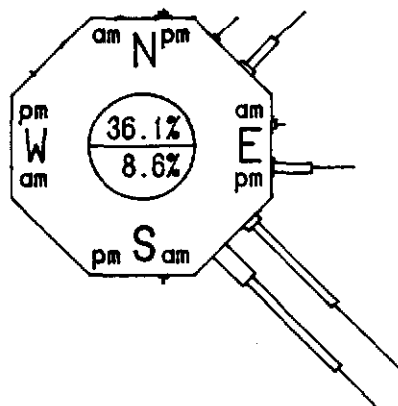
ALL OBSERVATIONS



Total No. of Observations : 1665

MORNING - AFTERNOON OBSERVATIONS

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

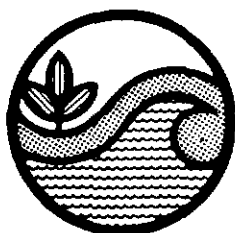


No. of Morning Observations : 919  
 No. of Afternoon Observations : 746

Mean Time :- Morning Obs : 0908 hrs  
 Mean Time :- Afternoon Obs : 1452 hrs

**SCALE**  
 0 10 20 30 40 50  
 Percentage

WIND DATA - APR 1976 to DEC 1979

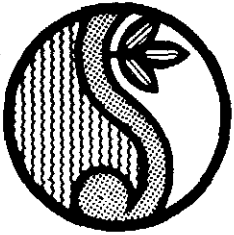


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WIND DATA

COPE  
 - Newell Beach

**Figure 2**  
 C 19.1



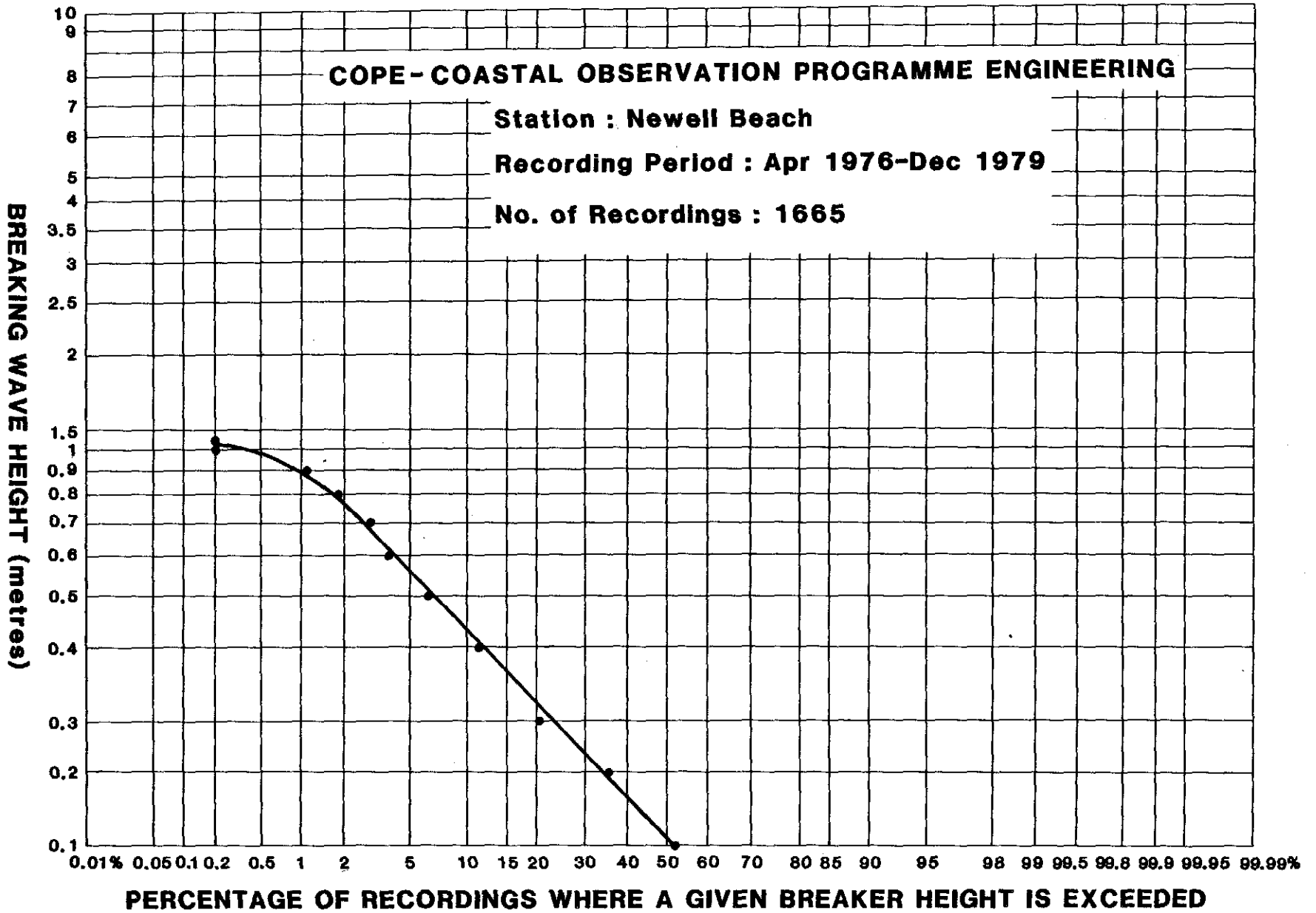
**WAVE HEIGHT % EXCEEDANCE  
ALL DATA**

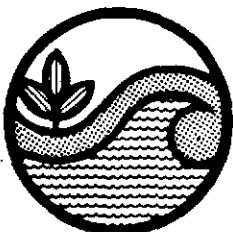
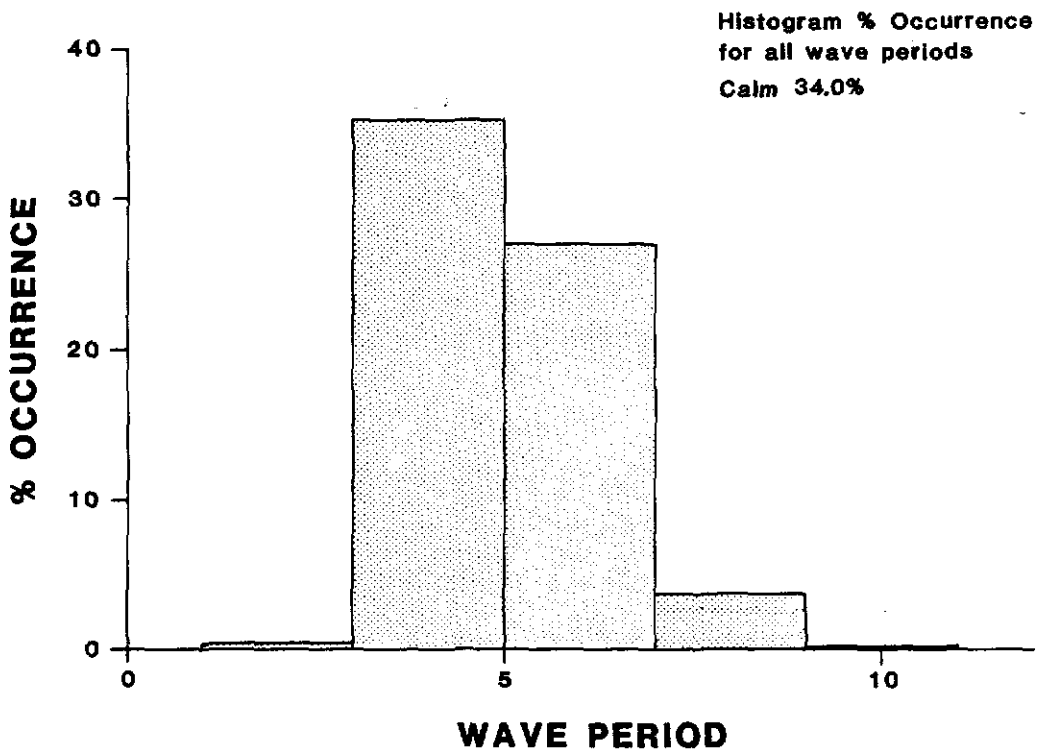
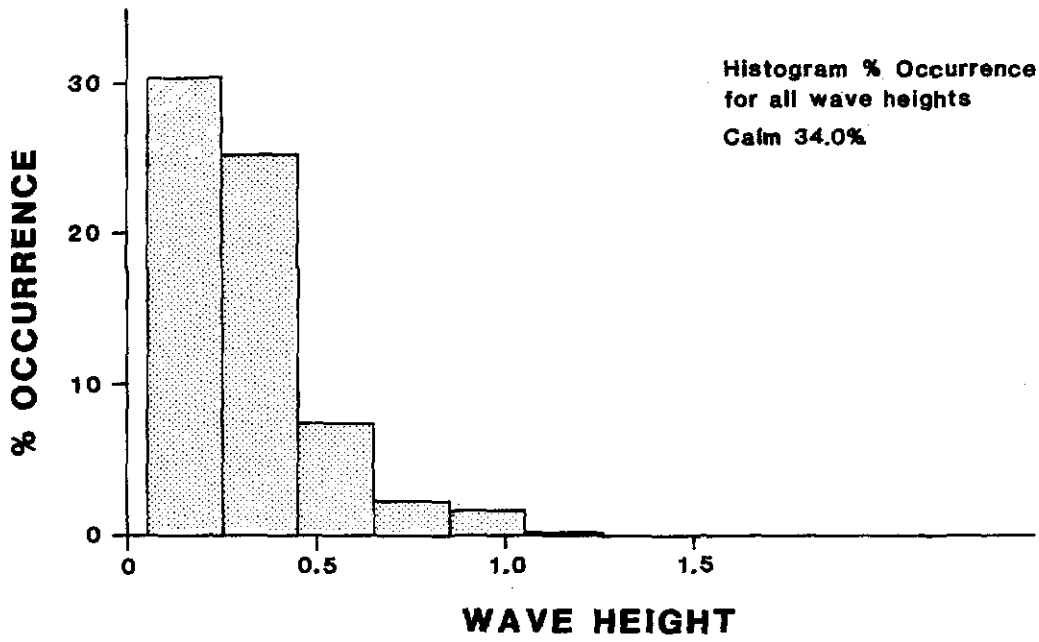
**COPE**

Newell Beach

**Figure 3**

C 19.1





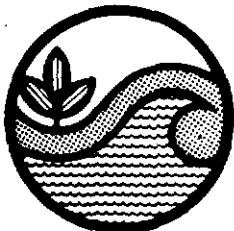
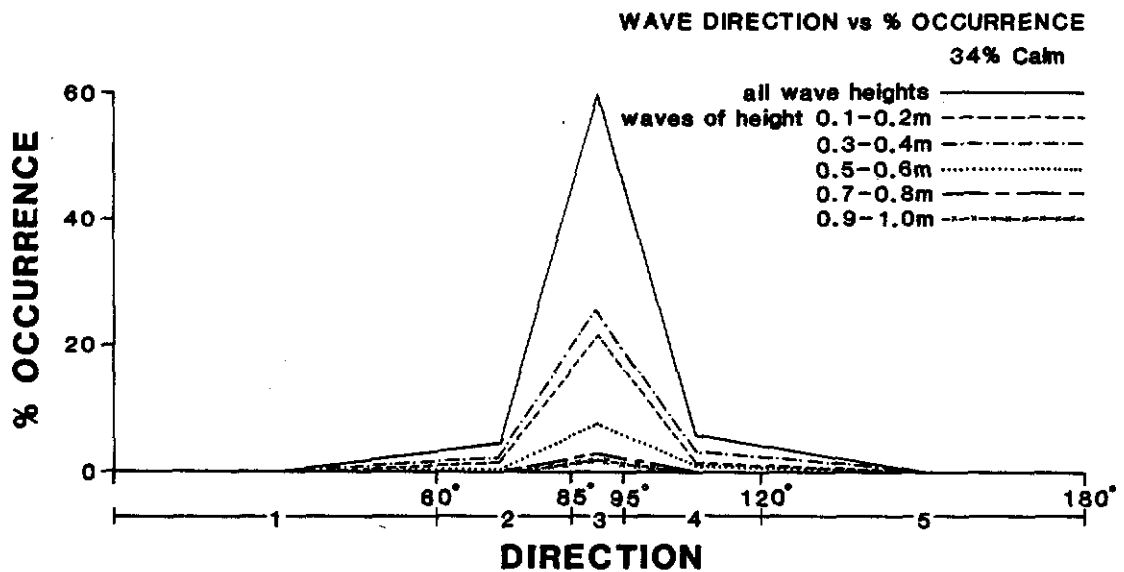
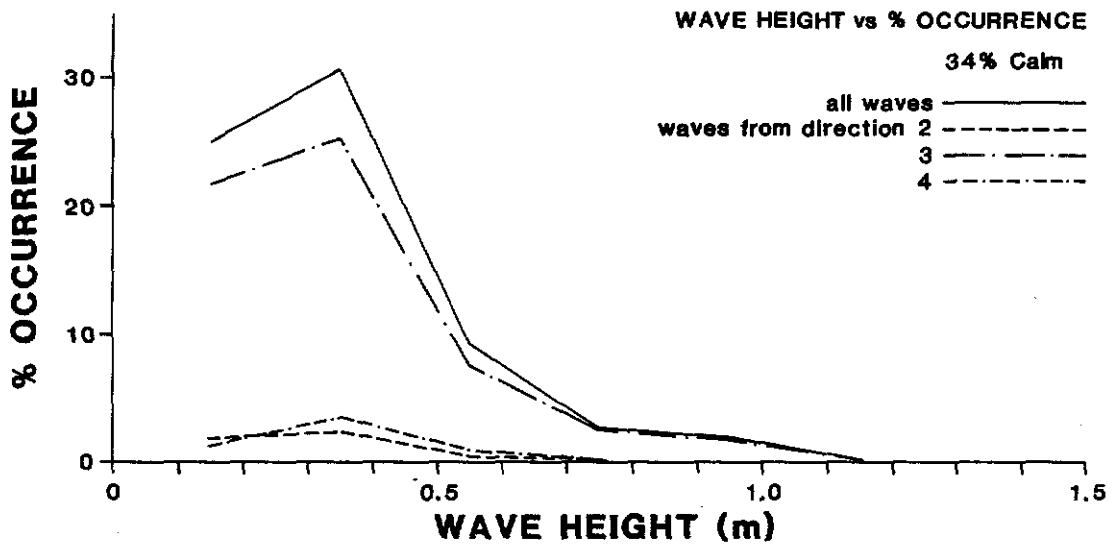
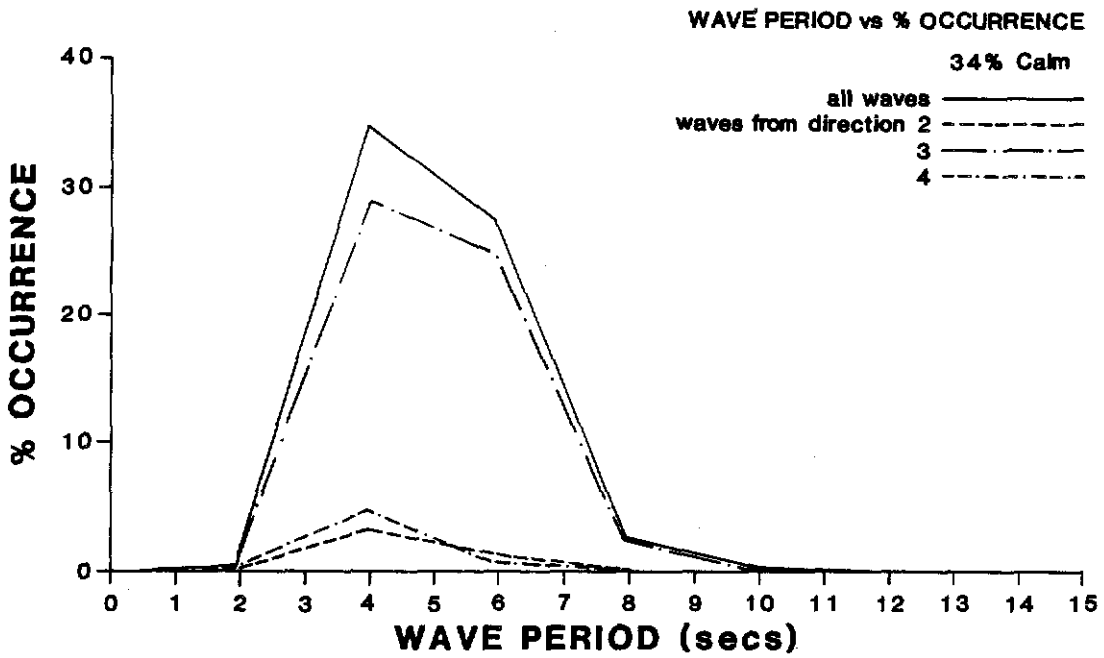
Beach Protection Authority

**PERCENTAGE OCCURRENCE OF  
WAVE HEIGHT AND WAVE PERIOD  
ALL DATA**

**COPE**  
Newell Beach

**Figure 4**

C 19.1



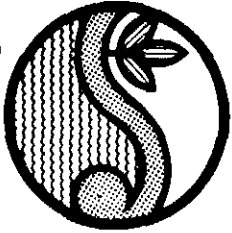
Beach Protection Authority

**WAVE DIRECTION ANALYSIS  
ALL DATA**

**COPE**  
Newell Beach

**Figure 5**

C 19.1



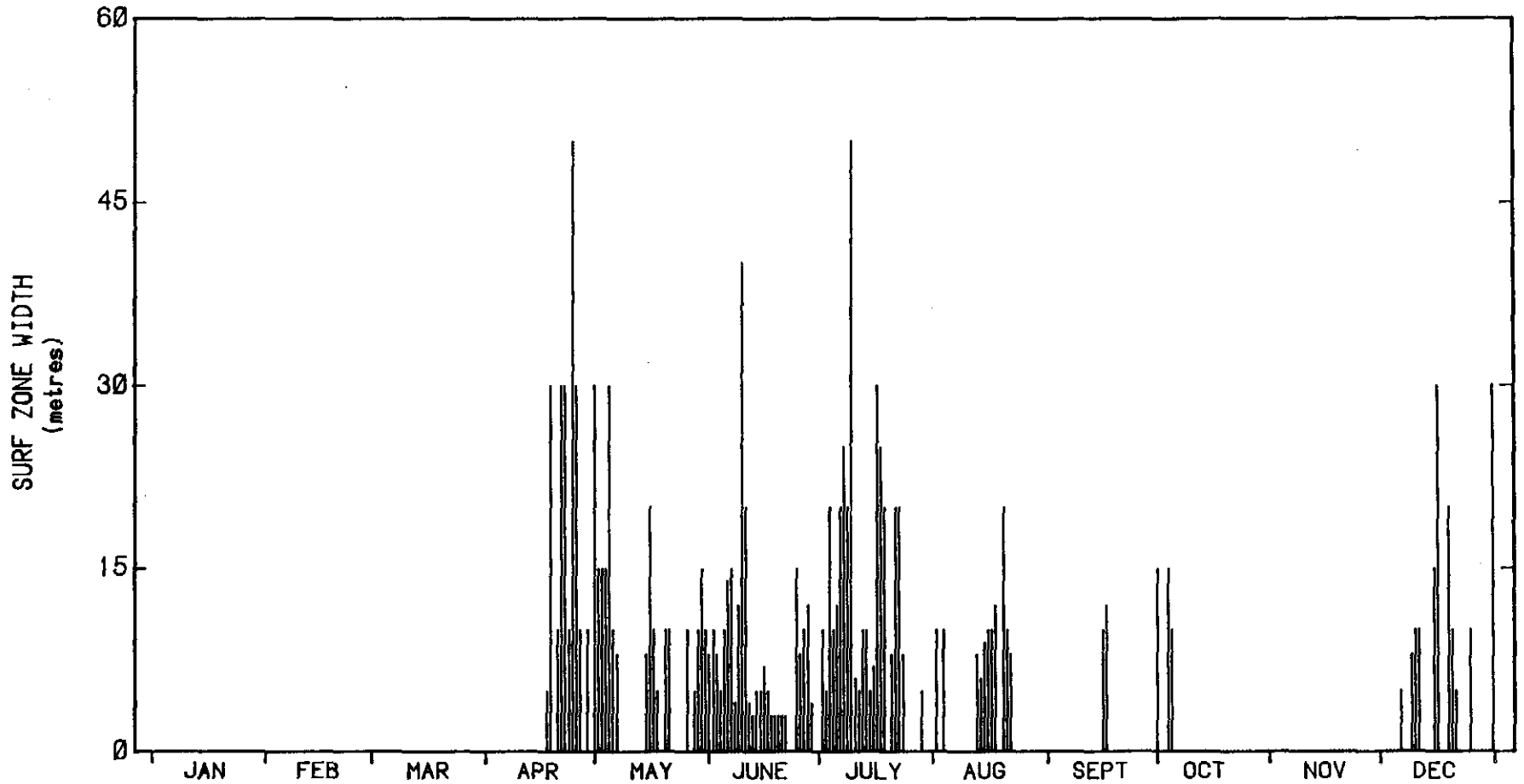
SURF ZONE WIDTH - MORNING 1976

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NEWELL BEACH

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SURF ZONE WIDTH SUMMARY - 1976

No. of Observations : 233

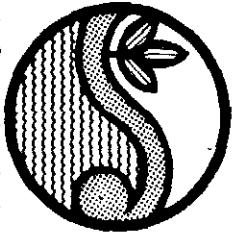
MORNING OBSERVATIONS

Mean Surf Zone Width = 5.9 m

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Figure 6

C 19.1



SURF ZONE WIDTH - AFTERNOON 1976

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Newell Beach

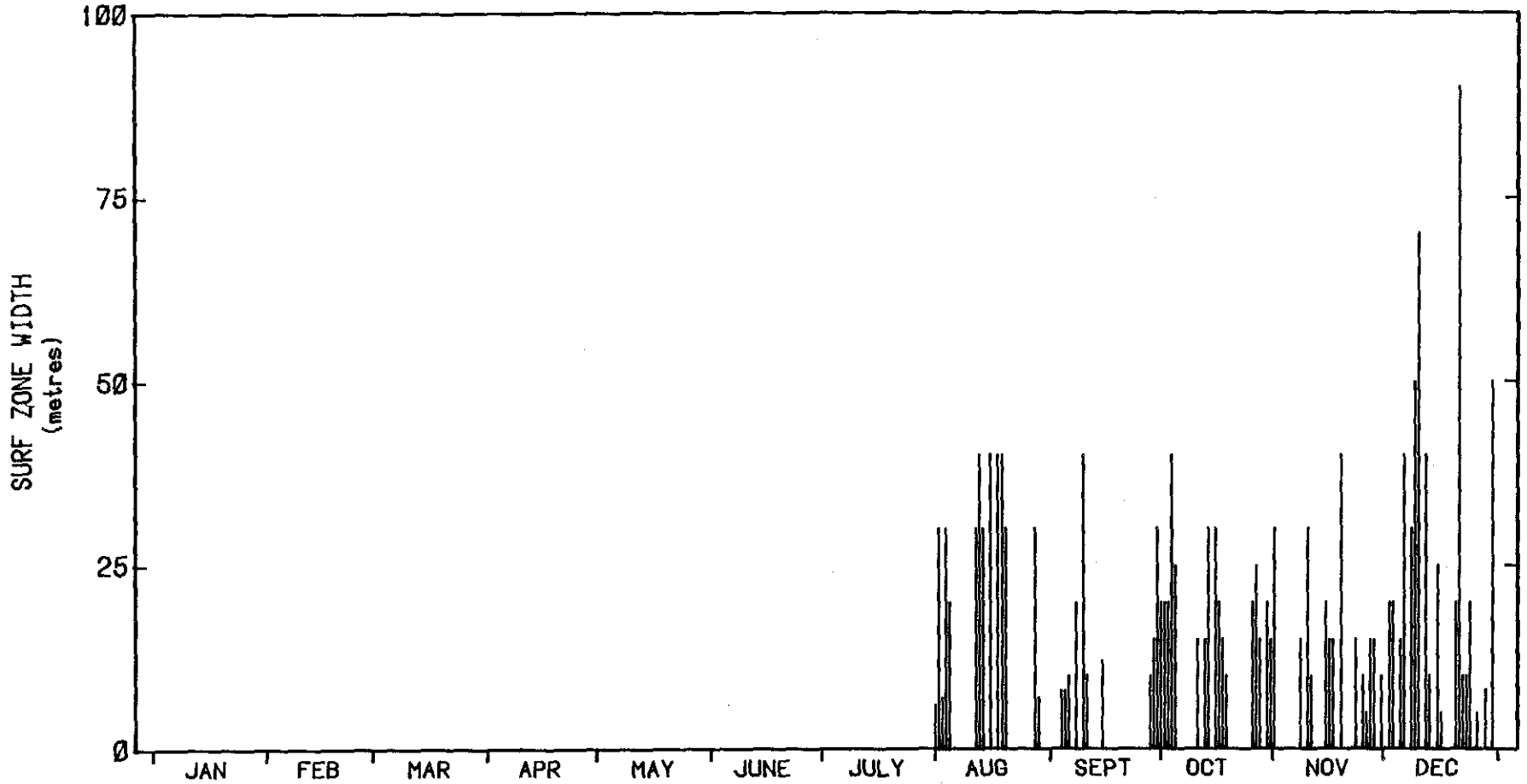
Figure 7  
C 19.1

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Programme Engineering

NEWELL BEACH

DOUGLAS SHIRE

3001

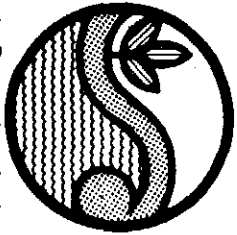


SURF ZONE WIDTH SUMMARY - 1976

No. of Observations : 140

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 12.0 m



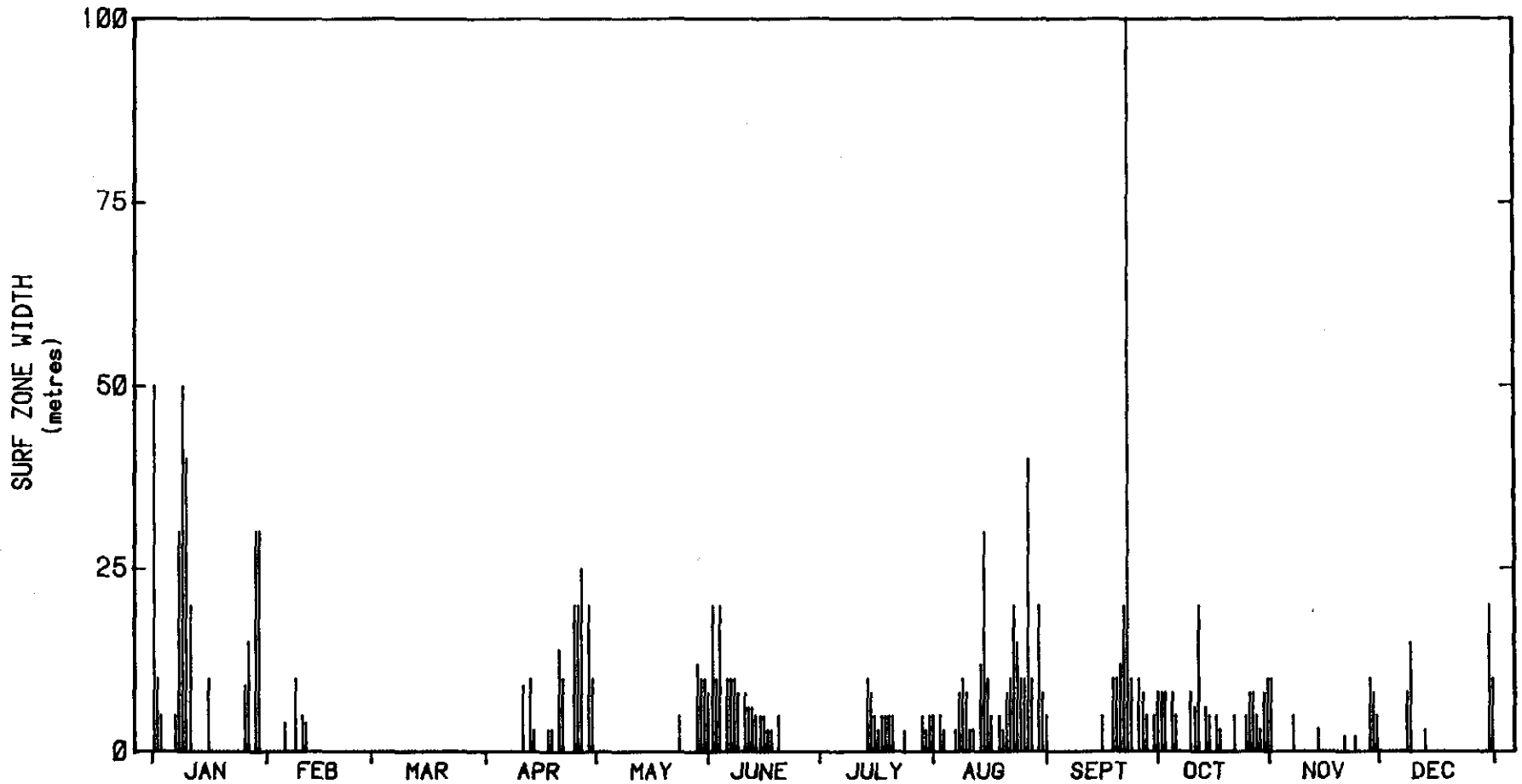
SURF ZONE WIDTH - MORNING 1977

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SURF ZONE WIDTH SUMMARY - 1977

No. of Observations : 286

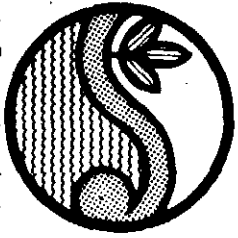
MORNING OBSERVATIONS

Mean Surf Zone Width = 5.0 m

Figure 8  
C 19.1

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Newell Beach





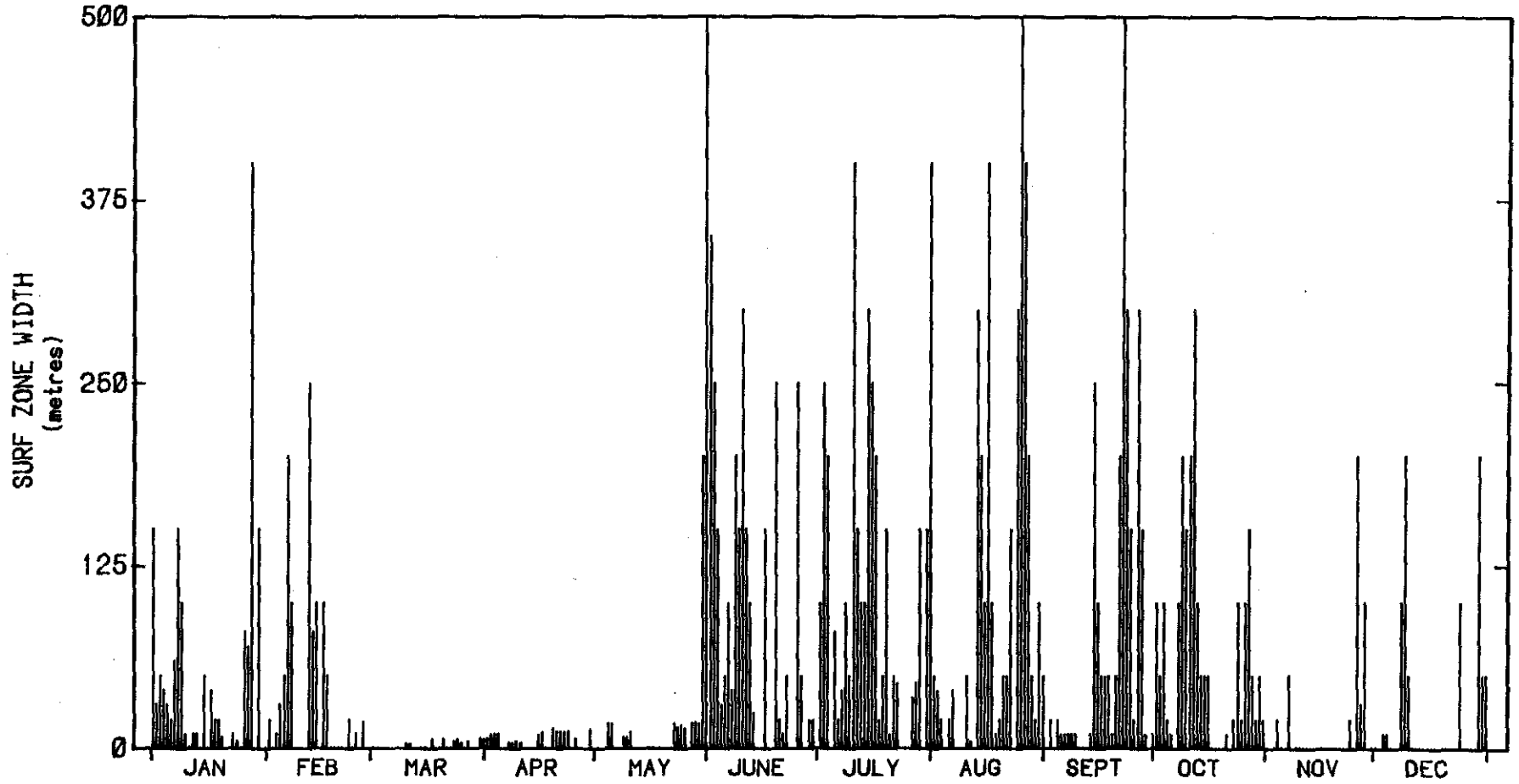
SURF ZONE WIDTH - AFTERNOON 1977

COPE - Coastal Observation Programme Engineering

NEWELL BEACH

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SURF ZONE WIDTH SUMMARY - 1977

No. of Observations : 317

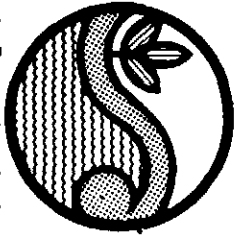
AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 58.9 m

Figure 9

C 19.1

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Newell Beach



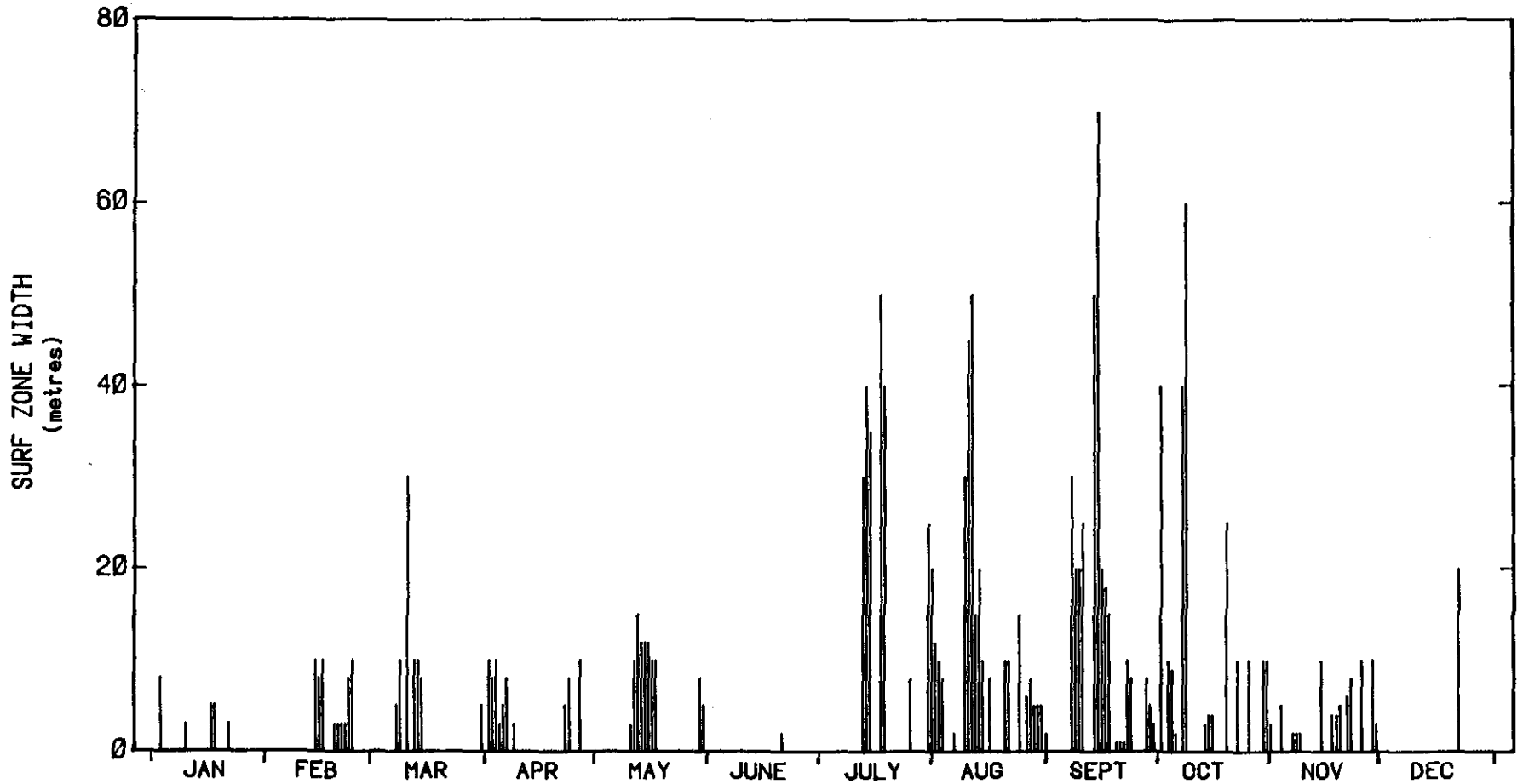
SURF ZONE WIDTH - MORNING 1978

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SURF ZONE WIDTH SUMMARY - 1978

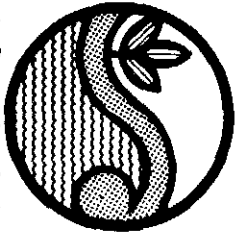
No. of Observations : 206

MORNING OBSERVATIONS

Mean Surf Zone Width = 7.3 m

Figure 10  
C 19.1

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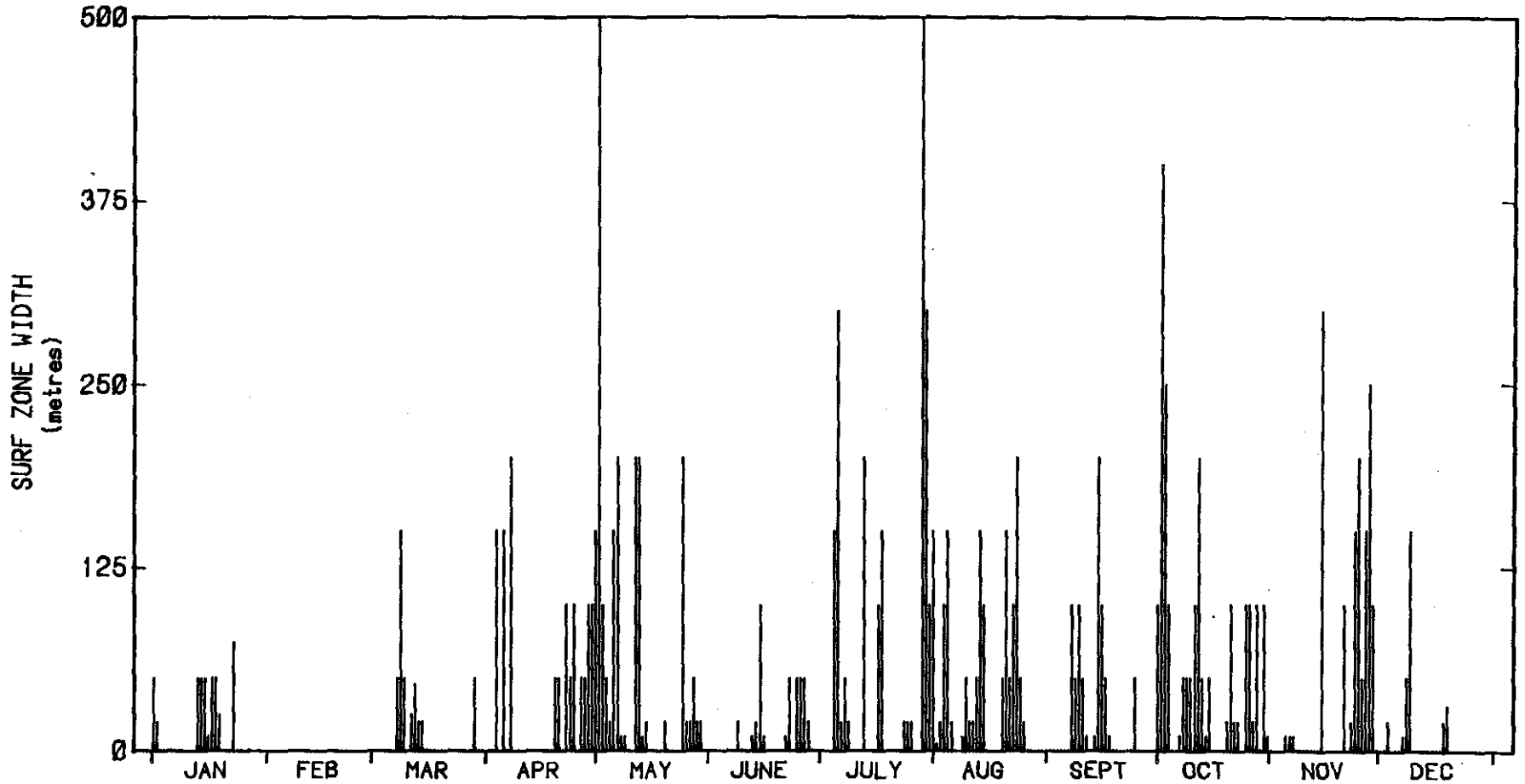
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SURF ZONE WIDTH - AFTERNOON 1978



### SURF ZONE WIDTH SUMMARY - 1978

No. of Observations : 284

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 43.1 m

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Figure 11

C 19.1



SURF ZONE WIDTH - MORNING 1979

Figure 12

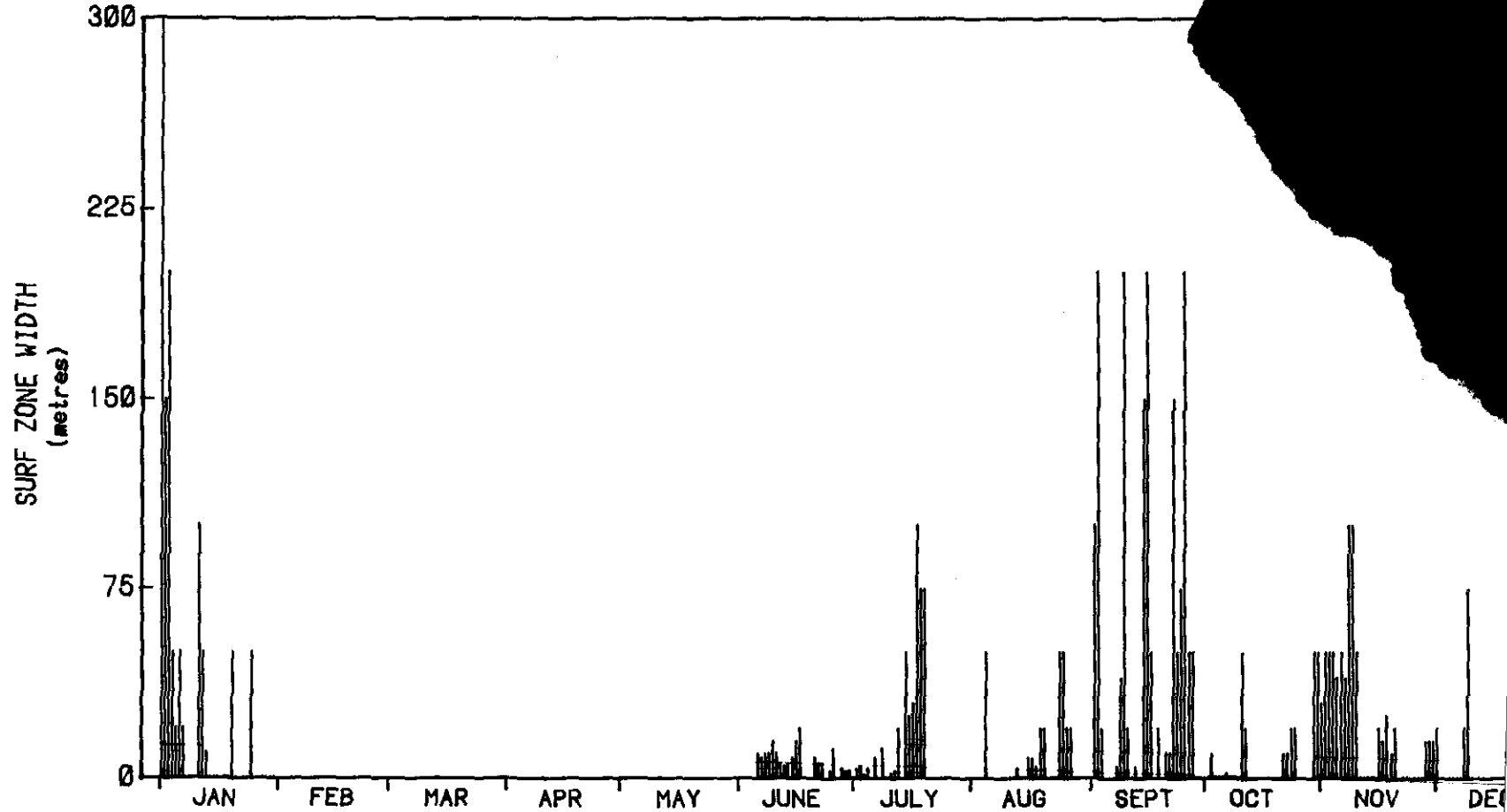
C 19.1

COPE  
Newell Beach

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Programme Engineering

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DOUGLAS S...



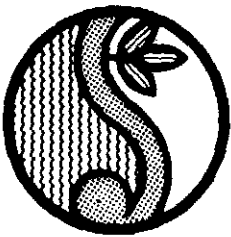
SURF ZONE WIDTH SUMMARY - 1979

No. of Observations : 194

MORNING OBSERVATIONS

Mean Surf Zone Width = 24.

■ Indicates Offshore Bar Present



LITTORAL CURRENTS - MORNING 1976

COPE  
Newell Beach

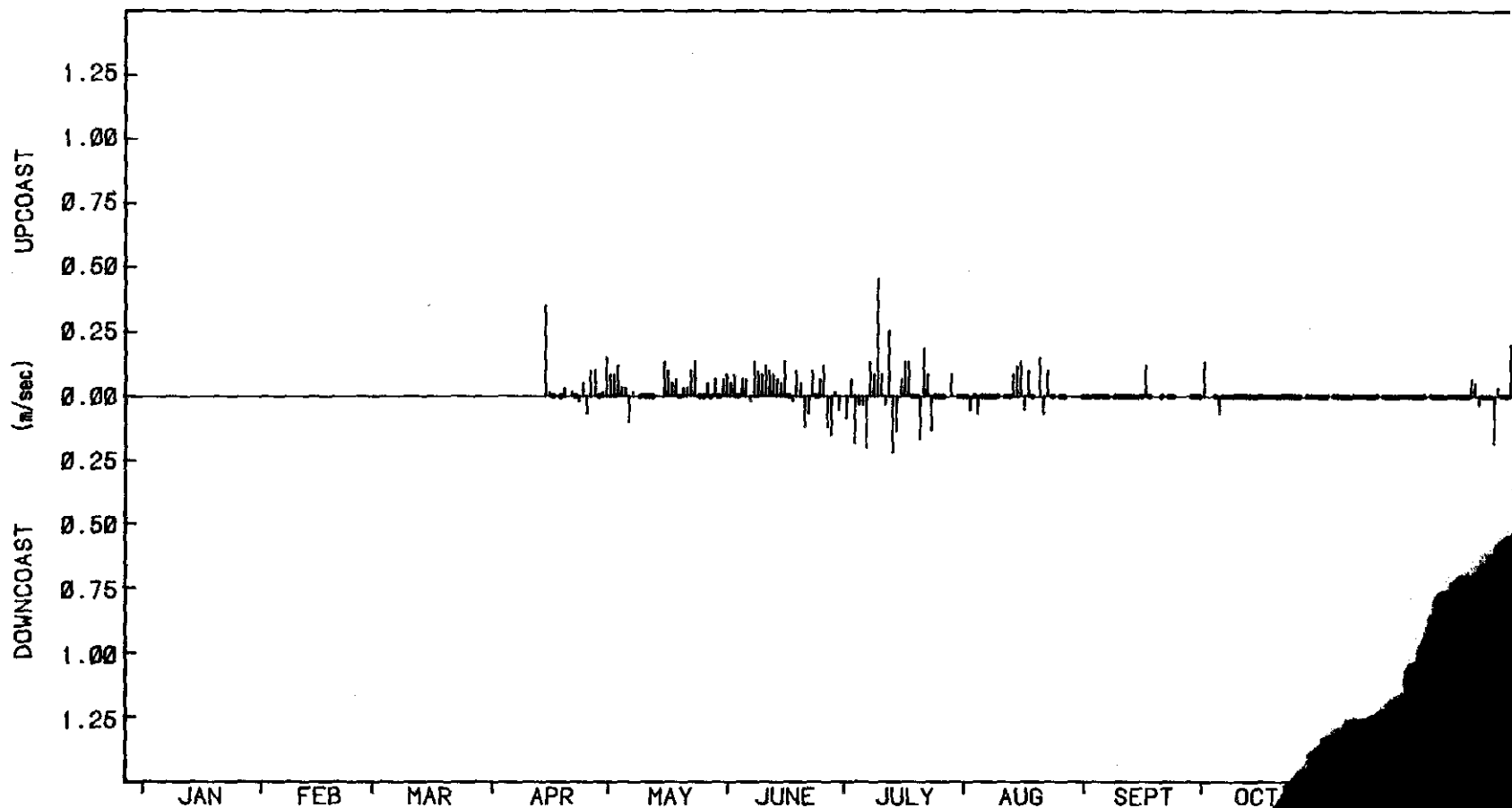
Figure 13  
C 19.1

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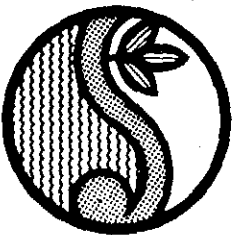
LITTORAL CURRENT SUMMARY - 1976

Mean Vel = 0.015 m/sec (up)

Mean Upcoast Vel = 0.096 m/sec

Mean D

MORNING OBSERVATIONS - (233 recordings)



LITTORAL CURRENTS - AFTERNOON 1976

COPE  
Newell Beach

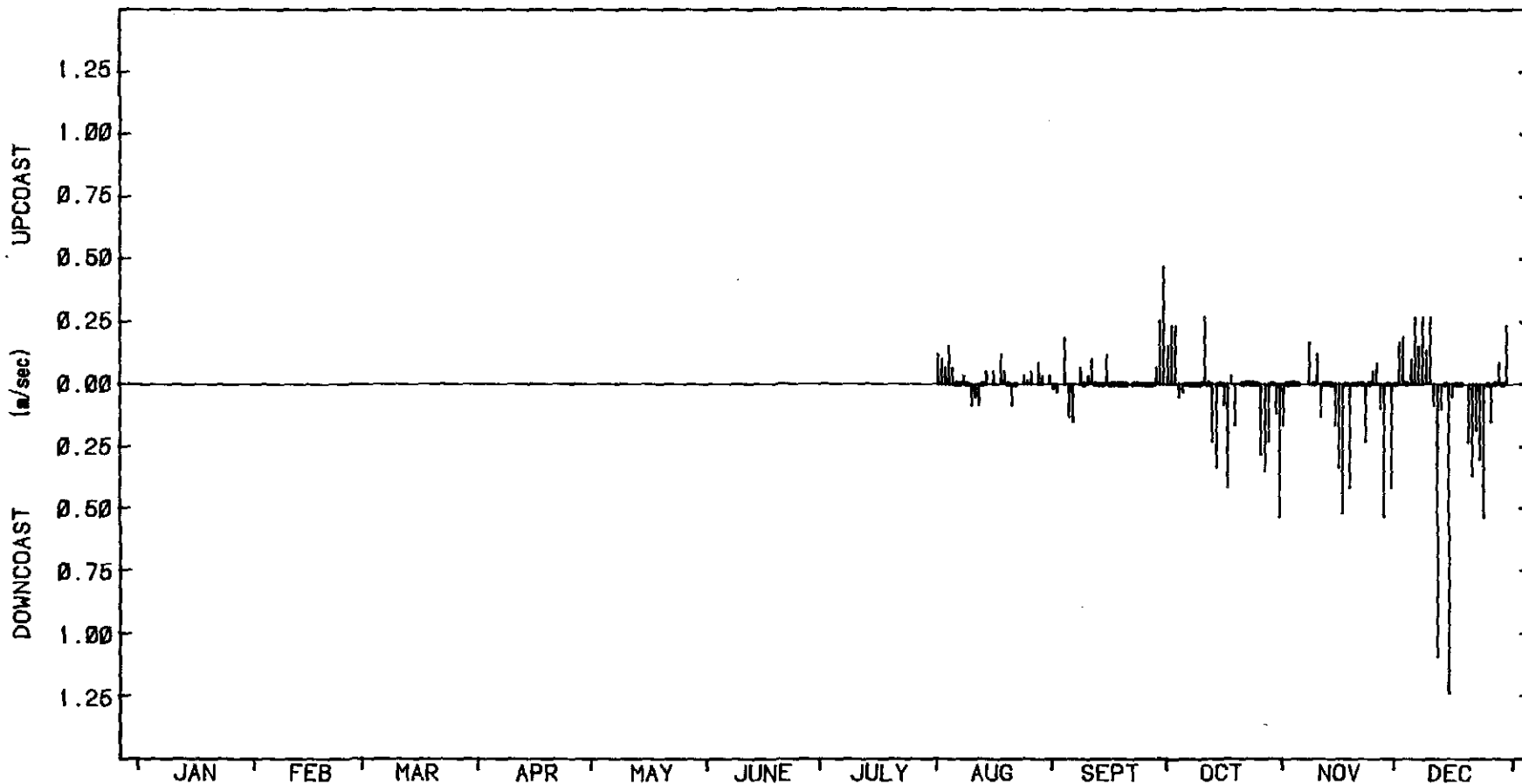
Figure 14  
C 19.1

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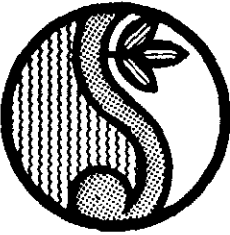
LITTORAL CURRENT SUMMARY - 1976

Mean Vel = -.038 m/sec (down)

Mean Upcoast Vel = 0.128 m/sec

Mean Downcoast Vel = 0.263 m/sec

AFTERNOON OBSERVATIONS - (140 recordings)



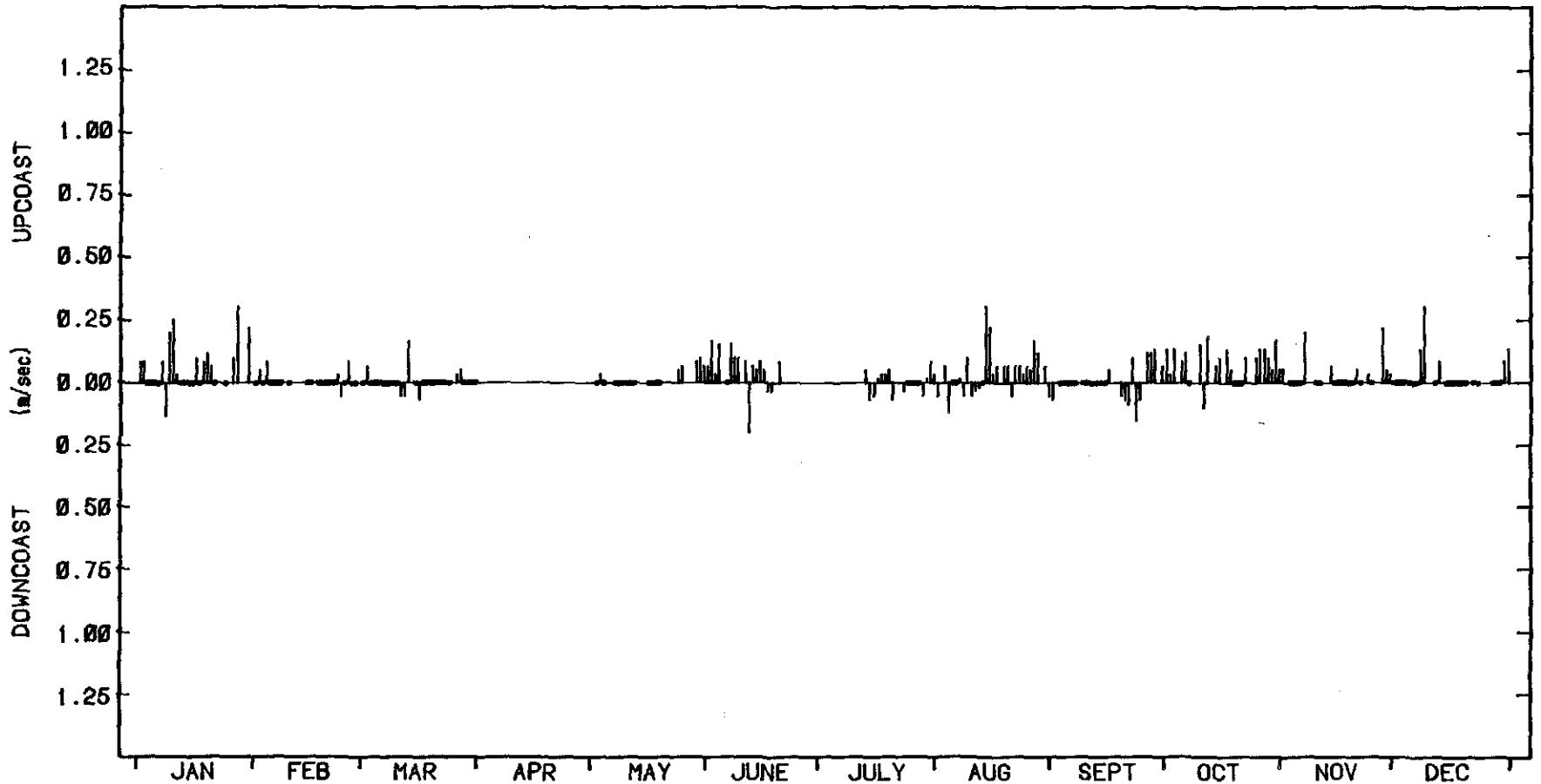
LITTORAL CURRENTS - MORNING 1977

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LITTORAL CURRENT SUMMARY - 1977

Mean Vel = 0.032 m/sec (up)

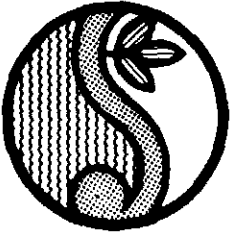
Mean Upcoast Vel = 0.095 m/sec

Mean Downcoast Vel = 0.067 m/sec

MORNING OBSERVATIONS - (250 recordings)

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Newell Beach

Figure 15  
C 19.1



LITTORAL CURRENTS - AFTERNOON 1977

COPE  
Newell Beach

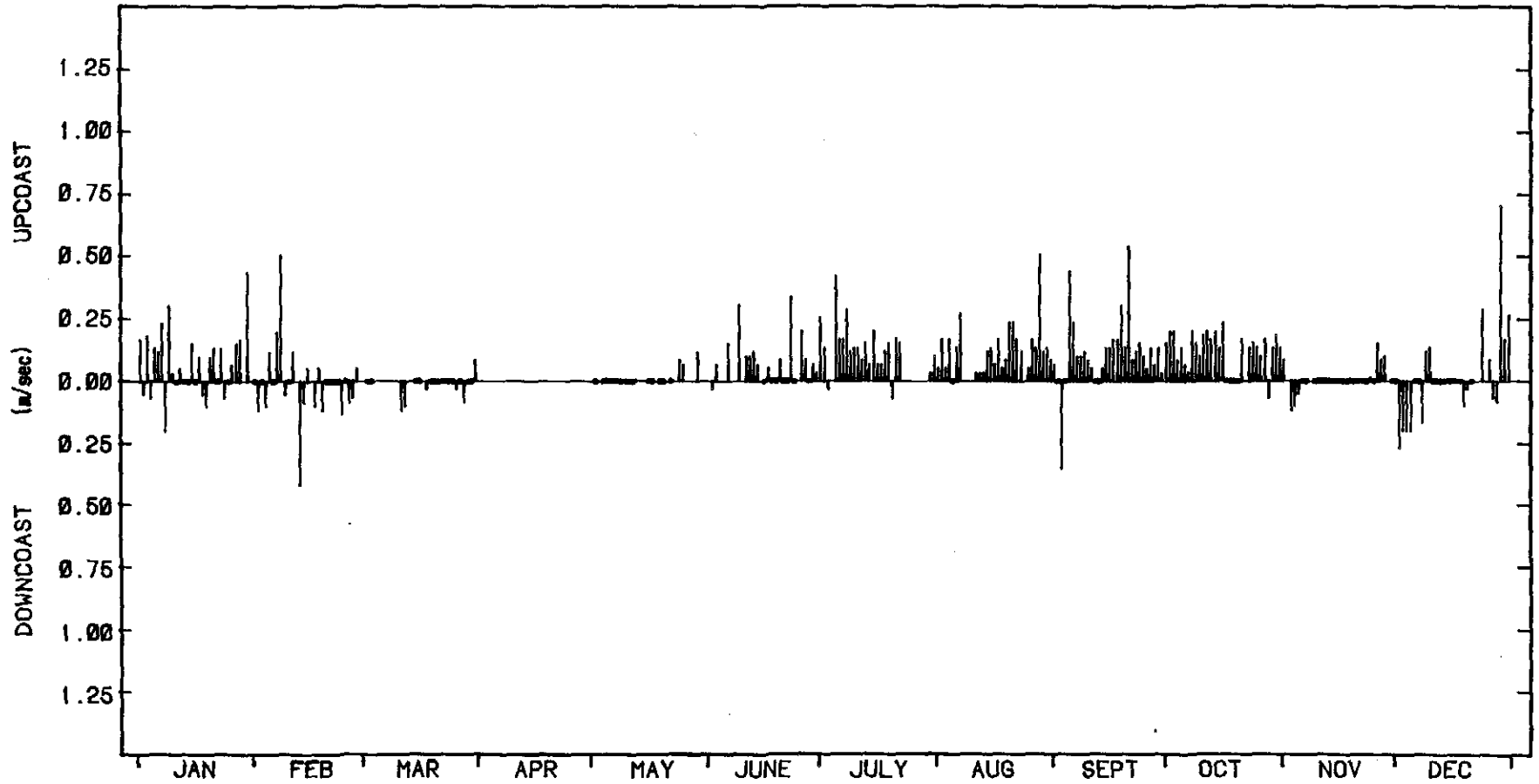
Figure 16  
C 19.1

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LITTORAL CURRENT SUMMARY - 1977

Mean Vel = 0.063 m/sec (up)

Mean Upcoast Vel = 0.146 m/sec

Mean Downcoast Vel = 0.113 m/sec

AFTERNOON OBSERVATIONS - (280 recordings)





LITTORAL CURRENTS - MORNING 1978

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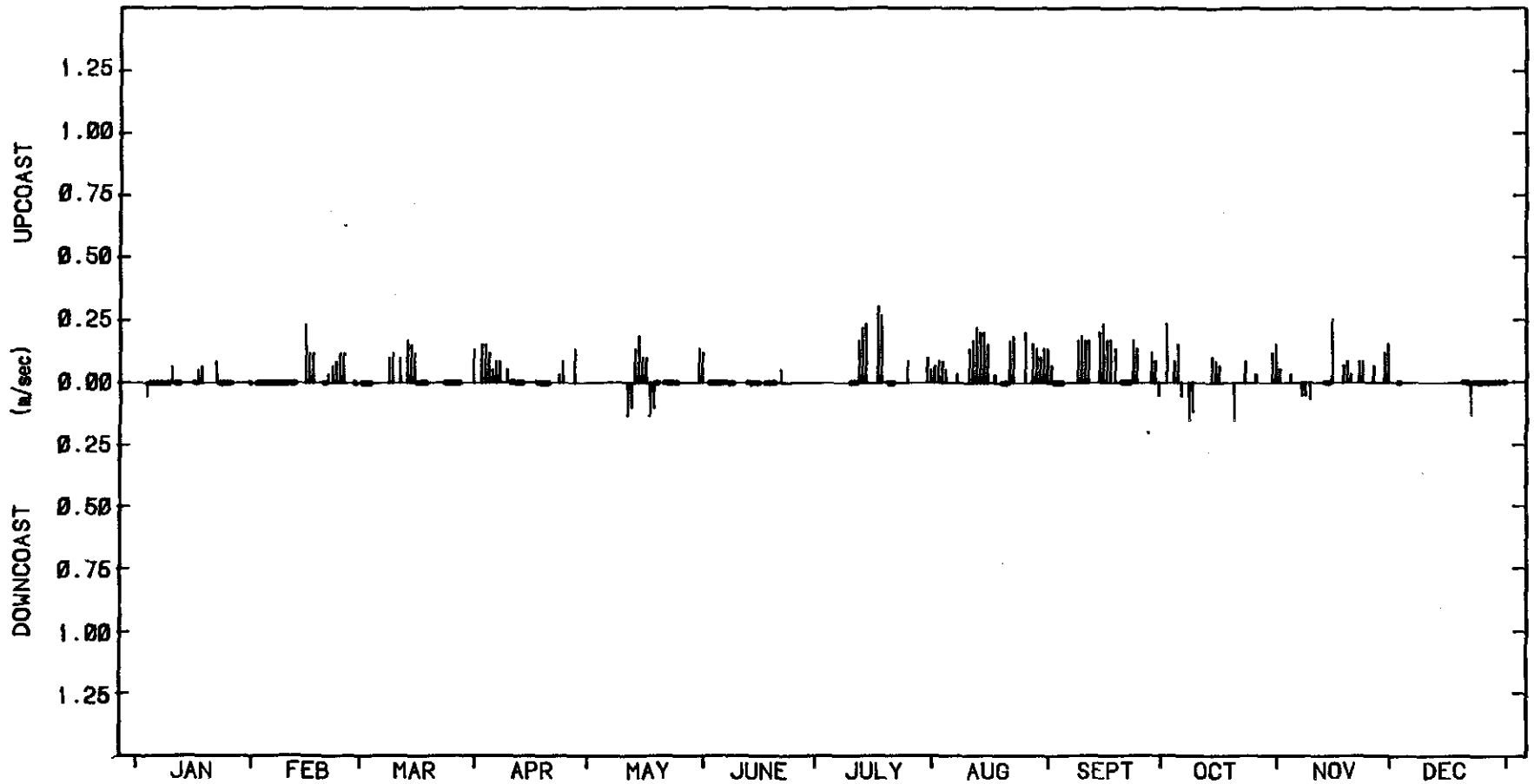
Figure 17  
C 19.1

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LITTORAL CURRENT SUMMARY - 1978

Mean Vel = 0.053 m/sec (up)

Mean Upcoast Vel = 0.122 m/sec

Mean Downcoast Vel = 0.095 m/sec

MORNING OBSERVATIONS - (204 recordings)



LITTORAL CURRENTS - AFTERNOON 1978

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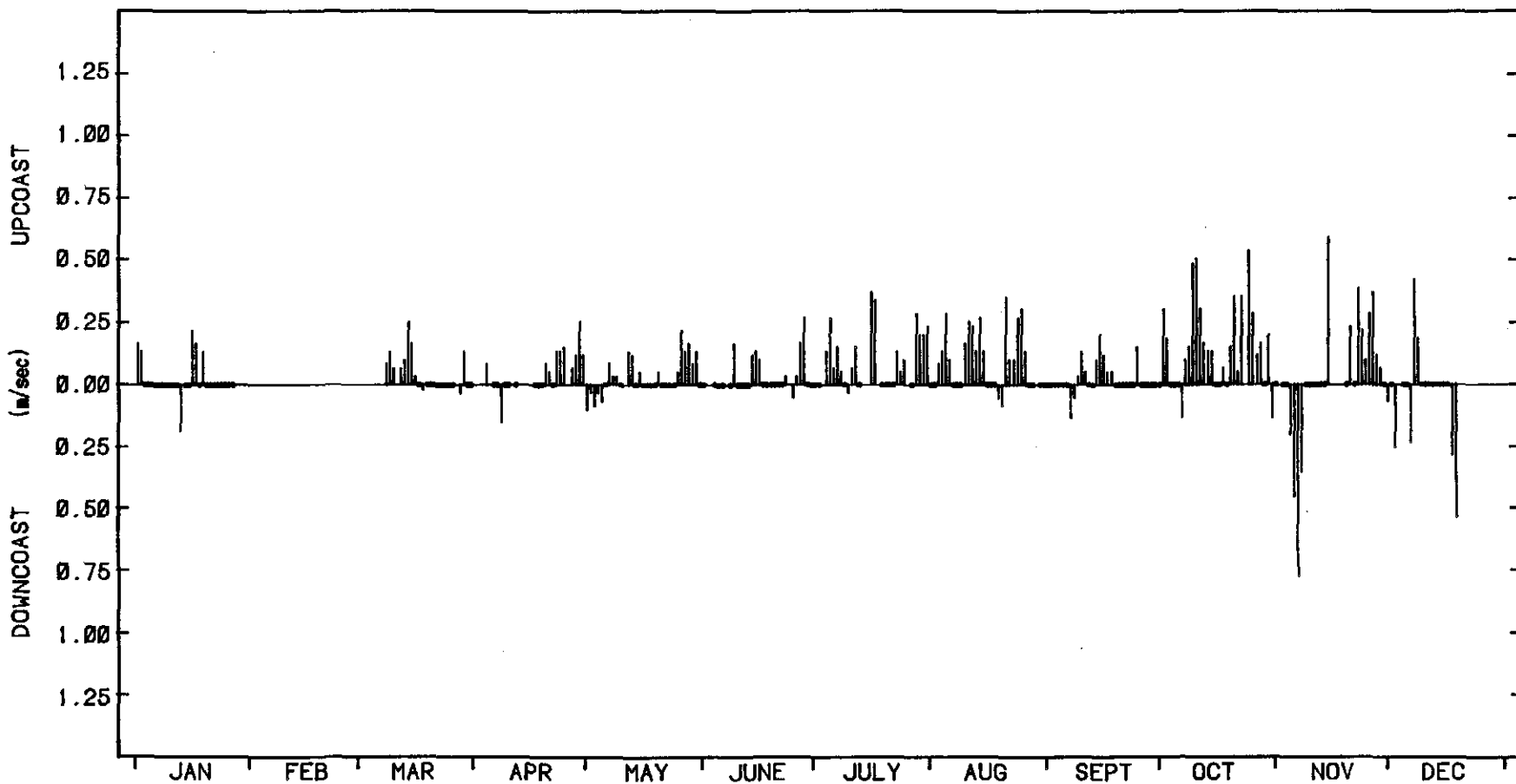
Figure 18  
C 19.1

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LITTORAL CURRENT SUMMARY - 1978

Mean Vel = 0.054 m/sec (up)

Mean Upcoast Vel = 0.168 m/sec

Mean Downcoast Vel = 0.173 m/sec

AFTERNOON OBSERVATIONS - (284 recordings)



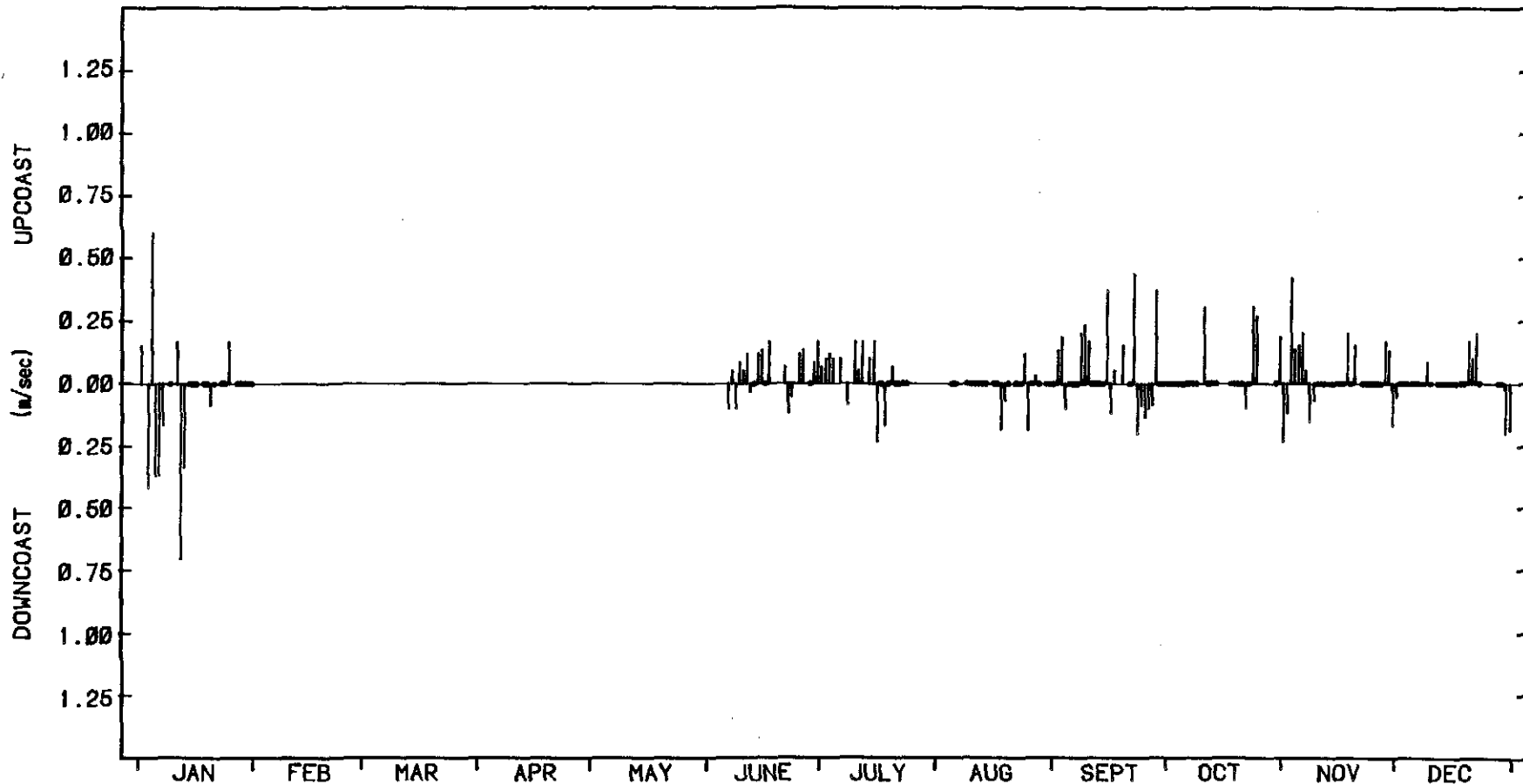
LITTORAL CURRENTS - MORNING 1979

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LITTORAL CURRENT SUMMARY - 1979

Mean Vel = 0.017 m/sec (up)

Mean Upcoast Vel = 0.164 m/sec

Mean Downcoast Vel = 0.172 m/sec

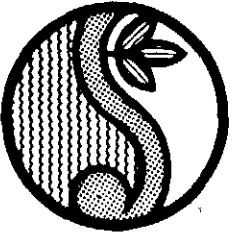
MORNING OBSERVATIONS - (193 recordings)

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Figure 19

C 19.1



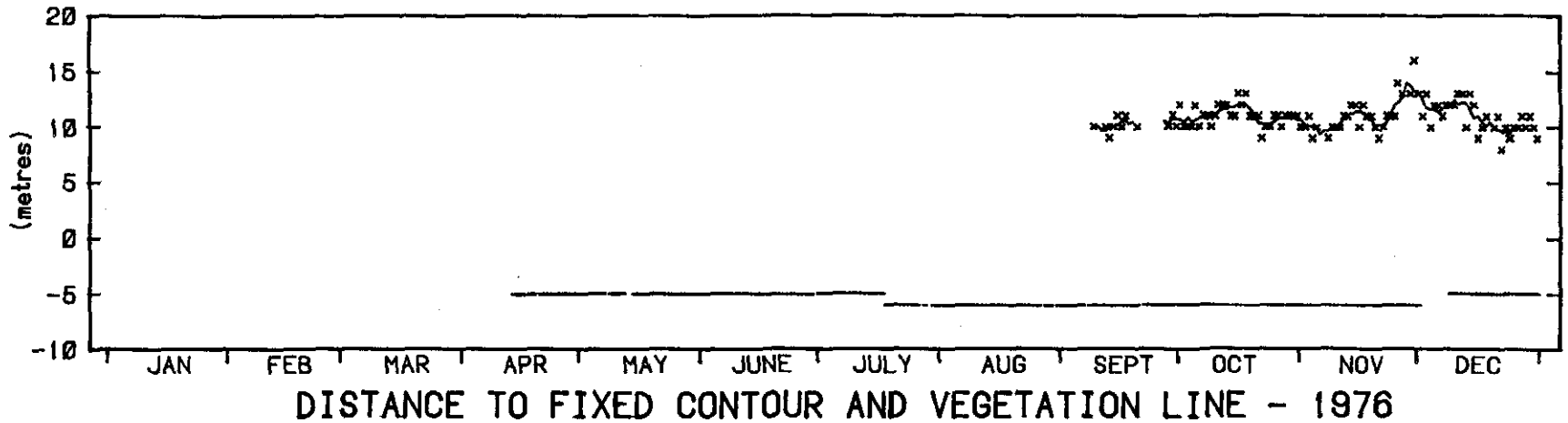
BEACH PROFILE PARAMETERS - 1976

COPE - Coastal Observation Programme Engineering

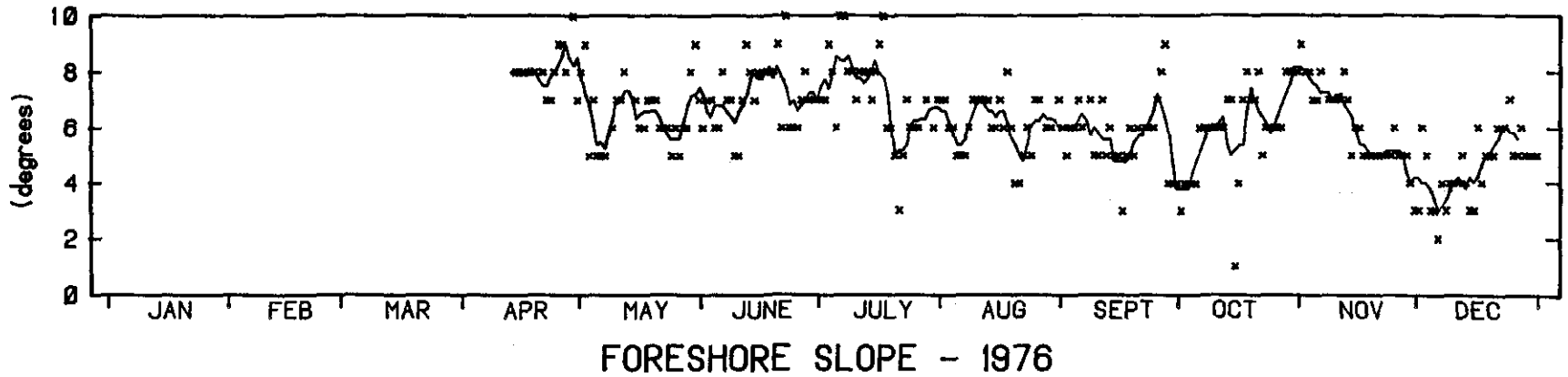
DOUGLAS SHIRE

NEWELL BEACH

3001



----- Indicates Distance to Fixed Contour : 99 Observations Fixed Contour Level is approx .5 m above AHD  
 ———— Indicates Distance to Vegetation Line : 250 Observations



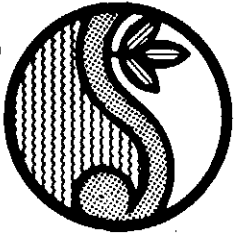
----- Five Day Moving Average

No. of Observations : 248

COPE  
Newell Beach

Figure 20

C 19.1



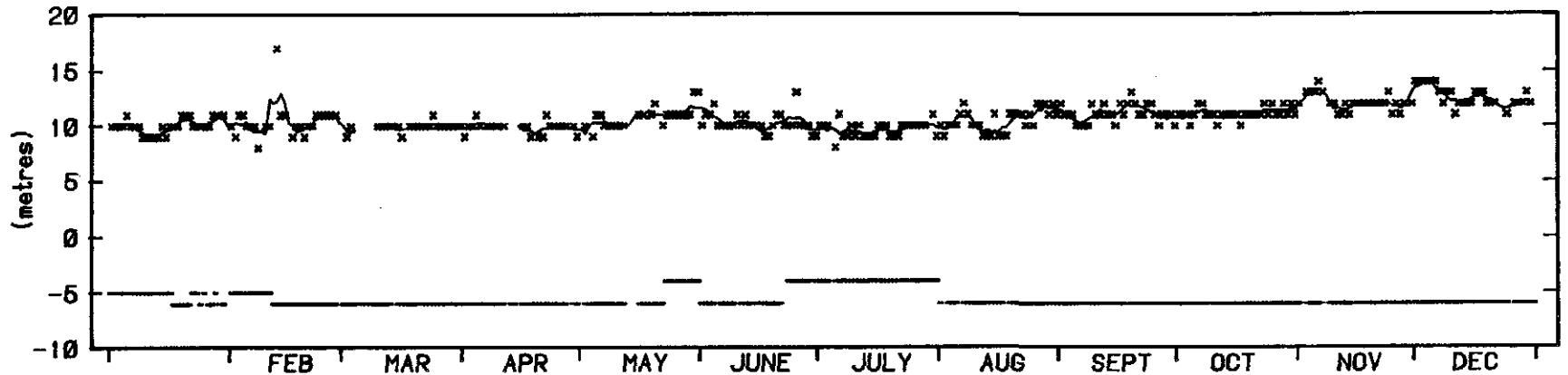
BEACH PROFILE PARAMETERS - 1977

COPE - Coastal Observation

DOUGLAS SHIRE

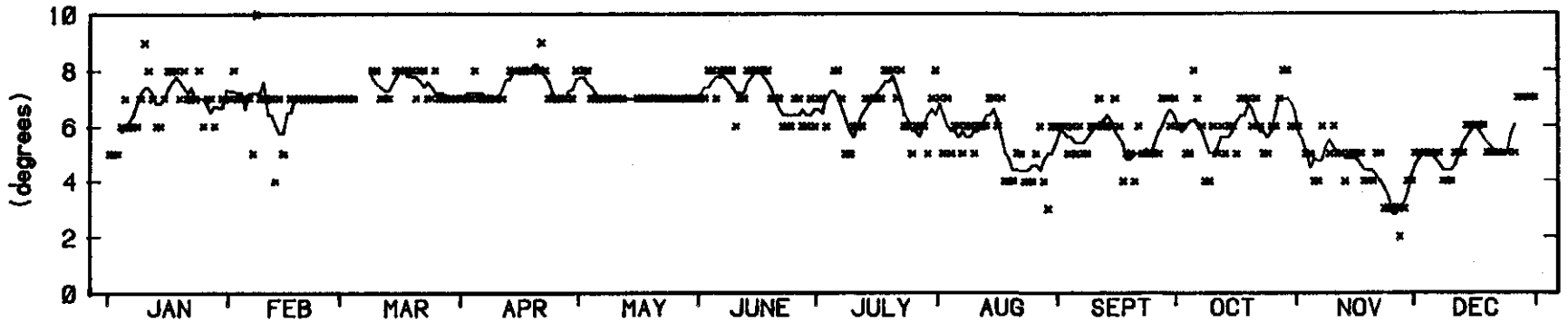
NEWELL BEACH

3001



DISTANCE TO FIXED CONTOUR AND VEGETATION LINE - 1977

xxxxx Indicates Distance to Fixed Contour : 326 Observations Fixed Contour Level is approx .5 m above AHD  
 ——— Indicates Distance to Vegetation Line : 346 Observations



FORESHORE SLOPE - 1977

Five Day Moving Average

No. of Observations : 343

Figure 21  
C 19.1

COPE  
Newell Beach



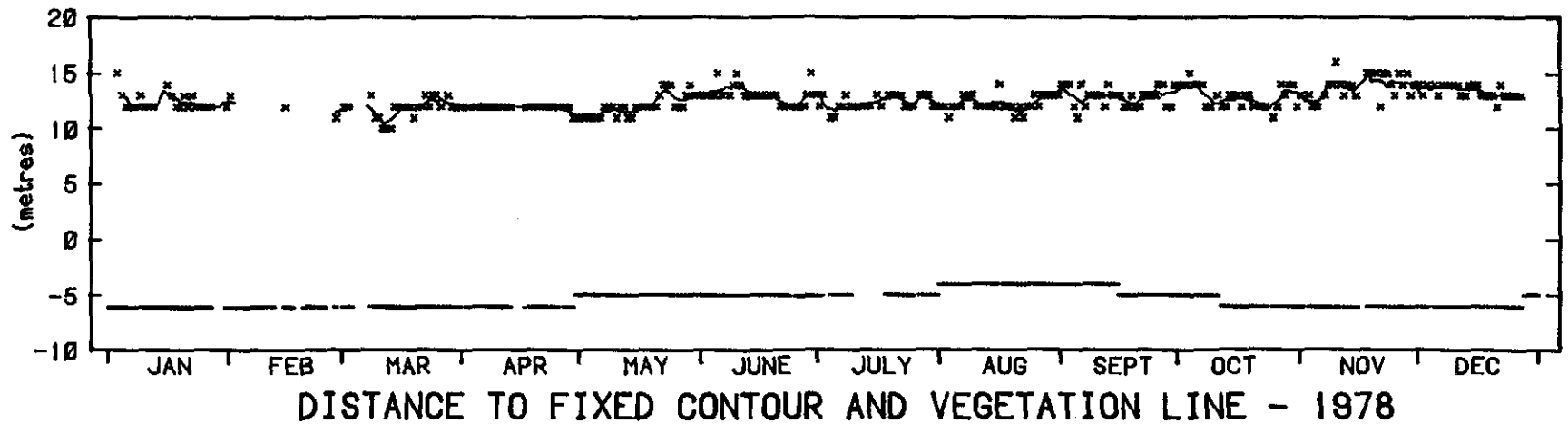
BEACH PROFILE PARAMETERS - 1978

COPE - Coastal Observation  
Programme Engineering

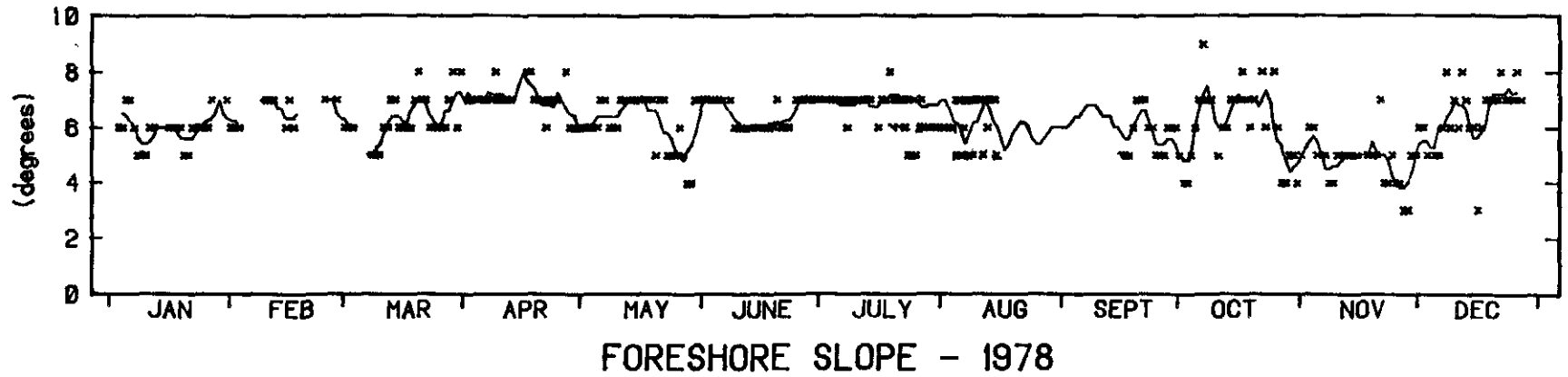
DOUGLAS SHIRE

NEWELL BEACH

3001



—x— Indicates Distance to Fixed Contour : 301 Observations Fixed Contour Level is approx .5 m above AHD  
 - - - Indicates Distance to Vegetation Line : 338 Observations



—x— Five Day Moving Average

No. of Observations : 313

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Newell Beach

Figure 22

C 19.1



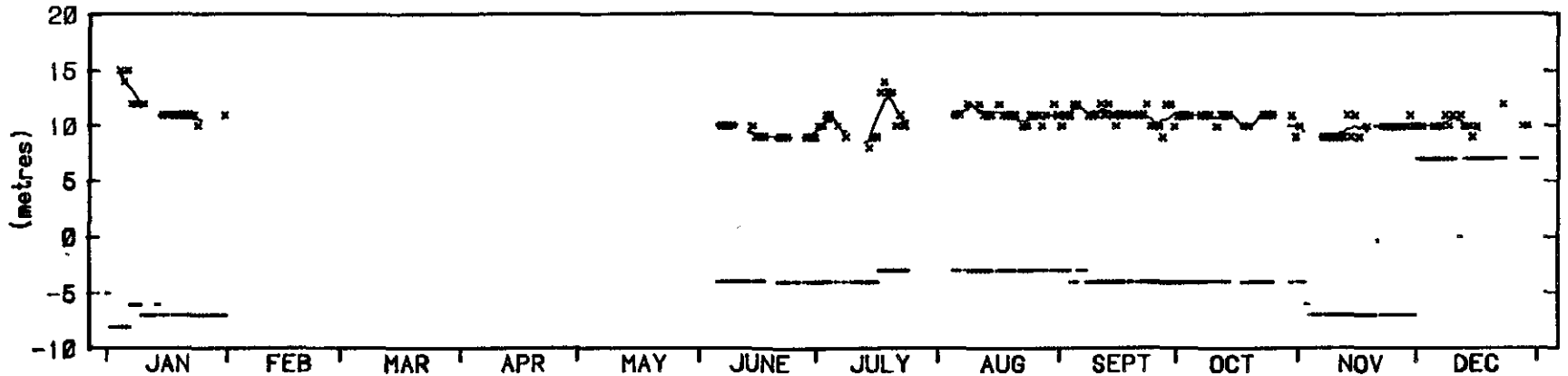
BEACH PROFILE PARAMETERS - 1979

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DOUGLAS SHIRE

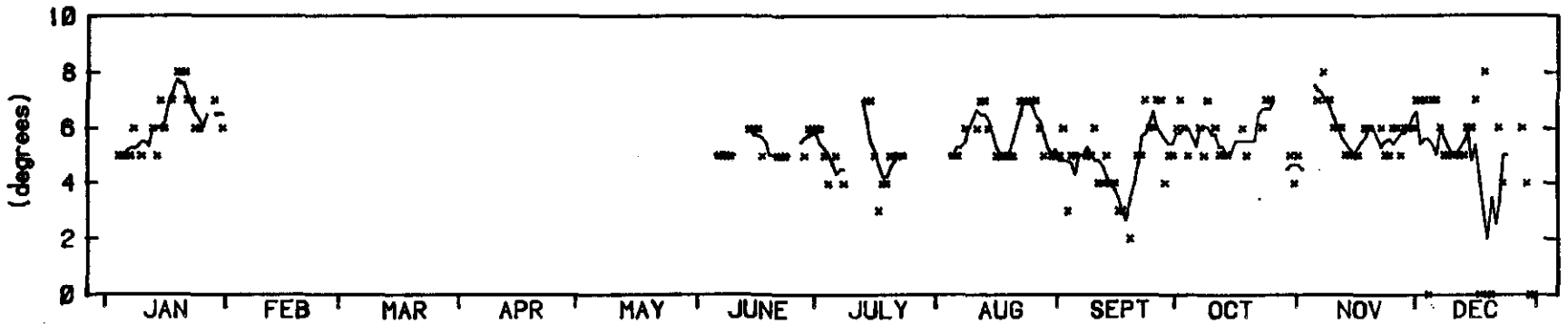
NEWELL BEACH

3001



DISTANCE TO FIXED CONTOUR AND VEGETATION LINE - 1979

Indicates Distance to Fixed Contour : 148 Observations Fixed Contour Level is approx .5 m above AHD  
 Indicates Distance to Vegetation Line : 188 Observations



FORESHORE SLOPE - 1979

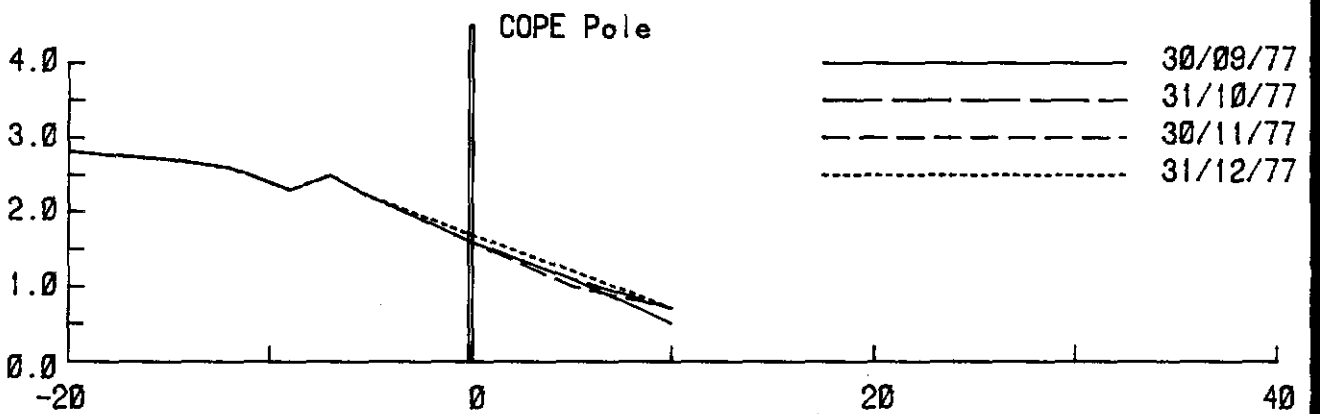
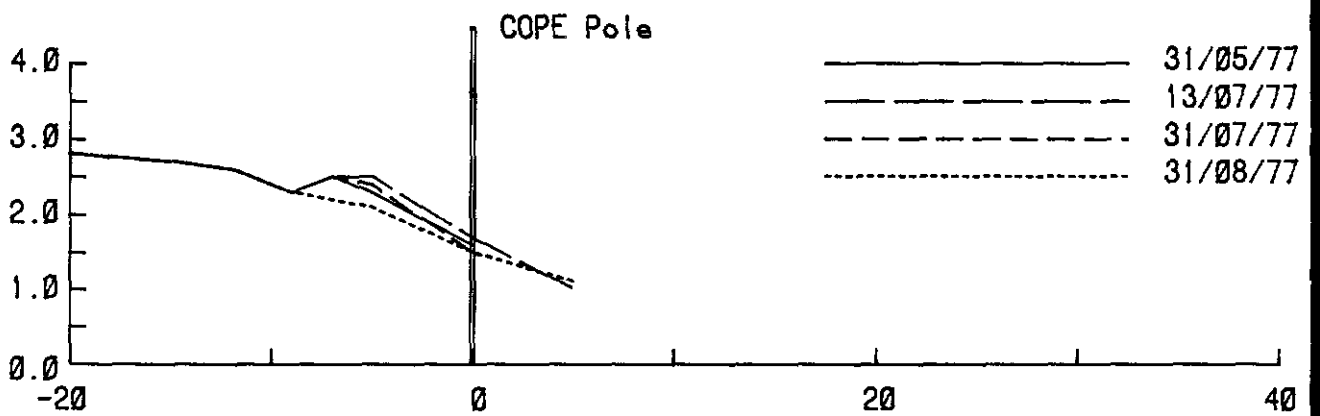
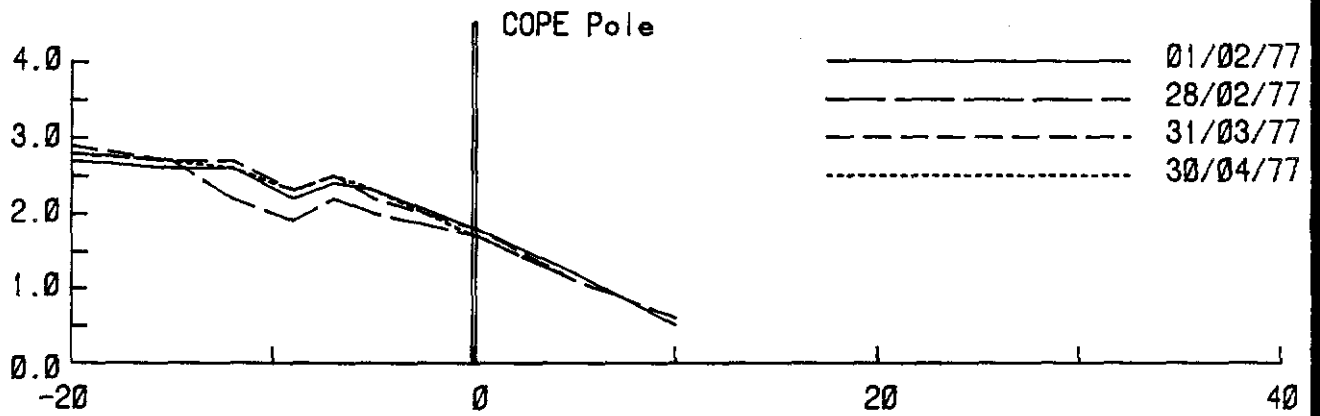
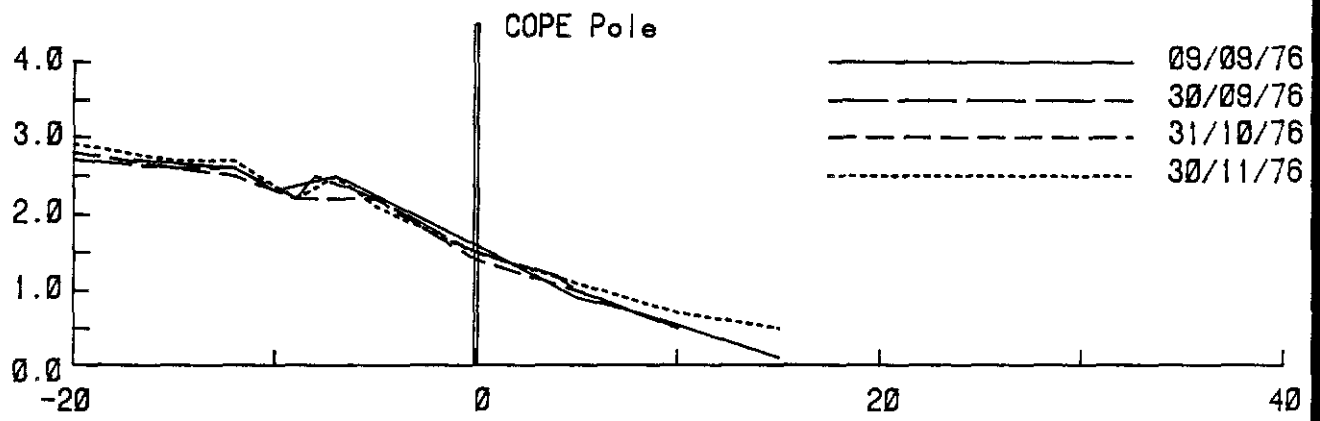
Five Day Moving Average

No. of Observations : 163

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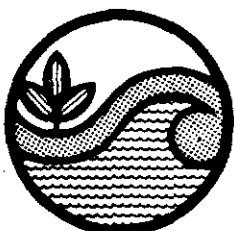
Figure 23

C 19.1



Level Datum is A.H.D.

Distances and Levels are measured in Metres



Beach Protection Authority

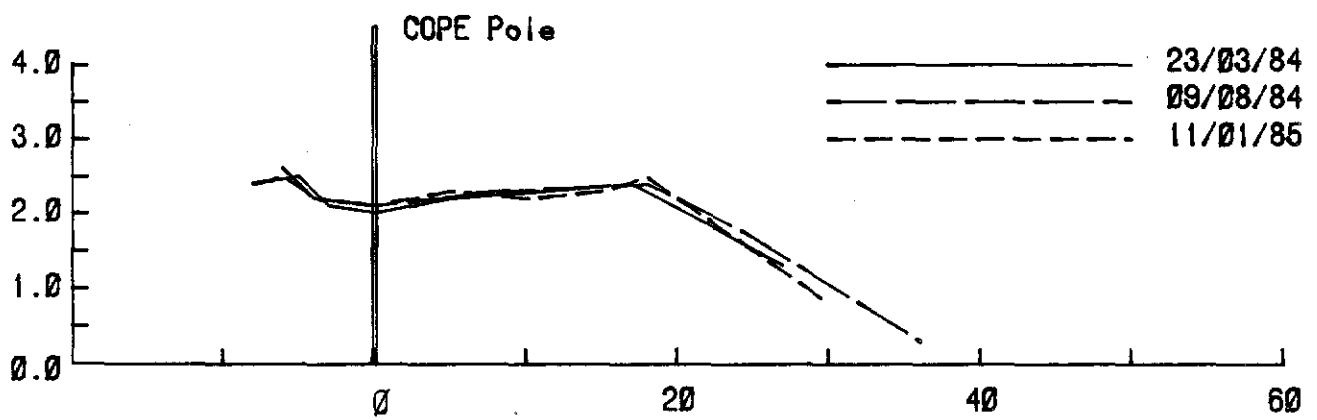
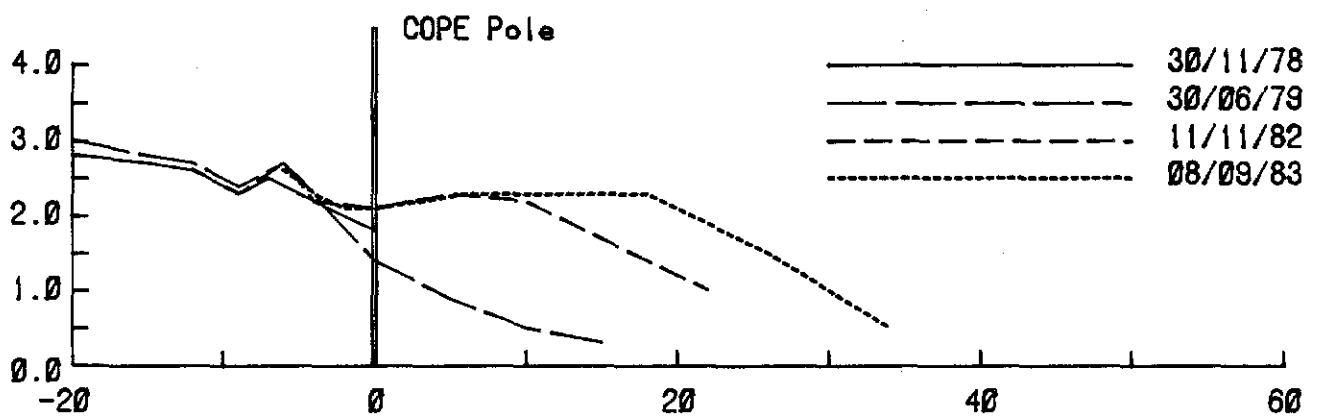
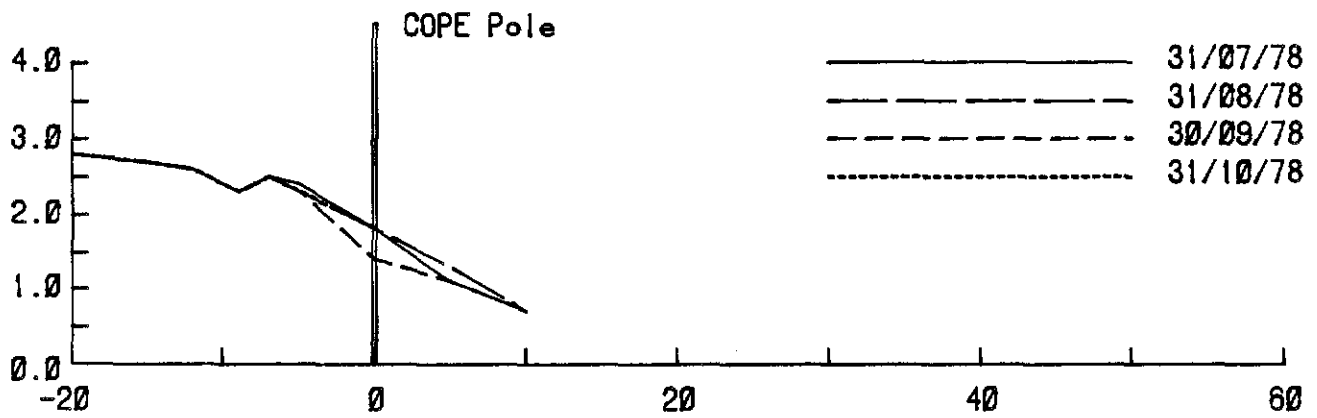
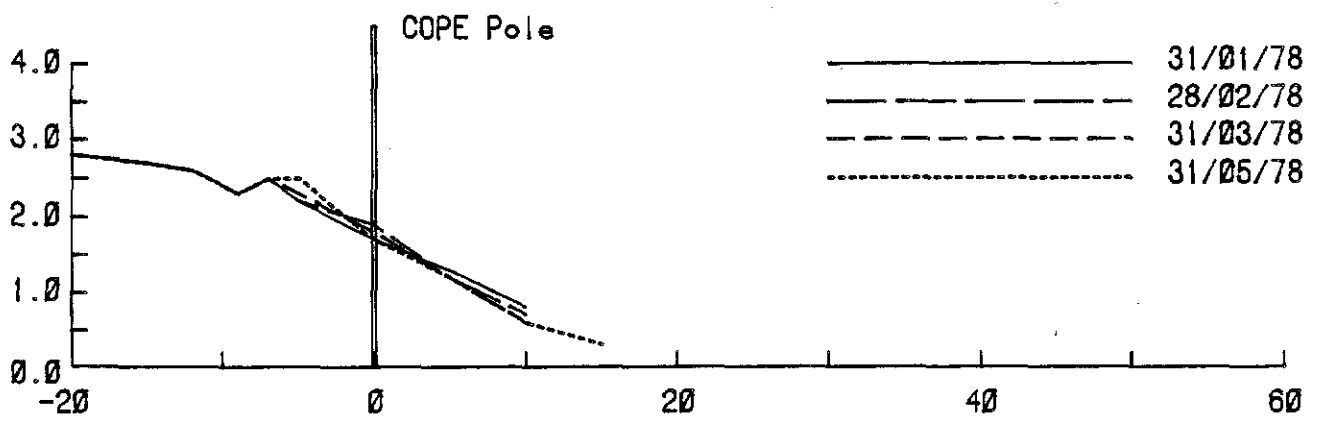
MONTHLY BEACH PROFILES

COPE  
Newell Beach

Figure 24

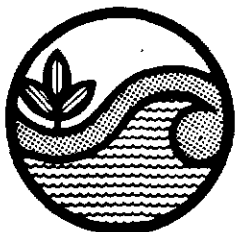
C 19.1





Level Datum is A.H.D.

Distances and Levels are measured in Metres



Beach Protection Authority

MONTHLY BEACH PROFILES

COPE  
Newell Beach

Figure 25

C 19.1