

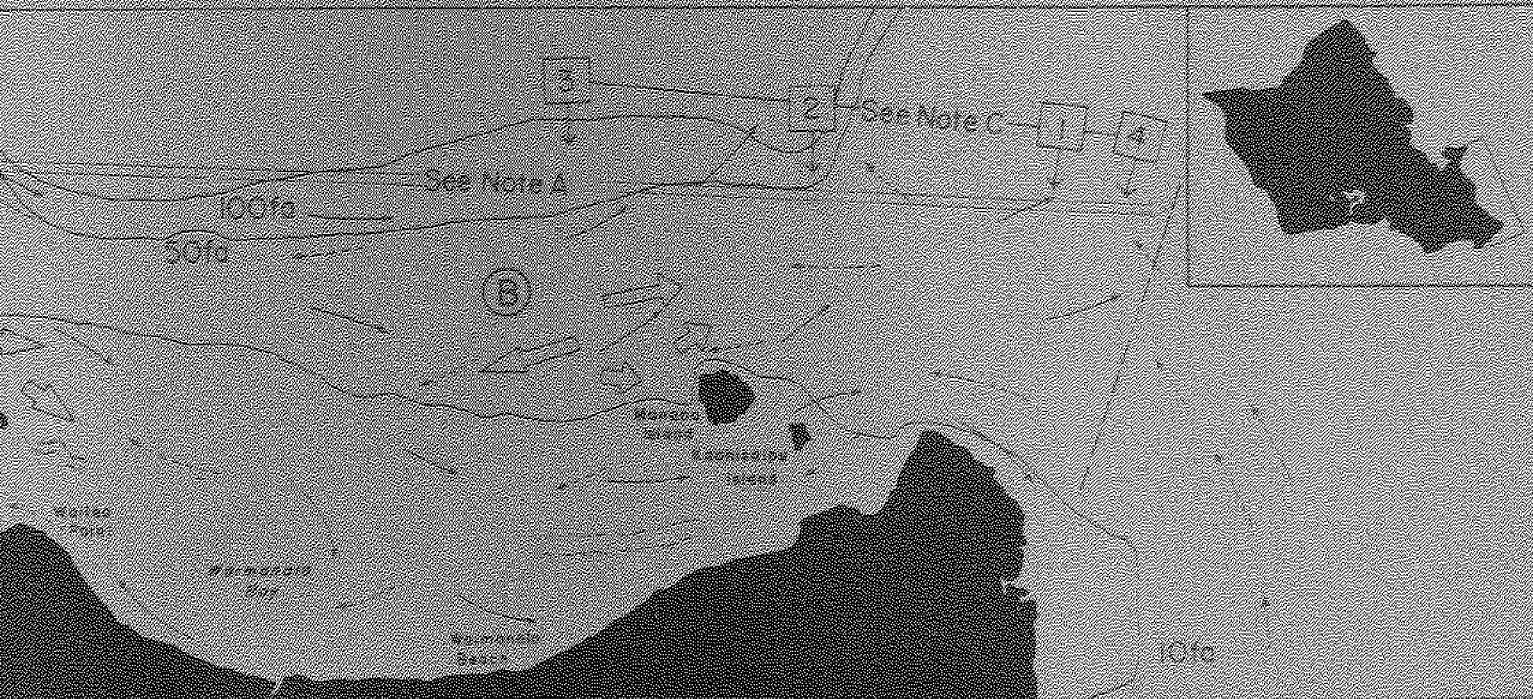
LOAN COPY ONLY

CIRCULATING COPY  
Sea Grant Depository

# CIRCULATION ATLAS FOR OAHU, HAWAII

KARL H. BATHEN

April 1978



LOAN COPY ONLY

CIRCULATION ATLAS  
FOR OAHU, HAWAII

by

Karl H. Bathen

Sea Grant Miscellaneous Report  
UNIH-SEAGRANT-MR-78-05

April 1978



*This publication reports on the result of research sponsored by the University of Hawaii Sea Grant College Program through Institutional Grant No. 04-5-158-17 from NOAA Office of Sea Grant, Department of Commerce. Partial funding for the publishing of this report was provided by the Office of the Marine Affairs Coordinator, State of Hawaii, under Task Order 152. The US Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notations that may appear hereon.*



## PREFACE

In undertaking the assembly of this atlas it was initially recognized that the data pertinent to describe the spatial and temporal variation of the circulation patterns existing around Oahu varied widely with location. Upon completing the atlas it was found that in some areas, principally west and south of Oahu, in Mamala Bay, and off east Oahu, data coverage in space and time is good, though incomplete with depth. In contrast, the data for areas off northern Oahu shores are very sparse in both time and space and essentially there is no information about the variation of circulation with depth.

Despite these shortcomings in data coverage it was felt that sufficient information existed to enable a description of at least the gross patterns of circulation in the surface mixed layer (to 120 m) existing around Oahu and to describe how these patterns vary seasonally. Further, it was possible to estimate the comparative importance of the winds, tides, and net transports in each area and to construct what a vertical profile of circulation in each area would likely be. In a few cases, such as off south and east Oahu, deep vertical profiles were available for verification.

In most areas the effects of tidal flows, wave transports, longshore transports, local bathymetry, and coastal configuration are evident in the past data taken close to the shoreline. However, no significant data showing the effects of near bottom drag or the deep offshore bathymetry could be found.

All published data found and used are listed in this atlas along with comments on the methodology employed, instruments used, and the tidal and meteorological conditions present at the time the data were taken. In addition, comments are included on the frequency of observations, the unusual phenomena present at observation time, and the analyses and report formats used by past investigators. All of this information is provided to aid the reader in the use of the historical data.

Funds for the research of this atlas were provided by the University of Hawaii Sea Grant College Program under Institutional Grant No. 04-5-158-17 from NOAA Office of Sea Grant, Department of Commerce.

The cooperation of several federal, state, and city agencies, along with numerous private corporations, groups, and individuals in providing access to and copies of available published and unpublished data, or in providing comment on observations at sea, is hereby acknowledged.

The difficult tasks of data compilation, the drawing of all preliminary graphics, and numerous laborious computations were completed by undergraduate student, Roger Au, and graduate student, Elaine Tamaye. Their diligent and able assistance is gratefully acknowledged. Wendy Nakano, graphics artist of the University of Hawaii Sea Grant College Program Publications Office, and Gilbert Fallau did the final cartography.



## TABLE OF CONTENTS

INTRODUCTION . . . . .	1
METHODS . . . . .	1
Assembly of Data . . . . .	1
Data Types and Coverage . . . . .	1
Data Evaluation Reduction and Assembly . . . . .	2
Development of Results . . . . .	3
Supplemental Analyses . . . . .	4
SUGGESTIONS FOR USE . . . . .	4
LIST OF REFERENCES . . . . .	7
SECTOR IDENTIFICATION AND DATA COVERAGE MAPS . . . . .	.11
CIRCULATION RESULTS BY SECTOR MAPS . . . . .	.17
VERTICAL PROFILES OF CURRENTS BY SECTOR . . . . .	.31
CIRCULATION COMPONENT MAPS . . . . .	.45
TIDAL CURRENT ELLIPSES . . . . .	.51
EXAMPLE OF COMBINED RESULTS . . . . .	.55
APPENDICES . . . . .	.59
Appendix A. Annotated Description of Data . . . . .	.61
Appendix B. Synopsis of Reported Data Depths and Winds . . . . .	.93

## LIST OF FIGURES

### SECTOR IDENTIFICATION AND DATA COVERAGE MAPS

Figure 1.	Sector identification . . . . .	13
Figure 2.	Published and unpublished data coverage . . . . .	14
Figure 3.	Data coverage during November through January . . . . .	15
Figure 4.	Data coverage during February through April . . . . .	15
Figure 5.	Data coverage during May through July . . . . .	15
Figure 6.	Data coverage during August through October . . . . .	15

### CIRCULATION RESULTS BY SECTOR MAPS

Figure 7.	N-NE Sector, Kahuku Point to Hauula . . . . .	19
Figure 8.	S-NE Sector, Hauula to Kualoa Point . . . . .	20
Figure 9.	K-B Sector, Kualoa Point to Mokapu Peninsula. . . . .	21
Figure 10.	E Sector, Mokapu Peninsula to Makapuu Point . . . . .	22
Figure 11.	S-E Sector, Makapuu Point to Diamond Head . . . . .	23
Figure 12.	E-S Sector, Diamond Head to Pearl Harbor. . . . .	24
Figure 13.	PH and KL Sector, Pearl Harbor to Keehi Lagoon. . . . .	25
Figure 14.	W-S Sector, Pearl Harbor to Barbers Point . . . . .	26
Figure 15.	S-SW Sector, Barbers Point to Kaneilio Point. . . . .	27
Figure 16.	N-SW Sector, Kaneilio Point to Kaena Point. . . . .	28
Figure 17.	S-NW Sector, Kaena Point to Haleiwa . . . . .	29
Figure 18.	N-NW Sector, Haleiwa to Kahuku Point. . . . .	30

### VERTICAL PROFILES OF CURRENTS BY SECTOR MAPS

Figure 19.	N-NE Sector, Kahuku Point to Hauula . . . . .	33
Figure 20.	S-NE Sector, Hauula to Kualoa Point . . . . .	34
Figure 21.	K-B Sector, Kualoa Point to Mokapu Peninsula. . . . .	35
Figure 22.	E Sector, Mokapu Peninsula to Makapuu Point . . . . .	36
Figure 23.	S-E Sector, Makapuu Point to Diamond Head . . . . .	37
Figure 24.	E-S Sector, Diamond Head to Pearl Harbor. . . . .	38
Figure 25.	W-S Sector, Pearl Harbor to Barbers Point . . . . .	39
Figure 26.	S-SW Sector, Barbers Point to Kaneilio Point. . . . .	40
Figure 27.	N-SW Sector, Kaneilio Point to Kaena Point. . . . .	41
Figure 28.	S-NW Sector, Kaena Point to Haleiwa . . . . .	42
Figure 29.	N-NW Sector, Haleiwa to Kahuku Point. . . . .	43

## LIST OF FIGURES (continued)

### CIRCULATION COMPONENT MAPS

Figure 30. Wind-driven flow. . . . .	47
Figure 31. Geostrophic flow. . . . .	48
Figure 32. Diurnal and semidiurnal tidal flows . . . . .	49

### TIDAL CURRENT ELLIPSES

Figure 33. Tidal current ellipses. . . . .	53
--	----

### EXAMPLE OF COMBINED RESULTS

Figure 34. Example of combined results . . . . .	57
--	----



## INTRODUCTION

The necessity to know the spatial and temporal circulation variation at each site of interest is an integral and important part of all ocean activities planned or underway in the nearshore and offshore waters around Oahu, Hawaii. These activities, to list a few, include coastal preservation, wastewater management, marine transportation, construction, shipping, marine research, offshore mooring design, commercial fishing, and recreation.

This atlas provides the first comprehensive analysis and summary of all circulation observations taken to date around Oahu, Hawaii. Detailed descriptive maps showing all seasonal characteristics of the circulation patterns observed or believed to exist around Oahu are included.

The four primary objectives of this work were (1) to assemble all available published and unpublished data and observations pertinent to describing the ocean circulation found around Oahu, Hawaii; (2) to evaluate and convert these data for comparison; (3) to collate all results and determine the circulation patterns; and (4) to present a summary of the results in atlas form. The intent was to identify both the offshore and nearshore (less than 20 m deep) seasonally consistent circulation patterns and to describe the seasonal changes in net transport associated with them. Further, an attempt was made to quantify the cause-effect relationships existing between these local circulation patterns and the annual changes in the geostrophic flow moving past the island, the seasonal changes in the local winds, and the monthly changes in the character of the tide.

It was initially recognized that both spatial and temporal deficiencies in the existing island-wide circulation data coverage would be identified as a result of this atlas. The intent was that this information would aid others in planning future ocean studies involving a need to know more about the seasonal behavior of the circulation existing around Oahu. As more data become available to fill these voids, subsequent updating of this atlas will be aimed at providing more comprehensive data coverage and descriptions of the circulation patterns found around the island.

## Assembly of Data

An effort was made to assemble all available published and unpublished data, related studies, comments, and observations pertinent to defining the circulation patterns found in the waters around Oahu. Among the groups contacted were private engineering firms, environmental and consulting firms, federal, state, city and county agencies, university researchers, the State Archives, and the University of Hawaii library. In addition the experience and comments of local fishermen and mariners were solicited and recorded. All of these results are hereafter referred to as input information.

## Data Types and Coverage

The types of input information assembled varied considerably, ranging from detailed reports of in situ current meter observations with corresponding data analyses, through drogue, drift card, and dye studies, to visual observations of floatsam and shoreline sediment discharges. The more comprehensive works were associated with University of Hawaii research projects, the development of environmental impact statements, flood control projects, ocean outfall site pre-surveys, or other similar projects related to either the modification or preservation of the nearshore water quality, beach conditions or a portion of the Oahu coastline.

A wide range of methods were employed in these works. Appendix A of this atlas contains an annotated description of these data in which title, author, date of work, methodology used, depth (at which data were taken), resultant presentation, station number and/or location, prevailing conditions, and comments are listed. The annotated descriptions were collated according to "sectors," that is, portions of the Oahu coastline assigned identifications according to the position of the sector relative to the island of Oahu. A data source reference number is also given for each item listed. The complete citation for these numbers may be found in the list of references.

Figure 1 shows the geographical limits assigned for each sector. Figure 2 shows the geographical area covered by all input information and all seasons and depths and also shows those areas around Oahu where data are either completely missing or were limited just to visual observations and comments describing the local conditions. The subsequent four data coverage maps (Figures 3 through 6) show the total input information collated according to four selected seasons: November through January, February through April, May through July, and August through October. Each season represents a portion of the year when different oceanographic or meteorological conditions prevail for different areas around Oahu.

The table in Appendix B was assembled to show the data distribution in each sector with respect to depth and to note the prevailing wind conditions present during the period data were taken. These results are separated into the four selected seasons.

#### Data Evaluation Reduction and Assembly

The results of published circulation studies were found in one or several of the following reduced forms: (1) current meter data reduced to velocity and direction frequency distributions, progressive vector diagrams, directional distribution plots of velocity; (2) drogues data shown as vector diagrams or net transport vectors, drift path diagrams; (3) dye data shown as dispersal patterns on a map or net transport vectors; and (4) drift card points shown as maps illustrating cast and recovery points.

##### 1. Current meter data

Current speed and direction frequency distributions--showing the predominant current speed(s) and direction(s) of flow observed at a station. They are independent diagrams and are not interpreted to give a correspondence between speed and direction.

Progressive vector diagrams--showing the history of flow past a station. These diagrams can resemble the trajectory of a water particle moving past the station if the assumption of a uniform flow field is valid for the location and time.

Directional distribution plots of velocity--indicating the velocity magnitudes (maximum, mean, and minimum) of the directional flow past a station. No time weighted parameter is given to the distribution. However, its use in conjunction with the direction frequency diagram can indicate the velocities of the predominant direction(s) of flow.

Net transport vectors (current meter, drogues, and dye data)--indicating the mean or modal magnitude and direction of flow at a station during the observational period.

Tidal correlation diagrams (current meter data)--showing flow vectors superimposed on a plot of the tidal cycle in effect during the observational period. These diagrams show the correlation of the current direction and strength with tidal changes. Phase relations and directional behavior can be distinguished in these results.

Vertical profiles of velocity (current meter data)--showing current direction and speed as a function of depth at a station. Though profiles were found these data are sparse. However, some of the current data assembled were taken synoptically at surface, mid, and bottom depths.

Time dependence plots of velocity and direction (current meter data)--illustrating the flow directions and magnitudes as a function of time.

##### 2. Drogue data

Vector diagrams (drogue data)--showing vectors drawn from the release point to the end point of observation.

Net transport vectors (current meter, drogues, and dye data)--indicating the mean or modal magnitude and direction of flow at a station during the observational period.

Drift path diagrams (drogue data)--showing plots of consecutive sightings illustrating the path of the drogue during the observational period.

### 3. Dye data

Dispersal patterns (dye data)--showing either tracings of aerial photographs or sketches of observed or monitored dispersal patterns as functions of time.

Net transport vectors (current meter, drogues, and dye data)--indicating the mean or modal magnitude and direction of flow at a station during the observational period.

### 4. Drift card data

Cast and recovery maps (drift card data)--showing points of card or bottle release and recovery along with the total elapsed time.

These published results were reviewed for errors and omissions and subsequently added to "working data maps." All results were collated by sectors and drawn on the data maps to a common/comparable scale.

The unpublished data assembled were in raw, tabulated, or keypunched form. These data were reduced to one of the forms discussed above as allowed by the type of data. These results were then added to the "working data maps" along with additional data summarizing local visual observations.

### Development of Results

When all possible entries had been added to the data maps they were reviewed to determine the direction and strength of the seasonal net drift (transport) in each sector. In most cases the net drift direction and approximate strength were evident in the results. However, in areas of limited data coverage it was necessary to consult the transport in neighboring areas to aid in establishing the local seasonal transport. In some cases, such as off portions of the north and northeast coasts of Oahu, little seasonal change could be determined.

All time series current meter data pertinent to each sector were combined by season for two to three smaller coastal areas within each sector, data permitting. These collated results were then used to establish a representative current rose for each coastal area and each season.

The model current velocity for each 30° portion of the compass of each current rose was determined. In about half of the cases, the available data permitted a more detailed statistical description. Modal flow strengths for each compass direction were selected as a compromise to allow comparisons between sub-areas of sectors and between individual sectors.

In some cases, as off the northeast coastline of Oahu, sparse data did not allow seasonal differentiation for development of several current roses. In those areas, however, the circulation inducing or modification forces are believed to be seasonally more consistent than in the more documented lee areas of Oahu. Therefore, the single roses shown should be initially adequate for these areas.

Comparison of current meter time series results and drogue path results with tidal profiles in effect at the time the data were taken gave the predominant ebb and flood flow directions. These results also provided the strongest recorded flows occurring during ebb and flood flows for each smaller coastal area within each sector.

National Weather Service, military weather data, and other wind data were also assembled and statistically analysed for each sector to provide sector wind roses for each season to allow the user a convenient reference. Modal winds speeds were computed for each 22-1/2° sector of the compass.

All of the above results were combined for each sector on 12 circulation result maps which show the following:

1. Net drift direction and strength by coastal areas within each sector and by season
2. Current roses by sub-area and season
3. Wind roses by season
4. Ebb and flood coastal flow patterns by sector
5. Ebb and flood modal flow speeds by sub-sector and season
6. Ebb and flood observed maximum flow speeds by sub-area and season

Included on the maps are notes pertinent to both the entire sector and in some cases to sub-areas within the sector. The results correspond to the mean of conditions found in the 0 to 60 m surface layer.

### Supplemental Analyses

Results of several supplemental analyses are included in this atlas. These analyses were completed to provide the user with additional maps for comparing the flows resulting from each of the significant forces driving the circulation seasonally found in each sector and to enable an estimate to be made of the vertical structure of velocity which is likely to be found in each area around Oahu. Specifically, these results include:

1. Circulation results by sector (Figures 7 through 18)--indicating the most probable current direction and speed in each sector around Oahu for wind-driven, geostrophic, and tidal-induced flows, respectively. The estimate of wind-driven and geostrophic flow characteristics is shown for both tradewind and kona wind conditions. The tidal flow characteristics are shown for both diurnal and semidiurnal tidal changes. Mixed tides would be a vectorally combined resultant of both components.
2. Vertical profiles of currents (Figures 19 through 29)--showing estimate of the current speed and direction in each sector to the 125 m depth. Each figure contains a hodograph to estimate current direction and strength as a function of depth for the sum of the wind-driven component and a seasonal geostrophic component (later assumed constant to the 125 m depth). Current speed versus depth curves are also shown, non-collinearly. Current direction estimates for average tradewind and kona wind conditions for each sector are given in the hodograph while estimates of the range of current speeds to the 125 m depth for light (<5 knots), moderate (5 to 20 knots) and strong (>20 knots) tradewind and kona wind conditions are given in the accompanying curves. Tidal flows (approximately constant with depth) must be added vectorally for the tidal phase of interest.

3. Map of tidal current ellipses (Figure 33)--showing the temporal behavior of observed tidal flows for six areas around Oahu. Estimates of both the current direction and speed are shown for diurnal (0 = 24) and semidiurnal (0 = 12) tidal flows.
4. Example of combined results (Figure 34)--showing a method of vectorally combining estimates of the geostrophic current component, Ekman wind drift, and semidiurnal and diurnal tidal components to obtain an estimate of the net current direction in any sector at any depth (to 125 m) for any of the four seasons given in the sector circulation result maps. The example given is for the May surface flow in sector "W-S" (Barbers Point to the Pearl Harbor entrance) on the western side of the sector for average tradewind conditions (11.5 knots) and during a mixed semidiurnal and diurnal tide.

### SUGGESTIONS FOR USE

Several types of information are contained in this atlas to aid users in estimating the circulation found in a particular area of interest during a given season. They include:

1. A list of references provided as a guide to the available published data (unpublished data are not noted)
2. Sector identification and data coverage maps showing the spatial and temporal distribution of all available data
3. Circulation result maps summarizing the results of collation and analysis of all circulation data, published and unpublished, found for each sector
4. Vertical profiles of currents showing computation results which are provided to aid users in estimating the offshore flow directions and strengths as a function of depth

5. Circulation component maps showing computation results which are provided to aid users in estimating the individual contributions of current-producing forces to the seasonal circulation patterns found in each area of interest
6. Tidal current ellipses map showing the temporal behavior of tidal-induced flows
7. An example for combining the results of items 3, 4, 5, and 6 above. It should be noted, however, that any circulation estimate obtained in this manner combines the results of historical field data (net seasonal drift) and theoretical computations (Ekman wind drift and tidal flow ellipses). The 12 circulation result maps noted in item 3 above should be consulted if just the data on characteristic flows, as evident in historical data, in any nearshore area are desired.

**SECTOR IDENTIFICATION** (Figure 1). Twelve sectors with abbreviated identifications as used throughout the atlas are shown. The identifications chosen relate to the position of the sector relative to the island of Oahu. Sector "E-S," for example, is the eastern portion of the southern sector (Diamond Head to Pearl Harbor), while sector "S-E" is the southern portion of the eastern sector (Makapuu Point to Diamond Head).

**PUBLISHED AND UNPUBLISHED DATA COVERAGE** (Figure 2). The locations and approximate size of each past study area of interest or areas discussed in past reports are summarized on this map. Cross-hatched areas indicate the coverage of available information. The coastal areas around Oahu for which no published information could be found are also shown. For portions of these areas, unpublished data and comments summarizing visual observations were available.

**DATA COVERAGE BY SEASON** (Figures 3 through 6). These four maps show the location and approximate size of each past study area collated according to the four seasons used throughout this atlas: November through January, February through April, May through July, and August through October. Each past study area contains a reference number corresponding to a key number found

in both the list of references and the annotated description of data with the source reference.

**CIRCULATION RESULTS BY SECTOR** (Figures 7 through 18). These 12 maps contain all of the results of past circulation data assembly, reduction, collation, and analysis for each sector around Oahu. Several types of information are shown on each map as follows:

1. Circulation Patterns.

Solid arrows indicate the flow during flooding tides; broken arrows during the ebbing tides. These nearshore (less than 20 m deep) and offshore patterns are believed to predominate in each area during the year. Sectors "W-S" and "E" are exceptions to this where offshore areas of flow divergence and convergence exist and move seasonally.

2. Current Roses.

Twelve-point current roses showing the modal current speeds for each 30° portion of the compass are shown. The predominant direction of the ebb (E) and flood (F) flows and the maximum flow speed in each case are also shown. The roses are oriented according to location on each map referenced to true and magnetic north as indicated. Two to four current rose stations marked A, B, C, or D are given for each map. Data permitting, roses for each of four seasons were assembled. Current directions are shown as the direction moving toward. Legends for current velocity (cm/sec) and frequency of occurrence (percent) are given. The modal speeds given are for the following ranges:

Current Velocity (cm/sec)	Modal Range (cm/sec)
10	0 to 15
20	>15 to 25
30	>25 to 35
40	>35 to 45
50	>45 to 55
60	>55

### 3. Wind Roses.

Sixteen-point wind roses showing modal wind speeds are given for four seasons. Wind directions are shown as the direction the wind is coming from with directions oriented to true north as indicated on each map. Legends are provided for wind velocity (knots) and frequency of occurrence (percent). The modal speeds given are for the following ranges:

<u>Wind Velocity</u> <u>(knots)</u>	<u>Modal Range</u> <u>(knots)</u>
4	0 to 5
6	>5 to 7
8	>7 to 9
10	>9 to 11
12	>11 to 13
14	>13

### 4. Net Drift.

Vectors indicating the direction of flow and flow strength are shown for each of four seasons. The width of the arrowhead indicates the persistence of flow direction. Variable flow direction is as shown oriented  $\pm 40^\circ$  (total  $80^\circ$  portion); consistent is as shown  $\pm 15^\circ$  (total  $30^\circ$  portion). Flow strengths are as follows:

Weak	<5 cm/sec	<2-1/3 nm/day
Moderate	5 to 15 cm/sec	2-1/3 to 7 nm/day
Strong	>15 cm/sec	>7 nm/day

VERTICAL PROFILES OF CURRENTS BY SECTOR (Figure 19 through 29). These figures show estimates of the characteristic rate of horizontal flow throughout the water column from the surface to the 120 m depth for each sector. The curves show the sum of the geostrophic and wind-driven components for light (<5 knots), moderate (5 to 20 knots), and strong (>20 knots) tradewind and kona wind conditions. The resulting profiles are shown plotted together; however, the reader should note that the current directions are not the same (not collinear) for each wind condition

and depth. Hodographs showing the vector sum of the geostrophic and wind-driven component for select depths (for average seasonal wind direction and speed) are also shown for each sector. The directions are shown for both the seasons of predominate tradewinds and possible kona winds. These hodographs provide an estimate of the flow direction at any desired depth up to 120 m for the given wind conditions. No influence of the bottom was considered to occur offshore. It is recognized that bathymetric effects and restrictions occur in waters shallower than 120 m.

CIRCULATION COMPONENT MAPS (Figures 30 through 32). These three maps show the results of an attempt to quantify the seasonal behavior of the important driving forces responsible for the flow of water past Oahu. The vectors distributed around the outline of the island indicate the most probable flow patterns in the surface layer (0 m).

Flow patterns for the wind-driven and geostrophic components are shown for typical tradewind ( $50^\circ$  to  $70^\circ$ T/ 5 to 20 knots) and kona wind ( $180^\circ$ T/5 to 15 knots) conditions. The characteristic speed of the flow and the corresponding wind speed are also given for each sector. The tidal map shows flood and ebb flow directions for semi-diurnal and diurnal tidal-induced flows. In each case a range of characteristic current speeds occurring within each sector for a corresponding range of tidal flow rates is given.

TIDAL CURRENT ELLIPSES (Figure 33). The tidal current ellipses map show the temporal behavior of tidal-induced flows at six locations around Oahu. Both a semi-diurnal ellipse ( $0 = 12$ ) and a diurnal ellipse ( $0 = 24$ ) containing time notations are shown for each location.

EXAMPLE OF COMBINED RESULTS (Figure 34). This figure provides a step by step guide to combining current speed and direction estimates for the geostrophic, wind-driven, and tidal-induced components at any given location of interest. The example given is for a location south-east of Barbers Point.

## LIST OF REFERENCES





# LIST OF REFERENCES

1. Engineering Science; Sunn, Low, Tom and Hara Inc.; and Dillingham Corporation. 1971. *Water quality program for Oahu with special emphasis on waste disposal-work areas 6 and 7, analysis of water quality-oceanographic studies, part 1.* Prepared for Department of Public Works, City and County of Honolulu.
2. Bathen, K. 1968. *A descriptive study of the physical oceanography of Kaneohe Bay, Oahu, Hawaii.* UH-HIMB-Tr-14. Hawaii Institute of Marine Biology, University of Hawaii, Kaneohe.
3. Wyrski, K., W. Graefe, and W. Patzert. 1969. *Current observations in the Hawaiian Archipelago.* UNIH-SEAGRANT-TR-72-01, Sea Grant Program, University of Hawaii, Honolulu. Also, HIG-69-15, Hawaii Institute of Geophysics, University of Hawaii, Honolulu.
4. Wyrski, K., J. Burks, R. Latham, and W. Patzert. 1967. *Oceanographic observations during 1965-67 in the Hawaiian Archipelago.* UNIH-SEAGRANT-TR-72-01, Sea Grant Program, University of Hawaii, Honolulu. Also, HIG-67-15, Hawaii Institute of Geophysics, University of Hawaii, Honolulu.
5. Laevastu, T., D. Avery, and D. Cox. 1964. *Coastal currents and sewage disposal in the Hawaiian Islands.* HIG-64-1. Hawaii Institute of Geophysics, University of Hawaii, Honolulu.
6. Bathen, K. 1974. *Results of circulation measurements taken during August 1972 to May 1973 in the area between Barber's Point and the entrance to Pearl Harbor, Oahu, Hawaii.* UH-LL-TR-34, Look Laboratory of Oceanographic Engineering, Department of Ocean Engineering, University of Hawaii, Honolulu.
7. Conoco-Dillingham. 1972. *An investigation of oceanographic and bathymetric conditions north of Barber's Point.* Prepared for Hawaiian Dredging and Construction Co., Honolulu.
8. Sunn, Low, Tom and Hara Inc. 1962. *Report on ocean survey and study relative to sewage disposal for Waianae, Oahu.* Prepared for Department of Public Works, City and County of Honolulu.
9. Coulbourn, W.T. 1971. *Sedimentology of Kahana Bay, Oahu, Hawaii.* UNIH-SEAGRANT-TR-71-03, Sea Grant Program, University of Hawaii, Honolulu. Also, HIG-71-14, Hawaii Institute of Geophysics, University of Hawaii, Honolulu.
10. Chave, K.E., J.R. Tait, J.S. Stimson, and E.H. Chave. 1973. *Waikiki Beach erosion project: marine environment study.* Final report prepared for the U.S. Army Corps of Engineers, Honolulu.
11. Bathen, K. 1972. *A descriptive study of the circulation and water quality in Kailua Bay, Oahu, Hawaii, during 1971 and 1972.* Technical Report No. 29, Look Laboratory of Oceanographic Engineering, University of Hawaii, Honolulu. Prepared for Chung Dho Ahn & Associates Inc., Honolulu.
12. Holmes & Narver, and Belt, Collins, & Associates Ltd. 1959. *Kailua ocean outfall sewer, ocean portion, Kailua sewage treatment plant, Kailua, Koolauapoko, Oahu, Hawaii.* Report to Department of Public Works, City and County of Honolulu.
13. Bathen, K. 1972. *Current measurements in Pearl Harbor, Oahu, Hawaii.* UH-LL-72-M6, Look Laboratory of Oceanographic Engineering, Department of Ocean Engineering, University of Hawaii, Honolulu.
14. Bathen, K. 1975. *Comments on circulation, stratification and sediment quality in West Loch, Pearl Harbor, pertinent to the proposed Honouliuli waste water treatment system interceptor line.* Prepared for Austin, Smith and Associates, Honolulu.
15. Au, D. 1965. "Survey of the Distribution of the eggs and larvae of the nehu (*Stolephorus purpurus*)

- in Pearl Harbor, Hawaii." M.S. thesis, Department of Zoology, University of Hawaii, Honolulu.
16. Bathen, K. 1968. *Keehi Lagoon oceanographic survey*. Prepared for Tetra Tech in Reef Runway report.
  17. Sunn, Low, Tom and Hara Inc. 1969. *Proposal reef runway report (1970)*. Prepared for State Department of Transportation, Honolulu. The Ralph M. Parsons Co.
  18. Piyakarnchawa, T. 1965. "The plankton community in the southern part of Kaneohe Bay, Oahu, with special emphasis on the distribution, breeding season and population fluctuation of *Sagitta engлата*." Ph.D. thesis, Department of Zoology, University of Hawaii, Honolulu.
  19. Austin, H.A.R., and Associates, and Law and Wilson, Ltd. 1960. *Engineering feasibility studies: part 1 of the comprehensive plan Ala Moana reef*. Prepared for State Department of Land and Natural Resources, Honolulu.
  20. Gonzales, F. 1971. *Descriptive study of the physical oceanography of Ala Wai Canal*. UNIH-SEAGRANT-72-01, Sea Grant Program, University of Hawaii, Honolulu. Also, HIG-71-7, Hawaii Institute of Geophysics, University of Hawaii, Honolulu.
  21. Bathen, K. 1973. *An examination of the oceanographic conditions existing along the west Ewa Beach coastline, Oahu, Hawaii*. Environmental Communications, Inc.
  22. Levine, J. 1970. "Field observations and theoretical analysis of currents on the inner reef from Kewalo Channel to Ala Moana Park." M.S. thesis, Department of Ocean Engineering, University of Hawaii, Honolulu.
  23. Oceanic Institute. 1971. *Draft environmental impact statement: improvement of Ala Wai Boat Harbor*. Prepared for Harbors Division, State Department of Transportation, Honolulu.
  24. Belt, Collins & Associates Ltd. 1962. *Waialua Bay pollution study, Haleiwa, Oahu, Hawaii*. Prepared for Harbors Division, State Department of Transportation, Honolulu.
  25. Belt, Collins & Associates Ltd. 1962. *Kaliaka Bay Small Boat Harbor: preliminary engineering and feasibility study*. Prepared for Harbors Division, State Department of Transportation, Honolulu.
  26. Sunn, Low, Tom and Hara Inc. 1969. *Study of coastal currents to determine suitability of drainage channel relocation site for Kahuku land development*. Progress report.
  27. Belt, Collins & Associates Ltd. 1962. *Kaneilio Point Small Boat Harbor, Waianae, Oahu: preliminary engineering and feasibility study*. Prepared for Harbors Division, State Department of Transportation, Honolulu.
  28. Conoco-Dillingham. 1972. *An investigation of oceanographic and bathymetric conditions north of Barber's Point*. Prepared for Hawaiian Dredging and Construction Co., Honolulu.
  29. Marine Advisors, Inc. 1961-62. *Technical supplement to ocean outfall report, Waimanalo core development*. Prepared for R.M. Towill Corporation.
  30. U.S. Army Corps of Engineers. 1975. *Draft environmental impact statement: Waianae light draft harbor construction, Waianae, Oahu, Hawaii*.
  31. Sunn, Low, Tom and Hara Inc. 1967. *Report on effluent from the proposed Pearl Harbor sewage treatment plant outfall*. NBY 82365. U.S. Public Work Center, Pearl Harbor, Honolulu.
  32. Neighbor Island Consultants. *Kualoa Park sand tracing project*. Prepared for U.S. Army Corps of Engineers, Honolulu. (not released)
  33. Sea-Test. 1972. *Pearl Harbor circulation, data report*. Prepared for U.S. Naval Undersea Center, Kaneohe.

SECTOR IDENTIFICATION  
AND DATA COVERAGE MAPS





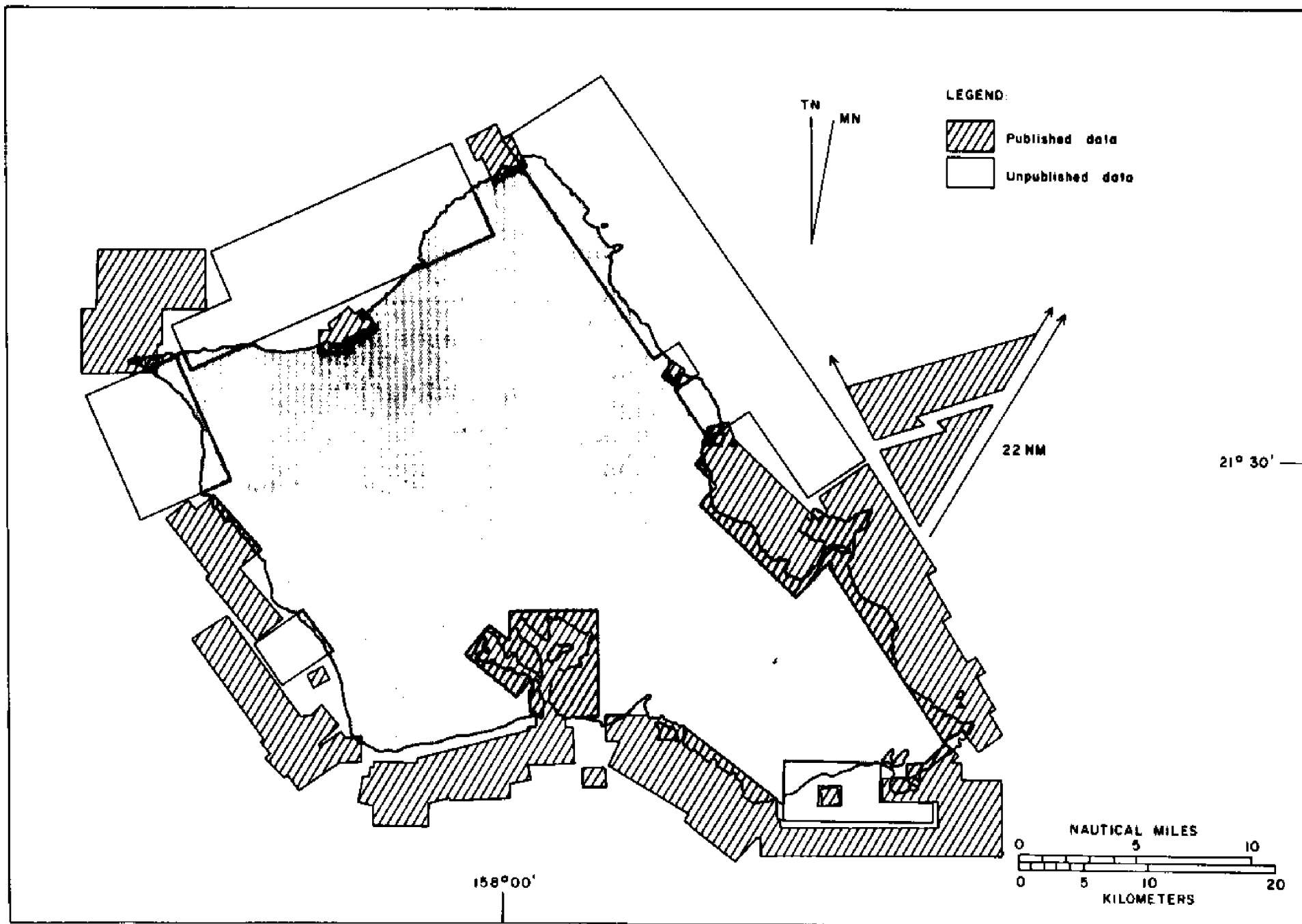


Figure 2. Published and unpublished data coverage

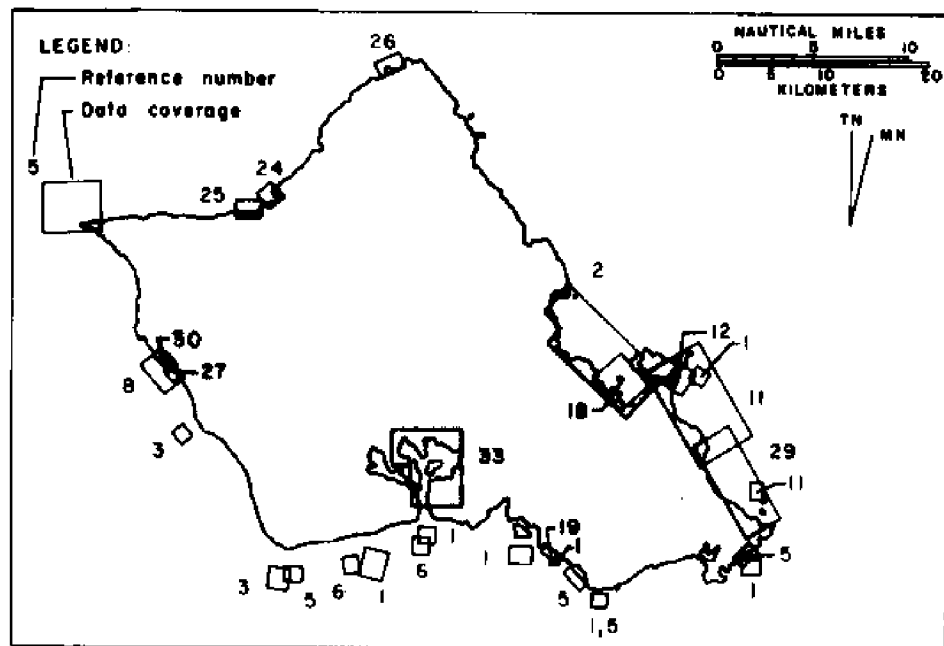


Figure 3. Data coverage during November through January

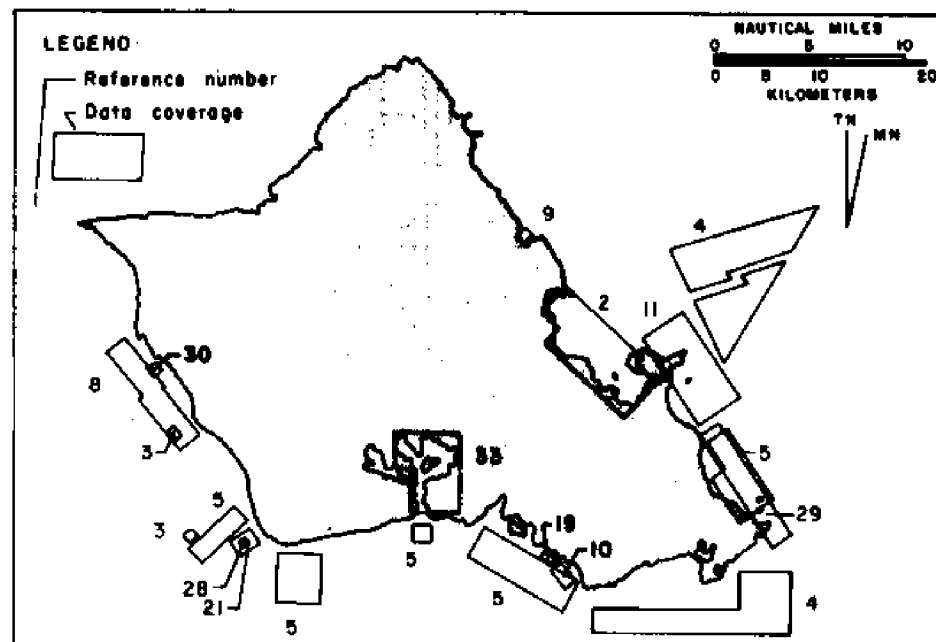


Figure 4. Data coverage during February through April

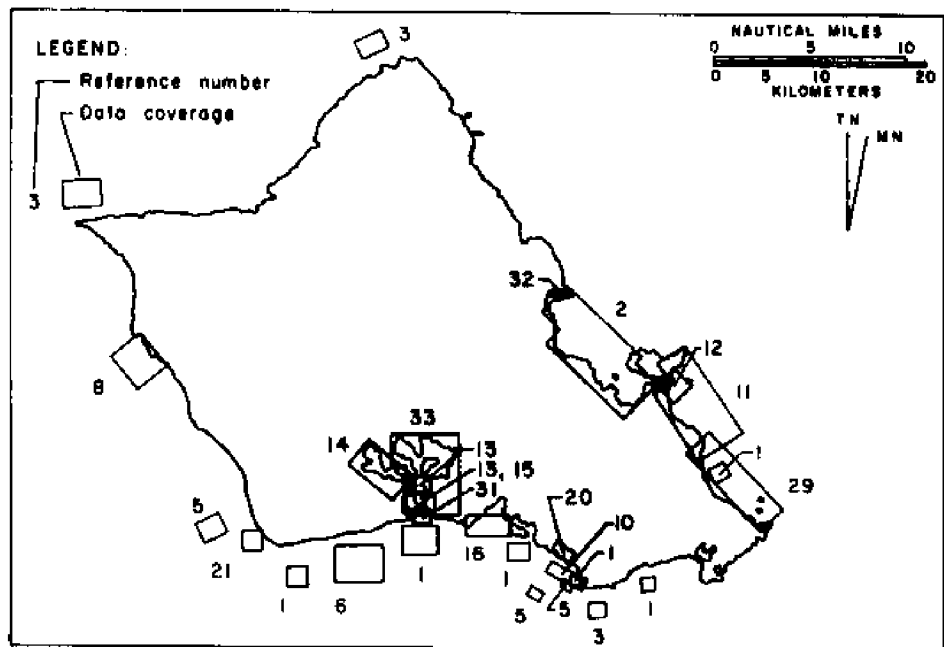


Figure 5. Data coverage during May through July

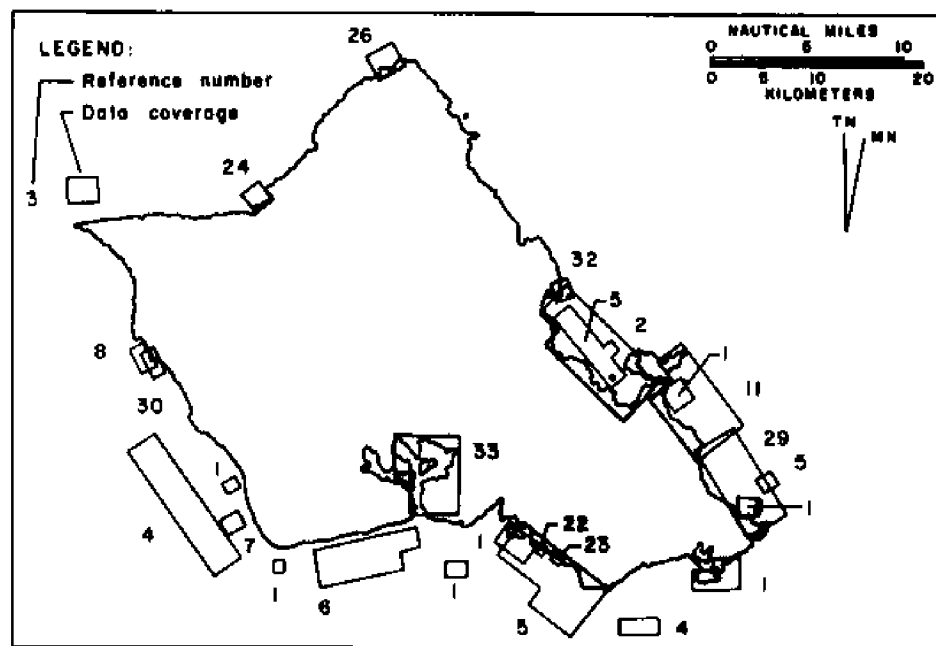


Figure 6. Data coverage during August through October





## CIRCULATION RESULTS BY SECTOR MAPS

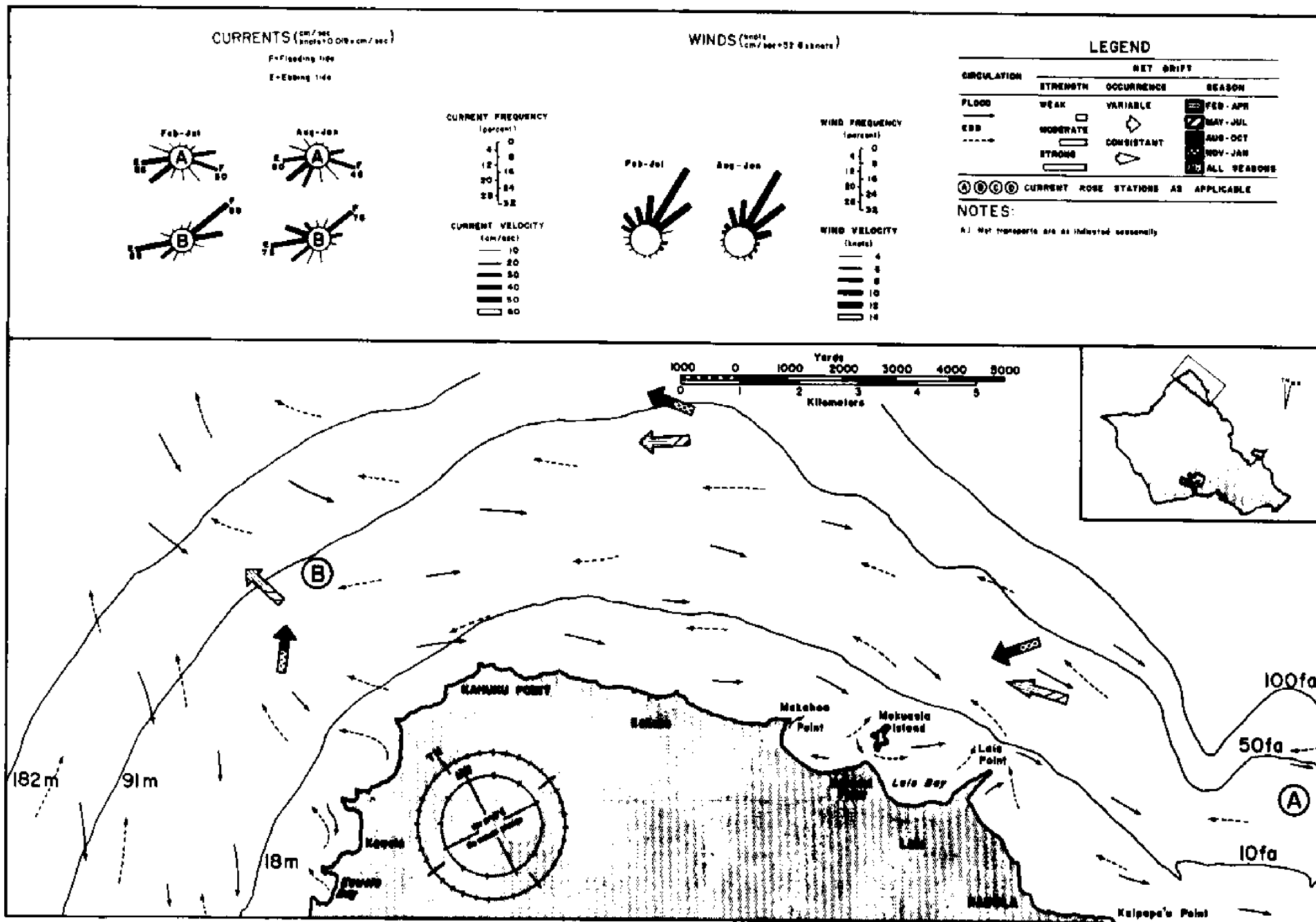


Figure 7. N-NE Sector, Kahuku Point to Hauula







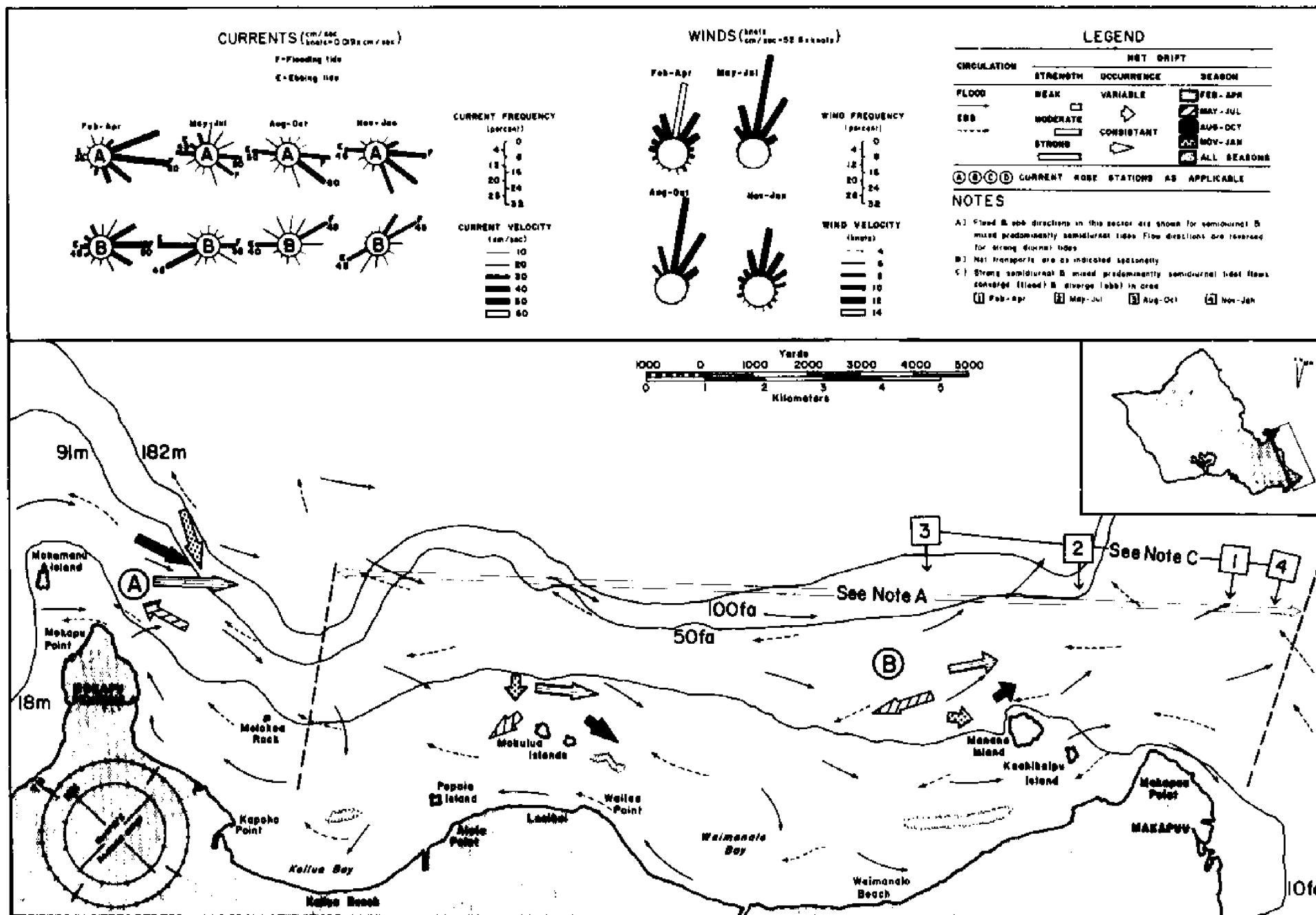


Figure 10. E Sector, Mokapu Peninsula to Makapuu Point



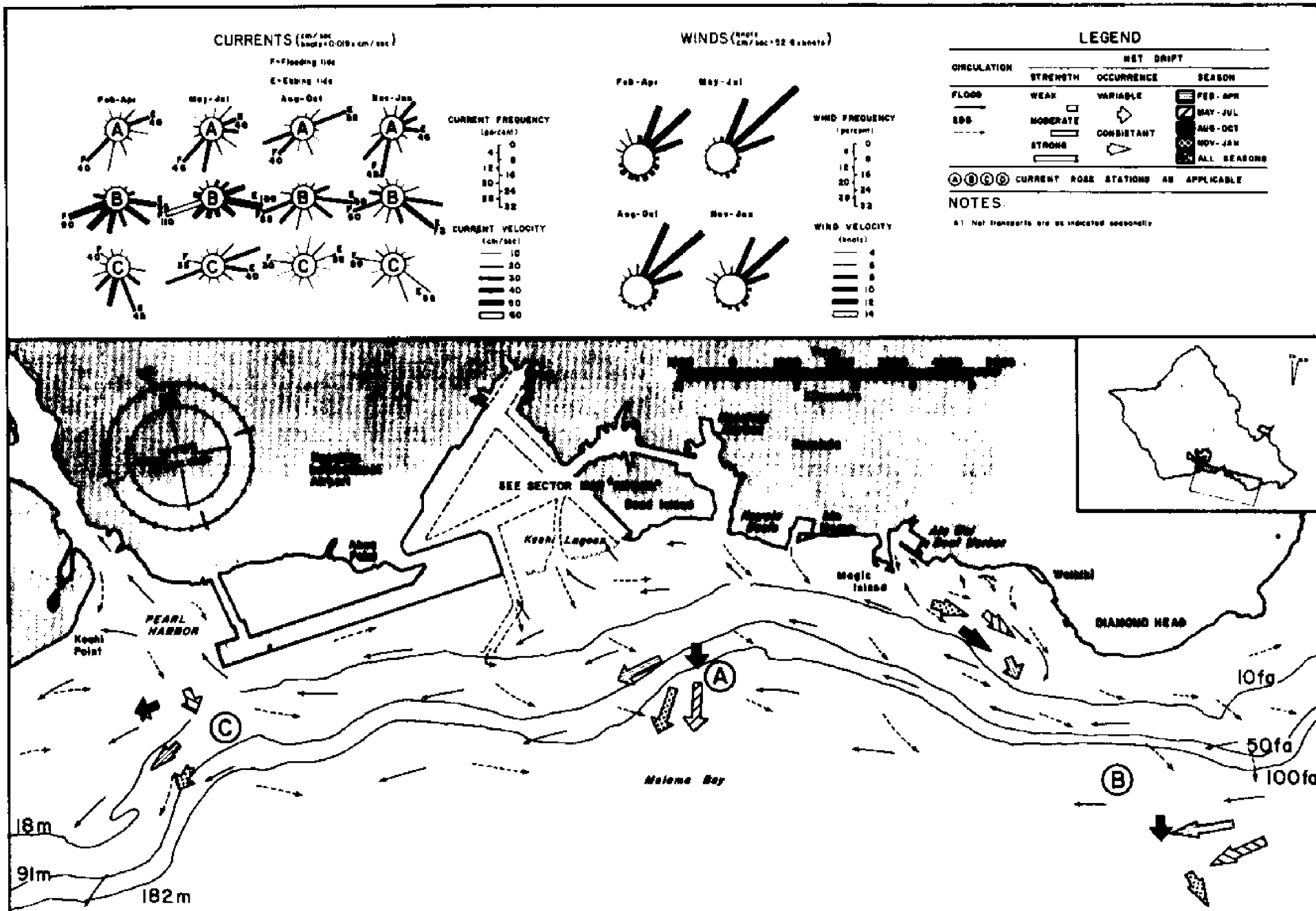


Figure 12. E-S Sector, Diamond Head to Pearl Harbor







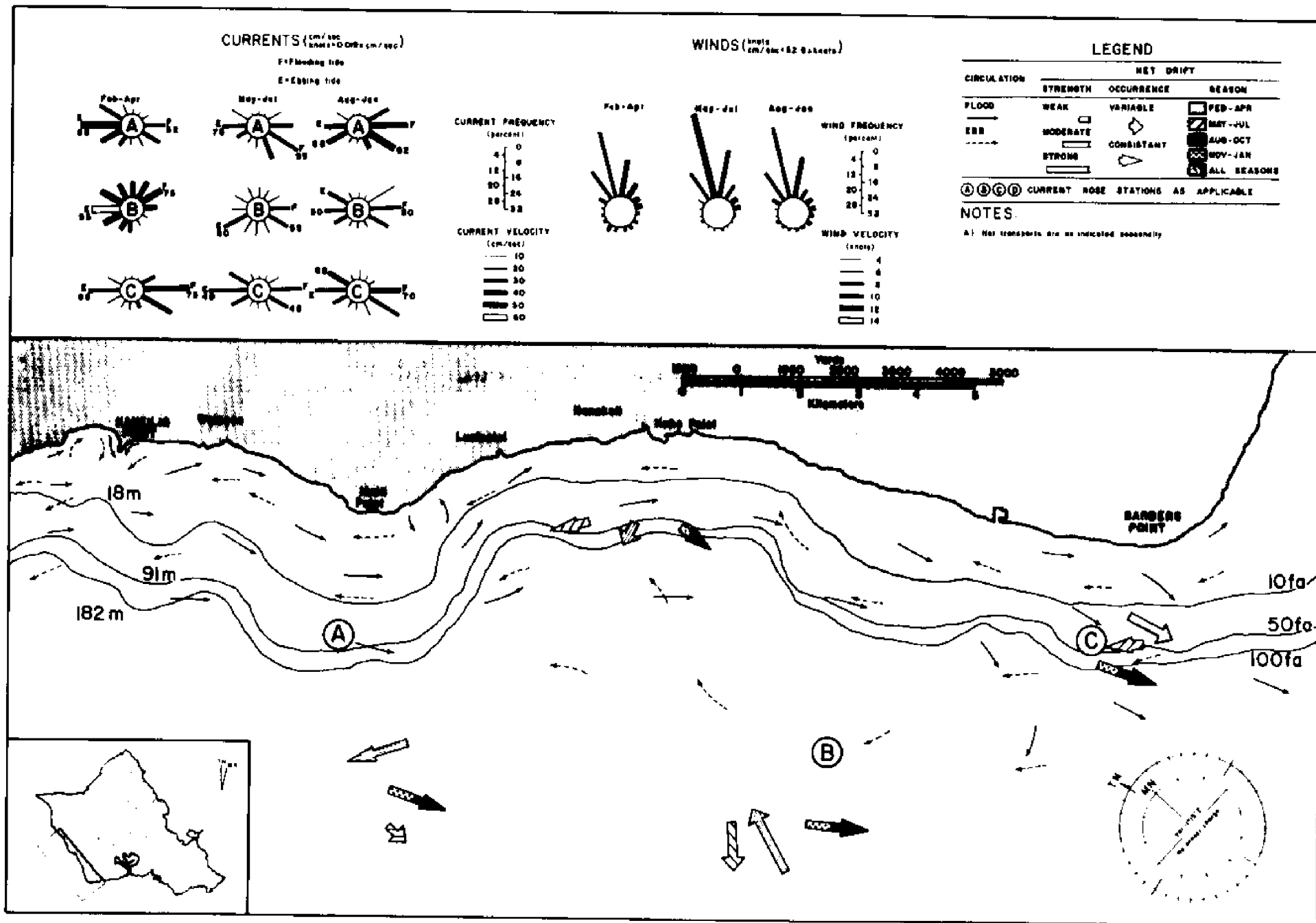


Figure 15. S-SW Sector, Barbers Point to Kaneohe Point

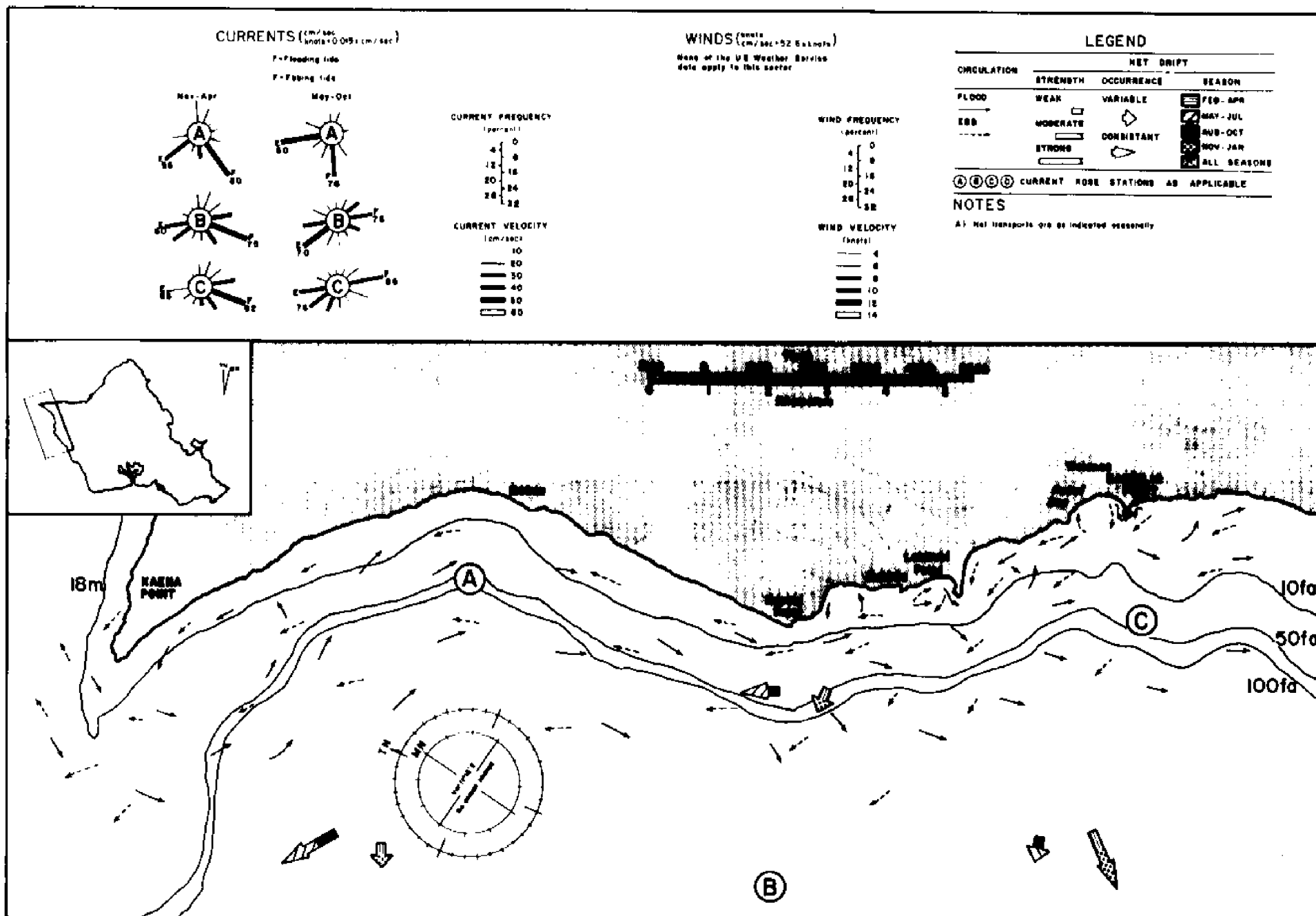
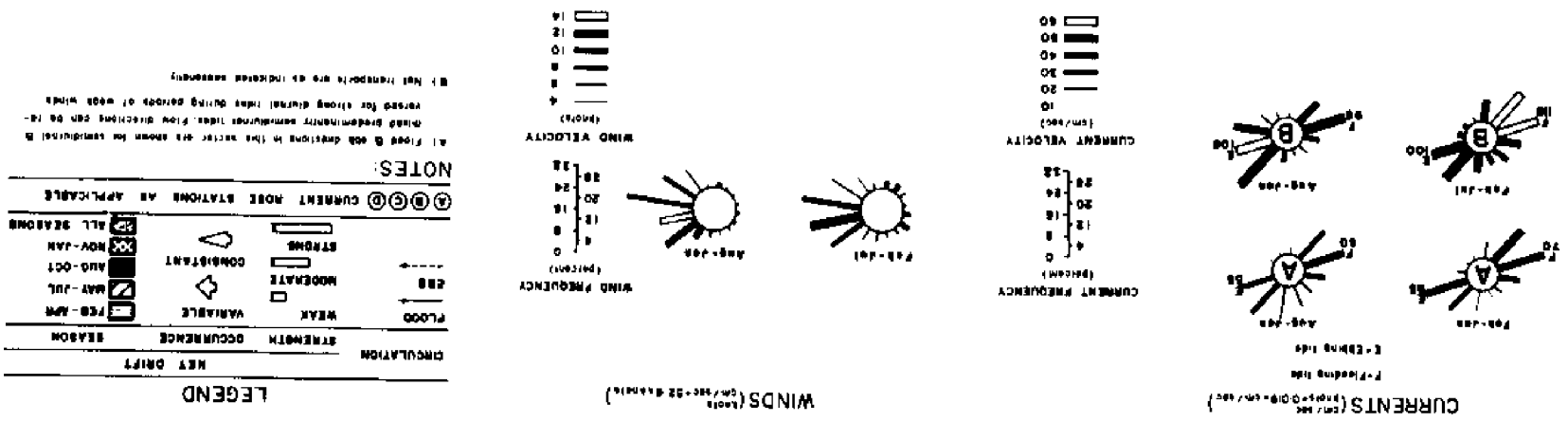
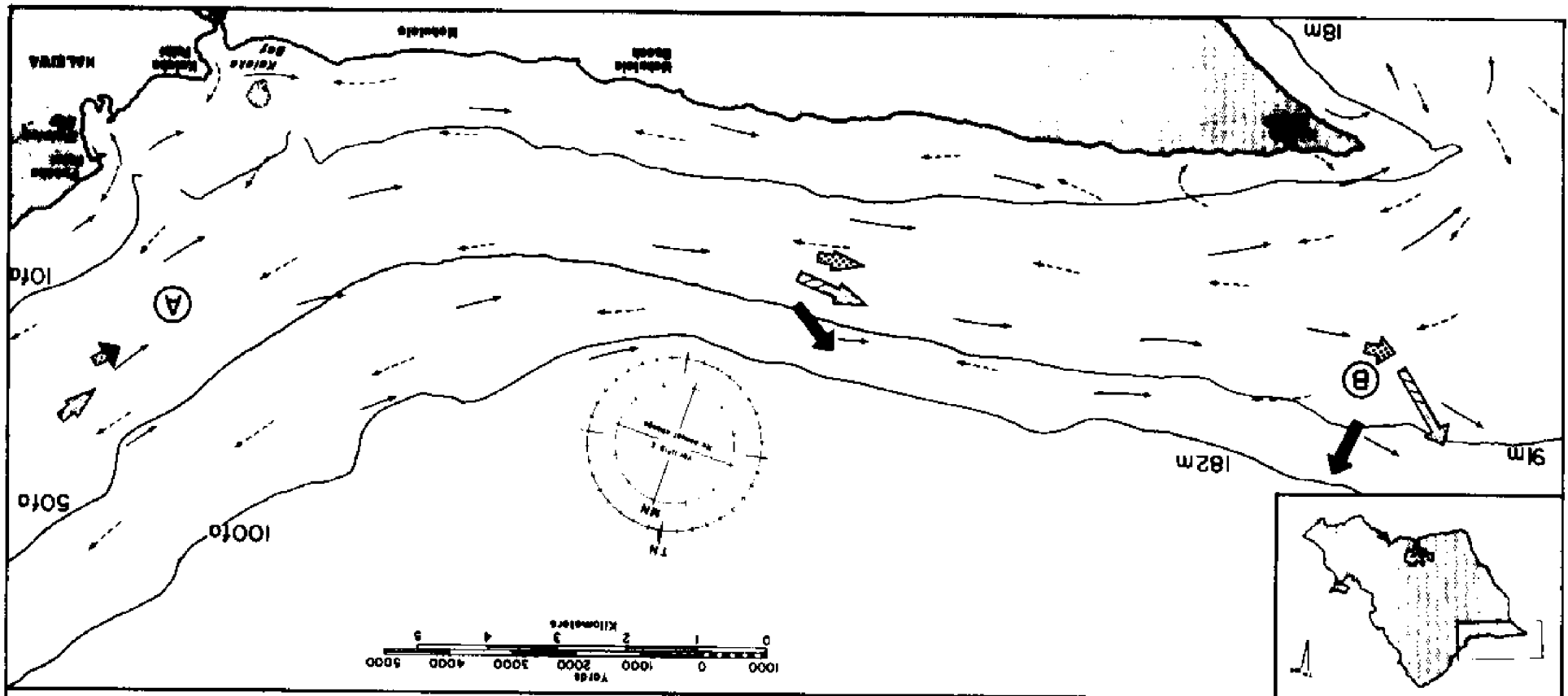


Figure 16. N-SW Sector, Kaneilio Point to Kaena Point

Figure 17. S-NW Sector, Kaena Point to Haleiwa





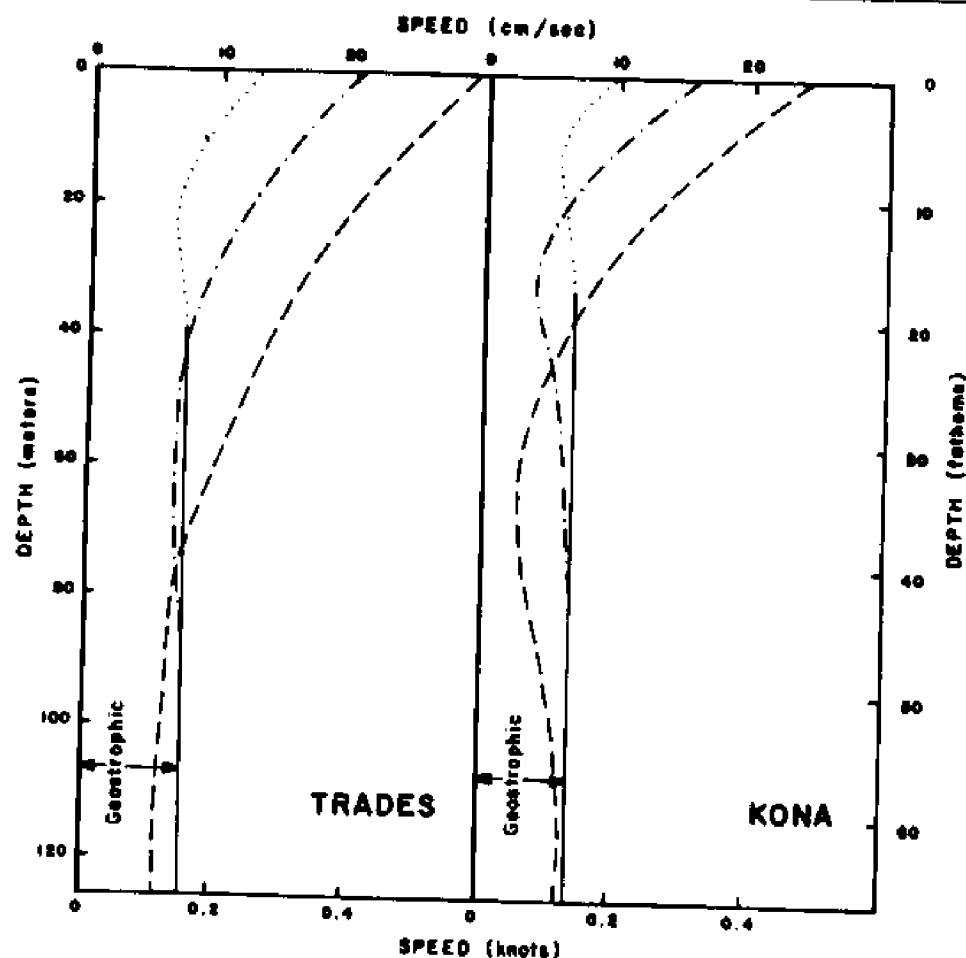
VERTICAL PROFILES  
OF CURRENTS BY SECTOR





# VERTICAL PROFILES OF CURRENTS (Geostrophic Plus Wind-Driven Flow)

N-NE SECTOR



NOTE:  
Current speeds not colinear

## LEGEND

Predicted:

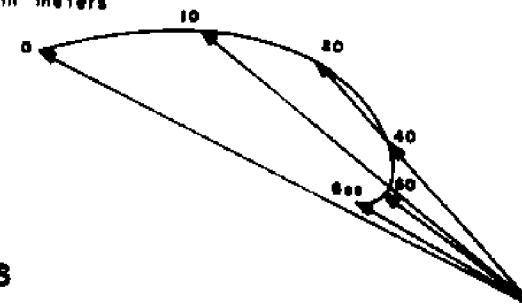
- strong (> 20 knots)
- - moderate (5-20 knots)
- ... light (< 5 knots)

## HODOGRAPHS FOR AVERAGE WINDS

(Tidal Current Not Included)

### LEGEND

- wind: Average Seasonal Wind for Months Shown
- Geo: Average Seasonal Geostrophic Component
- Depth in meters

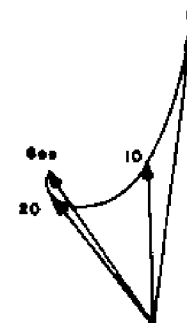


### TRADES

Predominate: FEBRUARY through JULY

wind: 12.0 knots, 69° T

Geo: 7.5 cm/sec, 299° T



### KONA

Possible:

AUGUST through JANUARY

wind: 6.8 knots, 180° T

Geo: 7.1 cm/sec, 326° T

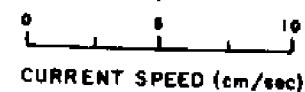
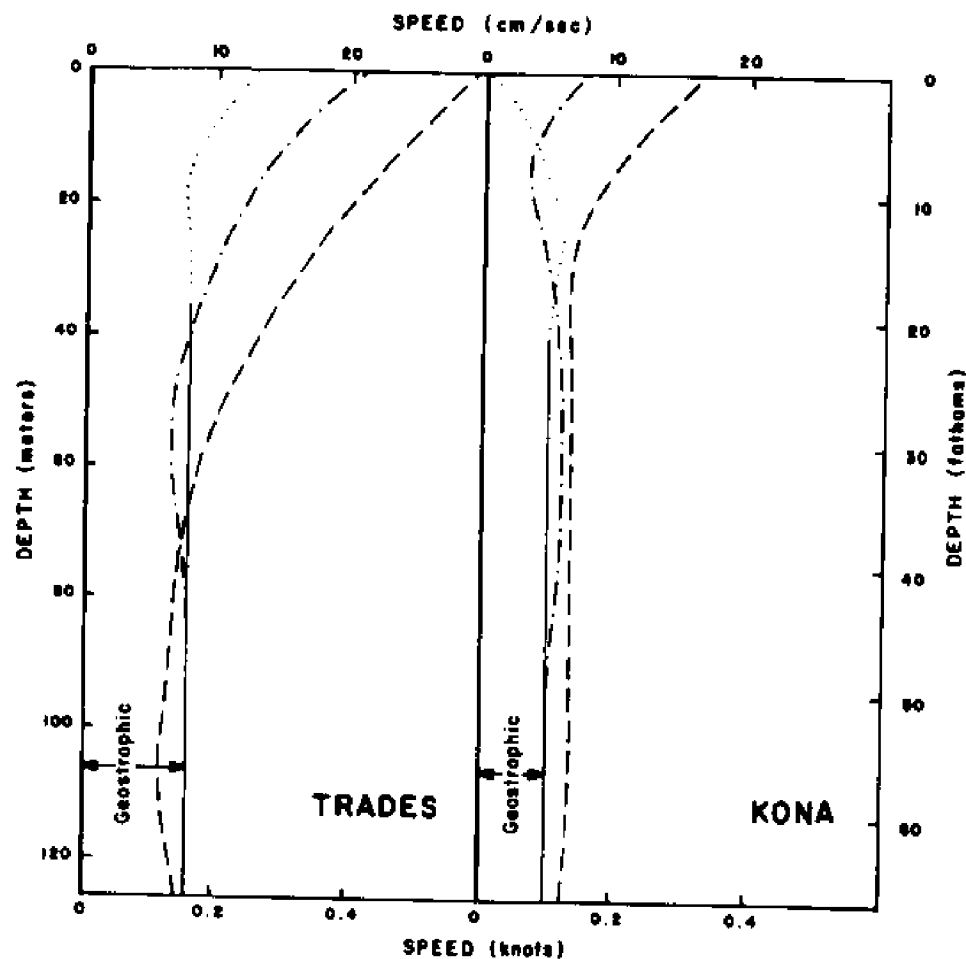


Figure 19. N-NE Sector, Kahuku Point to Hauula

# VERTICAL PROFILES OF CURRENTS (Geostrophic Plus Wind-Driven Flow)

S-NE SECTOR



## LEGEND

Predicted:

- strong (> 20 knots)
- - moderate (5-20 knots)
- · light (< 5 knots)

## NOTE:

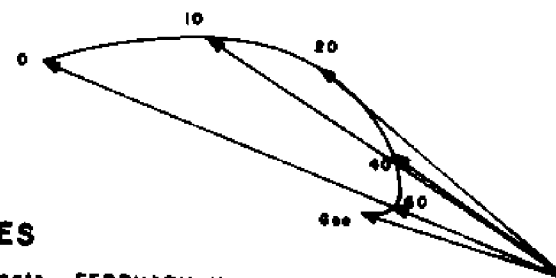
Current speeds not colinear

## HODOGRAPHS FOR AVERAGE WINDS

(Tidal Current Not Included)

## LEGEND

- wind: Average Seasonal Wind for Months Shown
- Geo: Average Seasonal Geostrophic Component
- Depth in meters

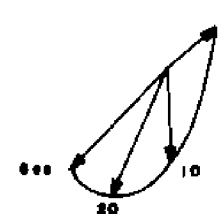


## TRADES

Predominate: FEBRUARY through JULY

wind: 12.0 knots, 89° T

Geo: 7.9 cm/sec, 285° T



## KONA

Possible: AUGUST through JANUARY

wind: 6.8 knots, 180° T

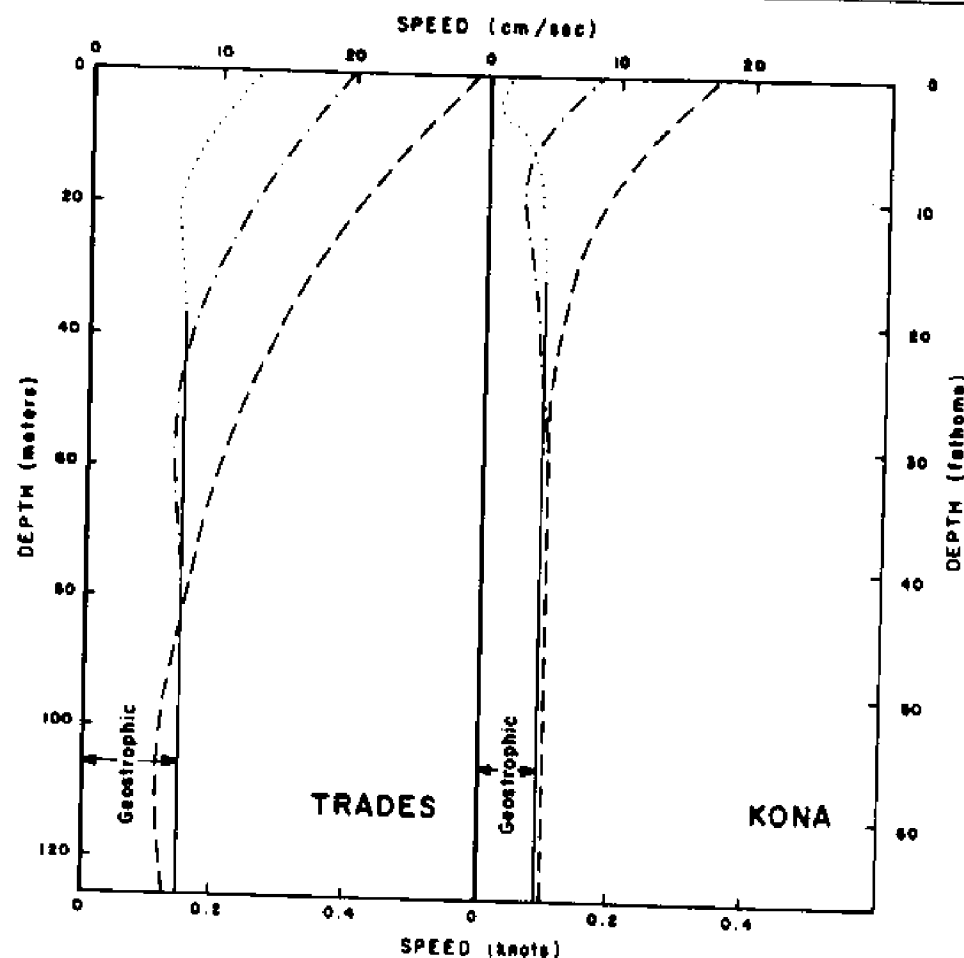
Geo: 5.3 cm/sec, 226° T



Figure 20. S-NE Sector, Hauula to Kualoa Point

# VERTICAL PROFILES OF CURRENTS (Geostrophic Plus Wind-Driven Flow)

K-B SECTOR

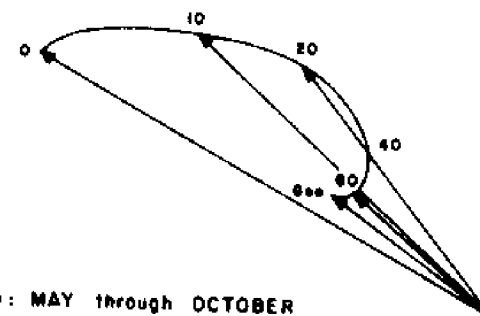


NOTE:  
Current speeds not colinear

LEGEND  
Predicted:  
— strong (> 20 knots)  
— moderate (5-20 knots)  
— light (< 5 knots)

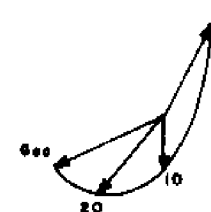
## HODOGRAPHS FOR AVERAGE WINDS (Tidal Current Not Included)

LEGEND  
wind: Average Seasonal Wind for Months Shown  
Geo: Average Seasonal Geostrophic Component  
Depth in meters



### TRADES

Predominate: MAY through OCTOBER  
wind: 11.3 knots, 70° T  
Geo: 7.4 cm/sec, 305° T



### KONA

Possible. NOVEMBER through JANUARY  
wind: 7.0 knots, 180° T  
Geo: 4.3 cm/sec, 243° T

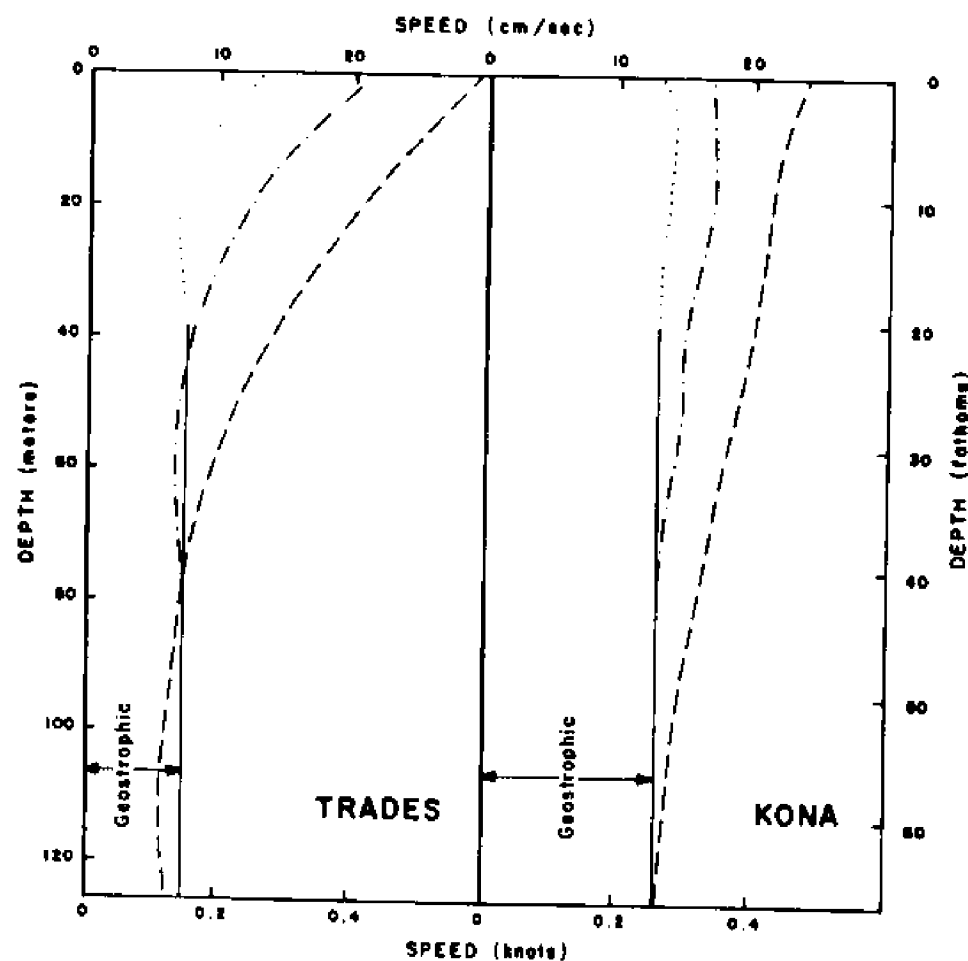
0 5 10  
CURRENT SPEED (cm/sec)

Figure 21. K-B Sector, Kualoa Point to Mokapu Peninsula

# VERTICAL PROFILES OF CURRENTS

(Geostrophic Plus Wind-Driven Flow)

E SECTOR



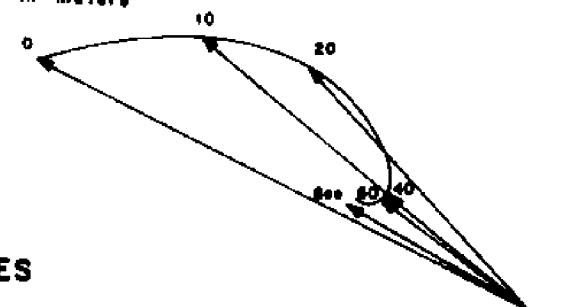
NOTE:  
Current speeds not colinear

LEGEND  
Predicted:  
— strong (> 20 knots)  
— moderate (5-20 knots)  
— light (< 5 knots)

## HODOGRAPHS FOR AVERAGE WINDS

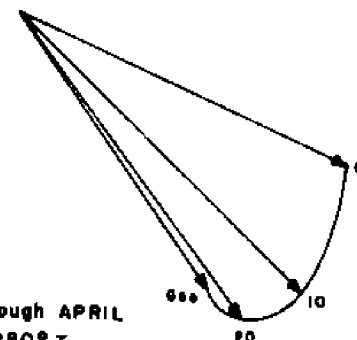
(Tidal Current Not Included)

LEGEND  
wind: Average Seasonal Wind for Months Shown  
Geo: Average Seasonal Geostrophic Component  
Depth in meters



### TRADES

Predominate: MAY through JULY  
wind: 11.7 knots, 69° T  
Geo: 7.5 cm/sec, 299° T



### KONA

Possible: FEBRUARY through APRIL  
wind: 6.3 knots, 180° T  
Geo: 12.9 cm/sec, 144° T

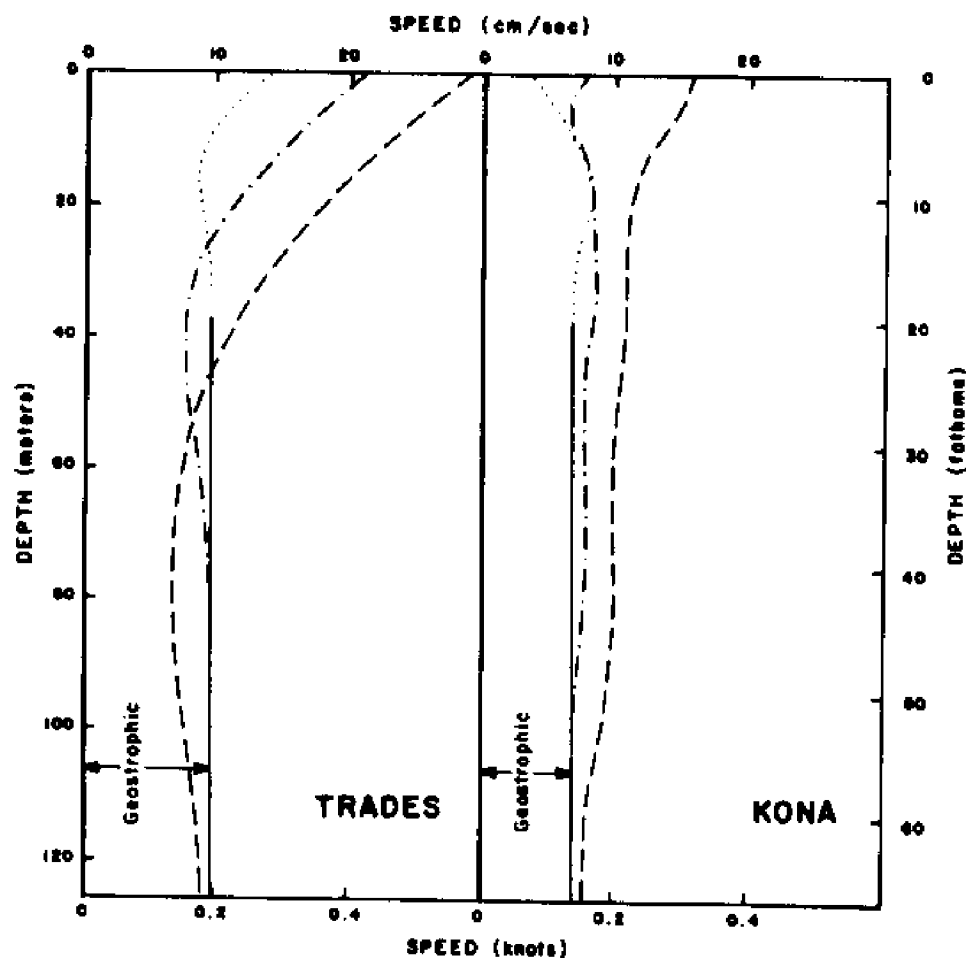
0 5 10  
CURRENT SPEED (cm/sec)

Figure 22. E Sector, Mokapu Peninsula to Makapuu Point

# VERTICAL PROFILES OF CURRENTS

(Geostrophic Plus Wind-Driven Flow)

S-E SECTOR



## LEGEND

Predicted:

- strong (>20 knots)
- - moderate (5-20 knots)
- ... light (<5 knots)

## NOTE:

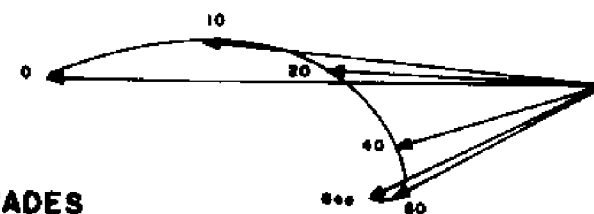
Current speeds not colinear

## HODOGRAPHS FOR AVERAGE WINDS

(Tidal Current Not Included)

## LEGEND

- wind: Average Seasonal Wind for Months Shown
- Geo: Average Seasonal Geostrophic Component
- Depth in meters



## TRADES

Predominate: FEBRUARY through JULY

wind: 11.6 knots, 85° T

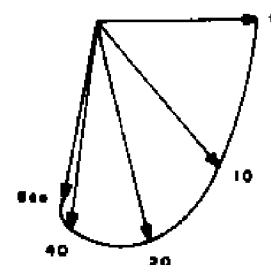
Geo: 9.7 cm/sec, 243° T

## KONA

Possible: AUGUST through JANUARY

wind: 9.0 knots, 180° T

Geo: 7.0 cm/sec, 193° T



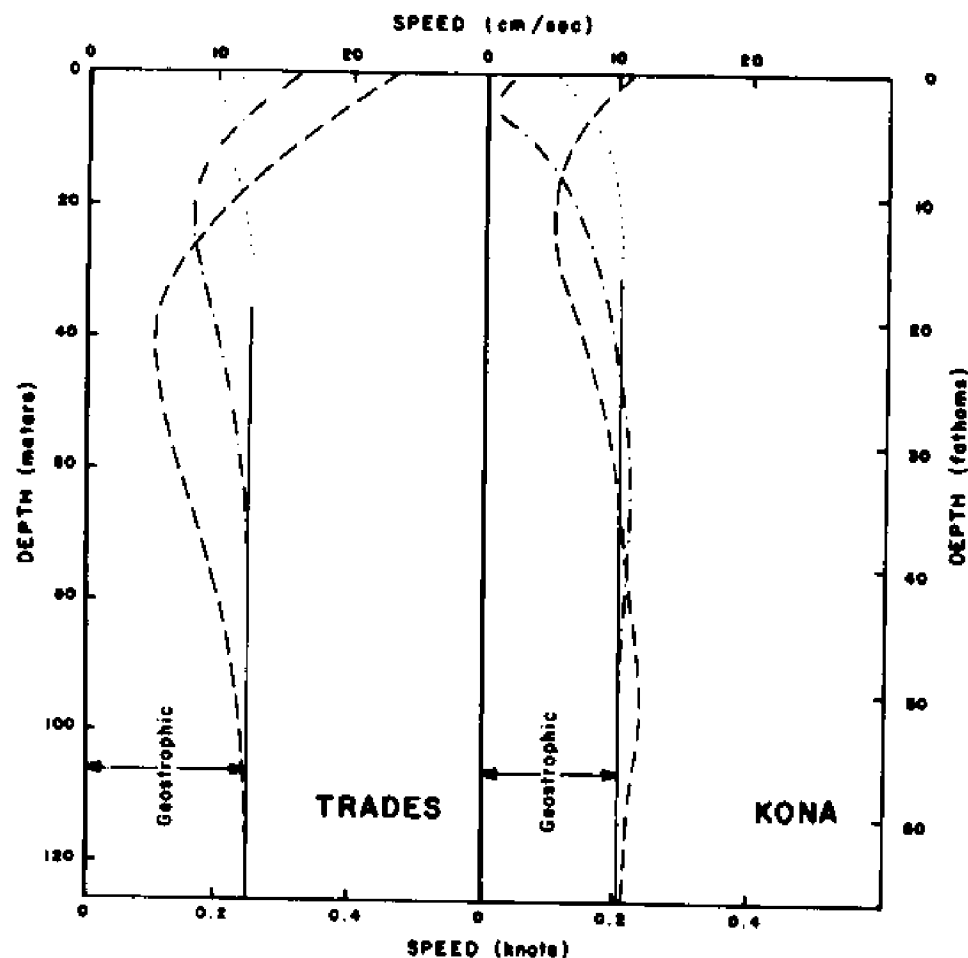
0 5 10  
CURRENT SPEED (cm/sec)

Figure 23. S-E Sector, Makapuu Point to Diamond Head

# VERTICAL PROFILES OF CURRENTS

(Geostrophic Plus Wind-Driven Flow)

E-S SECTOR



## HODOGRAPHS FOR AVERAGE WINDS

(Tidal Current Not Included)

### LEGEND

wind: Average Seasonal Wind for Months Shown

Geo: Average Seasonal Geostrophic Component

Depth in meters

### TRADES

Predominate: MAY through OCTOBER

wind: 11.5 knots, 65° T

Geo: 12.3 cm/sec, 190° T

### KONA

Possible: NOVEMBER through APRIL

wind: 9.0 knots, 180° T

Geo: 10.2 cm/sec, 233° T

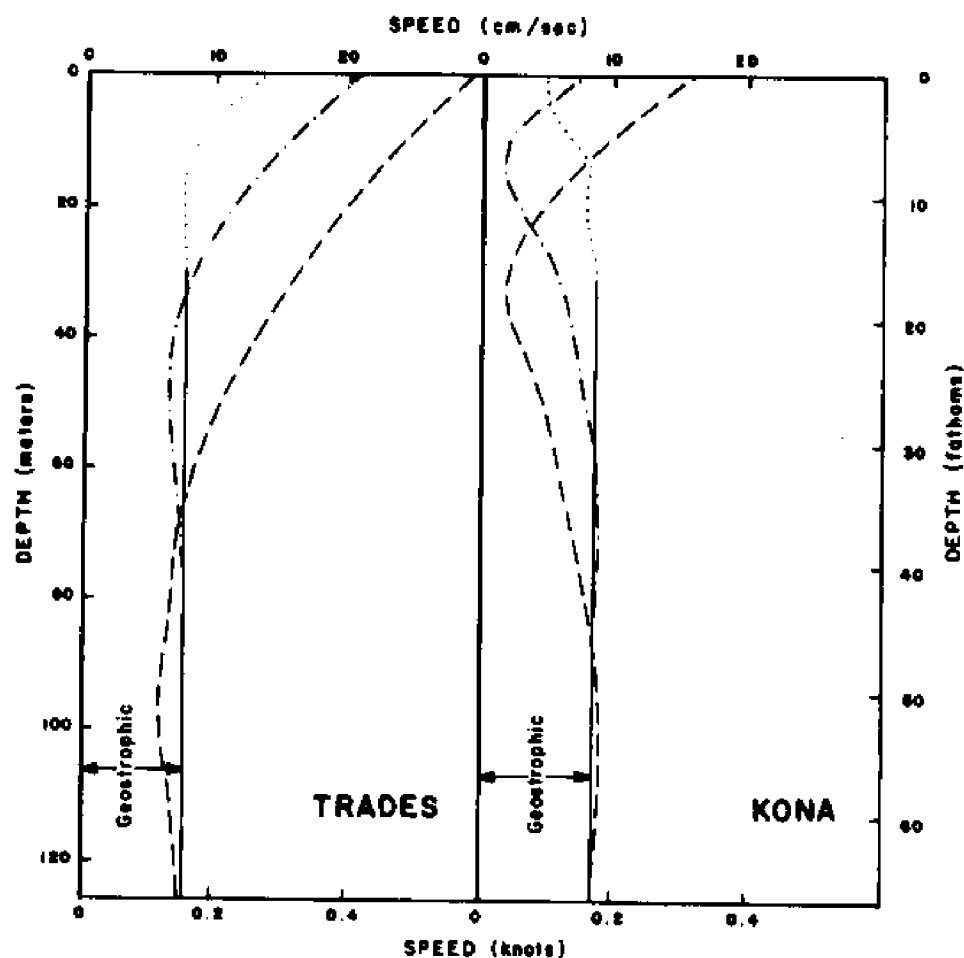


Figure 24. E-S Sector, Diamond Head to Pearl Harbor

# VERTICAL PROFILES OF CURRENTS

(Geostrophic Plus Wind-Driven Flow)

W-S SECTOR



## LEGEND

Predicted:

- strong (> 20 knots)
- moderate (5-20 knots)
- light (< 5 knots)

## NOTE:

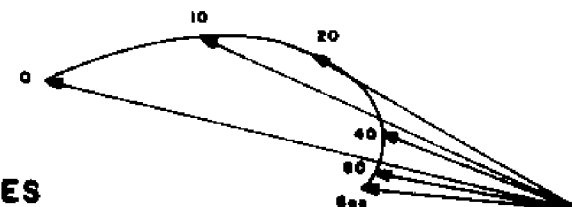
Current speeds not colinear

## HODOGRAPHS FOR AVERAGE WINDS

(Tidal Current Not Included)

## LEGEND

- wind: Average Seasonal Wind for Months Shown
- Geo: Average Seasonal Geostrophic Component
- Depth in meters

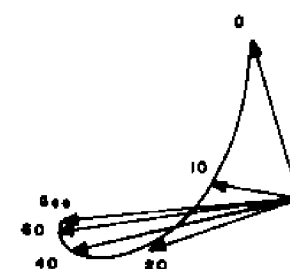


## TRADES

Predominate: MAY through OCTOBER

wind: 11.5 knots, 65° T

Geo: 8.2 cm/sec, 275° T



## KONA

Possible: NOVEMBER through APRIL

wind: 9.0 knots, 180° T

Geo: 8.6 cm/sec, 264° T



Figure 25. W-S Sector, Pearl Harbor to Barbers Point

# VERTICAL PROFILES OF CURRENTS (Geostrophic Plus Wind-Driven Flow)

S-SW SECTOR

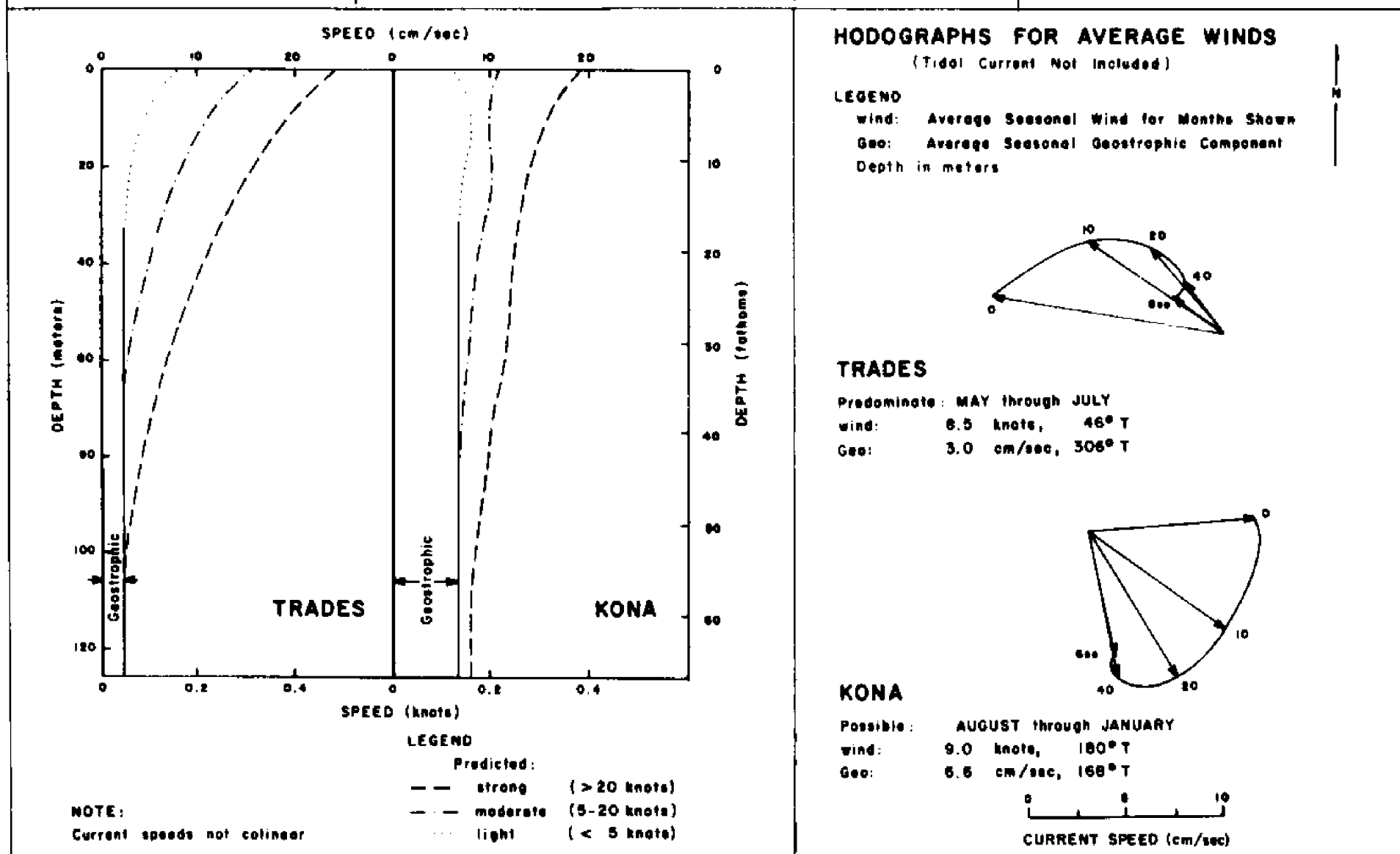


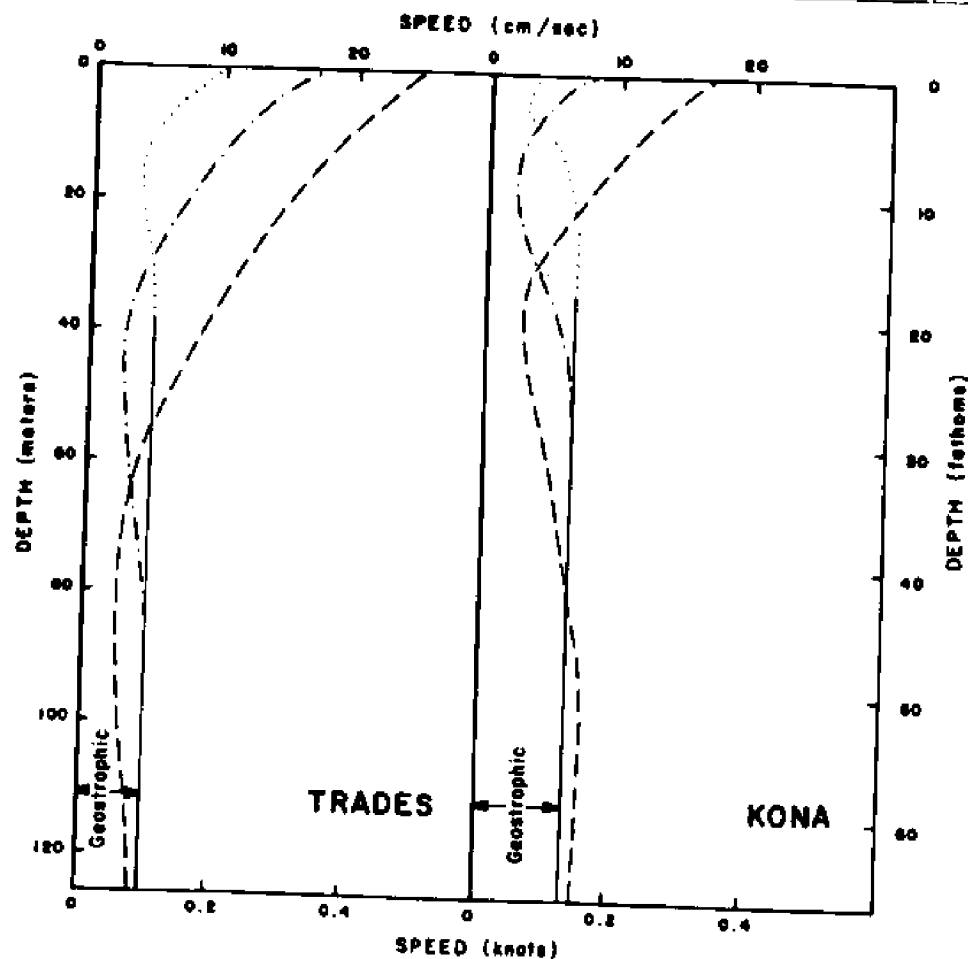
Figure 26. S-SW Sector, Barbers Point to Kaneilio Point



# VERTICAL PROFILES OF CURRENTS

(Geostrophic Plus Wind-Driven Flow)

N-SW SECTOR



NOTE:

Current speeds not colinear

## LEGEND

Predicted:

- strong (> 20 knots)
- - moderate (5-20 knots)
- light (< 5 knots)

## HODOGRAPHS FOR AVERAGE WINDS

(Tidal Current Not Included)

### LEGEND

- wind: Average Seasonal Wind for Months Shown
- Geo: Average Seasonal Geostrophic Component
- Depth in meters

### TRADES

Predominate: MAY through OCTOBER

wind: 6.0 knots, 140° T

Geo: 4.9 cm/sec, 312° T

### KONA

Possible: NOVEMBER through APRIL

wind: 9.0 knots, 180° T

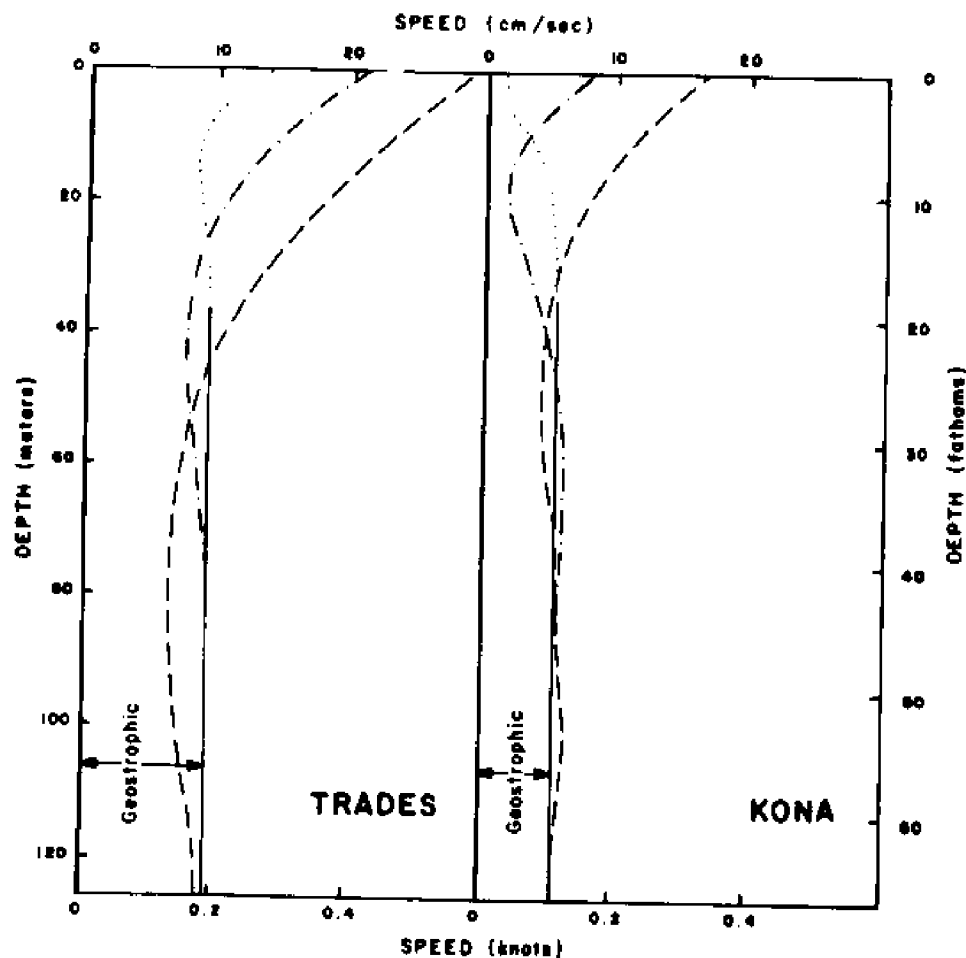
Geo: 6.7 cm/sec, 259° T

0 5 10  
CURRENT SPEED (cm/sec)

Figure 27. N-SW Sector, Kaneilio Point to Kaena Point

# VERTICAL PROFILES OF CURRENTS (Geostrophic Plus Wind-Driven Flow)

S-NW SECTOR



## LEGEND

Predicted:

- strong (> 20 knots)
- - moderate (5-20 knots)
- ... light (< 5 knots)

## NOTE:

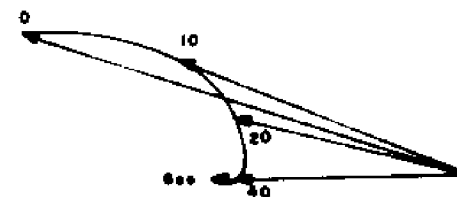
Current speeds not colinear

## HODOGRAPHS FOR AVERAGE WINDS

(Tidal Current Not Included)

## LEGEND

wind: Average Seasonal Wind for Months Shown  
Geo: Average Seasonal Geostrophic Component  
Depth in meters

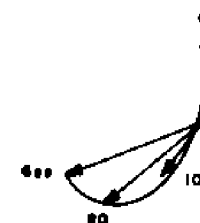


## TRADES

Predominate: FEBRUARY through JULY

wind: 7.9 knots, 83° T

Geo: 9.6 cm/sec, 269° T



## KONA

Possible: NOVEMBER through JANUARY

wind: 6.5 knots, 180° T

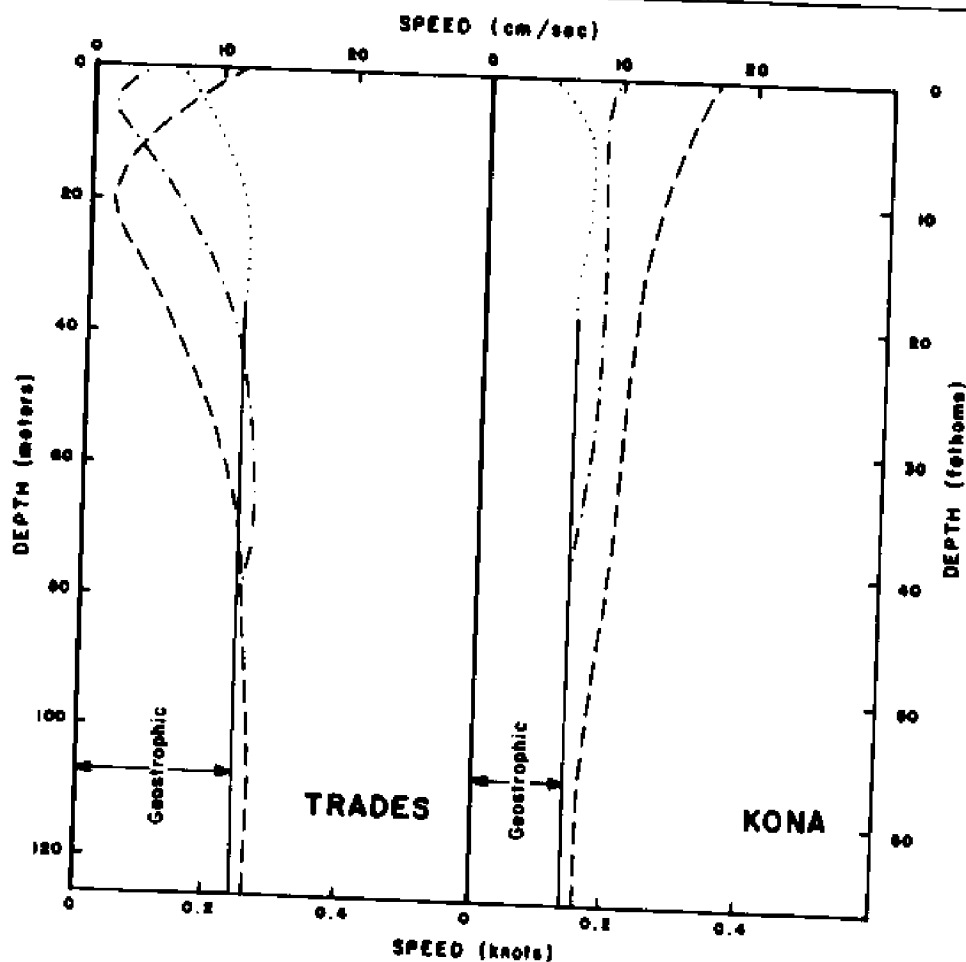
Geo: 5.4 cm/sec, 248° T



Figure 28. S-NW Sector, Kaena Point to Haleiwa

# VERTICAL PROFILES OF CURRENTS (Geostrophic Plus Wind-Driven Flow)

N-NW SECTOR



NOTE:  
Current speeds not colinear

## LEGEND

Predicted:  
— strong (> 20 knots)  
- - moderate (5-20 knots)  
... light (< 5 knots)

## HODOGRAPHS FOR AVERAGE WINDS (Tidal Current Not Included)

### LEGEND

wind: Average Seasonal Wind for Months Shown  
Geo: Average Seasonal Geostrophic Component  
Depth in meters

### TRADES

Predominate: FEBRUARY through JULY  
wind: 7.9 knots, 83° T  
Geo: 11.9 cm/sec, 154° T

### KONA

Possible: AUGUST through JANUARY  
wind: 6.5 knots, 180° T  
Geo: 7.0 cm/sec, 180° T

0 5 10  
CURRENT SPEED (cm/sec)

Figure 29. N-NW Sector, Haleiwa to Kahuku Point



## CIRCULATION COMPONENT MAPS



# WIND-DRIVEN FLOW (Ekman Surface Drift)

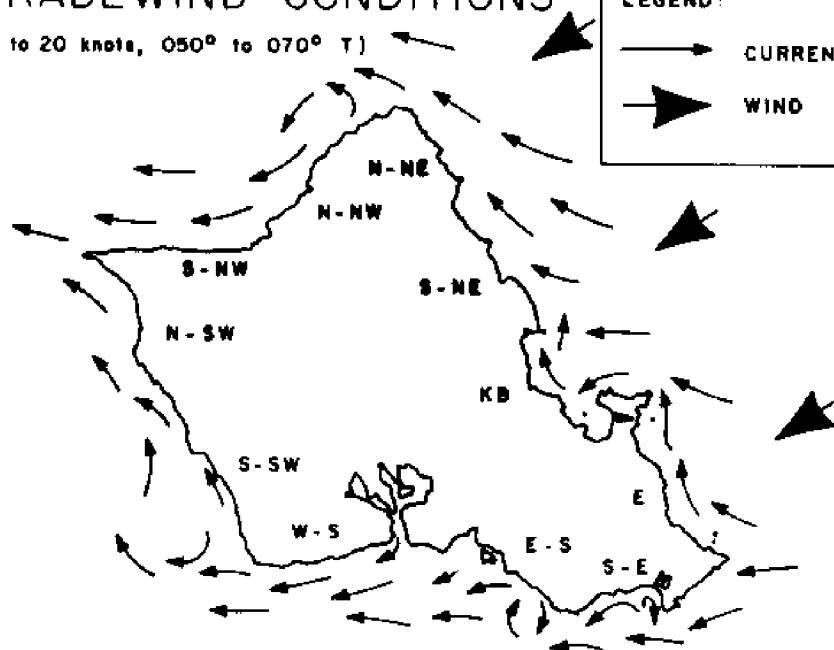
## TRADEWIND CONDITIONS

(5 to 20 knots, 050° to 070° T)

### LEGEND:

→ CURRENT

➔ WIND



SECTOR	CURRENT SPEED (cm/sec)	WIND SPEED (knots)
N-NE	13.2	12.0
S-NE	13.2	12.0
KB	12.4	11.3
E	12.8	11.7
S-E	12.7	11.6
E-S	12.6	11.5

SECTOR	CURRENT SPEED (cm/sec)	WIND SPEED (knots)
W-S	12.6	11.5
S-SW	9.3	8.5
N-SW	6.6	6.0
S-NW	8.7	7.9
N-NW	8.7	7.9

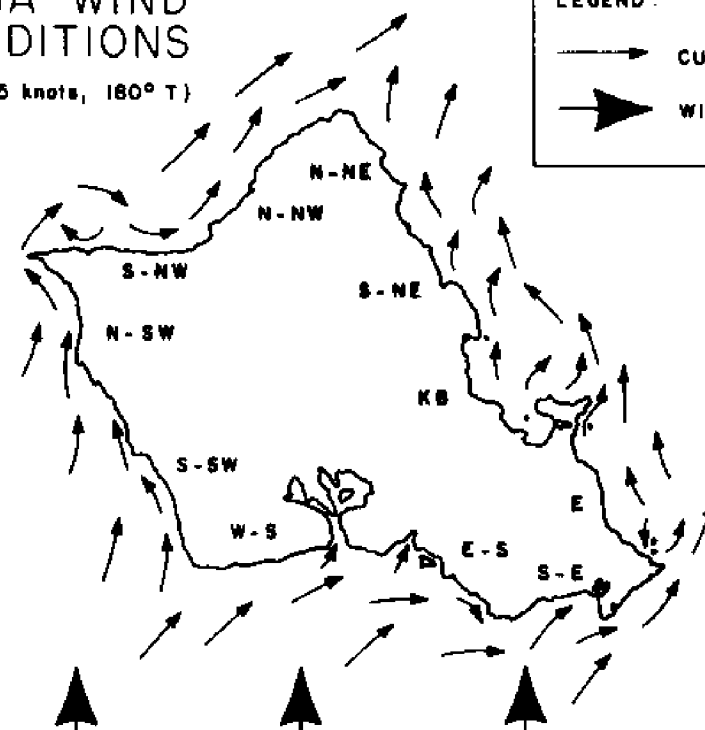
## KONA WIND CONDITIONS

(5 to 15 knots, 180° T)

### LEGEND:

→ CURRENT

➔ WIND



SECTOR	CURRENT SPEED (cm/sec)	WIND SPEED (knots)
N-NE	7.5	6.8
S-NE	7.5	6.8
KB	7.7	7.0
E	6.9	6.3
S-E	9.9	9.0
E-S	9.9	9.0

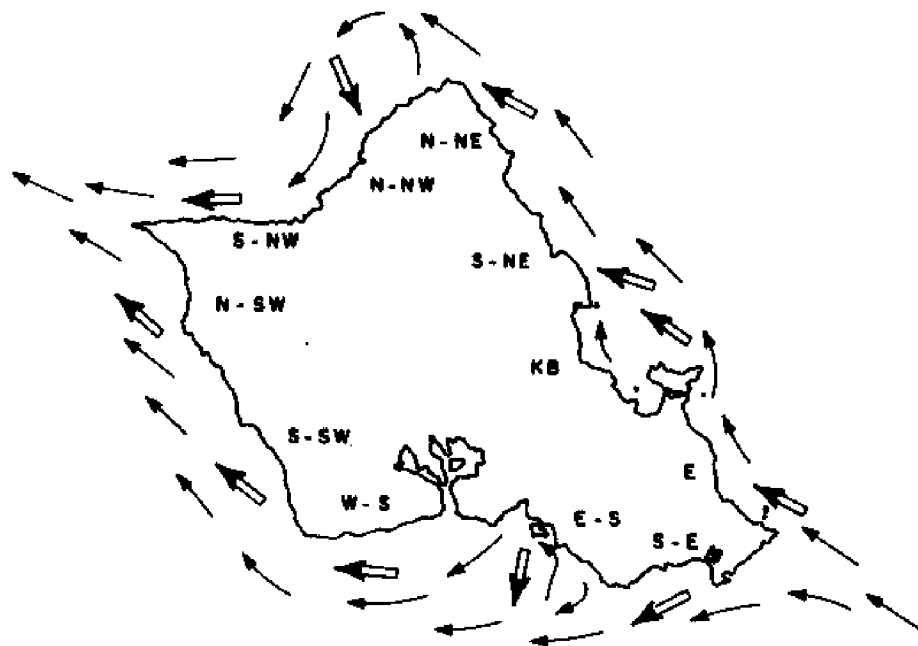
SECTOR	CURRENT SPEED (cm/sec)	WIND SPEED (knots)
W-S	9.9	9.0
S-SW	9.9	9.0
N-SW	9.9	9.0
S-NW	7.1	6.5
N-NW	7.1	6.5

Figure 30. Wind-driven flow

# GEOSTROPHIC FLOW

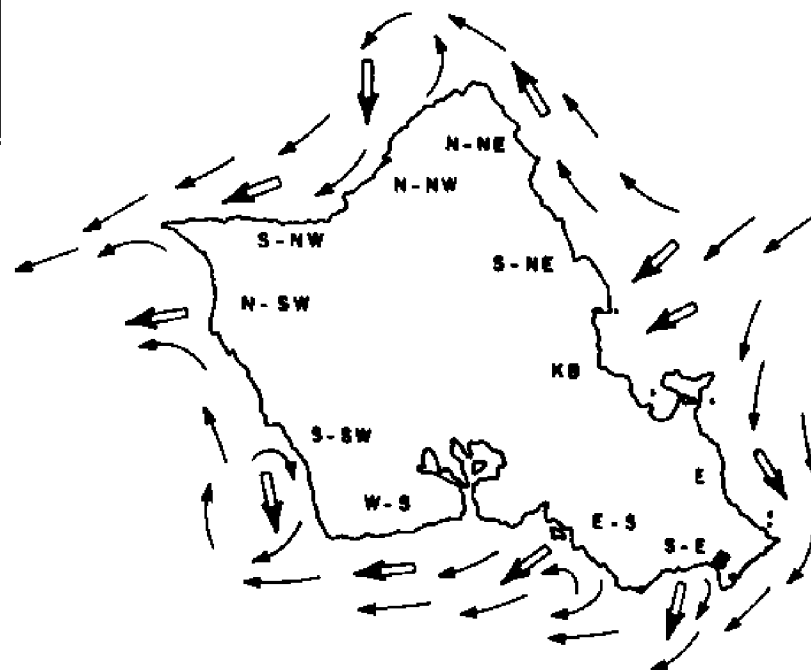
(Surface to Approximately 120m)

## TRADEWIND SEASON



CHARACTERISTIC CURRENT SPEEDS		CURRENT SPEEDS	
SECTOR	SPEED (cm/sec)	SECTOR	SPEED (cm/sec)
N-NE	7.5	W-S	8.2
S-NE	7.9	S-SW	3.0
KB	7.4	N-SW	4.9
E	5.7	S-NW	9.6
S-E	9.7	N-NW	11.9
E-S	12.3		

## KONA WIND SEASON



CHARACTERISTIC CURRENT SPEEDS		CURRENT SPEEDS	
SECTOR	SPEED (cm/sec)	SECTOR	SPEED (cm/sec)
N-NE	7.1	W-S	8.6
S-NE	5.3	S-SW	6.6
KB	4.3	N-SW	6.7
E	12.9	S-NW	5.4
S-E	7.0	N-NW	7.0
E-S	10.2		

Figure 31. Geostrophic flow



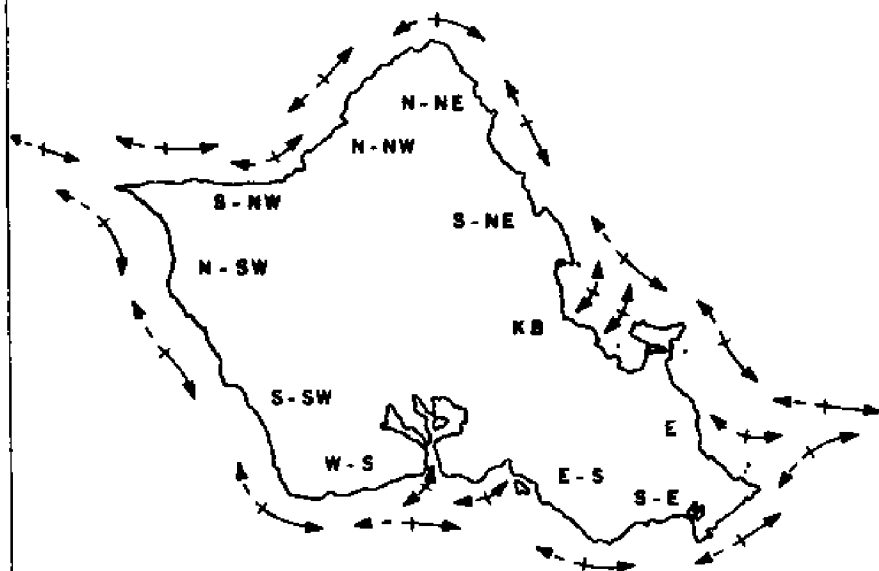
# TIDAL FLOW

(Throughout Water Column)

## DIURNAL TIDES

(2 to 4 cm/hr)

LEGEND:  
EBB      FLOOD  
← - - - →

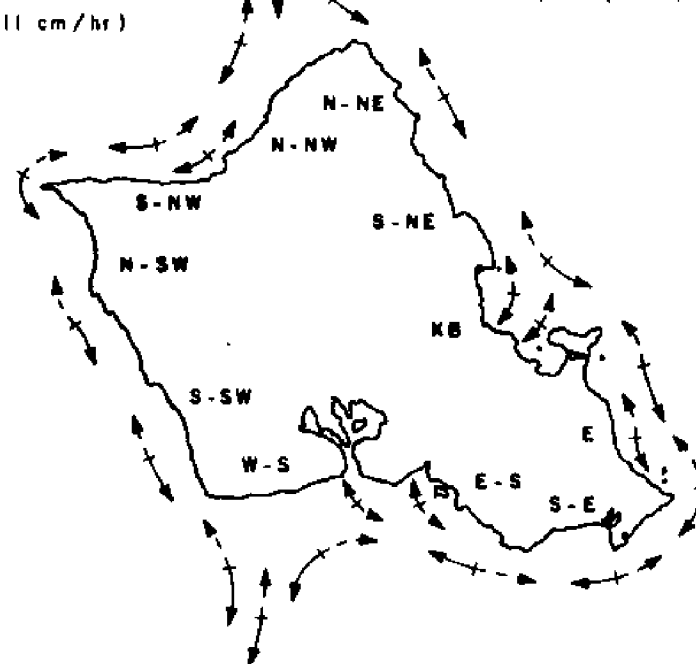


SECTOR	CHARACTERISTIC SPEED (cm/sec)	SECTOR	CURRENT SPEEDS (cm/sec)
N-NE	10 - 25	PH	3 - 8
S-NE	10 - 15	W-S	5 - 15
KB	5 - 15	S-SW	10 - 20
E	10 - 15	N-SW	10 - 20
S-E	15 - 30	S-NW	5 - 15
E-S	5 - 15	N-NW	5 - 15
KL	3 - 12		

## SEMIDIURNAL TIDES

(5 to 11 cm/hr)

LEGEND:  
EBB      FLOOD  
← - - - →



SECTOR	CHARACTERISTIC SPEED (cm/sec)	SECTOR	CURRENT SPEEDS (cm/sec)
N-NE	15 - 30	PH	5 - 10
S-NE	15 - 25	W-S	10 - 15
KB	5 - 20	S-SW	20 - 30
E	15 - 25	N-SW	15 - 50
S-E	25 - 50	S-NW	15 - 20
E-S	10 - 25	N-NW	15 - 25
KL	5 - 15		

Figure 32. Diurnal and semidiurnal tidal flows



## TIDAL CURRENT ELLIPSES



# TIDAL CURRENT ELLIPSES

from Wyrki et al (3)

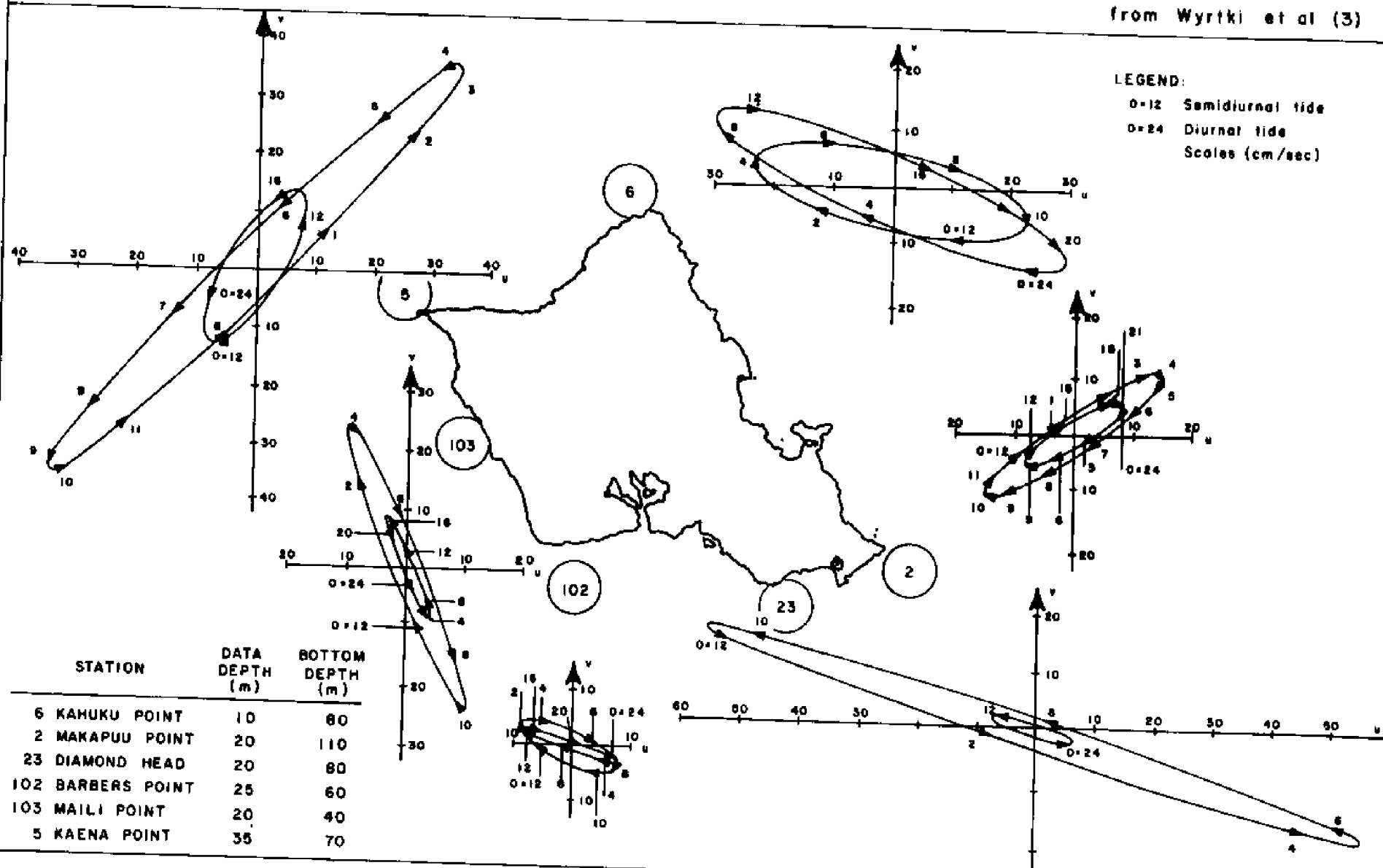


Figure 33. Tidal current ellipses



## EXAMPLE OF COMBINED RESULTS





# EXAMPLE OF COMBINED RESULTS: Geostrophic Flow, Wind-Driven Flow, Semidiurnal and Diurnal Tidal Flow W - S Sector, Average Trades

## PROBLEM:

Estimate the direction and speed of the surface current in May at a location southeast of Barbours Point during typical trade-wind conditions, four hours into a mixed flooding tide.

Also estimate the importance of the geostrophic, wind-driven, and tidal components at this location and time.

### 1. Estimate the Geostrophic Component

A. Vectorially determine a depth averaged wind drift vector from the theoretical Ekman vertical profile for the average wind condition for the sector in question.

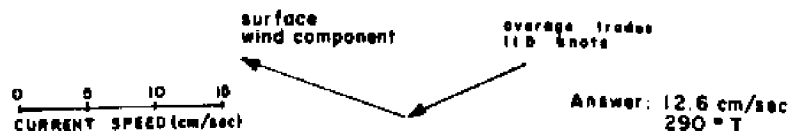


B. Vectorially subtract this net wind drift vector from the given atlas net drift\* to obtain an estimate of the geostrophic component.†



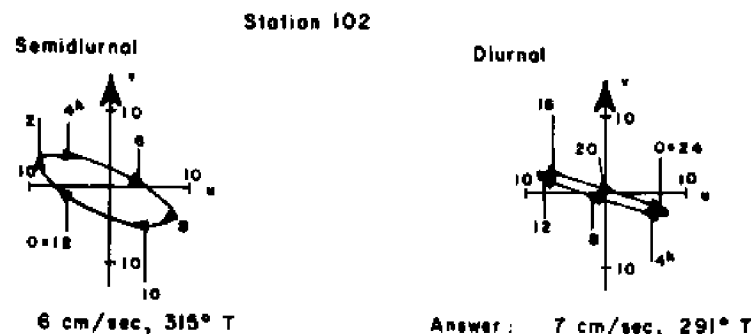
### 2. Estimate the Wind - Driven Component

Calculate the wind-driven component for the desired wind condition and depth. In this example choose the surface ( $0^m$ ) Ekman component for average trade conditions, obtained in 1-A above.



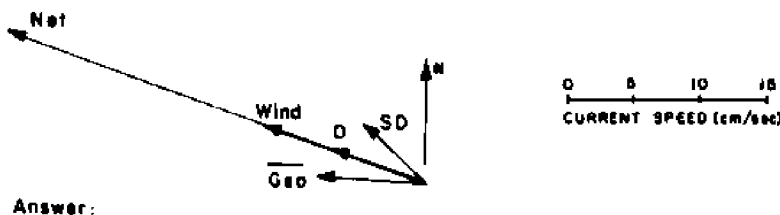
### 3. Estimate the Tidal Components

Using the tidal ellipse map, select the applicable station in the sector in question and choose the required tidal components for the time of interest. Determine the flood and ebb directions for the sector from the circulation result map and circulation component map on tidal flows.



### 4. Estimate the Net Current Direction and Speed

Vectorially add all components; geostrophic (Geo), wind-driven (wind), semidiurnal tide (SD), and diurnal tide (D).#



Answer:

$$\text{Net} = \overline{\text{Geo}}(\text{trade season}) + \text{Wind}(0^m, \text{average trades}) + \text{SD tide}(4^h) + \text{D tide}(16^h) = 33 \text{ cm/sec}, 290^\circ \text{ T}$$

\* Net drift vectors per sector per season are given in circulation results by sector maps.

† Average geostrophic components per sector per season are also given in "Circulation Component Map -- Geostrophic Flow".

# Radiographs for the combined geostrophic and wind-driven flow for average winds are given per sector per wind condition in "Vertical Profiles of Currents".

Figure 34. Example of combined results

## APPENDICES



## Explanation for Tables

A listing of the published data used for this atlas is given in this section. Data source reference number, title, author, date of work, methodology used, depth (at which data were taken), resultant presentation, station number and/or location, prevailing (meteorologic-oceanographic) conditions, and comments.

The information included in the annotated description of the data by each subject heading is as follows:

### Data source reference number

The data entries were numbered in the order that they were compiled and used. The first number in the set refers to an identification reference which may be found in the list of references and the second to the sequentially numbered entry of this reference.

Example:

Data Source Reference Number  
3-05  
└───┬───┘  
reference number 5th entry of  
                  this reference

### Title

The title of the data source is given in this column.

### Author

The author(s) of the data source is given in the second column.

### Date of work

This refers to the dates during which the data were taken (not the publication date).

### Methodology

The method by which the data were taken as reported is given. Where known, the manufacturer of the equipment used is indicated in parenthesis.

### Depth

This refers to the depth(s) at which the data were taken. The total water depth is indicated in parenthesis.

Example:

### Depth

50,100(3,000)'

Data taken at station depths of 50 and 100 ft; total water depth of 3,000 ft.

### Resultant presentation

The information in this column gives the methodology or format of the reduced data as reported in the reference and as transferred to the data maps. Brief explanatory remarks on methodology are given in the preceeding section of this atlas.

### Station number and location

The station number given is that number used in the respective reference. The approximate location pertains to the one mentioned in the respective reference also.

### Prevailing conditions

Any prevailing wind, tidal, sea-state, weather, or anomolous condition as reported in the reference is given. Where no winds were reported, the daily average at Honolulu International Airport is given as taken from *Local Climatological Data*, NOAA monthly reports (indicated as "Honolulu average"). Other comments necessary for clarification are also given.

# Appendix A. Annotated Description of Data

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
N-NW SECTOR, HALEIWA TO KAHUKU POINT								
26-01	Study of Coastal Currents to Determine Suitability of Drainage Channel Relocation Site for Kahuku Land Development Progress Report	Sunn, Low, Tom & Hara	10/28/68	Rhodamine-B dye	Mix	Graphical presentation on map	/Turtle Bay	Winds moderate (trades) High surf (6 to 10')
26-02	"	"	10/28/68	Rhodamine-B dye	Mix	Graphical presentation on map	/Turtle Bay	Winds moderate (trades) High surf (6 to 10')
26-03	"	"	12/12/68	Rhodamine-B dye	Mix	Graphical presentation on map	/Turtle Bay	Winds strong (trades) Medium surf
S-NW SECTOR, KAENA POINT TO HALEIWA								
3-06	Current Observations in the Hawaiian Archipelago	K. Wyrtki, V. Graefe, W. Patzert	04/26/66 to 05/17/66	Paddle wheel current meter (Hydrowerkstätten)	115(230)'	Net transport vector Progressive vector diagram Velocity and direction frequency distributions	S/Kaena Point	Winds moderate (NE) to moderate (SW), (Honolulu, average)
3-07	"	"	09/20/66 to 10/07/66	Paddle wheel current meter (Hydrowerkstätten)	33(260)'	Net transport vector Progressive vector diagram Velocity and direction frequency distributions	11/Kaena Point	Winds variable
4-06	Oceanographic Observations During 1965-1967 in the Hawaiian Archipelago	K. Wyrtki, J. Burks, R. Latham, W. Patzert	04/04/66 to 04/06/66	Parachute drogue	--	Vector diagram	/North of Kaena Point	Tidal information in tables Winds moderate (NE), (Honolulu, average)
5-01	Coastal Currents and Sewage Disposal in the Hawaiian Islands	T. Laevastu, D. Avery, D. Cox	01/03/63 to 01/04/63	Drogue (home-made cross)	--	Vector diagram	/West of Kaena Point	Winds moderate (NNW-ENE), (Honolulu, average)
24-01	Maialua Bay Pollution Study, Haleiwa, Oahu	Belt, Collins, and Associates Ltd.	10/04/61	Drogue and dye	Surface (dye) 2,6,12' (drogue)	Net transport vectors	/Maialua Bay	Winds weak (NE) Flood tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
24-02	Maialua Bay Pollution Study, Haleiwa, Oahu	Belt, Collins, and Associates Ltd.	10/04/61	Drogue and dye	Surface (dye) 2, 6, 12' (drogue)	Net transport vectors	/Maialua Bay	Winds weak (NE) Ebb tide
24-03	"	"	12/06/61	Drogue and dye	2, 6'	Net transport vectors	/Maialua Bay	Winds moderate (S) Flood tide
24-04	"	"	12/06/61	Drogue and dye	2, 6'	Net transport vectors	/Maialua Bay	Winds moderate (S) Ebb tide
25-01	Kaiaika Bay Small Boat Harbor: Preliminary Engineering and Feasibility Study	Belt, Collins, and Associates Ltd.	12/04/61	Floaters	Surface	Net transport vectors	/Kaiaika Bay	Winds weak (S)
N-SW SECTOR, KANEILIO POINT TO KAENA POINT								
3-05	Current Observations in the Hawaiian Archipelago	K. Wyrski, W. Graefe, W. Patzert	04/03/68 to 04/29/68	Current meter (Geodyne Film recording)	100(3000)'	Net transport vector Progressive vector diagram Velocity and direction frequency distribution	201/West of Oahu	---
8-01	Report on Ocean Survey and Study Relative to Sewage Disposal for Waianae	Sunn, Low, Tom & Horn	01/07/62	Drift bottles and cards	Surface	Positions on map	/West of Pokai Bay	Winds moderate (kona) Comments: Cruise XV made immediately after peak of Kona storm
8-02	"	"	01/21/62	Drift bottles and cards	Surface	Positions on map	/West of Pokai Bay	Winds strong (kona) Comments: Cruise XIV made immediately before peak of Kona storm
8-03	"	"	02/25/61	Drogue (home-made)	6-8', surface	Positions on map	/West of Pokai Bay	Winds moderate (trades) Comments: Cruise II
8-06	"	"	03/18/61	Drogue	6-8', surface	Positions on map	/Lahilahi Point area	Winds weak (trades) Shift to strong in PM Comments: Cruise III
8-07	"	"	03/18/61	Drift bottles	Surface	Positions on map	/Lahilahi Point area	Winds weak (trades) Shift to strong in PM Comments: Cruise III
8-08	"	"	04/15/61	Drogue (self-made)	6-8', deep	Diagram on map Tidal correlation vectors	/Off Kaneilio Point	Winds weak (SW) Comments: Cruise V

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
8-09	Report on Ocean Survey and Study Relative to Sewage Disposal for Maianae	Sunn, Low, Tom & Hara	04/15/61	Drogue (self-made)	6-8', deep	Diagram on map Tidal correlation vectors	/Off Kaneohe Point	Winds weak (SW) Comments: Cruise V
8-10	"	"	05/20/61	Drogue (self-made)	6-8'	Diagram on map Tidal correlation vectors	/Off Kaneohe Point	Winds weak (E-NE) to strong (E-NE) PM Comments: Cruise VII
8-11	"	"	06/17/61 to 06/18/61	Drogue (self-made)	6-8'	Diagram on map Tidal correlation vectors	/Off Kaneohe Point	Winds moderate (trades) Comments: Cruise IX
8-12	"	"	07/15/61	Drift bottles	Surface	Positions on map	/Lahilahi Point area	Winds moderate (trades) Comments: Cruise X. No bottles reached beach
8-13	"	"	07/15/61	Drogue (self-made)	6-8'	Diagram on map Tidal correlation vectors	/Lahilahi Point area	Winds moderate (trades) Comments: Cruise X
8-14	"	"	09/30/61	Drifters	Surface	Positions on map	/Pohai Bay area	Winds weak (NW) shifting to (SW) Comments: Cruise XII
8-15	"	"	09/30/61	Drogue (self-made)	6-8'	Diagram on map Tidal correlation vectors	/Pohai Bay area	Winds weak (NW) shifting to (SW) Comments: Cruise XII
8-16	"	"	12/02/61	Drogue (self-made)	6-8'	Diagram on map Tidal correlation vectors	/Pohai Bay area	Winds moderate (trades) Comments: Cruise XIII
8-17	"	"	03/07/62	Drogue (self-made)	6-8'	Diagram on map Tidal correlation vectors	/Pohai Bay area	Winds weak (trades) early AM, shift to moderate (SE) late AM and PM
8-18	"	"	03/07/62	Dye	Surface	Positions on map	/Pohai Bay area	Winds weak (trades) early AM, shift to moderate (SE) late AM and PM
27-01	Kaneohe Point Small Boat Harbor, Preliminary Engineering and Feasibility Study	Belt, Collins, and Associates Ltd.	10/31/61	Dye, drogues	2, 6, surface	Positions on map	/East of Kaneohe Point	Winds moderate (S) Flood tide
27-02	"	"	11/21/61	Dye, drogues	2, 6, surface	Positions on map	/East of Kaneohe Point	Winds moderate (E) Ebb tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
30-01	Draft Environmental Impact Statement, Waianae Light Draft Harbor Construction	U.S. Army Corps of Engineers	09/04/74	Unknown	Surface, bottom	Vectors on map	/North of Pokai Bay	Winds weak (NW), (Honolulu, average)
30-02	"	"	08/15/74	Drogue	--	Vectors on map	/North of Pokai Bay	Winds moderate (NE), (Honolulu, average)
30-03	"	"	08/15/74	Drogue	--	Vectors on map	/North of Pokai Bay	Winds moderate (NE), (Honolulu, average)
30-04	"	"	02/03/75	Drogue	1(5) m	Vectors on map	/North of Pokai Bay	Winds moderate to strong (NW), (Honolulu, average)
S-SW SECTOR, BARBERS POINT TO KANEILO POINT								
1-24	Water Quality Program for Oahu with Special Emphasis on Waste Disposal	Engineering Science, Sunn, Low, Tom & Hara, Billingham Corporation	08/13/70 to 09/01/70	Integrating current meter (University of Hawaii)	19(60)'	Directional distribution of velocity Net transport vector	H/Kahe Point	--
3-02	Current Observations in the Hawaiian Archipelago	K. Wyrski, V. Graefe, W. Patzert	04/04/68 to 04/26/68	Current meter (Geodyne Film recording)	99(396)'	Net transport vector Progressive vector diagram Velocity and direction frequency distributions	203/Barbers Point	--
3-03	"	"	04/03/68 to 04/29/68	Current meter (Geodyne magnetic tape)	66(165)'	Net transport vector Progressive vector diagram Velocity and direction frequency distributions	107/Maile Point	--
3-04	"	"	11/16/67 to 12/13/67	Current meter (Geodyne magnetic tape)	66(132)'	Net transport vector Progressive vector diagram Velocity and direction frequency distributions	103/Maile Point	--



Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
4-04	Oceanographic Observations During 1965-1967 in the Hawaiian Archipelago	K. Myrski, J. Burks, R. Latham, W. Patzert	09/28/65 to 09/30/65	Parachute drogue	--	Vector diagram	/Off Barbers Point	Tidal information in tables Winds moderate (SE-NE), (Honolulu, average)
4-05	"	"	09/28/65 to 09/30/65	Parachute drogue	--	Vector diagram	/Off Barbers Point	Tidal information in tables Winds moderate (SE-NE), (Honolulu, average)
5-07	Coastal Currents and Sewage Disposal in the Hawaiian Islands	T. Laavasto, D. Avery, D. Cox	04/09/63	Drogue (home-made cross)	--	Vector diagrams	/Northwest of Barbers Point	Winds weak (N), (Honolulu, average)
5-08	"	"	07/09/63	Drogue (home-made cross)	--	Vector diagrams	/Northwest of Barbers Point	Winds moderate (ENE), (Honolulu, average)
7-01	An Investigation of Oceanographic and Bathymetric Conditions North of Barbers Point	CONOCO-Dillingham Corporation	09/24/71 to 11/09/71	Ducted current meter (Marine Advisor's Q-15)	19,67(240)'	Chart reduced to directional histogram	/West of Barbers Point	Winds moderate (E)
7-02	"	"	09/24/71 to 11/09/71	Geomagnetic, bidirectional current meter (Marine Advisor's Q-15)	75(75)'	Chart reduced to directional histogram	/West of Barbers Point	Winds moderate (E)
21-01	An Examination of the Oceanographic Conditions Existing Along the West Ewa Beach Coastline	K. Bathen	02/12/72 to 02/24/72	Current meter (General Oceanics 2010)	30(68)'	Velocity and direction frequency distributions Net transport vectors	/Offshore - West of Barbers Point	Winds moderate (trades), (Honolulu, average)
21-02	"	"	03/26/72 to 04/24/72	Current meter (General Oceanics 2010)	30(68)'	Velocity and direction frequency distributions Net transport vectors	/Offshore - West of Barbers Point	Winds weak (kona), (Honolulu, average)
21-03	"	"	06/11/72 to 06/18/72	Current meter (General Oceanics 2010)	30(68)'	Velocity and direction frequency distributions Net transport vectors	/Offshore - West of Barbers Point	Winds moderate (trades), (Honolulu, average)

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
21-04	An Examination of the Oceanographic Conditions Existing Along the West Ewa Beach Coastline	K. Bathen	06/11/72 to 07/09/72	Current meter (General Oceanics 2010)	MI(98)'	Velocity and direction frequency distributions Net transport vectors	/Offshore - West of Barbers Point	Winds moderate to strong (trades), (Honolulu, average)
28-01	Barbers Point Environmental Impact Statement	CONOCO-Dillingham Corporation	02/05/72	Drogue	0,0,42'	---	/Offshore - West of Barbers Point	Winds moderate (W), (Honolulu, average) Moderate flood tide
28-02	"	"	02/09/72	Drogue	1'	Net transport vectors	/Offshore - West of Barbers Point	Winds moderate (ENE), (Honolulu, average) Weak flood tide
28-03	"	"	02/09/72	Drogue	1,24,42'	Net transport vectors	/Offshore - West of Barbers Point	Winds moderate (ENE), (Honolulu, average) Weak ebb tide All depths indicate same movement
28-04	"	"	04/26/72	Drogue	0,12'	Net transport vectors	/Offshore - West of Barbers Point	Winds moderate (ENE), (Honolulu, average) Strong flood tide
28-05	"	"	04/26/72	Drogue	0,0,12,0'	Drogue paths on map	/Offshore - West of Barbers Point	Winds moderate (ENE), (Honolulu, average) Slack high water
28-06	"	"	04/27/72	Drogue	0,6,0,18,0'	Drogue paths on map	/Offshore - West of Barbers Point	Winds moderate (ENE), (Honolulu, average) Slack low water
28-07	"	"	04/27/72	Drogue	0,12,18,0'	Drogue paths on map	/Offshore - West of Barbers Point	Winds moderate (ENE), (Honolulu, average) Strong flood tide
28-08	"	"	04/27/72	Drogue	0,6,12,18'	Drogue paths on map	/Offshore - West of Barbers Point	Winds moderate (ENE), (Honolulu, average) Strong flood tide
28-09	"	"	04/27/72	Drogue	0,6,12,18'	Drogue paths on map	/Offshore - West of Barbers Point	Slack high water
28-10	"	"	04/28/72	Drogue	12,36,56'	Drogue paths on map	/Offshore - West of Barbers Point	Winds moderate (ENE), (Honolulu, average) Strong flood tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
W-S SECTOR, PEARL HARBOR TO BARBERS POINT								
1-01	Water Quality Program for Oahu with Special Emphasis on Waste Disposal, Work Areas 6 and 7, Part 1	Engineering Science, Sunn, Low, Tom & Hara, Dillingham Corporation	08/13/70 to 09/01/70	Current meter (Hydro Products 502)	40(70)'	Velocity and direction frequency distributions Net transport vectors Progressive vector diagrams	G/Barbers Point	---
1-02	"	"	11/04/70 to 11/13/70	Current meter (Hydro Products 502)	200(300)'	Velocity and direction frequency distributions Net transport vectors Progressive vector diagrams Directional distribution of velocity	H/Ewa Beach	---
1-15	"	"	07/05/63 to 07/06/63	Current meter (Hydro Products 502)	42(79)'	Velocity and direction frequency distribution Progressive vector diagrams Net transport vectors	14/East of Barbers Point	Winds moderate (ENE), (Honolulu, average)
1-16	"	"	07/03/63 to 07/17/63	Current meter (Hydro Products 502)	80(120)'	Velocity and direction frequency distribution Progressive vector diagram	12/West of Pearl Harbor entrance	Winds moderate (ENE), (Honolulu, average)
1-25	"	"	08/13/70 to 09/19/70	Integrating current meter (University of Hawaii)	20(60)'	Directional distribution of velocity Net transport vector	F/Ewa Beach	---
1-26	"	"	07/22/70 to 08/10/70	Integrating current meter (University of Hawaii)	35(48)'	Directional distribution of velocity Net transport vector	B/Pearl Harbor	---
1-37	"	"	10/70	Integrating current meter (University of Hawaii)	20(70)'	Net transport vector	G/Barbers Point	---

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
3-01	Current Observations in the Hawaiian Archipelago	K. Wyrski, V. Graefe, W. Patzert	11/13/67 to 12/20/67	Current meter (Geodyne magnetic tape)	250(60) m	Net transport vector Progressive vector diagram Velocity and direction frequency distributions	102/Barbers Point	---
1-60	Water Quality Program for Oahu with Special Emphasis on Waste Disposal	Engineering Science, Sunn, Low, Tom & Harn, Dillingham Corporation	07/70	Drift cards	Bottom	Beginning and end points located on map	/Puuloa Beach	---
1-61	"	"	07/70	Drift cards	Bottom	Beginning and end points located on map	/Puuloa Beach	---
1-71	"	"	09/70	Drift cards	Surface	Beginning and end points located on map	/Pearl Harbor entrance	---
4-07	Oceanographic Observations During 1965-1967 in the Hawaiian Archipelago	K. Wyrski, J. Burks, R. Latham, W. Patzert	09/24/65 to 09/26/65	Parachute drogues	---	Drift paths	/South of Barbers Point	Some tidal information from tables Winds moderate to weak (SE-SW), (Honolulu, average)
5-13	Coastal Currents and Sewage Disposal in the Hawaiian Islands	T. Laevastu, D. Avery, D. Cox	04/08/63	Drogue (home-made cross)	1,2,3,4 m in different depths	Vector diagrams	/South of Barbers Point to Ewa Beach	Winds moderate (NE), (Honolulu, average)
5-14	"	"	07/05/63 to 07/06/63	Paddle wheel current meter	42(79)'	Tidal correlation vectors	14/East of Barbers Point	Winds moderate (ENE-E), (Honolulu, average)
6-01	Results of Circulation Measurements Taken During August 1972 to May 1973 in the Area Between Barbers Point and the Entrance to Pearl Harbor	K. Bathen	08/03/73	Drogue	6(18-30)'	Drift paths	/South of Ewa Beach	Winds moderate (N-NE) Ebbing tide
6-02	"	"	08/03/73	Drogue	6(60-90)'	Drift paths	/South of Ewa Beach	Winds moderate (N-NE) Ebbing tide
6-03	"	"	08/03/73	Drogue	66(60-90)'	Drift paths	/South of Ewa Beach	Winds moderate (N-NE) Ebbing tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
6-04	Results of Circulation Measurements Taken During August 1972 to May 1973 in the Area Between Barbers Point and the Entrance to Pearl Harbor	K. Bathen	08/03/73	Drogue	6,66,200(70-300)'	Drift paths	/South of Ewa Beach	Winds moderate (N-NE) Ebbing tide
6-05	"	"	08/03/73	Drogue	6,66(90-700)'	Drift paths	/South of Ewa Beach	Winds moderate (N-NE) Ebbing tide
6-06	"	"	08/73	Current meter (Hydro Products 502)	30,105,230(290)'	Tidal correlation vectors	4/South of Ewa Beach	Winds moderate (E-NE)
6-07	"	"	08/73	Current meter (Hydro Products 502)	64(70)'	Tidal correlation vectors	3/South of Ewa Beach	Winds moderate (E-NE)
6-08	"	"	08/73	Current meter (Hydro Products 502)	30,108,176(200)'	Tidal correlation vectors	2/South of Puuloa	Winds moderate (E-NE)
6-09	"	"	08/73	Current meter (Hydro Products 502)	70,110(200)'	Tidal correlation vectors	1/South of Pearl Harbor entrance	Winds moderate (E-NE)
6-10	"	"	08/73	Current meter (Hydro Products 502)	110'(bottom) 70'(mid)	Velocity and direction frequency distribution	1/South of Pearl Harbor entrance	Winds moderate (E-NE)
6-11	"	"	08/73	Current meter (Hydro Products 502)	176'(bottom) 100'(mid) 30'(surface)	Velocity and direction frequency distribution	2/South of Puuloa Beach	Winds moderate (E-NE)
6-12	"	"	08/73	Current meter (Hydro Products 502)	64'(mid)	Velocity and direction frequency distribution	3/South of Ewa Beach	Winds moderate (E-NE)
6-13	"	"	08/73	Current meter (Hydro Products 502)	230'(bottom) 105'(mid) 30'(surface)	Velocity and direction frequency distribution	4/South of Ewa Beach (offshore)	Winds moderate (E-NE)
6-14	"	"	08/03/73	Drogue (home-made cross)	6(30)'	Sight locations on map	/Off Puuloa Beach	Winds moderate (N-NE) Flood tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
6-15	Results of Circulation Measurements Taken During August 1972 to May 1973 in the Area Between Barbers Point and the Entrance to Pearl Harbor	K. Ratten	08/03/73	Drogue (home-made cross)	6(90)'	Sight locations on map	/Off Puuloa Beach	Winds moderate (N-NE) Flood tide
6-16	"	"	08/03/73	Drogue (home-made cross)	66(90)'	Sight locations on map	/Off Puuloa Beach	Winds moderate (N-NE) Flood tide
6-17	"	"	08/03/73	Drogue (home-made cross)	6(450-200)'	Sight locations on map	/Off Puuloa Beach	Winds moderate (N-NE) Flood tide
6-18	"	"	08/03/73	Drogue (home-made cross)	66(450-120)'	Sight locations on map	/Off Puuloa Beach	Winds moderate (N-NE) Flood tide
6-19	"	"	08/03/73	Drogue (home-made cross)	200(450-90)'	Sight locations on map	/Off Puuloa Beach	Winds moderate (N-NE) Flood tide
6-20	"	"	08/03/73	Drogue (home-made cross)	6(800-90)'	Sight locations on map	/Off Puuloa Beach	Winds moderate (N-NE) Flood tide
6-21	"	"	08/03/73	Drogue (home-made cross)	66(800-120)'	Sight locations on map	/Off Puuloa Beach	Winds moderate (N-NE) Flood tide
6-22	"	"	07/05/63 to 07/06/63	Current meter (General Oceanics)	45(80)'	Progressive vector diagram	8/Off Puuloa	Winds moderate (N-NE) Flood tide
6-24	"	"	05/21/73 to 05/22/73	Current meter (General Oceanics)	30(186)' 108(186)' 176(186)'	Tidal correlation vectors Velocity and direction frequency distributions	2/Off Ewa Beach	Winds moderate (E-NE)
6-25	"	"	05/21/73 to 05/22/73	Current meter (General Oceanics)	30(240)' 130(240)' 230(240)'	Tidal correlation vectors Velocity and direction frequency distributions	4/Off Ewa Beach	Winds moderate (E-NE)
6-26	"	"	12/16/72 to 12/17/72	Current meter (General Oceanics)	30(120)' 70(120)' 110(120)'	Tidal correlation vectors Velocity and direction frequency distributions	1/Off Pearl Harbor entrance	Winds moderate (S-SW)

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
6-27	Results of Circulation Measurements Taken During August 1972 to May 1973 in the Area Between Barber's Point and the Entrance to Pearl Harbor	K. Rathen	01/28/73 to 01/29/73	Current meter (General Oceanics)	108(186)' 176(186)'	Tidal correlation vectors Velocity and direction frequency distributions Progressive vector diagrams	2/Off Puuloa Beach	Winds strong (NE)
6-28	"	"	12/16/72 to 12/17/72	Current meter (General Oceanics)	30(110)' 64(110)' 98(110)'	Tidal correlation vectors Velocity and direction frequency distributions	3/Off Ewa Beach	Winds moderate (S-SW)
5-50	Coastal Currents and Sewage Disposal in the Hawaiian Islands	T. Laevastu, U. Avery, D. Cox	12/15/62	Drogue (home-made cross)	1,5(37) m	Vector diagram	23/Off Ewa Beach	Winds moderate (E), (Honolulu, average) Ebb tide
5-51	"	"	12/15/62	Drogue (home-made cross)	1,5(91) m	Vector diagram	24/Off Ewa Beach	Winds moderate (E), (Honolulu, average) Flood tide
5-53	"	"	04/10/63	Drogue (home-made cross)	5(15) m 5(42) m	Vector diagram	47/Off Pearl Harbor entrance	Winds moderate (SE)
31-01	Dispersion Study of Effluent from the Proposed Pearl Harbor Sewage Treatment Plant Outfall	Sunn, Low, Tom & Ilara	05/06/67	Dye	Surface	Dispersal on map	/Off Old Kam Wharf	Comments: Good environmental data
31-02	"	"	05/19/67	Dye	Surface	Dispersal on map	/Off Old Kam Wharf	Comments: Good environmental data. (Strong correlation with wind conditions)
31-03	"	"	05/20/67	Dye	Surface	Dispersal on map	/Off Old Kam Wharf	Comments: Good environmental data. (Strong correlation with wind conditions)
31-04	"	"	08/15/67	Dye	Surface	Dispersal on map	/Off Old Kam Wharf	Comments: Good environmental data. (Strong correlation with wind conditions)

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
PH SECTOR, PEARL HARBOR								
13-01	Current Measurements in Pearl Harbor	K. Bathen	07/05/72 to 08/04/72	Current meter (Hydro Products S02)	20(44)'	Velocity and direction frequency distributions Net transport vector	/Bishop Point	Winds strong (NE), (Honolulu, average)
13-02	"	"	07/06/72 to 07/15/72	Current meter (Hydro Products S02)	20(45)'	Velocity and direction frequency distributions Net transport vector	/South of Ford Island	Winds strong (NE), (Honolulu, average)
14-01	Comments on Circulation, Stratification and Sediment Quality in West Loch, Pearl Harbor Pertinent to the Proposed Honolulu Waste Water Treatment System Interceptor Line	K. Bathen	---	---	---	---	/West Loch	Comments: Generalized current patterns effective during trade conditions
15-01	Survey of the Distribution of the Eggs and Larvae of the Nehu in Pearl Harbor, Hawaii	D. Au	06/01/63	Caruthers current cone	0,5,15,35,50(50)'	Chart Tidal correlation vectors	42/Entrance channel to Pearl Harbor	Winds moderate (ENE) Flood tide
15-02	"	"	05/19/63	Caruthers current cone	5,20,40,50(50)'	Chart Tidal correlation vectors	42/Entrance channel to Pearl Harbor	Winds moderate (ENE) Flood tide
15-03	"	"	05/19/63	Caruthers current cone	0,5,10,15,35,50(50)'	Chart Tidal correlation vectors	42/Entrance channel to Pearl Harbor	Winds moderate (ENE) Ebb tide
15-04	"	"	05/21/63	Caruthers current cone	0,5,15,35,50(50)'	Chart Tidal correlation vectors	42/Entrance channel to Pearl Harbor	Winds moderate (ENE) Flood tide
33-01	Pearl Harbor Circulation, Data Report	Sea-Test	10/10/72	Drogue	1,18'	Times and positions on map	/Lower main entrance	Winds weak (S) Ebb tide (low, slack)
33-02	"	"	10/10/72	Drogue	1,18'	Times and positions on map	/Fork between West Loch and upper main channel	Winds weak (S) Ebb tide (low, slack)
33-03	"	"	10/10/72	Drogue	1,18'	Times and positions on map	/Between Ford Island and Naipio Peninsula	Winds weak (S) Ebb tide (low, slack)



Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
33-04	Pearl Harbor Circulation, Data Report	Sea-Test	10/10/72	Drogue	1,18'	Times and positions on map	/In channel east of Ford Island	Winds weak (S) Ebb tide (low, slack)
33-05	"	"	10/10/72	Drogue	1,18'	Times and positions on map	/Channel north of Ford Island	Winds weak (S) Ebb tide (low, slack)
33-06	"	"	09/26/72	Drogue	1,18'	Times and positions on map	/Middle Loch entrance channel	Winds moderate (trades) Ebb tide
33-07	"	"	03/06/73	Drogue	1'	Times and positions on map	/Upper main entrance	Winds strong (trades) Flood tide
33-08	"	"	03/06/73	Drogue	1,24'	Times and positions on map	/East section of East Loch	Winds strong (trades) Flood tide
33-09	"	"	03/06/73	Drogue	1,8,24'	Times and positions on map	/Middle Loch	Winds strong (trades) Flood tide
33-10	"	"	03/06/73	Drogue	1,20'	Times and positions on map	/Middle Loch	Winds strong (trades) Flood tide
33-11	"	"	12/21/72	Drogue	1,24'	Times and positions on map	/Main entrance	Winds moderate (trades) Ebb tide
33-12	"	"	12/21/72	Drogue	1,24'	Times and positions on map	/Upper main entrance	Winds moderate (trades) Ebb tide
33-13	"	"	12/21/72	Drogue	1,24'	Times and positions on map	/East portion of East Loch	Winds moderate (trades) Ebb tide
33-14	"	"	12/21/72	Drogue	1,24'	Times and positions on map	/Channel between Pearl City Peninsula and Ford Island	Winds moderate (trades) Ebb tide
33-15	"	"	12/21/72	Drogue	1,8,24'	Times and positions on map	/Middle Loch	Winds moderate (trades) Ebb tide
33-16	"	"	07/20/72	Drogue	1,24'	Times and positions on map	/West sector of East Loch	Winds weak (NE)
33-17	"	"	07/20/72	Drogue	1/2,24'	Times and positions on map	/East section of East Loch	Winds weak (NE)
33-18	"	"	07/20/72	Drogue	1/2,24'	Times and positions on map	/Middle Loch	Winds weak (NE)

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
KL SECTOR, KEEHI LAGOON								
16-01	Keehi Lagoon Oceanographic Survey	K. Bathen	07/26/68	Current meter (Ekman-Merz)	2,6 m	Vectors on map	/Seaplane runways and Ahua Point	Winds weak (kone) Flood tide
16-02		"	07/27/68	Current meter (Ekman-Merz)	2,6 m	Vectors on map	/Seaplane runways and Ahua Point	Winds moderate (NE) Flood tide
16-03		"	07/26/68	Surface drifters	Surface	Vectors on map	/Seaplane runways and Ahua Point	Winds weak (kone) Flood tide
16-04		"	07/27/68	Surface drifters	Surface	Vectors on map	/Seaplane runways and Ahua Point	Winds moderate (NE) Flood tide
16-05		"	07/22/68	Surface drifters	Surface	Vectors on map	/Seaplane runways and Ahua Point	Winds strong (NE) Ebb tide
16-06		"	07/31/68	Surface drifters	Surface	Vectors on map	/Seaplane runways and Ahua Point	Winds moderate (NE) Ebb tide
16-07		"	07/22/68	Surface drifters	Surface	Vectors on map	/Seaplane runways and Ahua Point	Winds strong (NE) Ebb tide
16-08		"	07/31/68	Surface drifters	Surface	Vectors on map	/Seaplane runways and Ahua Point	Winds moderate (NE) Ebb tide
16-09		"	07/19/68 to 08/05/68	Integrating current meter	None specified	Directional distribution of velocity	/South of Ahua Point	---
16-10		"	07/19/68 to 08/05/68	Integrating current meter	None specified	Directional distribution of velocity	/East of Ahua Point	---
E-S SECTOR, DIAMOND HEAD TO PEARL HARBOR								
1-03	Water Quality Program for Oahu with Special Emphasis on Waste Disposal, Work Areas 6 and 7, Part 1	Engineering Science, Sunn, Low, Tom & Hara, Dillingham Corporation	11/30/70 to 12/11/70	Current meter (Hydro Products 502)	60(120)'	Velocity and direction frequency distributions Progressive vector diagrams Directional distribution of velocity Net transport vector	S/Pearl Harbor entrance	---

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
1-04	Water Quality Program for Oahu with Special Emphasis on Waste Disposal, Work Areas 6 and 7, Part 1	Engineering Science, Sunn, Low, Tom & Hara Dillingham Corporation	06/25/70 to 07/09/70	Current meter (Hydro Products 502)	18(37)'	Velocity and direction frequency distributions Progressive vector diagrams Directional distribution of velocity Net transport vector	A/Sand Island	---
1-05	"	"	07/04/70 to 07/14/70	Current meter (Hydro Products 502)	200(400)'	Velocity and direction frequency distributions Progressive vector diagrams	B/Sand Island	---
1-06	"	"	11/06/70 to 11/23/70	Current meter (Hydro Products 502)	200(400)'	Velocity and direction frequency distributions Progressive vector diagrams Directional distribution of velocity Net transport vector	B/Sand Island	---
1-07	"	"	12/18/70 to 01/04/71	Current meter (Hydro Products 502)	275(400)'	Velocity and direction frequency distributions Progressive vector diagrams Directional distribution of velocity Net transport vector	B/Sand Island	Winds moderate (E-NE), (Honolulu, average)
1-08	"	"	01/22/71 to 02/05/71	Current meter (Hydro Products 502)	275(400)'	Velocity and direction frequency distributions Progressive vector diagrams Directional distribution of velocity	B/Sand Island	Winds moderate (SE), (Honolulu, average)

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
1-109	Water Quality Program for Oahu with Special Emphasis on Waste Disposal, Work Areas 6 and 7, Part 1	Engineering Science, Sunn, Low, Tom & Hara, Dillingham Corporation	07/14/70 to 07/23/70	Current meter (Hydro Products 502)	20(60)'	Velocity and direction frequency distributions Progressive vector diagrams Directional distribution of velocity Net transport vector	0/Waikiki	---
1-17	"	"	07/31/63 to 08/07/63	Current meter (Hydro Products 502)	15(45)'	Velocity and direction frequency distributions Progressive vector diagram	6/Sand Island	Winds moderate (ENE), (Honolulu, average)
1-18	"	"	07/63 to 08/63	Current meter (Hydro Products 502)	---	Directional distribution of velocity	A/Sand Island	Winds moderate (ENE)
1-19	"	"	08/14/63 to 08/20/63	Current meter (Hydro Products 502)	15(42)'	Velocity and direction frequency distributions Progressive vector diagram	4/Kewalo	Winds moderate (ENE), (Honolulu, average)
1-20	"	"	11/09/63 to 11/23/63	Current meter (Hydro Products 502)	15(42)'	Velocity and direction frequency distributions Progressive vector diagram	3/Magic Island	Winds moderate (ENE) to weak (SSE), (Honolulu, average)
1-28	"	"	07/05/70 to 07/14/70	Current meter (Hydro Products 502)	32(40)'	Velocity and direction frequency distributions Progressive vector diagram	3/Magic Island	Winds moderate (ENE) to weak (SSE), (Honolulu, average)
1-29	"	"	08/04/70 to 08/31/70	Current meter (Hydro Products 502)	25(400)'	Directional distribution of velocity Net transport vector	3/Sand Island	---
1-30	"	"	08/04/70 to 08/31/70	Current meter (Hydro Products 502)	275(400)'	Directional distribution of velocity Net transport vector	3/Sand Island	---

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
1-31	Water Quality Program for Oahu with Special Emphasis on Waste Disposal, Work Areas 6 and 7, Part 1	Engineering Science, Sunn, Low, Tom & Hara, Dillingham Corporation	06/20/70 to 07/09/70	Current meter (Hydro Products 502)	35(40)'	Directional distribution of velocity	A/Sand Island	---
1-32	"	"	06/20/70 to 07/09/70	Current meter (Hydro Products 502)	5(40)'	Directional distribution of velocity	A/Sand Island	---
1-33	"	"	09/11/70 to 09/19/70	Current meter (Hydro Products 502)	20(40)'	Directional distribution of velocity Net transport vector	I/Sand Island	---
1-36	"	"	10/70	Current meter (Hydro Products 502)	200(400)'	Net transport vector	B/Sand Island Deep	---
1-38	"	"	09/70	Current meter (Hydro Products 502)	200(400)'	Net transport vector	B/Sand Island Deep	---
1-62	"	"	08/70	Drift cards	Bottom	Positions indicated on map	/Waikiki	---
1-70	"	"	09/70	Drift cards	Bottom	Position indicated on map	/Keehi Lagoon	---
5-06	Coastal Currents and Sewage Disposal in the Hawaiian Islands	T. Laevastu, D. Avery, D. Cox	02/24/63	Drogue (home-made cross)	---	Vector diagram	/Mamala Bay	Winds moderate (ENE), (Honolulu, average)
5-09	"	"	03/03/63	Drogue (home-made cross)	1.5 m	Vector diagram	/Southwest of Diamond Head, South of East Mamala Bay	Winds moderate (ENE), (Honolulu, average)
5-10	"	"	03/03/63	Drogue (home-made cross)	1.5 m	Vector diagram	/Southwest of Diamond Head, South of East Mamala Bay	Winds moderate (ENE), (Honolulu, average)
5-11	"	"	08/17/63	Drogue (home-made cross)	Not indicated	Vector diagram	/Southwest of Diamond Head	Winds moderate (ENE), (Honolulu, average) Both flood and ebb
5-12	"	"	08/17/63	Drogue (home-made cross)	Not indicated	Vector diagram	/Southwest of Diamond Head	Winds moderate (ENE), (Honolulu, average) Both flood and ebb

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
5-20	Coastal Currents and Sewage Disposal in the Hawaiian Islands	T. Laevastu, D. Avery, D. Cox	11/11/63 to 11/12/63	Paddle wheel current meter	15(42)'	Tidal correlation vectors	3/Off Magic Island	Winds moderate (ENE), (Honolulu, average)
5-19	"	"	08/16/63 to 08/17/63	Paddle wheel current meter	15(42)'	Tidal correlation vectors	4/Off Kewalo Basin	Winds moderate (ENE), (Honolulu, average)
5-21	"	"	08/04/63 to 08/05/63	Paddle wheel current meter	---	Tidal correlation vectors	/Near Sand Island Outfall	Winds moderate (ENE), (Honolulu, average)
5-22	"	"	08/09/63 to 08/10/63	Paddle wheel current meter	---	Tidal correlation vectors	/Near Sand Island Outfall	Winds moderate (ENE), (Honolulu, average)
5-26	"	"	07/25/62	Drogue (cross)	2.5(560) m	Net transport vector	1/South of Diamond Head	Trade winds Flood tide
5-27	"	"	07/25/62	Drogue (cross)	0-15(256) m	Vector diagram	2/South of Diamond Head	Trade winds
5-29	"	"	08/01/62	Drogue (cross)	0-15(27) m	Vector diagram	2/South of Diamond Head	Trade winds Flood tide
5-30	"	"	08/01/62	Drogue (cross)	0-15(37) m	Vector diagram	2/South of Diamond Head	Trade winds Flood tide
5-31	"	"	08/01/62	Drogue (cross)	0-15(510) m	Vector diagram	1/South of Diamond Head	Trade winds Flood tide
5-28	"	"	07/27/62	Drogue (cross)	0-15(40) m	Vector diagram	3/South of Diamond Head	Trade winds Flood tide
5-32	"	"	08/01/62	Drogue (cross)	0-15(220) m	Vector diagram	2/South of Diamond Head	Trade winds Flood tide
5-33	"	"	08/01/62	Drogue (cross)	0-15(220-360) m	Vector diagram	2/South of Diamond Head	Trade winds Flood tide
5-34	"	"	08/01/62	Drogue (cross)	0-15(36,64) m	Vector diagram	4/South of Diamond Head	Trade winds Flood tide
5-35	"	"	08/02/62	Drogue (cross)	5(9,137,320) m	Vector diagram	5/South of Diamond Head	Trade winds Ebb tide
5-36	"	"	08/06/62	Drogue (cross)	5(37) m	Vector diagram	n/South of Diamond Head	Trade winds Ebb tide
5-37	"	"	08/06/62	Drogue (cross)	5(460-420) m	Vector diagram	2/South of Diamond Head	Trade winds Ebb tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
5-38	Coastal Currents and Sewage Disposal in the Hawaiian Islands	T. Laevastu, D. Avery, D. Cox	08/06/62	Drogue (cross)	5(550) m	Vector diagram	7/South of Diamond Head	Trade winds Ebb tide
5-39			08/06/62	Drogue (cross)	5(550) m	Vector diagram	1/South of Diamond Head	Trade winds Ebb tide
5-40			08/06/62	Drogue (cross)	5(27) m	Vector diagram	8/South of Sand Island	Trade winds Flood tide
5-41			08/08/62	Drogue (cross)	5(15,37,73,91) m	Vector diagram	8/South of Sand Island	Trade winds Ebb tide
5-42			08/08/62	Drogue (cross)	5(55) m	Vector diagram	9/South of Waikiki	Trade winds Flood tide
5-43			08/15/62	Drogue (cross)	5(30,100,200) m	Vector diagram	4/Off Kewalo	Trade winds Ebb tide
5-44			08/15/62	Drogue (cross)	5(550) m	Vector diagram	7/South of Diamond Head	Trade winds Flood tide
5-45			08/15/62	Drogue (cross)	5(274) m 5(73) m	Vector diagram	10/South of Sand Island	Trade winds Flood tide
5-46			08/15/62	Drogue (cross)	5(37,73,110,128, 220,366) m	Vector diagram	4 and 5/South of Ala Moana	Trade winds Flood tide (see insert on lower portion of map)
5-47			08/28/62	Drogue (cross)	1,2,5,5(128) m 1,2,5,5(330) m	Vector diagram	11 and 12/Off Keehi Lagoon	Trade winds Flood tide
5-49			12/08/62	Drogue (cross)	1(3) m	Vector diagram	4/South of Waikiki	Winds strong (SW) Ebb tide
5-54			04/11/63	Drogue (cross)	2.5(9) m	Vector diagram	38/South of Keehi Lagoon	Winds moderate (NNW), (Honolulu, average) Flood tide
10-01	Waikiki Beach Erosion Project: Marine Environment Study	K. Chave, R. Tait, J. Stimson, E. Chave	04/28/72	Dye	---	Net transport vectors	7/Waikiki	Winds strong (E-NE) Flood tide, high
10-02			02/25/72	Dye	---	Net transport vectors	1/Waikiki	Winds moderate (SW) Flood tide, high
10-03			03/24/72	Dye	---	Net transport vectors	2/Waikiki	Winds moderate (S-SW) Slack tide
10-04			03/27/72	Dye	---	Net transport vectors	3/Waikiki	Winds moderate (S) Flood tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
10-05	Waikiki Beach Erosion Project: Marine Environment Study	K. Chave, R. Tait, J. Stimson, E. Chave	03/30/72	Dye	---	Net transport vectors	4/Waikiki	Winds weak (W-NW) Ebb tide
10-06	"	"	04/05/72	Dye	---	Net transport vectors	5/Waikiki	Winds moderate (E) Slack tide
10-07	"	"	04/06/72	Dye	---	Net transport vectors	6/Waikiki	Winds moderate (N) Slack tide
10-08	"	"	05/10/72	Dye	---	Net transport vectors	8/Waikiki	Winds weak (S-SE)
10-09	"	"	05/22/72	Dye	---	Net transport vectors	9/Waikiki	Winds strong (E-NE)
10-10	"	"	05/26/72	Dye	---	Net transport vectors	10/Waikiki	Winds weak (N for flood) Winds strong (NE for ebb)
19-01	Comprehensive Plan for Ala Moana Reef, Part I, Engineering Feasibility Studies	Austin, H.A.R. and Associates, Law and Wilson, Ltd.	03/15/60	Surface drifter	0(22)'	Positions indicated on map	A-12/Ala Wai Channel	Winds moderate (NW)
19-02	"	"	01/07/60	Surface drifter	0(22)'	Positions indicated on map	A-7/Ala Wai Channel	Winds strong (NW)
19-03	"	"	11/24/59	Surface drifter	0(22)'	Positions indicated on map	A-3/Ala Wai Channel	Winds moderate (kona)
19-04	"	"	11/23/59	Surface drifter	0(10)'	Positions indicated on map	B-4/Ala Moana Reef	Winds moderate (kona)
19-05	"	"	01/07/60	Surface drifter	0(20)'	Positions indicated on map	B-17/Ala Moana Reef	Winds strong (kona)
19-06	"	"	11/25/59	Surface drifter	0(20)'	Positions indicated on map	B-7/Ala Moana Reef	Winds moderate (kona)
19-07	"	"	01/08/60	Surface drifter	0(20)'	Positions indicated on map	C-1/Kewalo entrance	Winds strong (kona)
19-08	"	"	03/15/60	Surface drifter	0(20)'	Positions indicated on map	A-10/Ala Wai Channel	Winds strong (N)
19-09	"	"	03/14/60	Surface drifter	0(20)'	Positions indicated on map	D-5/Channel between beach and reef	Winds moderate (NW)
19-10	"	"	03/14/60	Surface drifter	0(10)'	Positions indicated on map	D-3/Channel between beach and reef	Winds moderate (NW)



Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
20-01	Descriptive Study of the Physical Oceanography of Ala Wai Canal	Gonzales	06/29/69	Current meter (Ekman-Merz)	---	Net transport vectors Vertical velocity profiles	1,3-7,10,13/Ala Wai Canal	Winds moderate (trades)
20-02	"	"	06/30/69	Current meter (Ekman-Merz)	---	Net transport vectors Vertical velocity profiles	1,3-7,10,13/Ala Wai Canal	Winds moderate (E)
22-01	Field Observations and Theoretical Analysis of Currents on the Inner Reef from Kewalo Channel to Ala Moana Park	J. Levine	06/70 to 11/70	Surface drifters (Clorox bottles)	Surface	Net transport vectors	0,11/Between Kewalo and Ala Moana	---
23-01	Draft Environmental Impact Statement: Improvement of Ala Wai Boat Harbor	Oceanic Institute	08/72	Current meter (Ekman-Merz or General Oceanics)	Surface	Net transport vector Vertical velocity profiles Time dependent velocity	1,3,5/Ala Wai Harbor	Winds moderate (trades) Flood tide
23-02	"	"	08/72	Current meter (Ekman-Merz or General Oceanics)	Surface	Net transport vector Vertical velocity profiles Time dependent velocity	3,4/Ala Wai Harbor	Winds moderate (trades) Ebb tide
S-E SECTOR, MAKAPUU POINT TO DIAMOND HEAD								
1-10	Water Quality Program for Oahu with Special Emphasis on Waste Disposal	Engineering Science, Sunn, Low, Tom & Harn, Dillingham Corporation	11/15/70 to 11/25/70	Current meter (Hydro Products 502)	25(60)'	Velocity and direction frequency distributions Progressive vector diagrams Net transport vectors	11/Sandy Beach	---
1-21	"	"	11/24/63 to 12/10/63	Current meter (Hydro Products 502)	15(42)'	Velocity and direction frequency distributions Progressive vector diagrams	1/Diamond Head	Winds weak and variable

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
1-22	Water Quality Program for Oahu with Special Emphasis on Waste Disposal	Engineering Science, Sunn, Low, Tom & Hara, Billingham Corporation	07/11/63 to 07/12/63	Current meter (Hydro Products 502)	42(79)'	Velocity and direction frequency distributions Progressive vector diagrams Net transport vectors	30/Wailupe	Winds moderate (ENE), (Honolulu, average)
3-09	Current Observations in the Hawaiian Archipelago	K. Wyrtki, V. Graefe, W. Patzert	05/10/67 to 05/25/67	Paddle wheel current meter (Hydrowerkstätten)	66(264)'	Velocity and direction frequency distributions Progressive vector diagrams Net transport vector	23/Diamond Head	Winds weak and variable to moderate (NE), (Honolulu, average)
1-63	Water Quality Program for Oahu	Engineering Science, Sunn, Low, Tom & Hara, Billingham Corporation	08/70	Drift card	Bottom	Position indicated on map	/Off Sandy Beach	---
1-64	"	"	08/70	Drift card	Bottom	Position indicated on map	/Off Sandy Beach	---
1-69	"	"	09/70	Drift card	Bottom	Position indicated on map	/Off Portlock	---
4-01	Oceanographic Observations During 1965-1967 in the Hawaiian Archipelago	K. Wyrtki, J. Burks, R. Lathan, W. Patzert	02/02/66 to 02/05/66	Parachute drogue	Not indicated	Drift vector	/Off Southeast Oahu	Winds weak and variable (some tidal information)
4-02	"	"	02/02/66 to 02/05/66	Parachute drogue	Not indicated	Drift vector	/Off Southeast Oahu	Winds weak and variable (some tidal information)
4-08	"	"	09/24/65 to 09/26/65	Parachute drogue	Not indicated	Drift vector	/Off Southeast Oahu	Winds weak (SE-SW), (Honolulu, average)
5-02	Coastal Current and Sewage Disposal in the Hawaiian Islands	T. Laevastu, D. Avery, D. Cox	08/01/62	Drogue (home-made cross)	3,16,50(900)' 3,16,50(1740)' 3,16,50(450)' 3,16,50(80)'	Vector diagram	/Off Diamond Head	Winds moderate (ENE), (Honolulu, average)
5-15	"	"	11/24/63 to 11/25/63	Paddle wheel current meter	15(42)'	Tidal correlation vectors	/Diamond Head	Winds weak (NNE) to moderate (ENE), (Honolulu, average)

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions	
5-16	Coastal Current and Sewage Disposal in the Hawaiian Islands	T. Laevastu D. Avery, D. Cox	11/26/63 to 11/27/63	Paddle wheel current meter	15(42)'	Tidal correlation vectors	/Diamond Head	Winds moderate (ENE-W), (Honolulu, average)	
5-17		"	12/04/63 to 12/05/63	Paddle wheel current meter	15(42)'	Tidal correlation vectors	/Diamond Head	Winds moderate (NNE), (Honolulu, average)	
5-18		"	12/08/63 to 12/09/63	Paddle wheel current meter	15(42)'	Tidal correlation vectors	/Diamond Head	Winds moderate (N) to (SSE), (Honolulu, average)	
5-23		"	12/08/63 to 12/09/63	Paddle wheel current meter	42(79)'	Tidal correlation vectors	30/South of Wailupe	Winds moderate (ENE), (Honolulu, average)	
5-48		"	"	12/08/62	Drogue (home- made cross)	1.5(7) m	Vector diagram	21/Off Sandy Beach	Winds moderate (S-SW) Increasing current with coming of ebb tide
E SECTOR, MOKAPU PENINSULA TO MAKAPUU POINT									
1-11	Water Quality Program for Oahu with Special Empha- sis on Waste Disposal	Dillingham Corpora- tion, Engineering Science, Sunn, Low, Tom & Hara	01/08/71 to 01/30/71	Current meter (Hydro Products S02)	30(60)'	Velocity and di- rection frequency distributions Progressive vector diagrams Directional dis- tribution of velocity Net transport vector	Q/Kailua Bay	---	
1-12			"	02/05/71 to 02/16/71	Current meter (Hydro Products S02)	30(60)'	Velocity and di- rection frequency distributions Progressive vector diagrams Net transport vector	Q/Kailua Bay	---
1-13			"	02/05/71 to 02/21/71	Current meter (Hydro Products S02)	30(80)'	Velocity and di- rection frequency distributions Progressive vector diagrams Net transport vector	X/Kailua Bay	---

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
1-23	Water Quality Program for Oahu with Special Emphasis on Waste Disposal	Dillingham Corporation, Engineering Science, Sunn, Low, Tom & Hara	07/15/63 to 07/17/63	Current meter (Hydro Products 502)	22(32)'	Velocity and direction frequency distributions Progressive vector diagram Net transport vector	36/Waimanalo	Winds moderate (ENE), (Honolulu, average)
1-34	"	"	09/04/70 to 09/20/70	Integrating current meter (University of Hawaii)	15(30)'	Directional distribution of velocity Net transport vector	8/Waimanalo	---
1-35	"	"	09/04/70 to 09/20/70	Integrating current meter (University of Hawaii)	10(20)'	Directional distribution of velocity Net transport vector	1/Kailua Bay	---
1-65	"	"	09/70	Drift cards	Surface	Chart of release and recover points	/Off Makapuu	---
1-66	"	"	09/70	Drift cards	Surface	Chart of release and recover points	/Kailua Bay	---
1-67	"	"	09/70	Drift cards	Bottom	Chart of release and recover points	/Kailua Bay	---
1-68	"	"	09/70	Drift cards	Surface	Chart of release and recover points	/Kailua Bay	---
1-72	"	"	08/70	Drift cards	Bottom	Chart of release and recover points	/Kailua Bay	---
1-73	"	"	09/70	Drift cards	Bottom	Chart of release and recover points	/Kailua Bay	---
1-74	"	"	09/70	Drift cards	Bottom	Chart of release and recover points	/Kailua Bay	---
1-75	"	"	10/70	Drift cards	Bottom	Chart of release and recover points	/Off Lanikai	---

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
5-03	Coastal Currents and Sewage Disposal in the Hawaiian Islands	T. Laevastu D. Avery, D. Cox	09/11/62	Drogue (home-made cross)	16.5(270)*	Vector diagrams (7 separate entries)	/North of Waimanalo Bay	Winds moderate (ENE), (Honolulu, average)
5-04	"	"	02/23/63	Drogue (home-made cross)	---	Vector diagrams (17 separate entries)	/North of Waimanalo Bay	Winds weak (SSW), (Honolulu, average)
5-24	"	"	07/15/63 to 07/16/63	Paddle wheel current meter (manufacturer unknown)	22(32)*	Tidal correlation vectors	36/Waimanalo	Winds moderate (ENE), (Honolulu, average)
5-25	"	"	07/16/63 to 07/17/63	Paddle wheel current meter (manufacturer unknown)	---	Tidal correlation vectors	36/Waimanalo	Winds moderate (ENE), (Honolulu, average)
5-52	"	"	03/09/63	Drogue cross	1 and 5(5-80) m	Chart	40/Waimanalo	Winds moderate (SW), (Honolulu, average) Flood tide
11-01	A Descriptive Study of the Circulation and Water Quality in Kailua Bay, Oahu, Hawaii During 1971 and 1972	K. Bathen	10/71	Drift cards	Surface	Chart of release and recover points	1,3-13/Kailua Bay	Winds moderate (NE), (average for 3 days)
11-02	"	"	11/71	Drift cards	Surface	Chart of release and recover points	6-10/Kailua Bay	Winds moderate (E), (average for 3 days)
11-03	"	"	01/72	Drift cards	Surface	Chart of release and recover points	3-6,10-12/Kailua Bay	Winds weak (NW), (average for 3 days)
11-04	"	"	02/72	Drift cards	Surface	Chart of release and recover points	3,5-9,12/Kailua Bay	Winds moderate (NE)
11-05	"	"	04/72	Drift cards	Surface	Chart of release and recover points	2,7,9,11,13/Kailua Bay	Winds strong (E)
11-06	"	"	05/72	Drift cards	Surface	Chart of release and recover points	3,5-8,12-14/Kailua Bay	Winds moderate (NE)
11-07	"	"	06/72	Drift cards	Surface	Chart of release and recover points	5-10,12,14/Kailua Bay	Winds moderate (NE)

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
11-08	A Descriptive Study the Circulation and Water Quality in Kailua Bay, Oahu, Hawaii During 1971 and 1972	K. Bathen	07/72	Drift cards	Surface	Chart of release and recover points	2-10, 12-14/Kailua Bay	Winds moderate (NE)
11-09	"	"	11/30/71 to 12/01/71	Current meter (probably Hydro Products 502)	50(60) m	Velocity and direction frequency distributions	/Windward Oahu	Winds moderate (NE) at Honolulu (actual location unknown)
11-10	"	"	11/28/71 to 11/29/71	Current meter (probably Hydro Products 502)	40(60) m	Velocity and direction frequency distributions	/Windward Oahu	Winds moderate (NE) at Honolulu
11-11	"	"	11/27/71 to 11/28/71	Current meter (probably Hydro Products 502)	30(60) m	Velocity and direction frequency distributions	/Windward Oahu	Winds moderate (NE) at Honolulu
11-12	"	"	11/26/71 to 11/27/71	Current meter (probably Hydro Products 502)	20(60) m	Velocity and direction frequency distributions	/Windward Oahu	Winds moderate (NE) at Honolulu
11-13	"	"	11/25/71 to 11/27/71	Current meter (probably Hydro Products 502)	10(60) m	Velocity and direction frequency distributions	/Windward Oahu	Winds moderate (SE) change to moderate (NE)
11-14	"	"	11/22/71 to 12/01/71	Current meter (probably Hydro Products 502)	10(33) m	Velocity and direction frequency distributions Tidal correlation vectors	C/Mokapu Point	Winds moderate (NE), (Honolulu, average)
11-15	"	"	01/07/72 to 02/06/72	Current meter (probably Hydro Products 502)	7(33) m	Velocity and direction frequency distributions Tidal correlation vectors	C/Mokapu Point	Winds moderate (NE), (Honolulu, average)
11-16	"	"	01/07/72 to 02/06/72	Current meter (probably Hydro Products 502)	25(33) m	Velocity and direction frequency distributions Tidal correlation vectors	C/Mokapu Point	Winds moderate (NE), (Honolulu, average)
11-17	"	"	11/24/71 to 11/25/71	Current meter (probably Hydro Products 502)	1(60) m	Velocity and direction frequency distributions	C/Off Manana Island	Winds strong (NE) 11/24 Winds weak (SE) 11/25 at Honolulu

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
11-18	A Descriptive Study of the Circulation and Water Quality in Kailua Bay, Oahu, Hawaii During 1971 and 1972	K. Bathen	09/17/71 to 10/11/71	Current meter (probably Hydro Products 502)	7(10) m	Velocity and direction frequency distributions Tidal correlation vectors	B/Off Mokumanu	Winds moderate (NE) at Honolulu
11-19		"	09/17/71 to 10/12/71	Current meter (probably Hydro Products 502)	7(15) m	Velocity and direction frequency distributions Tidal correlation vectors	D/East of Flyer's Monument, Mokapu Point	Winds moderate (NE) at Honolulu
11-20		"	09/17/71 to 10/17/71	Current meter (probably Hydro Products 502)	7(20) m	Velocity and direction frequency distributions Tidal correlation vectors	E/North of Mokolua Rock	Winds moderate (NE) at Honolulu
11-21		"	05/17/72 to 06/09/72	Current meter (probably Hydro Products 502)	7(33) m	Velocity and direction frequency distributions Tidal correlation vectors	C/Off Mokapu Point, Kailua Bay	Winds moderate to strong (NE) at Honolulu
11-22		"	05/17/72 to 06/09/72	Current meter (probably Hydro Products 502)	25(33) m	Velocity and direction frequency distributions Tidal correlation vectors	C/Off Mokapu Point, Kailua Bay	Winds moderate to strong (NE) at Honolulu
11-23		"	03/23/72	Current meter	---	Net transport vector	A-G/Kailua Bay	Winds moderate (NE)
11-24		"	06/01/72	Current meter	---	Net transport vector	A-H/Kailua Bay	Winds weak (NE)
11-25		"	01/08/72	Drift cards	Surface	Chart locations	/East Oahu	Winds moderate (NE)
11-26		"	03/09/72	Drogue	0,4,8 m	Chart locations	/Off Mokumanu	Winds weak (kona) Weak ebb tide
11-27		"	03/16/72	Dye	0-2 m, Surface	Chart locations	4/Off Mokumanu	Winds moderate (N) Strong flood tide
11-28		"	03/16/72	Drogue	0,4,8 m, Surface	Chart locations	4/Off Mokumanu	Winds moderate (N) Strong flood tide
11-29		"	06/72	Dye	0-2 m, Surface	Chart locations	4/Off Mokumanu	Winds moderate (NE) Strong flood tide
11-30		"	06/72	Drogue	0,7,20(20) m	Chart locations	4/Off Mokumanu	Winds moderate (NE) Strong flood tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
11-31	A Descriptive Study of the Circulation and Water Quality in Kailua Bay, Oahu, Hawaii During 1971 and 1972	K. Rathen	06/19/72	Drogue Dye Drift cards	0, 7, 20(20) m Surface Surface	Chart locations	4/Off Mokumanu	Winds strong (NE)
12-01	Kailua Ocean Outfall Sewer, Ocean Portion, Kailua Sewage Treatment Plant	Holmes & Narver Inc., Belt, Collins, and Associates Ltd.	01/06/59	Dye	Surface	Chart locations	1/Off Mokolea Rock	Winds weak (NE) Flood tide
12-02	"	"	01/06/59	Drogue (home-made)	2, 6, 12(30)'	Chart locations	1/Off Mokolea Rock	Drogues followed until beached. Winds as above
12-03	"	"	05/21/59	Dye	Surface	Chart locations	6/Off Mokolea Rock	Winds weak (kona)
12-04	"	"	05/21/59	Drogue	6, 12(30)'	Chart location	6/Off Mokolea Rock	Winds weak (kona)
12-05	"	"	05/21/59	Dye	Surface	Chart location	6/Off Mokolea Rock	Winds weak (kona)
12-06	"	"	05/21/59	Drogue	6(30)'	Chart location	6/Off Mokolea Rock	Winds weak (kona)
12-07	"	"	08/20/59	Dye	Surface	Chart location	3/Off Mokolea Rock	Winds weak (NE)
12-08	"	"	08/20/59	Dye	Surface	Chart location	3/Off Mokolea Rock	Winds weak (NE)
12-09	"	"	08/20/59	Drogue	2, 6, 12(30)'	Chart location	3/Off Mokolea Rock	Winds weak (NE)
12-10	"	"	09/29/75	Drogue	2(30)'	Chart location	3/Off Mokolea Rock	Winds weak (NE)
12-11	"	"	09/29/75	Drogue	12(30)'	Chart location	3/Off Mokolea Rock	Winds weak (NE)
12-12	"	"	09/29/75	Drogue	6(30)'	Chart location	3/Off Mokolea Rock	Winds weak (NE)
12-13	"	"	09/29/75	Dye	Surface	Chart location	3/Off Mokolea Rock	Winds weak (NE)
12-14	"	"	07/24/59	Drogue (home-made) Dye	2, 6, 12(30)' Surface	Chart location	/Near Mokolea Rock	Winds weak (NE) Ebb tide
12-15	"	"	06/18/59	Drogue (home-made) Dye	2, 6, 12(30)' Surface	Chart location	/Near Mokolea Rock	Winds weak (NE) Flood tide
29-01	Technical Supplement to Ocean Outfall Report, Waimanalo Core Development	Marine Advisors, Inc.	09/28/61	Drogue	Surface	Vector on map	/Waimanalo Bay	Winds moderate (NE) Flood tide



Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
29-02	Technical Supplement to Ocean Outfall Report, Waimanalo Core Development	Marine Advisors, Inc.	09/28/61	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds moderate (NE)
29-03	"	"	01/18/62	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds strong (S)
29-04	"	"	01/23/62	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds moderate (NE)
29-05	"	"	01/25/62	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds moderate (NE)
29-06	"	"	01/31/62	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds moderate (S)
29-07	"	"	02/03/62	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds weak (NE) to calm
29-08	"	"	06/05/72	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds moderate (NE)
29-09	"	"	10/21/62	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds weak (N)
29-10	"	"	10/24/62	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds weak (N)
29-11	"	"	10/27/62	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds weak (N)
29-12	"	"	10/31/62	Drogue	Surface (deep)	Vector on map	/Waimanalo Bay	Winds weak (NE)
Kaneohe Bay Sector, KUALOA POINT TO MOKAPU PENINSULA								
1-76	Water Quality Program for Oahu with Special Emphasis on Waste Disposal	Engineering Science, Sunn, Low, Tom & Hara, Dillingham Corporation	05/70	Drift cards	Surface	Positions indicated on map	/Off Ulupau Head	---
4-03	Oceanographic Observations During 1965-1967 in the Hawaiian Archipelago	K. Wyrki, J. Burks, R. Lathan, W. Patzert	02/05/66 to 02/08/66	Parachute drogues	---	Vector diagram	/Off Ulupau Head	Winds weak and variable
5-02	Coastal Currents and Sewage Disposal in the Hawaiian Islands	T. Luevasto, D. Avery, D. Cox	09/04/62 to 09/06/62	Drogue (home-made cross)	---	Vector diagram	/Within Kaneohe Bay	Winds strong to moderate (ENE), (Honolulu, average)
18-01	The Plankton Community in the Southern Part of Kaneohe Bay	Plyakarn-chawa	12/22/63 to 12/23/63	Drogue	---	Vectors on map	/South Kaneohe Bay	Winds moderate (NW), (Honolulu, average)
18-02	"	"	11/23/63	Dye	Surface	Vectors on map	/South Kaneohe Bay	Winds weak (NW), (Honolulu, average)

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
2-01	A Descriptive Study of the Physical Oceanography of Kaneohe Bay	K. Bathen	04/14/67 to 04/15/67	Paddle wheel current meter (Hydrowerk-stätten)	1, 6, 25 (27) m	Tidal correlation vectors Current velocity as a function of time (24-hr period). Current direction as a function of time (24-hr period)	/Southeast and northwest entrance channels	---
S-NE SECTOR, HAILUA TO KUALOA POINT								
9-01	Sedimentology of Kahana Bay	W. Coulbourn	01/30/ to 01/31/	Sand tracer	Bottom (~30)'	Isopleths on graph	Grid 1/Western side of Kahana Bay	General SE drift
9-02	"	"	02/10/	Sand tracer	Bottom (~30)'	Isopleths on graph	Grid 1/Western side of Kahana Bay	General SE drift
9-03	"	"	02/20/	Sand tracer	Bottom (~30)'	Isopleths on graph	Grid 1/Western side of Kahana Bay	General SE drift
9-04	"	"	01/30/ to 01/31/	Sand tracer	Bottom (~30)'	Isopleths on graph	Grid 2/Western side of Kahana Bay	General SE drift
9-05	"	"	02/10/	Sand tracer	Bottom (~30)'	Isopleths on graph	Grid 2/Western side of Kahana Bay	General SE drift
9-06	"	"	02/20/	Sand tracer	Bottom (~30)'	Isopleths on graph	Grid 2/Western side of Kahana Bay	General SE drift
32-01	Kualoa Park Sand Tracing Project	U.S. Army Corps of Engineers	07/21/75	Drogue	Shallow	Net transport vector	A/Nearshore off Kualoa Point	Winds moderate (E-SE) Seas: 6" chop Flood tide
32-02	"	"	07/21/75	Drogue	Shallow	Net transport vector	B/Nearshore off Kualoa Point	Winds weak (E) Seas: 6" chop Flood tide
32-03	"	"	07/23/75	Drogue	Shallow	Net transport vector	A/Nearshore off Kualoa Point	Winds weak (SE) Seas: 3" chop Ebb tide
32-04	"	"	07/23/75	Drogue	Shallow	Net transport vector	B/Nearshore off Kualoa Point	Winds weak (E) Seas: 3-6" chop Ebb tide
32-05	"	"	07/27/75	Drogue	Shallow	Net transport vector	A/Nearshore off Kualoa Point	Winds weak (E) Seas: 3" chop Flood tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
32-06	Kualoa Park Sand Tracing Project	U.S. Army Corps of Engineers	07/27/75	Drogue	Shallow	Net transport vector	H/Nearshore off Kualoa Point	Winds weak (E) Seas: 6" chop Flood tide
32-07	"	"	08/03/75	Drogue	Shallow	Net transport vector	A/Nearshore off Kualoa Point	Winds weak (E) Waves: 12", 9 sec. Flood tide
32-08	"	"	08/03/75	Drogue	Shallow	Net transport vector	B/Nearshore off Kualoa Point	Winds moderate (E) Waves: 12 to 15", 12.5 sec Flood tide
32-09	"	"	08/05/75	Drogue	Shallow	Net transport vector	A/Nearshore off Kualoa Point	Winds weak (E-SE) Ebb tide
32-10	"	"	08/05/75	Drogue	Shallow	Net transport vector	B/Nearshore off Kualoa Point	Winds moderate (E) Ebb tide, drogue drifted directly to shore
32-11	"	"	08/07/75	Drogue	Shallow	Net transport vector	A/Nearshore off Kualoa Point	Winds moderate (E) Seas: 3" chop Flood tide
32-12	"	"	08/07/75	Drogue	Shallow	Net transport vector	B/Nearshore off Kualoa Point	Winds strong (E) Seas: 3-6" chop Flood tide, drogue drifted directly to shore
32-13	"	"	08/11/75	Drogue	Shallow	Net transport vector	A/Nearshore off Kualoa Point	Winds weak (E) Seas: 6" chop Flood tide
32-14	"	"	08/11/75	Drogue	Shallow	Net transport vector	H/Nearshore off Kualoa Point	Winds moderate (ENE) Waves: 12 to 18", 9.5 sec Flood tide
32-15	"	"	08/13/75	Drogue	Shallow	Net transport vector	A/Nearshore off Kualoa Point	Winds moderate (E) Seas: 3" chop Ebb tide
32-16	"	"	08/13/75	Drogue	Shallow	Net transport vector	B/Nearshore off Kualoa Point	Winds moderate (ENE) Waves: 12", 11 sec Ebb tide
32-17	"	"	08/15/75	Drogue	Shallow	Net transport vector	A/Nearshore off Kualoa Point	Winds weak (ESE) Waves: 3" Flood tide
32-18	"	"	08/15/75	Drogue	Shallow	Net transport vector	B/Nearshore off Kualoa Point	Winds moderate (E) Waves: 18 to 24", 17 sec Flood tide

Data Source Reference Number	Title	Author	Date of Work	Methodology	Depth	Resultant Presentation	Station Number/ Station Location	Prevailing Conditions
N-NE SECTOR, KAHUKU POINT TO MAUULA								
3-08	Current Observations in the Hawaiian Archipelago	K. Wyrski, V. Graefe, W. Patzert	04/26/66 to 05/17/66	Paddle wheel current meter (Hydrowerk station)	33(264)'	Net transport vector Velocity and direction frequency distributions Progressive vector diagrams	6/Kahuku Point	Winds moderate (NE) to moderate (SW), (Honolulu, average)

# Appendix B. Synopsis of Reported Data Depths and Winds

(AUGUST - JANUARY)													
LEGEND: x Single Data Entry ( ) Estimated Depth													
SECTOR	N-NE	S-NE	KB	E	S-E	E-S	KL	PH	N-S	S-SW	N-SW	S-NW	N-NW
AUGUST, SEPTEMBER, OCTOBER													
DEPTH (FT)	0	(XXXXX)		XXXXXX	XXXX	XXXXXX		XXXXXX	XXXXXX	XX	XXXX	XXXXXX	XXXXXX
	50			(XXXX)	XXXX	XXXXXX		XXXXXX	XXXXXX	XX	(X)	XXXXXX	XXXXXX
	100				XXXX	XXXXXX			XXXXXX	XX			
	150								XXXXXX				
	200								XX				
	250								XX				
	300												
WIND	W M S	None E, ENE E	None	NW, N NE	None	Trades	None	S Trades	N-NE, E-NE	E	NW, SW S	NE Variable	Trades
NOVEMBER, DECEMBER, JANUARY													
DEPTH (FT)	0			XXXXXX	XXXXXX	XXXXXX		XXXXXX	XXXXXX		XXXXXX	XXXXXX	XXXXXX
	50	XX		XXXXXX	XXXXXX	XXXXXX		XXXXXX	XXXXXX	XX	XXXXXX	XXXXXX	XXXXXX
	100			XXXXXX	XXXXXX	XXXXXX			XXXXXX	XXXXXX			
	150			XXXXXX	XXXXXX	XXXXXX			XXXXXX				
	200								XXXXXX				
	250												
	300												
WIND	W M S	None	None	NW, NE E, SE-NE S	Variable S-SW	Kona SW, NW, Kona	None	Trades	S-SW NE	None	Kona, trades, E Kona	S S	Trades

