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Partial Technical Completion Report No. 8
Project A-031-PR

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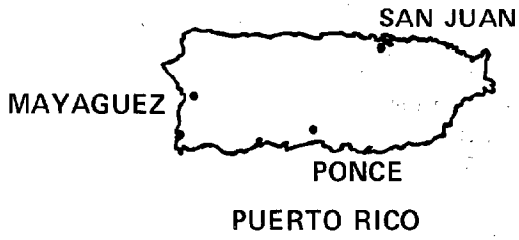

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Water Resources Research Institute

ESTUARIES, BAYS AND COASTAL CURRENTS AROUND P. R.

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WATER RESOURCES RESEARCH INSTITUTE
University of Puerto Rico
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Mayagüez, Puerto Rico 00708

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*** Commonwealth of Puerto Rico**

UPRICO-WRRI-PR-71-31-8

Partial Technical Completion Report Number (8 of ?)
A-031-PR

ESTUARIES, BAYS AND COASTAL CURRENTS AROUND PUERTO RICO

By

ERNESTO F. COLON
Professor IE

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Mayaguez, Puerto Rico

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WASHINGTON, D.C.

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Partial Technical Completion Report No. 8.

Title of Project: Estuaries, Bays and Coastal Currents Around Puerto Rico.

Reporting Agency: University of Puerto Rico (WRRI) and OWRR.

Principal Investigator: Prof. Ernesto F. Colon, WRRI-UPR.

OWRR-Project A-031-PR
UPRICO-WRRI-PR-71-31-8

ABSTRACT

Three model 502 In-situ Current direction, temperature, and velocity meters, manufactured by Hydro Products in California were used simultaneously in a triangular pattern or in line. In some cases, all three instruments were used vertically at different depths.

A one half moon cycle period was taken for each station and a continuous recording was obtained for all three instruments. This data is shown by vectors every 10 degrees on a magnetic rose and in tabular form indicating the relative volume of water passing through the station every 10 degrees during the entire study period.

Keywords:

* Currents * Coasts *Ocean Currents *Bays *Estuaries

FCST Category VIII A

INTRODUCTION

This is the eigth partial completion report of an undetermined number of stations to be studied. The first seven reports covered the following stations in the Southwest and Southern coast of Puerto Rico.

Report No.	Station	Location	Coordinates Long.	Lat.
1	1	Mayaguez Bay	67°- 11' - 51"	18°- 13' - 49"
"	2	Mayaguez Bay	67°- 11' - 36"	18°- 13' - 44"
2	1	La Parguera	67°- 01' - 36"	17°- 58' - 8"
"	2	La Parguera	67°- 01' - 36"	17°- 57' - 48"
"	3	La Parguera	67°- 01' - 48"	17°- 57' - 36"
3	1	Mayaguez Bay	67°- 10' - 47"	18°- 11' - 13"
"	2	Mayaguez Bay	67°- 09' - 51"	18°- 12' - 15"
"	3	Mayaguez Bay	67°- 11' - 25"	18°- 12' - 25"
4	1	Belvedere	67°- 11' - 36"	18°- 06' - 12"
"	2	Belvedere	67°- 11' - 39"	18°- 06' - 24"
"	3	Belvedere	67°- 11' - 48"	18°- 06' - 33"
5	1	Boqueron Punta Guaniquilla	67°- 12' - 57"	18°- 02' - 14"
"	2	Boqueron Punta Guaniquilla	67°- 12' - 57"	18°- 02' - 14"
"	3	Boqueron Punta Guaniquilla	67°- 12' - 57"	18°- 02' - 14"
6	1	Ponce Punta Cuchara	66°- 40' - 52"	17°- 56' - 22"

Report No.	Station	Location	Coordinates Long.	Lat.
7	1	Boqueron Canal Sur	67°- 12' - 36"	18°- 01' - 00"
"	2	Punta Tocon Parguera	67°- 06' - 29"	17°- 55' - 51"
"	3	Boqueron Canal Norte	67°- 12' - 27"	18°-02' - 09"
"	1	Cayo Fanduca Puerto Real	67°- 12' - 52"	18°- 05' - 00"
"	2	Las Coronas Puerto Real	67°- 16' - 22"	18°- 03' - 40"
"	3	Caño Corazones	67°- 10' - 18"	18°- 10' - 52"

Domestic as well as industrial wastes have been discharged for many years along the coastal waters of Puerto Rico without adequate treatment in a few instances and certainly with no treatment at all in most cases.

In the past, economic factors dominated the design criteria of these outfalls with little or no concern for environmental effects.

The data and information used for the design and construction of outfalls in Puerto Rico depended entirely on drift bottle studies and on Eckman's theory of the Coriolis effect. Both of these are inadequate to ensure proper design and proper location of outfall installations.

In the first case the data is limited to the upper layers of the body of water and, therefore, little or no knowledge is obtained of the greater depths where the pipes are installed. In the second case it is not correct to transfer or apply a general

theory which deals with open ocean reaction to the earth's axial rotation, to enclosed bays and estuaries having entirely different physical characteristics from those existing in the open sea.

The limitations and defect of the above stated criteriological data and the lack of reliable coastal currents information, has inevitably resulted in heavily polluted bays.

With the rapid population increase and industrial growth, this problem is logically expected to grow at a geometric rate.

A better understanding of the hydraulics of these bodies of water was, and is, therefore, urgently needed.

Recent federal ocean disposal restrictions require definite assurance that new outfalls will be properly located in order to protect recreational areas as well as the ocean environment before permit is granted for such installations. However, coastal currents measurements are quite expensive and dangerous. Initial high investment, high operating cost, and personnel skilled in marine endeavor are essential for a successful project and for a safe operation thereof. Funds available either from Commonwealth sources and the Office of Water Resources Research for urgent Island water research are quite limited. This project, therefore, limits itself to the collection of essential data in bays and estuaries around the Island on a continuous basis and occasionally from specific locations under private or government contracts.

TECHNIQUE AND PROCEDURE

The Institute utilizes one Downeast 34' equipped with two 130 HP diesel Perkins engines. Three model 502 In-situ Current direction, temperature and velocity meters, manufactured by Hydro Products in California are used simultaneously in a triangular pattern or in line.

Although we usually collect data for a minimum of one-half moon cycle period (14-16 days) for each station, the instruments are capable of recording data continuously for thirty (30) days. The maximum depth at which we propose to measure these currents is 1000 ft. (meters may go down up to 10,000 ft.).

The data obtained is recorded and the relative quantity of water passing through the selected station is computed for each direction at 10° intervals.

The information thus gathered, can be utilized in further studies using other relevant data in table form such as tide tables, tidal current tables, moon phases and wind direction available from airports, industrial and weather bureau information sources.

WATER RESOURCES RESEARCH INSTITUTE

UNIVERSITY OF PUERTO RICO, MAYAGUEZ - PROJECT A-031-PR INVESTIGATOR - PROF. E. F. COLON

BAY Ponce COORDINATES LONG. 66°-36'-59" LAT. 17°-57'-22" INST. S.N. 516

DATE IN 12-3-71 HR. IN 8:30 am DATE OUT 12-15-71 HR. OUT 8:00 am TOTAL HRS. 287.5

DEPTH OF BOTTOM 75 FT. DEPTH OF SENSOR 15 FT. REMARKS: see below

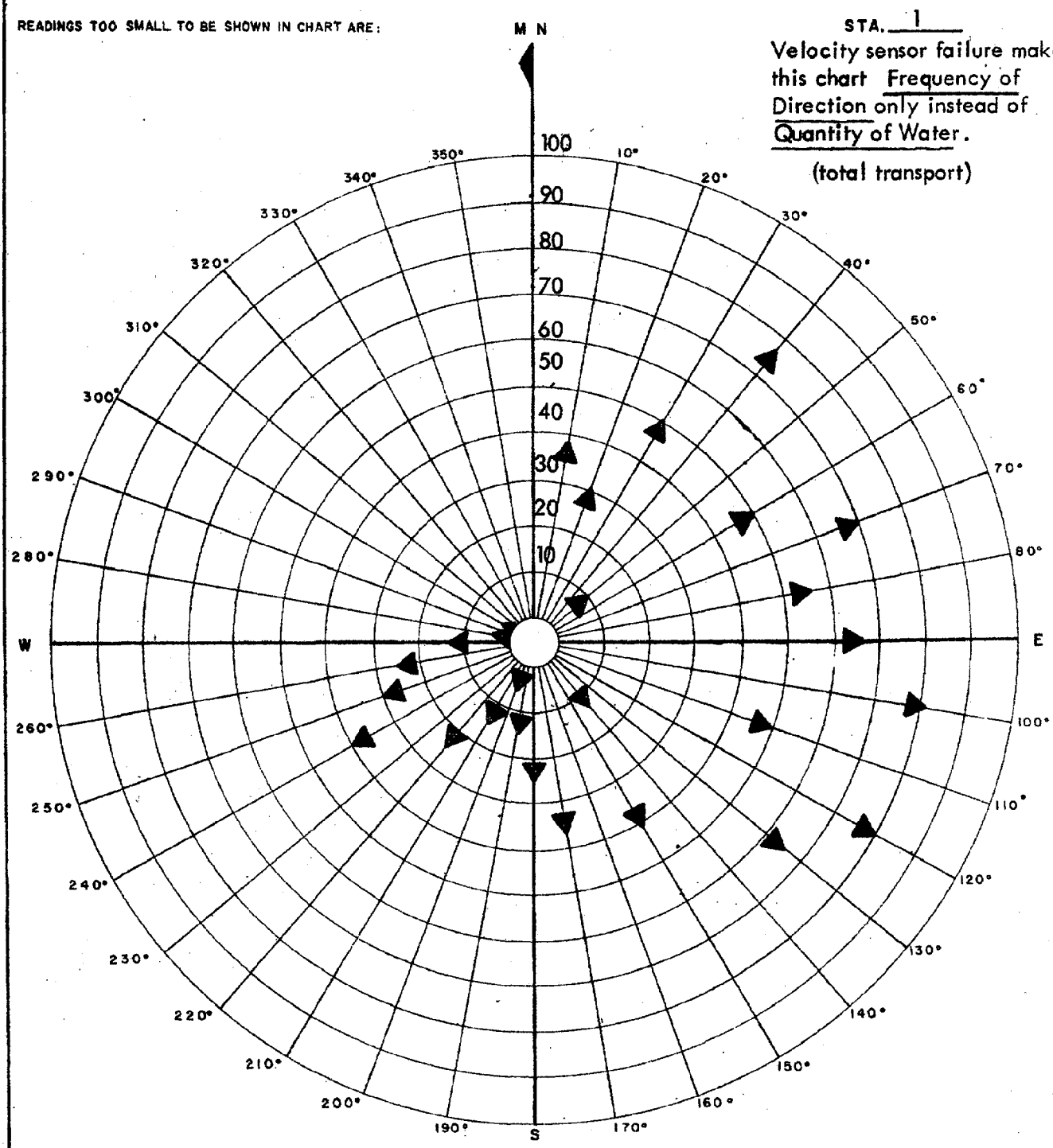
FREQUENCY OF DIRECTION OF WATER FLOW see page 40

READINGS TOO SMALL TO BE SHOWN IN CHART ARE:

STA. 1

Velocity sensor failure makes this chart Frequency of Direction only instead of Quantity of Water.

(total transport)



Water Resources Research Institute
University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-59" Lat. 17°-57'-22" Inst.S.N. 516

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15.86 min. 15.86 min. 15.86 min.

A

~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.
1	29	5	.04	43	29	225	.07	85	29	191	.03
2	29	5	.08	44	29	225	.05	86	29	202	.03
3	29	5	.10	45	29	256	.05	87	29	180	.03
4	29	5	.12	46	29	180	.05	88	29	135	.03
5	29	5	.20	47	29	112	.05	89	29	213	.03
6	29	5	.25	48	29	78	.07	90	29	168	.03
7	29	5	.34	49	29	90	.07	91	29	101	.03
8	29	5	.44	50	29	101	.07	92	29	101	.03
9	29	5	.35	51	29	70	.04	93	29	45	.03
10	29	5	.28	52	29	146	.04	94	29	45	.03
11	29	5	.26	53	29	256	.10	95	29	123	.05
12	29	5	.27	54	29	256	.10	96	29	135	.08
13	29	5	.25	55	29	256	.20	97	29	180	.10
14	29	5	.30	56	29	270	.23	98	29	180	.11
15	29	5	.40	57	29	270	.25	99	29	191	.11
16	29	5	.36	58	29	270	.27	100	29	168	.08
17	29	5	.34	59	29	270	.28	101	29	101	.05
18	29	5	.33	60	29	256	.27	102	29	78	.05
19	29	5	.28	61	29	270	.22	103	29	78	.05
20	29	5	.26	62	29	270	.20	104	29	45	.05
21	29	5	.25	63	29	270	.24	105	29	78	.05
22	29	5	.18	64	29	281	.27	106	29	56	.07
23	29	4	.15	65	29	270	.25	107	29	67	.07
24	29	3	.10	66	29	270	.25	108	29	123	.07
25	29	3	.06	67	29	256	.18	109	29	168	.07
26	29	3	.05	68	29	256	.15	110	29	236	.05
27	29	3	.06	69	29	256	.11	111	29	225	.06
28	29	5	.04	70	29	256	.07	112	29	225	.10
29	29	5	.03	71	29	270	.04	113	29	225	.18
30	29	5	.03	72	29	270	.04	114	29	236	.17
31	29	5	.03	73	29	56	.04	115	29	236	.17
32	29	5	.03	74	29	101	.05	116	29	236	.20
33	29	5	.03	75	29	90	.05	117	29	247	.13
34	29	5	.03	76	29	101	.05	118	29	247	.14
35	29	5	.04	77	29	112	.05	119	29	236	.09
36	29	5	.05	78	29	112	.05	120	29	236	.09
37	29	5	.05	79	29	123	.05	121	29	213	.07
38	29	15	.05	80	29	130	.04	122	29	202	.05
39	29	20	.05	81	29	168	.04	123	29	168	.04
40	29	101	.05	82	29	180	.04	124	29	112	.04
41	29	168	.05	83	29	135	.03	125	29	112	.05
42	29	225	.05	84	29	168	.03	126	29	146	.09

2) Velocity sensor failure makes this chart Frequency of Direction only instead of Quantity of Water.

(total transport)

Analist: Torres, Pacheco, Gonzalez
Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E.F. Colón

Bay Ponce Coordinates Long. 66°-36'-59" Lat. 17°-57'-22" Inst.S.N. 516

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15.86 min. 15.86 min. 15.86 min.

A

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127	29	146	.10	169	29	256	.10	211	29	213	.06
128	29	146	.11	170	29	247	.08	212	29	247	.07
129	29	168	.12	171	29	256	.03	213	29	281	.11
130	29	123	.09	172	29	56	.03	214	29	270	.12
131	29	157	.07	173	29	45	.03	215	29	281	.15
132	29	168	.07	174	29	90	.03	216	29	258	.17
133	29	165	.09	175	29	95	.05	217	29	220	.20
134	29	146	.08	176	29	95	.03	218	29	258	.17
135	29	123	.04	177	29	123	.05	219	29	247	.17
136	29	75	.04	178	29	123	.04	220	29	247	.17
137	29	78	.04	179	29	146	.05	221	29	236	.18
138	29	213	.05	180	29	157	.05	222	29	247	.15
139	29	236	.09	181	29	160	.06	223	29	247	.12
140	29	247	.05	182	29	180	.07	224	29	247	.06
141	29	236	.06	183	29	150	.07	225	29	258	.08
142	29	247	.05	184	29	146	.07	226	29	250	.08
143	29	247	.10	185	29	101	.04	227	29	247	.08
144	29	202	.06	186	29	157	.04	228	29	250	.06
145	29	225	.06	187	29	225	.04	229	29	225	.05
146	29	225	.07	188	29	240	.07	230	28	180	.04
147	29	236	.03	189	29	247	.08	231	28	202	.03
148	29	247	.05	190	29	247	.09	232	28	78	.03
149	29	247	.07	191	29	240	.10	233	28	90	.04
150	29	256	.08	192	29	246	.05	234	28	112	.05
151	29	256	.09	193	29	247	.03	235	28	213	.05
152	29	247	.10	194	29	36	.03	236	28	213	.06
153	29	256	.07	195	29	78	.03	237	28	213	.09
154	29	256	.06	196	29	101	.03	238	28	213	.07
155	29	213	.05	197	29	180	.03	239	28	236	.08
156	29	191	.05	198	29	109	.04	240	28	236	.10
157	29	213	.06	199	29	67	.05	241	29	236	.13
158	29	225	.06	200	29	237	.05	242	29	236	.13
159	29	236	.07	201	29	146	.05	243	29	225	.10
160	29	240	.10	202	29	123	.05	244	29	225	.10
161	29	256	.15	203	29	78	.07	245	29	225	.10
162	29	303	.20	204	29	70	.05	246	29	213	.14
163	29	303	.20	205	29	78	.03	247	29	236	.15
164	29	236	.25	206	29	101	.04	248	29	240	.15
165	29	240	.22	207	29	67	.04	249	29	236	.15
166	29	247	.20	208	29	101	.05	250	29	225	.15
167	29	256	.18	209	29	112	.05	251	29	225	.13
168	29	256	.15	210	29	202	.05	252	29	213	.10

Analist: Torres, Pacheco, Gonzalez

Typist: Ramirez

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University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E.F. Colón

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15.86 min. 15.86 min. 15.86 min.

A

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253	29	213	.08	295	29	247	.12	337	29	146	.21
254	29	225	.13	296	29	247	.07	338	29	146	.20
255	29	236	.10	297	29	225	.07	339	29	146	.20
256	29	258	.10	298	29	236	.09	340	29	56	.13
257	29	270	.10	299	29	225	.08	341	29	45	.08
258	29	247	.09	300	29	236	.07	342	29	45	.08
259	29	236	.10	301	29	236	.06	343	29	45	.09
260	29	247	.10	302	29	225	.05	344	29	45	.08
261	29	236	.06	303	29	225	.05	345	29	45	.08
262	29	262	.09	304	29	157	.05	346	29	45	.08
263	29	213	.08	305	28.5	140	.05	347	29	45	.07
264	28.5	225	.09	306	28.5	112	.06	348	29	56	.05
265	28.6	236	.08	307	28.5	112	.05	349	29	60	.05
266	28.5	236	.09	308	28.5	135	.05	350	29	69	.05
267	28.5	236	.09	309	28.5	112	.04	351	29	90	.11
268	28.5	202	.05	310	28.5	135	.04	352	29	120	.15
269	28.5	247	.04	311	28.5	146	.06	353	29	146	.18
270	28.2	236	.03	312	28.5	105	.04	354	29	135	.16
271	28.2	56	.03	313	28.5	100	.03	355	29	146	.18
272	28.2	90	.05	314	28.5	105	.03	356	29	140	.20
273	28.2	135	.05	315	28.5	135	.06	357	29	140	.20
274	28.2	146	.06	316	28.5	157	.07	358	x	140	.25
275	28.2	146	.09	317	28.5	160	.10	359	x	145	.24
276	28.2	168	.08	318	28.5	168	.11	360	x	168	.24
277	28.2	168	.08	319	28.5	180	.12	361	x	168	.22
278	28.2	157	.08	320	28.5	160	.16	362	x	168	.23
279	28.2	168	.10	321	28.5	160	.20	363	x	157	.23
280	28.2	157	.10	322	28.5	168	.20	364	x	168	.23
281	28.2	157	.10	323	28.5	168	.21	365	x	168	.23
282	28.2	157	.10	324	28.5	160	.21	366	x	180	.23
283	29	157	.09	325	28.5	146	.22	367	x	180	.20
284	29	112	.05	326	29	146	.25	368	x	176	.17
285	29	90	.04	327	29	155	.28	369	x	180	.15
286	29	236	.05	328	29	160	.30	370	x	180	.15
287	29	236	.05	329	29	160	.30	371	x	170	.15
288	29	236	.05	330	29	146	.31	372	x	180	.12
289	29	240	.09	331	29	146	.29	373	x	168	.13
290	29	258	.09	332	29	146	.27	374	x	168	.11
291	29	258	.11	333	29	168	.23	375	x	168	.10
292	29	247	.09	334	29	168	.25	376	x	168	.10
293	29	236	.13	335	29	168	.23	377	x	157	.08
294	29	236	.12	336	29	135	.21	378	x	157	.07

Analist: Torres, Pacheco, Gonzalez
Typist: Ramirez

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379	x	157	.05	421	x	180	.01	463	x	157	.05
380	x	157	.05	422	x	56	.01	464	x	157	.06
381	x	168	.05	423	x	78	.01	465	x	168	.05
382	x	157	.05	424	x	101	.01	466	x	135	.05
383	x	146	.05	425	x	90	.01	467	x	90	.06
384	x	146	.05	426	x	67	.01	468	x	67	x
385	x	110	.05	427	x	67	.01	469	x	112	x
386	x	135	.05	428	x	112	.01	470	x	101	x
387	x	78	.04	429	x	90	.01	471	x	101	x
388	x	56	.03	430	x	101	.01	472	x	125	x
389	x	67	.03	431	x	90	.01	473	x	112	x
390	x	60	.03	432	x	90	.01	474	x	90	x
391	x	67	.03	433	x	135	.01	475	x	123	x
392	x	45	.02	434	x	135	.02	476	x	123	x
393	x	56	.01	435	x	146	.02	477	x	155	x
394	x	33	.01	436	x	146	.02	478	x	157	x
395	x	67	.01	437	x	157	.03	479	x	146	x
396	x	50	.01	438	x	146	.04	480	x	146	x
397	x	45	.01	439	x	146	.05	481	x	146	.06
398	x	50	.01	440	x	146	.06	482	x	135	.06
399	x	67	.01	441	x	146	.06	483	x	105	.06
400	x	56	.01	442	x	135	.05	484	x	112	.05
401	x	45	.01	443	x	157	.06	485	x	100	.05
402	x	45	.01	444	x	157	.08	486	x	78	.05
403	x	45	.01	445	x	157	.06	487	x	45	.05
404	x	45	.01	446	x	157	.04	488	x	50	.04
405	x	80	.01	447	x	157	.06	489	x	35	.04
406	x	45	.01	448	x	150	.06	490	x	35	.04
407	x	45	.01	449	x	157	.06	491	x	22	.04
408	x	45	.01	450	x	157	.06	492	x	25	.03
409	x	45	.01	451	x	157	.06	493	x	40	.03
410	x	56	.01	452	x	157	.01	494	x	90	.02
411	x	67	.01	453	x	146	.06	495	x	135	.02
412	x	100	.01	454	x	168	.07	496	x	135	.03
413	x	180	.01	455	x	105	.07	497	x	157	.03
414	x	90	.01	456	x	112	.07	498	x	192	.02
415	x	45	.01	457	x	146	.06	499	x	190	.02
416	x	90	.01	458	x	157	.05	500	x	190	.03
417	x	90	.01	459	x	157	.05	501	x	192	.04
418	x	157	.01	460	x	157	.07	502	x	192	.05
419	x	180	.01	461	x	168	.07	503	x	192	.05
420	x	180	.01	462	x	157	.06	504	x	192	.05

Analist: Torres, Pacheco, Gonzalez

Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-59" Lat. 17°-57'-22" Inst.S.N. 516

Date In 12-3-71 Hr. In. 8:30 am Date Out 12-15-71 Hr.Out 8:00am Total Hrs. 287.5

Depth of bottom 75 ft. Depth of Sensor 15 ft. Remarks: 1) In this station, information was taken every 15.86 minutes.

2) Velocity sensor failure makes this chart Frequency of Direction only instead of Quantity of Water. (total transport)

15.86 min. 15.86 min. 15.86 min.

A

~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.
505	x	192	.07	547	x	57	x	589	x	123	.03
506	x	192	.05	548	x	67	x	590	x	123	.03
507	x	192	.05	549	x	67	x	591	x	112	.03
508	x	180	.08	550	x	78	x	592	x	112	.03
509	x	192	.08	551	x	90	x	593	x	105	.03
510	x	180	.08	552	x	101	x	594	x	105	.03
511	x	190	.08	553	x	105	.01	595	x	105	.01
512	x	185	.08	554	x	105	.03	596	x	98	.01
513	x	180	.68	555	x	90	.02	597	x	56	.01
514	x	180	.10	556	x	101	.02	598	x	40	x
515	x	180	.10	557	x	101	.03	599	x	22	x
516	x	170	.10	558	x	105	.03	600	x	40	x
517	x	168	.13	559	x	105	.03	601	x	22	x
518	x	168	.12	560	x	105	.03	602	x	37	x
519	x	168	.13	561	x	105	.02	603	x	37	x
520	x	168	.14	562	x	123	.03	604	x	50	x
521	x	168	.15	563	x	112	.03	605	x	56	x
522	x	160	.12	564	x	110	.04	606	x	56	x
523	x	160	.12	565	x	130	.04	607	x	30	x
524	x	157	.08	566	x	130	.05	608	x	22	x
525	x	157	.08	567	x	130	.04	609	x	22	x
526	x	157	.08	568	x	130	.05	610	x	45	x
527	x	160	.07	569	x	130	.05	611	x	35	x
528	x	160	.06	570	x	130	.05	612	x	30	x
529	x	157	.05	571	x	130	.06	613	x	56	x
530	x	157	.06	572	x	130	.04	614	x	112	x
531	x	150	.05	573	x	123	.03	615	x	70	x
532	x	145	.04	574	x	130	.04	616	x	33	x
533	x	140	.03	575	x	123	.03	617	x	33	x
534	x	135	.02	576	x	130	.03	618	x	22	x
535	x	135	.02	577	x	130	.03	619	x	78	x
536	x	146	.01	578	x	130	.01	620	x	90	x
537	x	135	x	579	x	130	.01	621	x	112	x
538	x	146	x	580	x	130	.01	622	x	112	x
539	x	112	x	581	x	112	.01	623	x	135	x
540	x	101	x	582	x	123	.02	624	x	135	x
541	x	105	x	583	x	123	.03	625	x	135	x
542	x	90	x	584	x	123	.01	626	x	140	x
543	x	90	x	585	x	123	.02	627	x	130	x
544	x	67	x	586	x	120	.02	628	x	45	x
545	x	50	x	587	x	101	.03	629	x	135	x
546	x	55	x	588	x	101	.03	630	x	135	x

Analist: Torres, Pacheco, Gonzalez
Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-59" Lat. 17°-57'-22" Inst.S.N. 516

Date in 12-3-71 Hr. In. 8:30 am Date Out 12-15-71 Hr.Out 8:00 am Total Hrs. 287.5

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~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.
631	x	135	x	673	x	123	x	715	x	115	x
632	x	22	x	674	x	140	x	716	x	115	x
633	x	22	x	675	x	140	x	717	x	115	x
634	x	56	x	676	x	140	x	718	x	105	x
635	x	67	x	677	x	140	x	719	x	101	x
636	x	78	x	678	x	135	x	720	x	105	x
637	x	101	x	679	x	123	x	721	x	123	x
638	x	101	x	680	x	123	x	722	x	123	x
639	x	101	x	681	x	135	x	723	x	112	x
640	x	120	x	682	x	140	x	724	x	115	x
641	x	90	x	683	x	135	x	725	x	115	x
642	x	101	x	684	x	135	x	726	x	67	x
643	x	105	x	685	x	135	x	727	x	53	x
644	x	101	x	686	x	135	x	728	x	33	x
645	x	105	x	687	x	135	x	729	x	33	x
646	x	110	x	688	x	135	x	730	x	78	x
647	x	105	.01	689	x	135	.01	731	x	78	x
648	x	90	.01	690	x	135	.01	732	x	56	x
649	x	105	.02	691	x	130	.03	733	x	90	x
650	x	80	.02	692	x	130	.03	734	x	90	x
651	x	90	.03	693	x	130	.03	735	x	90	x
652	x	80	.03	694	x	130	.03	736	x	101	x
653	x	90	.03	695	x	130	.03	737	x	95	x
654	x	90	.02	696	x	130	.03	738	x	112	x
655	x	90	.02	697	x	130	.04	739	x	112	x
656	x	90	.02	698	x	130	.05	740	x	112	x
657	x	78	.02	699	x	130	.05	741	x	90	x
658	x	90	.02	700	x	130	.04	742	x	90	x
659	x	90	.02	701	x	130	.01	743	x	101	x
660	x	78	.01	702	x	130	.01	744	x	112	.01
661	x	69	.01	703	x	130	.01	745	x	78	.03
662	x	80	.01	704	x	123	x	746	x	69	.03
663	x	90	.01	705	x	123	x	747	x	90	.04
664	x	45	.01	706	x	123	x	748	x	90	.05
665	x	33	.01	707	x	123	x	749	x	70	.05
666	x	40	x	708	x	123	x	750	x	70	.04
667	x	30	x	709	x	123	x	751	x	78	.06
668	x	15	x	710	x	123	x	752	x	90	.05
669	x	11	x	711	x	115	x	753	x	90	.04
670	x	11	x	712	x	120	x	754	x	90	.04
671	x	5	x	713	x	120	x	755	x	101	.04
672	x	45	x	714	x	120	x	756	x	112	.04

Analist: Torres, Pacheco, Gonzalez

Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-59" Lat. 17°-57'-22" Inst.S.N. 516

Date in 12-3-72 Hr. In. 8:30 am Date Out 12-15-71 Hr.Out 8:00 am Total Hrs. 287.5

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15.86 min. 15.86 min. 15.86 min.

~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.
757	x	123	.04	799	x	90	x	841	x	78	.04
758	x	90	.04	800	x	70	x	842	x	80	.03
759	x	90	.01	801	x	70	x	843	x	75	.03
760	x	101	.01	802	x	90	x	844	x	78	.04
761	x	78	x	803	x	78	x	845	x	78	.04
762	x	70	x	804	x	90	x	846	x	78	.03
763	x	95	x	805	x	100	x	847	x	80	.03
764	x	56	x	806	x	90	x	848	x	78	.03
765	x	56	x	807	x	78	x	849	x	56	.03
766	x	67	x	808	x	70	x	850	x	70	.03
767	x	67	x	809	x	90	.01	851	x	75	.03
768	x	67	x	810	x	90	.01	852	x	78	.03
769	x	35	x	811	x	70	.02	853	x	78	.02
770	x	45	x	812	x	78	.04	854	x	70	.01
771	x	60	x	813	x	67	.03	855	x	67	.01
772	x	67	x	814	x	60	.04	856	x	45	x
773	x	67	x	815	x	67	.04	857	x	33	x
774	x	70	x	816	x	67	.04	858	x	30	x
775	x	70	x	817	x	67	.05	859	x	22	x
776	x	70	x	818	x	70	.05	860	x	25	x
777	x	56	x	819	x	70	.05	861	x	22	x
778	x	56	x	820	x	70	.05	862	x	11	x
779	x	60	x	821	x	57	.05	863	x	11	x
780	x	60	x	822	x	66	.05	864	x	123	x
781	x	67	x	823	x	56	.06	865	x	123	x
782	x	67	x	824	x	70	.05	866	x	123	x
783	x	33	x	825	x	90	.05	867	x	123	x
784	x	45	x	826	x	65	.06	868	x	120	x
785	x	67	x	827	x	90	.07	869	x	123	x
786	x	60	x	828	x	101	.06	870	x	120	x
787	x	33	x	829	x	101	.07	871	x	90	x
788	x	33	x	830	x	67	.06	872	x	120	x
789	x	33	x	831	x	90	.06	873	x	123	x
790	x	70	x	832	x	56	.06	874	x	123	x
791	x	56	x	833	x	90	.07	875	x	123	x
792	x	45	x	834	x	56	.08	876	x	123	x
793	x	67	x	835	x	70	.07	877	x	123	x
794	x	78	x	836	x	78	.06	878	x	123	x
795	x	90	x	837	x	78	.06	879	x	123	x
796	x	90	x	838	x	78	.06	880	x	123	x
797	x	90	x	839	x	78	.06	881	x	123	x
798	x	78	x	840	x	70	.05	882	x	123	x

Analist: Torres, Pacheco, Gonzalez

Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-59" Lat. 17°-57'-22" Inst.S.N. 516

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15.86 min.				15.86 min.				15.86 min.			
~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.	~~1/2 Hr.~~ Int.	T C°	Dir. O°M	Speed K/Hr.
883	x	123	x	925	x	56	x	967	x	11	x
884	x	123	x	926	x	56	x	968	x	30	x
885	x	123	x	927	x	56	x	969	x	35	x
886	x	123	x	928	x	78	x	970	x	45	x
887	x	123	x	929	x	78	x	971	x	56	x
888	x	123	x	930	x	75	x	972	x	67	x
889	x	123	x	931	x	56	x	973	x	78	x
890	x	120	x	932	x	80	x	974	x	85	x
891	x	123	x	933	x	80	x	975	x	90	x
892	x	112	x	934	x	90	x	976	x	90	x
893	x	120	x	935	x	22	x	977	x	70	x
894	x	123	x	936	x	45	x	978	x	67	x
895	x	123	x	937	x	67	x	979	x	80	x
896	x	112	x	938	x	78	x	980	x	90	x
897	x	123	x	939	x	56	x	981	x	80	x
898	x	120	x	940	x	11	x	982	x	90	x
899	x	123	x	941	x	22	x	983	x	78	x
900	x	123	x	942	x	45	x	984	x	70	x
901	x	123	x	943	x	56	x	985	x	70	x
902	x	123	x	944	x	45	x	986	x	75	x
903	x	123	x	945	x	105	x	987	x	70	x
904	x	123	x	946	x	105	x	988	x	70	x
905	x	123	x	947	x	90	x	989	x	78	x
906	x	112	x	948	x	56	x	990	x	67	x
907	x	112	x	949	x	70	x	991	x	56	x
908	x	105	x	950	x	45	x	992	x	60	x
909	x	105	x	951	x	105	x	993	x	60	x
910	x	112	x	952	x	105	x	994	x	45	x
911	x	100	x	953	x	105	x	995	x	45	x
912	x	112	x	954	x	101	x	996	x	45	x
913	x	90	x	955	x	105	x	997	x	35	x
914	x	105	x	956	x	105	x	998	x	40	x
915	x	101	x	957	x	101	x	999	x	45	x
916	x	105	x	958	x	105	x	1000	x	45	x
917	x	112	x	959	x	105	x	1001	x	33	x
918	x	101	x	960	x	105	x	1002	x	33	x
919	x	22	x	961	x	105	x	1003	x	35	x
920	x	11	x	962	x	105	x	1004	x	40	x
921	x	22	x	963	x	105	x	1005	x	40	x
922	x	25	x	964	x	101	x	1006	x	40	x
923	x	33	x	965	x	x	x	1007	x	25	x
924	x	20	x	966	x	22	x	1008	x	40	x

Analist: Torres, Pacheco, Gonzalez

Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

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1009	x	22	x	1051	x	45	x				
1010	x	5	x	1052	x	45	x				
1011	x	11	x	1053	x	33	x				
1012	x	x	x	1054	x	33	x				
1013	x	x	x	1055	x	33	x				
1014	x	x	x	1056	x	40	x				
1015	x	x	x	1057	x	40	x				
1016	x	x	x	1058	x	40	x				
1017	x	22	x	1059	x	56	x				
1018	x	30	x	1060	x	50	x				
1019	x	35	x	1061	x	45	x				
1020	x	35	x	1062	x	56	x				
1021	x	35	x	1063	x	45	x				
1022	x	33	x	1064	x	45	x				
1023	x	40	x	1065	x	45	x				
1024	x	45	x	1066	x	35	x				
1025	x	45	x	1067	x	35	x				
1026	x	40	x	1068	x	45	x				
1027	x	33	x	1069	x	45	x				
1028	x	33	x	1070	x	40	x				
1029	x	33	x	1071	x	22	x				
1030	x	30	x	1072	x	11	x				
1031	x	30	x	1073	x	x	x				
1032	x	33	x	1074	x	x	x				
1033	x	33	x	1075	x	x	x				
1034	x	35	x	1076	x	x	x				
1035	x	33	x	1077	x	x	x				
1036	x	31	x	1078	x	5	x				
1037	x	33	x	1079	x	11	x				
1038	x	35	x	1080	x	11	x				
1039	x	40	x	1081	x	22	x				
1040	x	45	x	1082	x	22	x				
1041	x	45	x	1083	x	22	x				
1042	x	45	x	1084	x	5	x				
1043	x	45	x	1085	x	x	x				
1044	x	56	x	1086	x	22	x				
1045	x	50	x	1087	x	22	x				
1046	x	50	x	1088	x	30	x				
1047	x	40	x	1089	x	30	x				
1048	x	45	x	1090	x	30	x				
1049	x	45	x	1091	x	30	x				
1050	x	45	x								

Analist: Torres, Pacheco, Gonzalez

Typist: Ramirez

Bay Ponce Sta. 1 Coordinates Long. 66°-36'-59" Lat. 17°-57'-22" Instrument SN 516 Date In 12-3-71

Direction ~~Velocities~~ Frequency For Each 10° Magnetic Direction

10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°	160°	170°	180°	190°	200°	210°	220°	230°	240°	250°	260°	270°	280°	290°	300°	310°	320°	330°	340°	350°	360°
34	30	50	76	10	50	69	56	66	81	48	79	65	13	41	50	37	25	15	6	14	24		39	29	24	13	3		2						

WATER RESOURCES RESEARCH INSTITUTE

UNIVERSITY OF PUERTO RICO, MAYAGUEZ - PROJECT A-031-PR INVESTIGATOR - PROF. E. F. COLON

BAY Ponce COORDINATES LONG. 66°-37'-01" LAT. 17°-57'-06" INST. S.N. 523

DATE IN 12-3-71 HR. IN 9:45 am DATE OUT 12-15-71 HR. OUT 7:20 am TOTAL HRS. 285.6

DEPTH OF BOTTOM 40 FT. DEPTH OF SENSOR 15 FT. REMARKS: Speed sensor failure after 80 hrs.

DIRECTION AND RELATIVE QUANTITY OF WATER FLOW

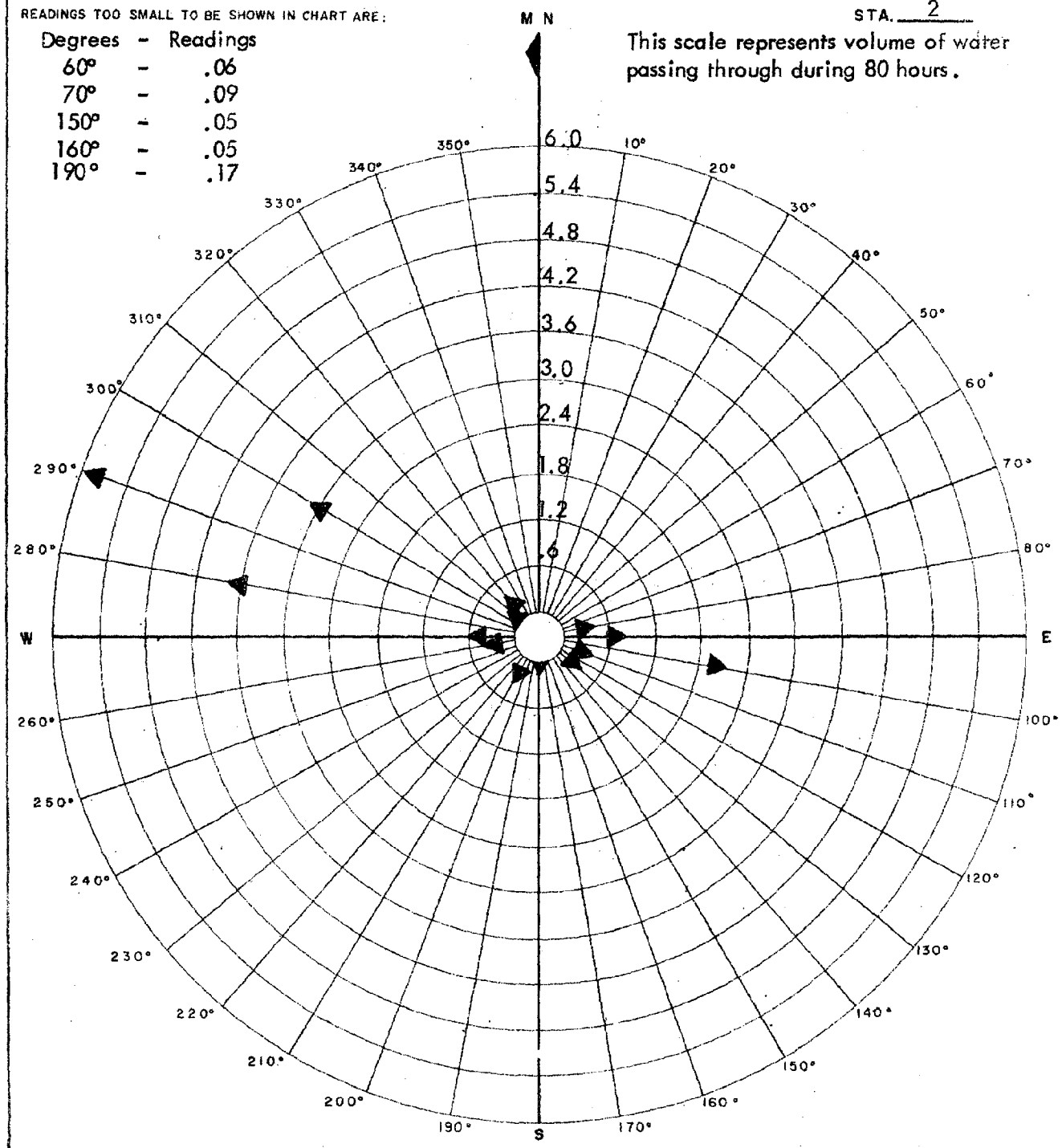
see page 40

STA. 2

READINGS TOO SMALL TO BE SHOWN IN CHART ARE:

Degrees	-	Readings
60°	-	.06
70°	-	.09
150°	-	.05
160°	-	.05
190°	-	.17

This scale represents volume of water passing through during 80 hours.



Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-37'-01" Lat. 17°-57'-06" Inst.S.N. 523

Date in Dec. 3, 1971 Hr. In. 9:45 am Date Out Dec. 15, 1971 Hr. Out 7:20 am Total Hrs. 285.6

Depth of bottom 40 ft. Depth of Sensor 15 ft. Remarks: Speed sensor failure after 80 hours.

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
1	28	292.5	.23	43	28	180	.06	85	28	146	.05
2	28	292.5	.25	44	28	135	.07	86	28	285	.04
3	28	303.75	.30	45	28	112	.09	87	28	270	.04
4	28	297.5	.34	46	28	105	.10	88	28	180	.05
5	28	292.5	.25	47	28	110	.08	89	28	88	.06
6	28	288	.23	48	28	180	.05	90	27	90	.08
7	28	292.5	.20	49	28	281	.08	91	28	112	.09
8	28	294	.25	50	28	281	.17	92	28	101	.11
9	28	292.5	.26	51	28	281	.23	93	28	105	.16
10	28	297	.27	52	28	292	.23	94	28	103	.17
11	28	291	.24	53	28	290	.20	95	28	101	.16
12	28	303.75	.33	54	28	292	.17	96	28	101	.12
13	28	297	.29	55	28	292	.16	97	28	95	.09
14	28	295	.30	56	28	285	.15	98	29	292	.14
15	28	280.75	.23	57	28	285	.10	99	27	292	.14
16	28	292.5	.30	58	28	285	.14	100	27	303	.08
17	28	301	.20	59	28	283	.18	101	27	303	.07
18	28	325	.16	60	28	285	.22	102	27	90	.06
19	28	281.25	.08	61	28	290	.21	103	28	78	.07
20	28	303.75	.10	62	28	295	.20	104	28	75	.09
21	28	303.75	.06	63	28	310	.10	105	28	101	.08
22	28	253	.08	64	28	315	.11	106	28	135	.08
23	28	258	.08	65	28	303	.10	107	28	112	.09
24	28	325	.08	66	28	281	.06	108	28	225	.09
25	28	270	.07	67	28	200	.06	109	28	258	.09
26	28	213.75	.07	68	28	56	.06	110	28	213	.10
27	28	210	.08	69	28	90	.08	111	28	213	.10
28	28	200	.08	70	28	101	.14	112	28	258	.08
29	28	258	.06	71	28	101	.14	113	28	260	.08
30	28	135	.08	72	28	101	.14	114	28	281	.10
31	28	123.75	.10	73	28	90	.12	115	28	270	.09
32	28	97	.12	74	28	85	.12	116	28	290	.10
33	28	97	.14	75	28	85	.11	117	28	281	.10
34	28	101.75	.12	76	28	80	.10	118	28	270	.12
35	28	123.5	.10	77	28	90	.09	119	28	280	.16
36	28	105	.09	78	28	95	.08	120	27	270	.18
37	28	105	.08	79	28	101	.06	121	28	290	.17
38	28	292	.07	80	28	105	.06	122	27	285	.19
39	28	303	.08	81	28	105	.07	123	27	281	.20
40	28	303	.09	82	28	247	.01	124	27	292	.19
41	28	303	.09	83	28	225	.06	125	27	292	.18
42	28	157	.05	84	28	192	.07	126	27	303	.14

Analist: Torres, Pacheco, González

Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-37'-01" Lat. 17°-57'-06" Inst. S.N. 523

Date in Dec. 3, 1971 Hr. In. 9:45 am Date Out Dec. 15, 1971 Hr. Out 7:20 am Total Hrs. 285.6

Depth of bottom 40 ft. Depth of Sensor 15 ft. Remarks: Speed sensor failure after 80 hours.

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
127	27	303	.10	169	27	292	x	211	26	180	x
128	27	303	.10	170	27	292	x	212	27	135	x
129	27	303	.10	171	27	285	x	213	26	146	x
130	27	300	.09	172	27	285	x	214	27	135	x
131	27	303	.09	173	27	295	x	215	27	135	x
132	27	290	.08	174	27	303	x	216	26	135	x
133	27	300	.08	175	27	300	x	217	26	150	x
134	27	292	.09	176	27	295	x	218	26	150	x
135	27	292	.09	177	27	180	x	219	26	123	x
136	27	292	.10	178	27	67	x	220	26	146	x
137	27	303	.09	179	27	78	x	221	26	180	x
138	27	270	.09	180	27	78	x	222	27	135	x
139	27	110	.08	181	27	90	x	223	27	101	x
140	27	90	.08	182	27	90	x	224	27	90	x
141	27	100	.06	183	27	90	x	225	27	101	x
142	27	135	.06	184	27	90	x	226	27	101	x
143	27	292	.07	185	27	100	x	227	27	101	x
144	27	290	.10	186	27	100	x	228	27	101	x
145	27	281	.10	187	27	101	x	229	27	101	x
146	27	285	.10	188	27	101	x	230	27	95	x
147	28	285	.12	189	27	110	x	231	27	95	x
148	28	295	.12	190	27	105	x	232	27	95	x
149	27	295	.12	191	27	101	x	233	27	95	x
150	28	295	.12	192	27	95	x	234	27	95	x
151	28	285	.12	193	27	101	x	235	27	95	x
152	28	292	.12	194	27	157	x	236	27	95	x
153	27	281	.13	195	27	258	x	237	27	96	x
154	28	285	.14	196	27	270	x	238	27	95	x
155	28	280	.15	197	27	270	x	239	27	95	x
156	28	281	.16	198	27	281	x	240	27	101	x
157	28	285	.15	199	27	292	x	241	27	101	x
158	27	290	.15	200	27	285	x	242	27	101	x
159	27	281	.12	201	27	292	x	243	27	101	x
160	27	285	.12	202	27	290	x	244	27	101	x
161	27	285	x	203	27	270	x	245	27	90	x
162	27	290	x	204	27	135	x	246	27	95	x
163	27	281	x	205	27	225	x	247	27	60	x
164	27	285	x	206	27	247	x	248	27	90	x
165	27	292	x	207	27	258	x	249	27	70	x
166	27	303	x	208	27	270	x	250	27	70	x
167	27	303	x	209	27	292	x	251	27	90	x
168	27	285	x	210	27	225	x	252	27	135	x

Analist: Torres, Pacheco, González

Typist: Ramírez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-37'-01" Lat. 17°-57'-06" Inst.S.N. 523

Date in Dec. 3, 1971 Hr. in. 9:45 am Date Out Dec. 15, 1971 Hr.Out 7:20 am Total Hrs. 285.6

Depth of bottom 40 ft. Depth of Sensor 15 ft. Remarks: Speed sensor failure after 80 hours.

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
253	27	146	x	295	27	281	x	337	27	157	x
254	27	157	x	296	27	292	x	338	27	236	x
255	27	146	x	297	27	292	x	339	27	270	x
256	27	135	x	298	27	303	x	340	27	285	x
257	27	101	x	299	27	303	x	341	27	310	x
258	27	75	x	300	27	292	x	342	27	315	x
259	27	90	x	301	27	270	x	343	27	292	x
260	27	95	x	302	27	281	x	344	27	292	x
261	27	101	x	303	27	270	x	345	27	270	x
262	27	101	x	304	27	90	x	346	27	281	x
263	27	101	x	305	27	78	x	347	27	281	x
264	27	105	x	306	27	101	x	348	27	292	x
265	27	101	x	307	27	105	x	349	27	292	x
266	27	101	x	308	27	105	x	350	27	270	x
267	27	101	x	309	27	101	x	351	27	180	x
268	27	100	x	310	27	101	x	352	27	67	x
269	27	95	x	311	27	101	x	353	27	90	x
270	27	90	x	312	27	101	x	354	27	90	x
271	27	88	x	313	27	101	x	355	27	101	x
272	27	83	x	314	27	101	x	356	27	101	x
273	27	202	x	315	27	101	x	357	26	105	x
274	27	225	x	316	27	100	x	358	26	101	x
275	27	270	x	317	27	92	x	359	26	101	x
276	27	280	x	318	27	78	x	360	26	95	x
277	27	303	x	319	27	67	x	361	26	92	x
278	27	270	x	320	27	90	x	362	26	87	x
279	27	180	x	321	27	90	x	363	26	80	x
280	27	67	x	322	27	56	x	364	26	80	x
281	27	78	x	323	27	90	x	365	26	90	x
282	26	95	x	324	26	90	x	366	26	101	x
283	26	101	x	325	26	247	x	367	26	123	x
284	26	101	x	326	26	247	x	368	26	225	x
285	26	92	x	327	26	270	x	369	26	270	x
286	26	100	x	328	26	112	x	370	26	180	x
287	26	90	x	329	26	105	x	371	26	101	x
288	26	95	x	330	26	112	x	372	26	101	x
289	27	95	x	331	26	112	x	373	27	105	x
290	27	112	x	332	26	120	x	374	27	101	x
291	27	105	x	333	27	101	x	375	27	105	x
292	27	90	x	334	27	95	x	376	27	101	x
293	27	101	x	335	27	95	x	377	27	101	x
294	27	290	x	336	27	105	x	378	27	101	x

Analist: Torres, Pacheco, Gonzalez

Typist: Ramirez

Water Resources Research Institute

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Bay Ponce Coordinates Long. 66°-37'-01" Lat. 17°-57'-06" Inst. S.N. 523

Date in Dec. 3, 1971 Hr. In. 9:45 am Date Out Dec. 15, 1971 Hr. Out 7:20 am Total Hrs. 285.6

Depth of bottom 40 ft. Depth of Sensor 15 ft. Remarks: Speed sensor failure after 80 hours.

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1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
379	27	105	x	421	27	80	x	463	25	300	x
380	27	105	x	422	27	80	x	464	26	295	x
381	27	100	x	423	27	80	x	465	26	295	x
382	27	100	x	424	27	90	x	466	26	300	x
383	27	100	x	425	27	85	x	467	26	300	x
384	27	100	x	426	27	85	x	468	26	300	x
385	27	101	x	427	27	90	x	469	26	310	x
386	27	95	x	428	27	90	x	470			
387	27	78	x	429	27	100	x	471			
388	27	80	x	430	27	100	x	472			
389	27	225	x	431	27	105	x	473			
390	27	303	x	432	27	80	x	474			
391	27	290	x	433	27	180	x	475			
392	27	290	x	434	27	225	x	476			
393	27	292	x	435	27	247	x	477			
394	27	295	x	436	27	270	x	478			
395	27	295	x	437	27	290	x	479			
396	27	303	x	438	27	280	x	480			
397	27	303	x	439	27	285	x	481			
398	27	300	x	440	27	292	x	482			
399	27	292	x	441	27	281	x	483			
400	26	300	x	442	27	285	x	484			
401	26	213	x	443	27	285	x	485			
402	26	180	x	444	26	290	x	486			
403	26	123	x	445	26	295	x	487			
404	26	67	x	446	26	300	x	488			
405	26	78	x	447	26	300	x	489			
406	26	90	x	448	26	285	x	490			
407	26	78	x	449	26	292	x	491			
408	26	90	x	450	26	292	x	492			
409	26	57	x	451	26	290	x	493			
410	26	135	x	452	26	290	x	494			
411	26	90	x	453	26	290	x	495			
412	26	292	x	454	26	292	x	496			
413	26	292	x	455	26	295	x	497			
414	26	292	x	456	26	300	x	498			
415	26	290	x	457	26	300	x	499			
416	26	292	x	458	26	300	x	500			
417	26	300	x	459	26	300	x	501			
418	27	180	x	460	26	303	x	502			
419	27	78	x	461	26	292	x	503			
420	27	78	x	462	26	300	x	504			

Analist: Torres, Pacheco, Gonzalez

Typist: Ramirez

Bay Ponce Sta. 2 Coordinates Long. 66°-37'-01" Lat. 17°-57'-06" Instrument SN 523 Date In Dec. 3, 1971

Velocities Frequency For Each 10° Magnetic Direction

10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°	160°	170°	180°	190°	200°	210°	220°	230°	240°	250°	260°	270°	280°	290°	300°	310°	320°	330°	340°	350°	360
					.06	.09	.12	.08	.12	.09	.10	.08		.05	.05		.06	.07	.08	.07	.06			.08	.08	.07	.23	.23	.30	.10	.16				
							.11	.12	.14	.08	.10	.07					.05		.06	.08	.09			.01	.06	.04	.08	.25	.34	.11	.08				
							.10	.09	.12	.09		.08					.05			.10					.09	.09	.08	.25	.27						
							.07	.08	.09	.09		.06								.10					.08	.12	.17	.23	.33						
								.06	.08	.08															.08	.18	.23	.20	.29						
								.08	.10																	.09	.15	.25	.20						
								.09	.14																		.10	.26	.10						
								.06	.14																		.14	.24	.06						
								.08	.14																		.18	.30	.08						
									.06																		.22	.30	.09						
									.06																		.06	.07	.09						
									.07																		.04	.23	.10						
									.11																		.10	.20	.08						
									.16																		.10	.17	.07						
									.17																		.16	.16	.14						
									.16																		.19	.21	.10						
									.12																		.20	.20	.10						
									.08																		.10	.14	.10						
									.06																		.10	.14	.09						
																											.12	.10	.09						
																											.12	.17	.08						
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Bay Ponce Sta. 2 Coordinates Long. 66°-37'-01" Lat. 17°-57'-06" Instrument SN 523 Date In Dec. 3, 1971

Velocities Frequency For Each 10° Magnetic Direction

10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°	160°	170°	180°	190°	200°	210°	220°	230°	240°	250°	260°	270°	280°	290°	300°	310°	320°	330°	340°	350°	360°
																												.12							
																												.12							
																												.12							
																												.15							
					.06	.09	.40	.74	2.22	.43	.20	.29		.05	.05		.16	.07	.14	.35	.15			.09	.39	.59	3.84	5.83	3.16	.21	.24				

WATER RESOURCES RESEARCH INSTITUTE

UNIVERSITY OF PUERTO RICO, MAYAGUEZ - PROJECT A-031-PR INVESTIGATOR - PROF. E. F. COLON

BAY Ponce COORDINATES LONG. 66°-36'-44" LAT. 17°-56'-32" INST. S.N. 519

DATE IN 12-3-71 HR. IN 10:45 am DATE OUT 12-15-71 HR. OUT 7:35 am TOTAL HRS. 284.8

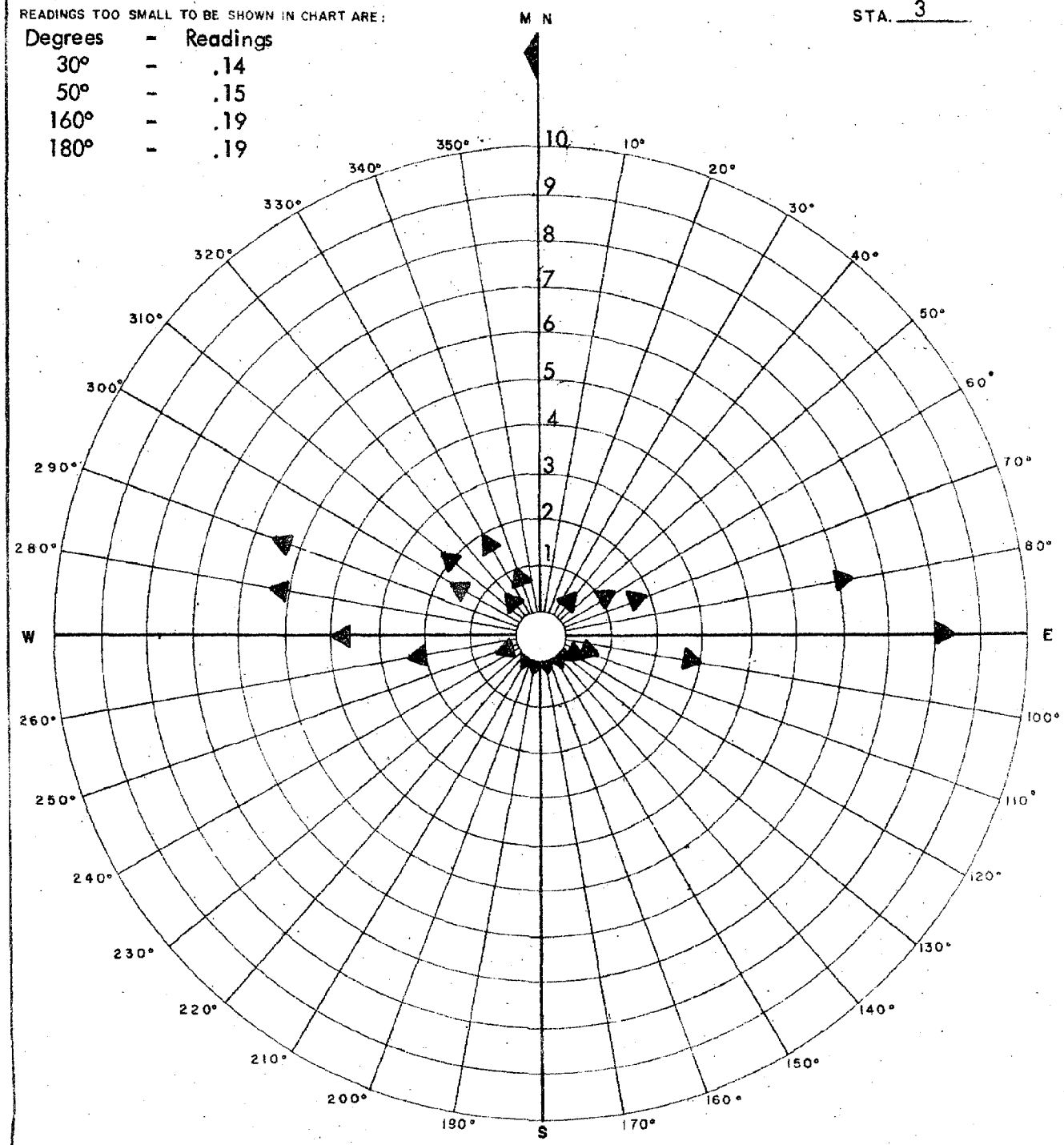
DEPTH OF BOTTOM 85 FT. DEPTH OF SENSOR 20 FT. REMARKS:

DIRECTION AND RELATIVE QUANTITY OF WATER FLOW see page 40

STA. 3

READINGS TOO SMALL TO BE SHOWN IN CHART ARE:

Degrees	-	Readings
30°	-	.14
50°	-	.15
160°	-	.19
180°	-	.19



Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-44" Lat. 17°-56'-32" Inst.S.N. 519

Date in Dec. 3, 1971 Hr. In. 10:45 am Date Out Dec. 15, 1971 Hr.Out 7:35 am Total Hrs. 284.8

Depth of bottom 85 ft. Depth of Sensor 20 ft. Remarks:

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
1	29	292	.22	43	28	146	.06	85	28	56	.04
2	29	292	.25	44	28	56	.05	86	28	78	.05
3	29	281	.30	45	28	56	.05	87	28	67	.05
4	29	275	.34	46	28	90	.05	88	28	67	.07
5	29	285	.33	47	28	90	.05	89	28	45	.07
6	29	290	.33	48	29	258	.09	90	28	78	.05
7	29	292	.24	49	28	270	.10	91	28	123	.06
8	29	270	.24	50	29	281	.15	92	28	101	.09
9	29	285	.25	51	28	281	.15	93	28	78	.12
10	29	281	.28	52	28	281	.18	94	28	101	.11
11	29	275	.28	53	28	290	.21	95	28	190	.05
12	29	270	.25	54	28	292	.20	96	28	101	.04
13	29	281	.25	55	28	303	.22	97	28	101	.03
14	29	265	.23	56	29	315	.14	98	28	67	.03
15	28	270	.24	57	28	326	.12	99	28	326	.03
16	29	281	.20	58	28	292	.12	100	28	292	.08
17	29	270	.15	59	28	281	.14	101	28	101	.09
18	28	270	.10	60	28	270	.18	102	28	101	.09
19	28	270	.08	61	28	281	.16	103	28	90	.06
20	28	270	.05	62	28	303	.13	104	28	67	.05
21	29	315	.05	63	28	303	.12	105	28	123	.05
22	28	330	.05	64	28	326	.09	106	28	225	.05
23	28	275	.04	65	28	315	.05	107	28	347	.07
24	28	258	.04	66	28	315	.05	108	28	281	.12
25	28	292	.03	67	28	337	.07	109	29	292	.15
26	28	225	.05	68	28	33	.08	110	29	292	.14
27	28	78	.05	69	28	67	.06	111	29	281	.11
28	28	101	.05	70	28	87	.07	112	29	270	.09
29	29	56	.05	71	28	87	.10	113	29	275	.06
30	28	90	.08	72	28	101	.09	114	29	315	.05
31	29	95	.05	73	28	101	.05	115	29	247	.04
32	29	123	.10	74	29	95	.06	116	29	236	.05
33	29	123	.05	75	29	90	.08	117	29	78	.06
34	28	135	.05	76	29	78	.04	118	29	112	.08
35	29	101	.05	77	29	101	.06	119	29	90	.07
36	29	225	.05	78	28	123	.07	120	29	90	.13
37	29	247	.05	79	29	157	.05	121	29	101	.15
38	28	270	.06	80	28	90	.05	122	29	101	.10
39	29	292	.07	81	28	90	.05	123	29	101	.13
40	29	303	.07	82	29	291	.05	124	29	123	.10
41	28	281	.05	83	28	101	.05	125	29	112	.15
42	29	247	.05	84	28	337	.04	126	29	112	.18

Analist: Torres

Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-44" Lat. 17°-56'-32" Inst. S.N. 519

Date in Dec. 3, 1971 Hr. In. 10:45 am Date Out Dec. 15, 1971 Hr. Out 7:35 am Total Hrs. 284.8

Depth of bottom 85 ft. Depth of Sensor 20 ft. Remarks:

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
127	29	95	.16	169	28	90	.03	211	29	270	.15
128	29	90	.15	170	28	67	.04	212	28	270	.12
129	29	95	.14	171	28	78	.05	213	28	265	.13
130	29	78	.09	172	28	56	.03	214	28	258	.10
131	28	78	.07	173	28	56	.03	215	28	292	.12
132	28	67	.05	174	28	78	.04	216	28	270	.06
133	28	326	.04	175	28	56	.04	217	28	315	.06
134	28	315	.05	176	28	112	.04	218	28	320	.04
135	28	281	.06	177	28	78	.05	219	28	303	.04
136	28	285	.06	178	28	67	.06	220	28	281	.07
137	28	292	.06	179	28	75	.04	221	28	292	.08
138	28	281	.06	180	28	85	.03	222	28	281	.10
139	28	275	.04	181	28	168	.03	223	28	281	.09
140	28	270	.04	182	28	191	.07	224	28	295	.06
141	28	281	.03	183	28	258	.06	225	28	303	.05
142	28	292	.03	184	28	258	.08	226	28	310	.03
143	28	146	.03	185	28	258	.12	227	28	281	.03
144	28	90	.05	186	28	270	.11	228	28	213	.03
145	28	101	.04	187	28	265	.07	229	28	292	.05
146	28	195	.05	188	28	270	.05	230	28	247	.06
147	28	281	.04	189	28	281	.03	231	28	270	.07
148	28	315	.05	190	28	292	.03	232	28	292	.05
149	28	213	.05	191	28	67	.05	233	28	281	.08
150	28	78	.08	192	28	56	.07	234	28	292	.03
151	29	50	.07	193	28	50	.08	235	28	285	.09
152	29	236	.07	194	29	68	.09	236	28	285	.12
153	29	292	.09	195	28	202	.09	237	28	292	.12
154	29	281	.07	196	29	213	.10	238	28	292	.10
155	29	258	.11	197	29	180	.10	239	28	285	.10
156	29	265	.19	198	29	157	.09	240	28	285	.15
157	29	285	.20	199	29	101	.06	241	28	315	.21
158	29	290	.20	200	29	90	.05	242	28	315	.19
159	29	290	.12	201	29	95	.04	243	28	292	.15
160	29	290	.15	202	28	67	.06	244	28	305	.06
161	29	275	.15	203	29	101	.06	245	28	285	.08
162	29	285	.08	204	29	168	.06	246	28	303	.08
163	29	281	.09	205	28	175	.05	247	28	310	.06
164	28	275	.06	206	29	285	.08	248	28	295	.06
165	28	247	.05	207	29	258	.10	249	28	281	.06
166	28	310	.03	208	29	265	.11	250	28	303	.07
167	29	78	.04	209	29	292	.19	251	28	258	.07
168	28	85	.03	210	28	270	.16	252	28	258	.05

Analist: Torres

Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-44" Lat. 17°-56'-32" Inst.S.N. 519

Date in Dec. 3, 1971 Hr. In. 10:45 am Date Out Dec. 15, 1971 Hr.Out 7:35 am Total Hrs. 284.8

Depth of bottom 85 ft. Depth of Sensor 20 ft. Remarks:

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
253	28	292	.10	295	28	281	.05	337	28	60	.09
254	28	258	.07	296	28	281	.04	338	28	45	.11
255	28	258	.08	297	28	281	.04	339	28	45	.10
256	28	292	.08	298	28	78	.04	340	28	45	.08
257	28	320	.08	299	28	101	.04	341	28	56	.09
258	28	303	.06	300	28	146	.04	342	28	56	.08
259	28	295	.08	301	28	95	.05	343	28	45	.10
260	28	310	.09	302	28	101	.03	344	28	56	.12
261	28	310	.08	303	28	56	.03	345	28	67	.17
262	28	310	.05	304	28	101	.05	346	28	85	.20
263	28	330	.04	305	28	123	.04	347	28	90	.20
264	28	292	.03	306	28	146	.03	348	28	90	.20
265	28	78	.03	307	28	67	.03	349	28	90	.15
266	28	67	.03	308	28	135	.03	350	28	101	.15
267	28	78	.05	309	28	77	.05	351	28	90	.15
268	28	56	.06	310	28	78	.09	352	28	90	.15
269	28	90	.08	311	28	78	.07	353	28	85	.15
270	28	78	.08	312	28	85	.13	354	28	90	.13
271	28	78	.07	313	28	101	.13	355	28	95	.09
272	28	78	.09	314	28	90	.15	356	28	78	.06
273	28	80	.10	315	28	90	.17	357	28	67	.07
274	28	90	.10	316	28	90	.19	358	28	67	.04
275	28	101	.10	317	28	90	.20	359	28	326	.04
276	28	90	.09	318	28	95	.25	360	28	326	.05
277	28	78	.07	319	28	95	.25	361	28	303	.05
278	28	90	.05	320	28	95	.25	362	28	337	.05
279	28	123	.05	321	28	90	.25	363	28	330	.05
280	28	202	.05	322	28	90	.25	364	28	337	.05
281	28	191	.07	323	28	90	.25	365	28	337	.05
282	28	258	.07	324	28	90	.22	366	28	213	.04
283	28	270	.12	325	28	90	.20	367	28	67	.06
284	28	281	.11	326	28	85	.20	368	28	67	.11
285	28	292	.12	327	28	80	.20	369	28	78	.11
286	28	295	.13	328	28	78	.20	370	28	80	.10
287	28	310	.11	329	28	78	.19	371	28	80	.09
288	28	315	.10	330	28	78	.14	372	28	80	.09
289	28	326	.12	331	28	78	.13	373	28	85	.14
290	28	326	.13	332	28	67	.10	374	28	80	.15
291	28	326	.10	333	28	56	.06	375	28	80	.15
292	28	326	.08	334	28	56	.09	376	28	80	.15
293	28	326	.07	335	28	67	.09	377	28	95	.12
294	28	281	.06	336	28	67	.08	378	28	90	.10

Analist: Torres

Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-44" Lat. 17°-56'-32" Inst.S.N. 519

Date in Dec. 3, 1971 Hr. In. 10:45 am Date Out Dec. 15, 1971 Hr.Out 7:35 am Total Hrs. 284.8

Depth of bottom 85 ft. Depth of Sensor 20 ft. Remarks:

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
379	28	90	.06	421	28	105	.07	463	28	78	.14
380	28	75	.04	422	28	105	.05	464	28	78	.15
381	28	180	.04	423	28	105	.01	465	28	78	.09
382	28	337	.10	424	28	30	.01	466	28	101	.10
383	28	337	.11	425	28	280	.04	467	28	125	.09
384	28	337	.10	426	28	270	.05	468	28	130	.14
385	28	337	.15	427	28	268	.06	469	28	112	.10
386	28	326	.14	428	28	303	.07	470	28	101	.08
387	28	320	.10	429	28	315	.12	471	28	135	.06
388	28	326	.07	430	28	330	.12	472	28	135	.03
389	28	315	.05	431	28	330	.12	473	28	101	.03
390	28	292	.04	432	28	337	.11	474	28	180	.05
391	28	70	.06	433	28	330	.10	475	28	270	.08
392	28	78	.10	434	28	337	.11	476	28	281	.07
393	28	78	.16	435	28	326	.09	477	28	303	.08
394	28	90	.16	436	28	326	.06	478	28	315	.08
395	28	90	.22	437	28	326	.07	479	28	315	.05
396	28	90	.18	438	28	45	.07	480	28	326	.06
397	28	95	.15	439	28	45	.12	481	28	315	.07
398	28	80	.11	440	28	101	.10	482	28	315	.05
399	28	78	.15	441	28	95	.11	483	28	310	.07
400	28	90	.10	442	28	101	.14	484	28	295	.07
401	28	85	.10	443	28	103	.18	485	28	281	.07
402	28	146	.08	444	28	90	.20	486	28	270	.04
403	28	157	.05	445	28	95	.24	487	28	90	.03
404	28	101	.03	446	28	95	.18	488	28	146	.04
405	28	105	.04	447	28	92	.15	489	28	90	.06
406	28	210	.07	448	28	90	.13	490	28	90	.05
407	28	258	.06	449	28	78	.11	491	28	90	.06
408	28	292	.05	450	28	67	.11	492	28	90	.05
409	28	315	.04	451	28	67	.07	493	28	78	.06
410	28	315	.04	452	28	67	.05	494	28	85	.04
411	28	292	.03	453	28	56	.06	495	28	90	.03
412	28	315	.05	454	28	60	.05	496	28	70	.03
413	28	326	.04	455	28	33	.05	497	28	80	.03
414	28	326	.03	456	28	67	.06	498	28	56	.03
415	28	112	.05	457	28	56	.08	499	28	202	.03
416	28	67	.03	458	28	67	.09	500	28	56	.03
417	28	101	.05	459	28	78	.10	501	28	90	.03
418	28	90	.05	460	28	85	.08	502	28	315	.03
419	28	90	.05	461	28	85	.10	503	28	247	.03
420	28	90	.08	462	28	90	.13	504	28	78	.05

Analist: Torres

Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-44" Lat. 17°-56'-32" Inst. S.N. 519

Date in Dec. 3, 1971 Hr. In. 10:45 am Date Out Dec. 15, 1971 Hr. Out 7:35 am Total Hrs. 284.8

Depth of bottom 85 ft. Depth of Sensor 20 ft. Remarks:

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
505	28	78	.06	547	27	281	.13				
506	28	78	.07	548	27	258	.14				
507	28	78	.05	549	27	292	.15				
508	28	90	.07	550	27	258	.16				
509	28	90	.06	551	27	303	.15				
510	28	101	.05	552	27	315	.13				
511	28	101	.06	553	27	320	.14				
512	28	90	.05	554	27	320	.12				
513	28	78	.06								
514	28	80	.06								
515	28	112	.06								
516	28	78	.06								
517	28	112	.07								
518	28	110	.05								
519	28	78	.05								
520	28	290	.05								
521	28	326	.06								
522	28	303	.07								
523	28	303	.08								
524	28	303	.11								
525	28	292	.17								
526	28	303	.17								
527	28	292	.16								
528	28	292	.19								
529	28	292	.17								
530	28	292	.13								
531	28	281	.08								
532	28	281	.09								
533	28	281	.05								
534	28	303	.06								
535	28	292	.07								
536	28	281	.07								
537	28	270	.08								
538	28	270	.09								
539	28	280	.09								
540	28	258	.09								
541	27	258	.10								
542	27	255	.10								
543	27	258	.07								
544	27	258	.07								
545	27	250	.09								
546	27	270	.13								

Analist: Torres

Typist: Ramirez

Bay Ponce Sta. 3 Coordinates Long. 66°-36'-44" Lat. 17°-56'-32" Instrument SN 519 Date In Dec. 3, 1971

Velocities Frequency For Each 10° Magnetic Direction

10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°	160°	170°	180°	190°	200°	210°	220°	230°	240°	250°	260°	270°	280°	290°	300°	310°	320°	330°	340°	350°	360
		.08	.07	.07	.05	.06	.05	.08	.05	.08	.10	.05		.06	.05	.03	.10	.05	.09	.05	.05		.05	.05	.23	.34	.30	.22	.07	.05	.06	.05	.07		
		.01	.11	.08	.05	.05	.04	.05	.05	.15	.05	.03		.03	.09	.09	.04	.05	.05	.10	.05		.07	.05	.04	.24	.33	.25	.22	.14	.08	.12	.04		
		.05	.10		.05	.07	.05	.05	.09	.18	.07	.14		.04	.05	.06	.05	.07	.03	.03	.05			.07	.09	.28	.25	.33	.13	.05	.10	.09	.05		
			.08		.04	.03	.05	.05	.05	.04	.06	.06		.03		.05		.07		.04				.04	.11	.25	.28	.24	.12	.05	.14	.03	.05		
			.10		.03	.05	.12	.07	.06	.05	.05	.03		.08						.07				.05	.19	.24	.25	.04	.04	.06	.12	.04	.05		
			.07		.03	.05	.06	.10	.05	.10	.10			.04										.06	.06	.15	.20	.07	.05	.05		.04	.10		
			.12		.04	.04	.09	.06	.09	.06	.05													.03	.08	.10	.05	.21	.06	.05		.12	.11		
					.07	.06	.07	.08	.11	.07	.04													.10	.12	.08	.15	.20	.08	.03		.13	.10		
					.06	.04	.08	.05	.04	.05	.09													.09	.07	.05	.15	.12	.07	.06		.10	.15		
					.03	.05	.04	.05	.03															.16	.10	.04	.18	.05	.06	.03		.08	.11		
					.06	.06	.03	.06	.09																.11	.06	.14	.08	.05	.21		.07	.11		
					.09	.03	.05	.07	.09																.13	.10	.16	.15	.07	.19		.04			
					.09	.03	.04	.13	.15																.10	.18	.12	.14	.08	.06		.05			
					.09	.10	.05	.16	.10																.07	.09	.11	.06	.07	.09		.05			
					.08	.09	.03	.15	.13																.05	.06	.06	.03	.08	.08		.14			
					.12	.08	.03	.14	.04																.07	.04	.06	.09	.11	.05		.07			
					.06	.17	.05	.05	.06																.08	.04	.06	.20	.17	.11		.04			
					.05	.07	.08	.03	.06																.07	.15	.03	.12	.06	.10		.03			
					.08	.04	.07	.05	.10																.06	.06	.04	.15	.15	.05		.12			
					.03	.06	.09	.04	.04																.09	.11	.09	.03		.04		.12			
					.03	.11	.10	.08	.03																.10	.05	.20	.19		.04		.10			
						.04	.07	.10	.05																.07	.16	.08	.12		.05		.09			
						.06	.04	.09	.13																.07	.15	.09	.08		.12		.06			
						.03	.05	.05	.15																.14	.12	.03	.06		.08		.07			
						.11	.09	.05	.03																	.06	.08	.05		.05		.06			
						.07	.07	.15	.04																	.07	.07	.05		.12		.06			
						.05	.13	.17	.05																	.12	.10	.07		.07					
						.06	.30	.19	.07																	.05	.09	.12		.03					
						.09	.20	.20	.05																	.06	.03	.10		.13					
						.03	.20	.25	.01																	.08	.08	.15							

Bay Ponce Site 3 Coordinates Long. 66°-36'-44" Lat. 17°-56'-32" Instrument SN 519 Date In Dec. 3, 1971

Velocities Frequency For Each 10° Magnetic Direction

10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°	160°	170°	180°	190°	200°	210°	220°	230°	240°	250°	260°	270°	280°	290°	300°	310°	320°	330°	340°	350°	360°
							.19	.25	.10																	.04	.09	.06							
							.14	.25	.14																	.08	.12	.10							
							.13	.25	.18																	.09	.10	.08							
							.20	.25	.10																	.13	.15	.08							
							.15	.25	.08																		.08	.03							
							.06	.22	.03																		.06	.12							
							.11	.20	.05																		.11	.13							
							.10	.20	.06																		.06	.04							
							.09	.20																			.05	.05							
							.09	.15																			.04	.03							
							.14	.15																			.04	.07							
							.15	.15																			.04	.05							
							.15	.13																			.07	.17							
							.15	.09																			.07	.16							
							.10	.12																			.08	.19							
							.16	.10																			.09	.17							
							.11	.06																			.05	.13							
							.15	.16																			.07	.07							
							.10	.22																			.09	.15							
							.11	.18																			.13								
							.10	.15																											
							.08	.10																											
							.10	.05																											
							.14	.13																											
							.15	.11																											
							.09	.20																											
							.06	.24																											
							.04	.18																											
							.03	.15																											
							.05	.13																											

Bay Ponce Sta. 3 Coordinates Long. 66°-36'-44" Lat. 17°-56'-32" Instrument SN 519 Date In Dec. 3, 1971

Velocities Frequency For Each 10° Magnetic Direction

10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°	160°	170°	180°	190°	200°	210°	220°	230°	240°	250°	260°	270°	280°	290°	300°	310°	320°	330°	340°	350°	360
							.06	.13																											
							.07	.03																											
							.05	.11																											
							.06	.11																											
							.06	.03																											
							.06	.03																											
							.05	.07																											
								.06																											
								.05																											
		.14	.65	.15	1.23	1.88	6.25	8.49	2.93	.78	.61	.31		.28	.19	.23	.19	.24	.17	.28	.15		.12	.70	2.30	3.92	5.45	5.65	1.74	2.24	.50	1.97	.94			

WATER RESOURCES RESEARCH INSTITUTE

UNIVERSITY OF PUERTO RICO, MAYAGUEZ - PROJECT A-031-PR INVESTIGATOR - PROF. E. F. COLON

BAY Ponce COORDINATES LONG. 66°-36'-45" LAT. 17°-56'-50" INST. S.N. 907

DATE IN 12-3-71 HR. IN 12:00 pm DATE OUT 12-12-71 HR. OUT 10:00 am TOTAL HRS. 214

DEPTH OF BOTTOM 35 FT. DEPTH OF SENSOR 15 FT. REMARKS: New instrument - see below

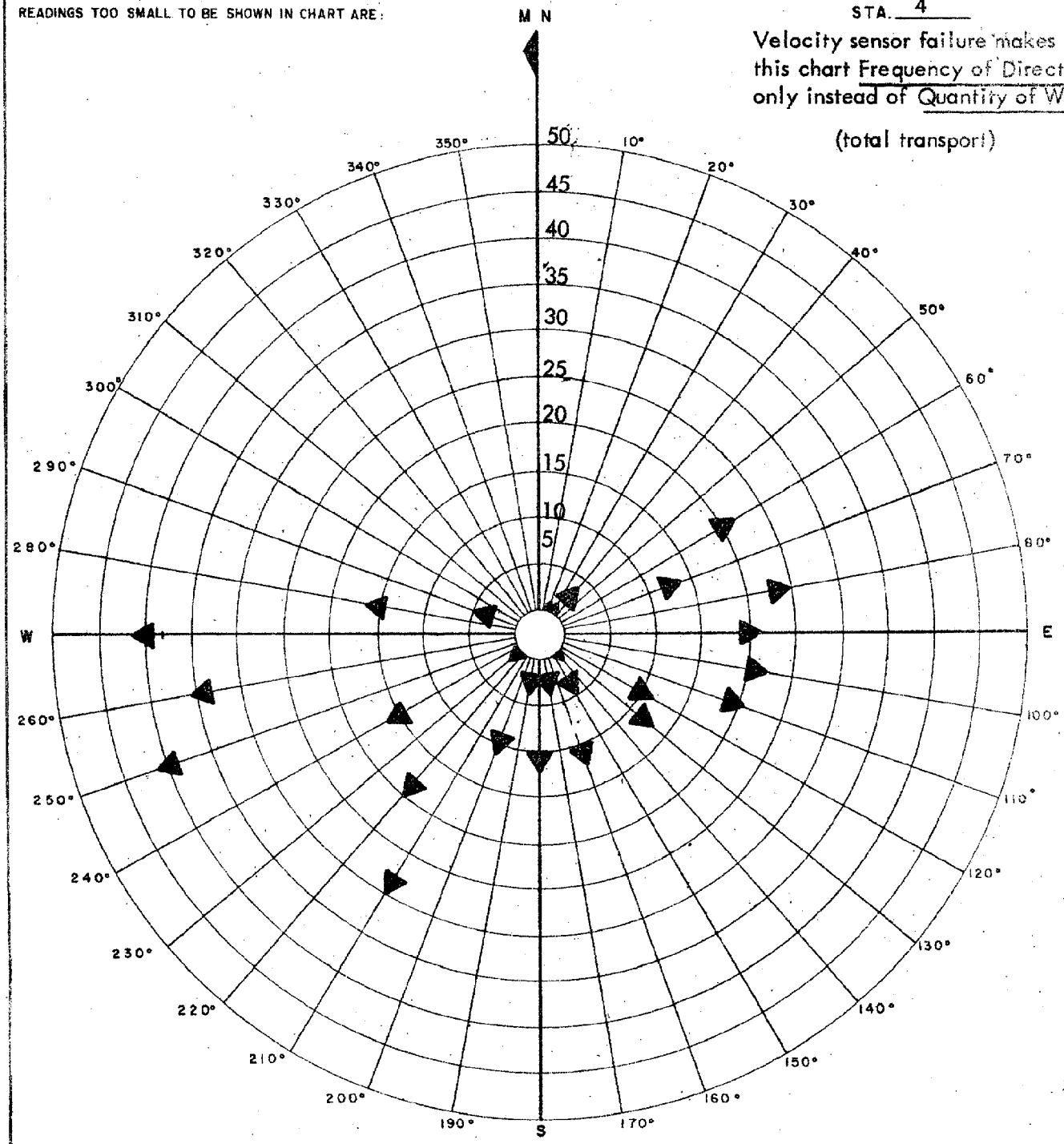
FREQUENCY OF DIRECTION OF WATER FLOW see page 40

READINGS TOO SMALL TO BE SHOWN IN CHART ARE:

STA. 4

Velocity sensor failure makes this chart Frequency of Direction only instead of Quantity of Water.

(total transport)



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University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-45" Lat. 17°-56'-50" Inst.S.N. 907

Date in 12-3-71 Hr. In. 12:00 pm Date Out 12-12-71 Hr.Out 10:00 am Total Hrs. 214

Depth of bottom 35 ft. Depth of Sensor 15 ft. Remarks: Failure in the speed sensor.

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
1	28	248	x	43	28	107	x	85	28	247	x
2	28	248	x	44	28	124	x	86	28	180	x
3	28	246	x	45	28	180	x	87	28	180	x
4	28	237	x	46	28	254	x	88	28	180	x
5	28	240	x	47	28	255	x	89	28	146	x
6	28	248	x	48	29	256	x	90	28	78	x
7	28	245	x	49	28	259	x	91	28	75	x
8	28	245	x	50	28	255	x	92	28	85	x
9	28	249	x	51	28	262	x	93	28	90	x
10	29	248	x	52	28	271	x	94	28	78	x
11	28	253	x	53	28	271	x	95	28	78	x
12	28	253	x	54	28	266	x	96	28	90	x
13	28	253	x	55	28	272	x	97	28	112	x
14	29	253	x	56	28	270	x	98	28	112	x
15	28	258	x	57	28	270	x	99	28	112	x
16	28	237	x	58	28	258	x	100	28	101	x
17	28	234	x	59	28	258	x	101	28	43	x
18	28	225	x	60	28	270	x	102	28	146	x
19	28	135	x	61	28	270	x	103	28	236	x
20	28	113	x	62	28	286	x	104	28	213	x
21	28	146	x	63	28	289	x	105	28	247	x
22	28	146	x	64	28	293	x	106	28	270	x
23	28	103	x	65	28	180	x	107	28	270	x
24	28	90	x	66	28	19	x	108	28	270	x
25	28	78	x	67	28	30	x	109	28	258	x
26	28	168	x	68	28	45	x	110	28	245	x
27	28	102	x	69	28	68	x	111	28	247	x
28	28	146	x	70	28	73	x	112	28	245	x
29	28	135	x	71	28	78	x	113	28	180	x
30	28	158	x	72	28	73	x	114	28	101	x
31	28	158	x	73	28	68	x	115	28	56	x
32	28	161	x	74	28	56	x	116	28	67	x
33	28	180	x	75	28	56	x	117	28	78	x
34	28	208	x	76	28	145	x	118	28	78	x
35	28	220	x	77	28	202	x	119	28	80	x
36	28	236	x	78	28	180	x	120	28	78	x
37	28	251	x	79	28	202	x	121	28	90	x
38	28	270	x	80	28	202	x	122	28	80	x
39	28	146	x	81	28	247	x	123	28	85	x
40	28	90	x	82	28	247	x	124	28	90	x
41	28	146	x	83	28	236	x	125	28	78	x
42	28	135	x	84	28	135	x	126	28	76	x

Analist: Pacheco and Gonzalez
Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-45" Lat. 17°-56'-50" Inst.S.N. 907

Date in 12-3-71 Hr. In. 12:00 pm Date Out 12-12-71 Hr.Out 10:00 am Total Hrs. 214

Depth of bottom 35 ft. Depth of Sensor 15 ft. Remarks:

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
127	28	80	x	169	28	78	x	211	28	258	x
128	28	90	x	170	28	69	x	212	28	258	x
129	28	101	x	171	28	78	x	213	28	247	x
130	28	105	x	172	28	78	x	214	28	240	x
131	28	146	x	173	28	78	x	215	28	240	x
132	28	213	x	174	28	78	x	216	28	258	x
133	28	247	x	175	28	112	x	217	28	258	x
134	28	250	x	176	28	90	x	218	28	270	x
135	28	258	x	177	28	101	x	219	28	247	x
136	28	258	x	178	28	101	x	220	28	202	x
137	28	270	x	179	28	112	x	221	28	281	x
138	28	250	x	180	28	135	x	222	28	285	x
139	28	258	x	181	28	202	x	223	28	285	x
140	28	202	x	182	28	225	x	224	28	285	x
141	28	247	x	183	28	247	x	225	28	280	x
142	28	180	x	184	28	247	x	226	28	225	x
143	28	112	x	185	28	236	x	227	28	135	x
144	28	135	x	186	28	258	x	228	28	157	x
145	28	270	x	187	28	270	x	229	28	202	x
146	28	225	x	188	28	270	x	230	28	270	x
147	28	258	x	189	28	75	x	231	28	270	x
148	28	157	x	190	28	180	x	232	28	270	x
149	28	146	x	191	28	56	x	233	28	258	x
150	28	213	x	192	28	67	x	234	28	258	x
151	28	213	x	193	28	45	x	235	28	265	x
152	28	270	x	194	28	135	x	236	28	265	x
153	28	270	x	195	28	112	x	237	28	270	x
154	28	258	x	196	28	45	x	238	28	270	x
155	28	250	x	197	28	75	x	239	28	270	x
156	28	255	x	198	28	180	x	240	28	281	x
157	28	255	x	199	28	67	x	241	28	281	x
158	28	258	x	200	28	157	x	242	28	280	x
159	28	258	x	201	28	270	x	243	28	281	x
160	28	247	x	202	28	270	x	244	28	281	x
161	28	247	x	203	28	225	x	245	28	281	x
162	28	247	x	204	28	230	x	246	28	281	x
163	28	247	x	205	28	247	x	247	28	281	x
164	28	258	x	206	28	247	x	248	28	270	x
165	28	258	x	207	28	240	x	249	28	270	x
166	28	135	x	208	28	258	x	250	28	265	x
167	28	56	x	209	28	260	x	251	28	258	x
168	28	60	x	210	28	250	x	252	28	258	x

Analist: Pacheco and Gonzalez

Typist: Ramirez

Water Resources Research Institute
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Bay Ponce Coordinates Long. 66°-36'-45" Lat. 17°-56'-50" Inst.S.N. 907

Date In 12-3-71 Hr. In. 12:00 pm Date Out 12-12-71 Hr.Out 10:00 am Total Hrs. 214

Depth of bottom 35 ft. Depth of Sensor 15 ft. Remarks:

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
253	28	281	x	295	28	270	x	337	28	69	x
254	28	270	x	296	28	270	x	338	28	65	x
255	28	258	x	297	28	281	x	339	28	65	x
256	28	258	x	298	28	281	x	340	28	56	x
257	28	265	x	299	28	247	x	341	28	56	x
258	28	270	x	300	28	210	x	342	28	56	x
259	28	266	x	301	28	180	x	343	28	56	x
260	28	281	x	302	28	157	x	344	28	56	x
261	28	270	x	303	28	168	x	345	28	56	x
262	28	270	x	304	28	157	x	346	28	60	x
263	28	270	x	305	28	202	x	347	28	60	x
264	28	270	x	306	28	202	x	348	28	78	x
265	28	157	x	307	28	202	x	349	28	90	x
266	28	56	x	308	28	225	x	350	28	101	x
267	28	56	x	309	28	247	x	351	28	101	x
268	28	60	x	310	28	236	x	352	28	101	x
269	28	78	x	311	28	146	x	353	28	112	x
270	28	112	x	312	28	157	x	354	28	112	x
271	28	101	x	313	28	112	x	355	28	112	x
272	28	90	x	314	28	112	x	356	28	123	x
273	28	90	x	315	28	112	x	357	28	132	x
274	28	80	x	316	28	112	x	358	28	132	x
275	28	90	x	317	28	101	x	359	28	132	x
276	28	90	x	318	28	101	x	360	28	157	x
277	28	90	x	319	28	101	x	361	28	157	x
278	28	67	x	320	28	101	x	362	28	236	x
279	28	78	x	321	28	110	x	363	28	236	x
280	28	67	x	322	28	110	x	364	28	168	x
281	28	157	x	323	28	105	x	365	28	135	x
282	28	270	x	324	28	123	x	366	28	120	x
283	28	247	x	325	28	123	x	367	28	90	x
284	28	247	x	326	28	123	x	368	28	90	x
285	28	247	x	327	28	123	x	369	28	56	x
286	28	255	x	328	28	123	x	370	28	56	x
287	28	258	x	329	28	123	x	371	28	90	x
288	28	258	x	330	28	123	x	372	28	90	x
289	28	270	x	331	28	123	x	373	28	101	x
290	28	281	x	332	28	112	x	374	28	101	x
291	28	292	x	333	28	101	x	375	28	101	x
292	28	270	x	334	28	123	x	376	28	101	x
293	28	220	x	335	28	90	x	377	28	112	x
294	28	270	x	336	28	78	x	378	28	95	x

Analist: Pacheco and Gonzalez
Typist: Ramirez

Water Resources Research Institute

University of Puerto Rico, Mayaguez - Project PR A-031-PR Investigator-Prof. E. F. Colón

Bay Ponce Coordinates Long. 66°-36'-45" Lat. 17°-56'-50" Inst.S.N. 907

Date in 12-3-71 Hr. In. 12:00 pm Date Out 12-12-71 Hr.Out 10:00 am Total Hrs. 214

Depth of bottom 35 ft. Depth of Sensor 15 ft. Remarks:

A

1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.	1/2 Hr. Int.	T C°	Dir. O°M	Speed K/Hr.
379	28	281	x	421	28	213	x	463			
380	28	213	x	422	28	213	x	464			
381	28	213	x	423	28	213	x	465			
382	28	213	x	424				466			
383	28	213	x	425				467			
384	28	213	x	426				468			
385	28	213	x	427				469			
386	28	213	x	428				470			
387	28	213	x	429				471			
388	28	213	x	430				472			
389	28	213	x	431				473			
390	28	213	x	432				474			
391	28	213	x	433				475			
392	28	213	x	434				476			
393	28	225	x	435				477			
394	28	225	x	436				478			
395	28	225	x	437				479			
396	28	225	x	438				480			
397	28	225	x	439				481			
398	28	225	x	440				482			
399	28	225	x	441				483			
400	28	225	x	442				484			
401	28	225	x	443				485			
402	28	225	x	444				486			
403	28	225	x	445				487			
404	28	225	x	446				488			
405	28	192	x	447				489			
406	28	192	x	448				490			
407	28	180	x	449				491			
408	28	192	x	450				492			
409	28	168	x	451				493			
410	28	192	x	452				494			
411	28	205	x	453				495			
412	28	202	x	454				496			
413	28	210	x	455				497			
414	28	210	x	456				498			
415	28	210	x	457				499			
416	28	210	x	458				500			
417	28	213	x	459				501			
418	28	213	x	460				502			
419	28	213	x	461				503			
420	28	213	x	462				504			

Analist: Pacheco and Gonzalez

Typist: Ramirez

Bay Ponce Sta. 4 Coordinates Long. 66°-36'-45" Lat. 17°-56'-50" Instrument SN 907 Date In 12-3-71

Direction ~~Measure~~ Frequency For Each 10° Magnetic Direction

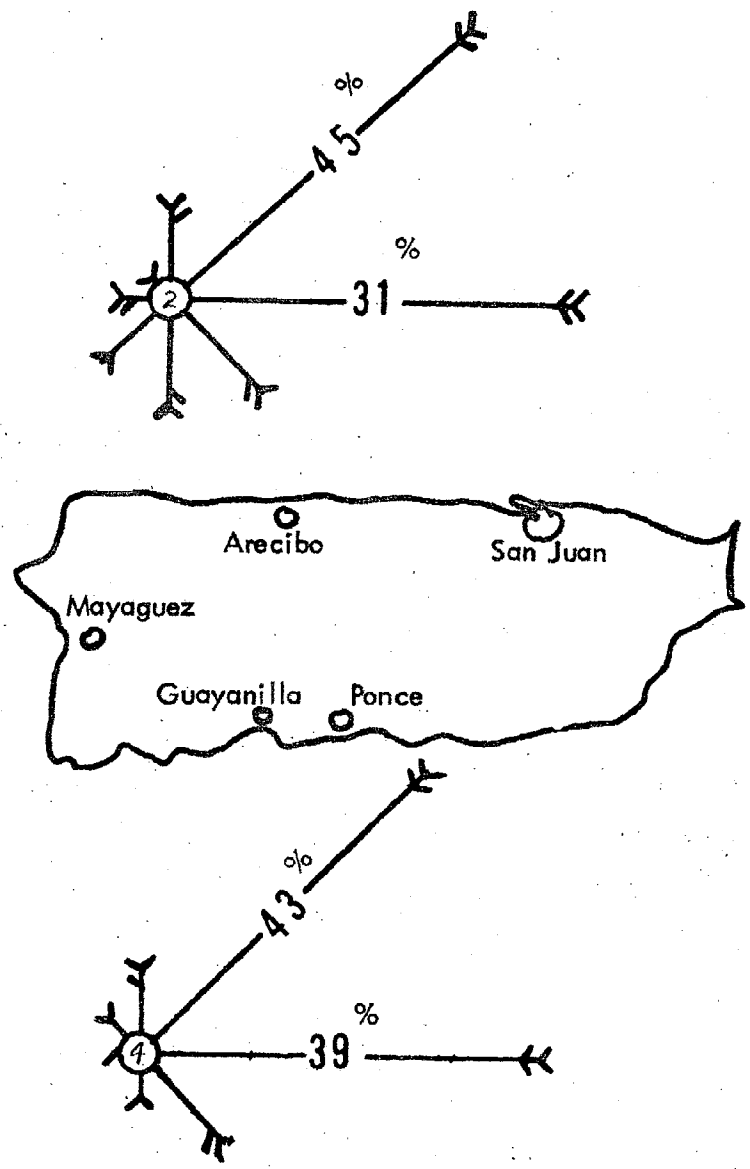
10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°	160°	170°	180°	190°	200°	210°	220°	230°	240°	250°	260°	270°	280°	290°	300°	310°	320°	330°	340°	350°	360°
1	1	4		22	14	25	21		22	21	12	13	1	10	13	4	13	4	12	30	20	2	17	42	36	42	17	5							

NOVEMBER WIND

PILOT CHART OF THE CENTRAL AMERICAN WATERS

by

United States Naval Oceanographic office: U. S. NAVY



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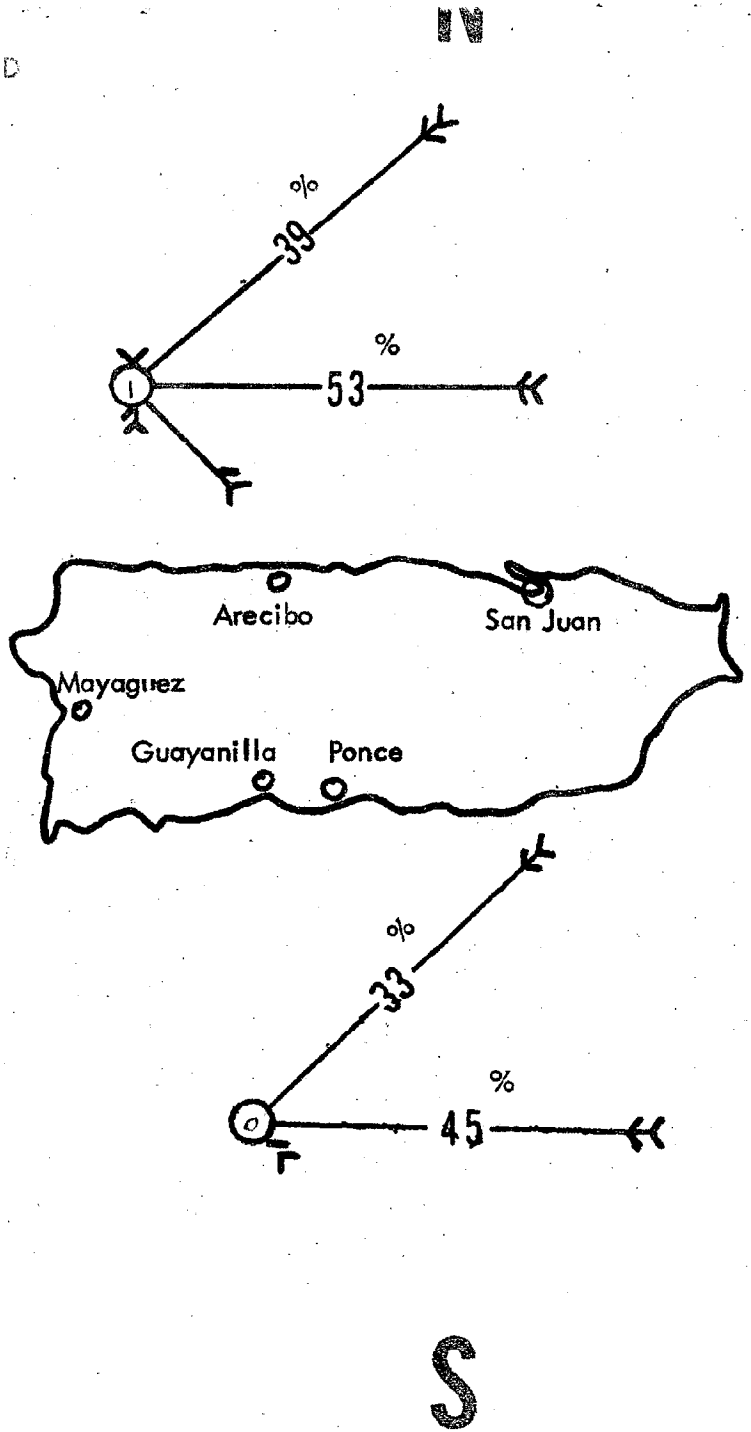
WIND



PILOT CHART OF THE CENTRAL AMERICAN WATERS

by

United States Naval Oceanographic office: U. S. NAVY

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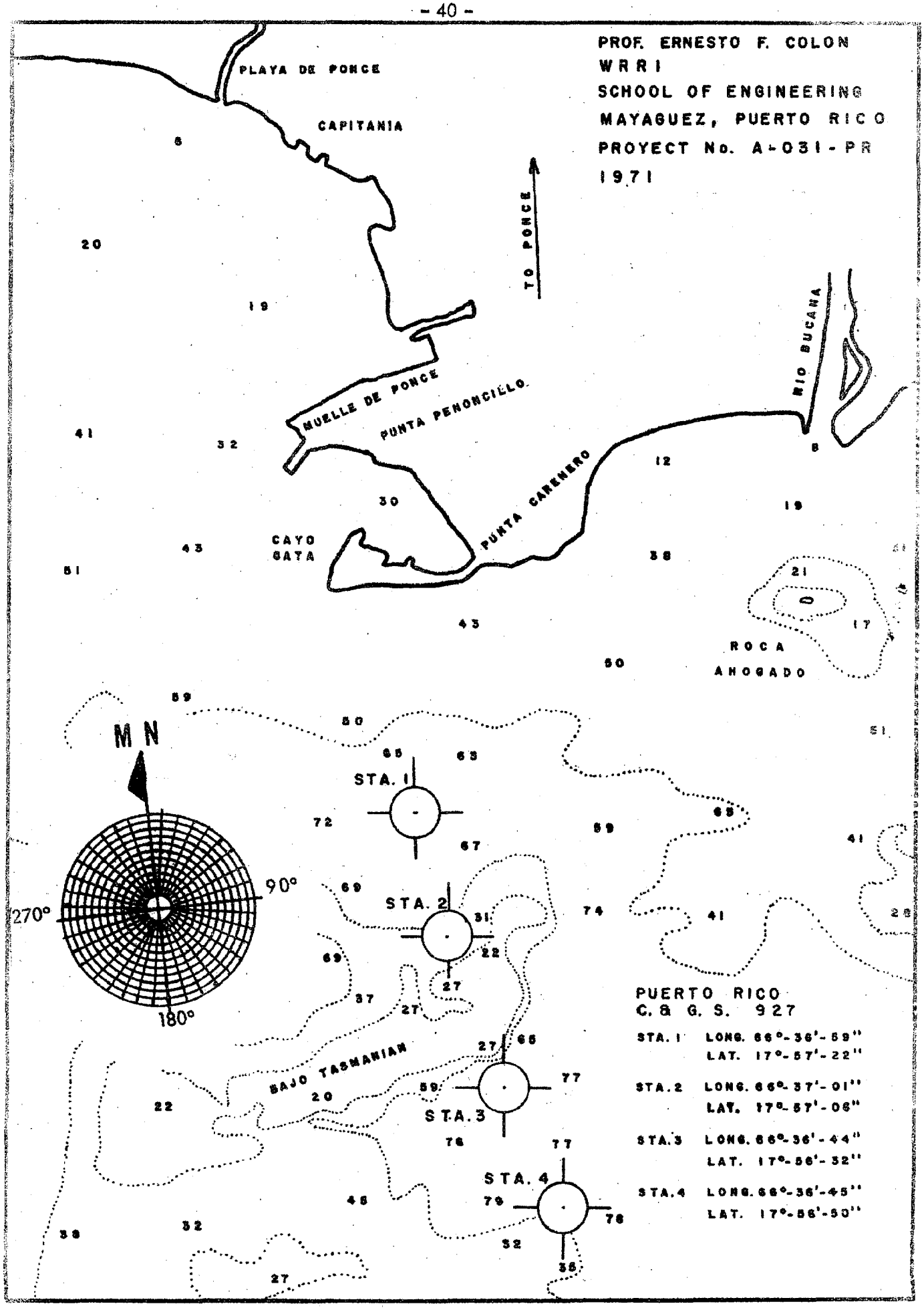
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1971
PLAYA DE PONCE
CAPITANIA
TO PONCE
RIO BUCANA
MUELLE DE PONCE
PUNTA PENONCILLO
PUNTA CARENERO
CAYO GATA
ROCA AHOGADO
MN
90°
270°
180°
STA. 1
STA. 2
STA. 3
STA. 4
BAJO TASMANIAN
PUERTO RICO
C. & G. S. 927
STA. 1 LONG. 66°-36'-59"
LAT. 17°-57'-22"
STA. 2 LONG. 66°-37'-01"
LAT. 17°-57'-06"
STA. 3 LONG. 66°-36'-44"
LAT. 17°-56'-32"
STA. 4 LONG. 66°-36'-45"
LAT. 17°-56'-50"

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