THIRD PROGRESS REPORT (FOR THE
MONTHS OF JULY AND AUGUST, 1974)
FROM THE
MOTE MARINE LABORATORY

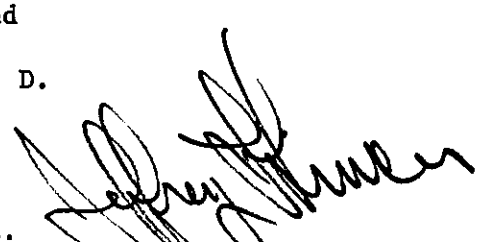
TO

THE BOARD OF COUNTY COMMISSIONERS
SARASOTA COUNTY

ON

THE ECOLOGICAL STATUS OF DONA AND ROBERT'S BAY AND ITS RELATIONSHIP TO COW PEN SLOUGH AND OTHER POSSIBLE PERTURBATIONS

Respectfully Submitted
by
Jeffrey L. Lincer, Ph. D.



Date Submitted: 18 October 1974 By: _____
Jeffrey L. Lincer
Project Coordinator

I. INTRODUCTION

This progress report is primarily for the months of July and August, however, references back to previous months are made when light can be thrown on changes that are taking place in water quality, etc.

The format is basically the same as in the past and includes progress made under the following headings: water quality and other monitoring; biological surveys, and; photographic efforts.

In an effort to conserve paper and reduce duplication costs, you will notice that this report is typed single-space. If you find this unacceptable, please contact the author so that subsequent reports can be typed double-space.

II. WATER QUALITY MONITORING

Nutrients

High nutrient levels were associated with the heavy rains in late June. These nutrient levels in the study area continued to generally rise until late July. At this point, levels began a slow decrease which continued through August. This is probably a reflection of a latent maximum flow and the continued rains over much of the watershed. Maximum leaching of intermittently wet-dry areas, to date, occurred in late July, with the expected decrease in nutrient levels through August. By late August the total nitrogen and ortho-phosphate levels were greatly reduced from July levels (see Appendix A) but remained higher than values obtained during the "dry season" (April, May, and early June).

In situ sulfide analysis was not initiated as planned due to instrumental limitations. A strong sulfide odor, however, was associated with sediment samples taken from bay waters. Furthermore, deposits of silver sulfide and gold sulfide were formed on the diver's jewelry in less than an hour during the bottom investigations. While precise values of $S^{=}$ (sulfide) could not be obtained, it is obvious that a strong sulfide layer associated with decomposition of organic matter existed.

Dissolved Oxygen and Salinity

During the months of July and August, the bays remained essentially fresh water. Aerial photographs of the Venice Jetty area indicated that the bay system was relatively unaffected by incoming tides, because the outflow was sufficiently strong to nullify the effects of flood tides. As a result many of the freshwater weeds remained viable longer than normal in the estuaries. The expected decline in dissolved oxygen (DO) associated with decomposition of freshwater weeds in saline waters did not occur

during August at our bridge sampling sites. However, bridge sites are characterized by rapidly flowing, highly oxygenated water. For this reason, a special sampling program was instigated to investigate the DO and other parameters in Dona and related bays (see section entitled "Special Hydro-Lab Monitoring Study").

Suspended Solids and Chlorophyll

The July and August suspended solids levels reflected rainy season conditions. For the tidal stations, readings remained steady in July and dropped slightly in August. These levels were still much higher than the May and June "dry season" values.

Suspended solids for the tidal stations are shown in Figure 1 for the months of April - August. Of interest is the peaking effect at stations 3, 4, and 5 (Shakett Creek, Curry Creek, and Dona Bay, respectively) late in June. The South Creek stations (1 and 2) did not show the exaggerated peaking after the late June rains (as did the Dona Bay stations) but were generally higher than those stations during July and August. This was presumably due to a continuing and more spread out flow of runoff water in response to the more natural condition of the South Creek system.

The freshwater stations rose substantially in suspended solids levels during July and August. Station 8 on Main #1 at Cattlemen Road showed an increase in suspended solids of five times the early June level. Station 7 on upper South Creek (Oscar Scherer Recreation Area) remained consistently lower than the other stations. These and other freshwater station values are graphed in Figure 2.

While suspended solids levels rose at the freshwater stations in July and August, the chlorophyll levels (which reflect phytoplankton populations) dropped. The one exception to this was a high reading in July for station 7 (upper South Creek). It is likely that increased suspended solids prevented adequate sunlight from reaching the microscopic phytoplankton resulting in a population decrease.

Chlorophylls at the tidal stations generally showed higher levels during the rainy season than they had before it. Stations 1 and 2, at South Creek, had consistently high readings in July. Similarly, Station 3 at Shakett Creek showed a substantial rise in chlorophylls in late July.

Bacteria

Counts at freshwater stations (7 through 12) showed an increase in numbers of the three bacterial groups observed. However, the increases were not large. Stations 7 (upper South Creek at Oscar Scherer Park) and 8 (Main #1 and Cattlemen Road) showed the highest counts and greatest increase in counts of fecal coliforms and of fecal streptococci.

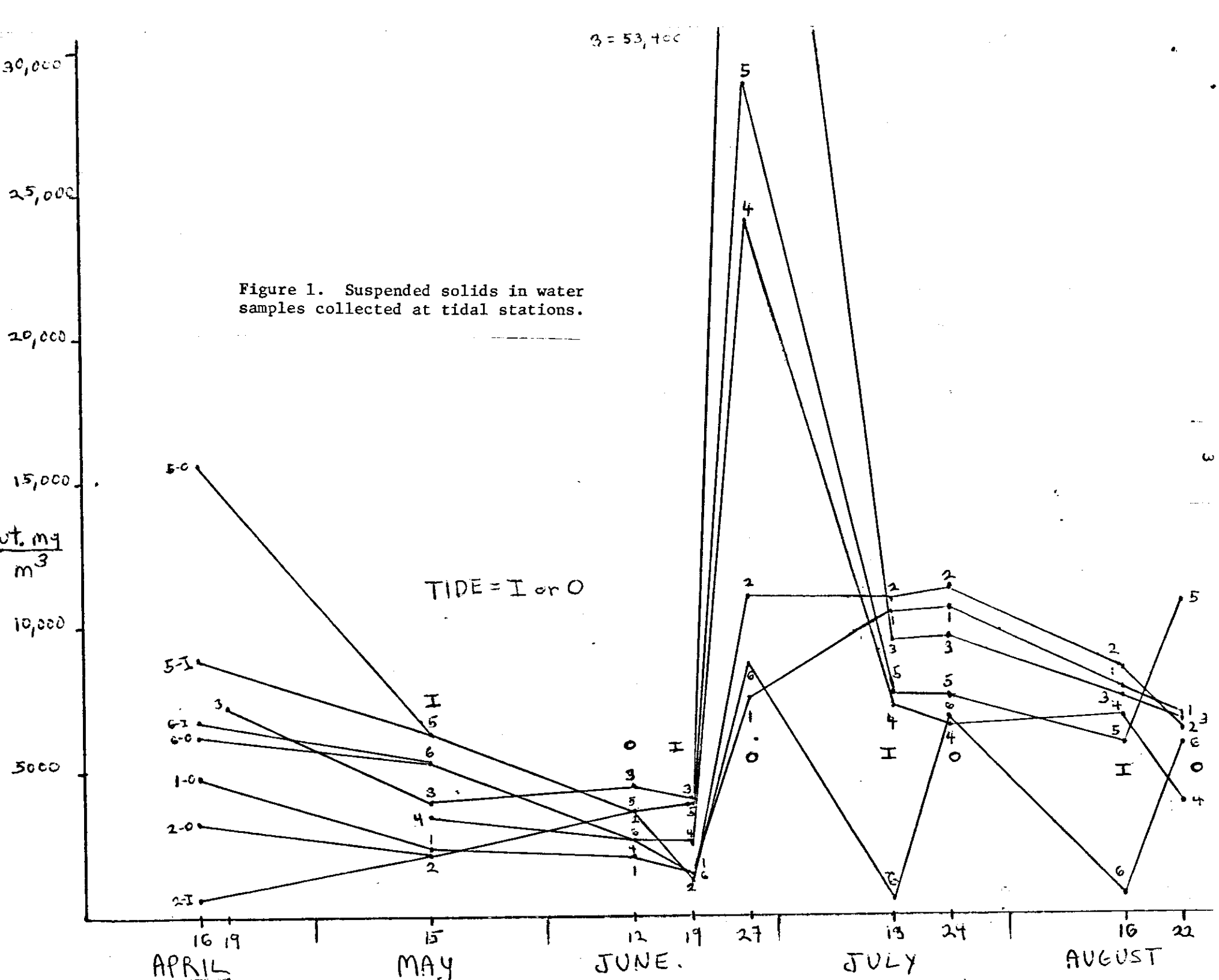


Figure 1. Suspended solids in water samples collected at tidal stations.

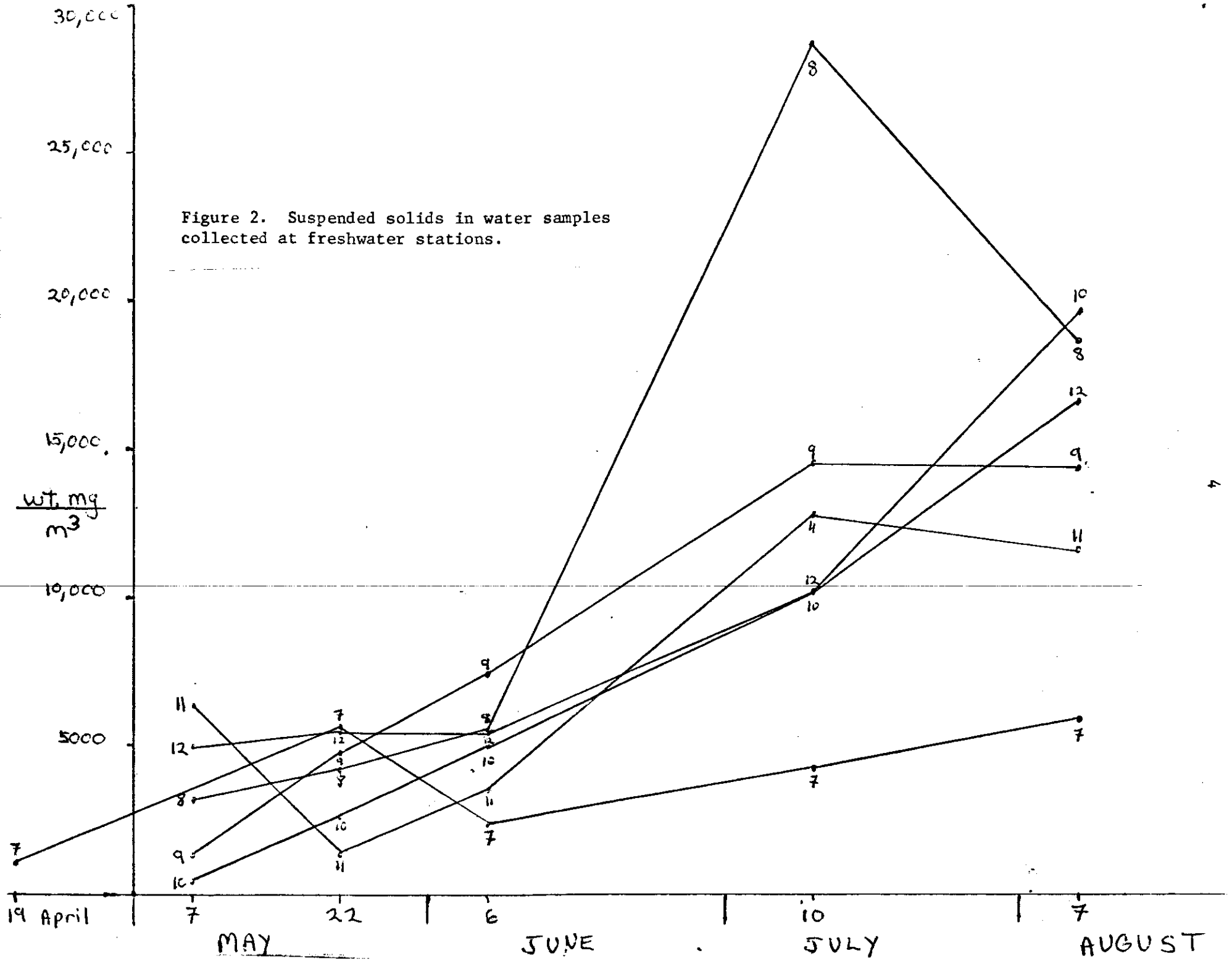


Figure 2. Suspended solids in water samples collected at freshwater stations.

The ratios of fecal coliforms to fecal streptococci were calculated as indicators of source of bacterial contamination of surface water. Ratios calculated for all freshwater stations, except one, indicated mixed sources of bacteria, with livestock the predominant source. The ratio for station 8,on July 10 only, indicated human wastes as the source of bacteria.

Counts at tidal stations (1 through 6) were generally higher than those made in June. Total coliform counts remained below the permissible level of 10,000/100 ml (1) with two exceptions. On July 24, total coliforms at station 2 (South Creek) were 10,200/100 ml., and on August 16, total coliforms at station 1 (South Creek at the Intracoastal Waterway) were 13,600/100 ml. Fecal coliform counts and fecal streptococcus counts, though higher than those of May and June were not unduly high. This suggests that the high total coliform counts may be from other than animal sources (plants, soil, etc.).

The total coliform count, with the possible contributions from non-animal sources, is not as sensitive an indicator of potentially dangerous water pollution as is the percent contributed by fecal coliforms (2). Thus, station 8 (Cattlemen Road) on July 10 with 1,900/100 ml total coliforms and 1100 fecal coliforms, had a more significant bacterial count than the same station on August 7 with a far higher total coliform count (5,700/100 ml) but only about 5 1/2% of those being fecal coliforms (320/100 ml).

The (tidal station) ratios of fecal coliforms to fecal streptococci were calculated although significance of this ratio in salt water is normally questionable. This is because variable factors such as salinity have varying effects on different kinds of bacteria (3). However, because of the freshwater nature of the bays following the rains, more significance can be placed on these data for this period. All ratios, except two, indicated mixed sources of bacteria with livestock wastes predominating. On August 22, bacteria counts at stations 5 (Dona Bay) and 6 (Venice Jetties) were low, but the fecal coliform to fecal streptococcus ratios at both stations indicated human wastes as the source of the bacteria.

Figure 3 provides an overview of ranges in bacterial counts and ratios for July and August.

Special Hydro-Lab Monitoring Study

In response to the need for a more intense monitoring of Dona Bay, a close investigation of that region was initiated mid-July. Since then, the study has been enlarged to 27 stations and now includes, not only observations on Dona and Robert's Bays, but also Lyons Bay and a segment of the Intracoastal Waterway from the Bay region to South Creek. (See Appendix B for station locations). Preliminary data on water temperature, DO, conductivity, pH and oxidation-reduction potential (ORP) indicate that all of these areas have direct influence on the water quality of Dona Bay. Initial observations also indicate that, especially during an

Figure 3. An overview of ranges in bacterial counts.
Values (except ratio) expressed per 100 ml of water.

Collection	Total Colif.	Fecal Colif.	Fecal Strep.	FC/FS
July 10 (Freshwater)	1600 - 3300	<10 - 1200	24 - 430	1.1 - 8.4[t]
July 18 (Tidal)	<10 - 2180	3 - 246	1 - 260	.33 - 1.6
July 24 (Tidal)	105 - 10,200***	4 - 134	9 - 510	.04 - 1.2
August 7 (Freshwater)	1100 - 5700	40 - 440	196 - 500	.08 - 1.2
August 16 (Tidal)	65 - 13,600**	<1 - 200	7 - 370	<.1 - 2.4
August 22 (Tidal)	295 - 3000	26 - 72	3 - 136	.44 -17.0*

* 17.0 at station 6
11.3 at station 5
** 13,600 at station 1
*** 10,200 at station 2
t 8.4 at station 8

ebb tide, water from Robert's Bay, Lyons Bay and the adjacent northern and southern sections of the Intracoastal Waterway all merge at the mouth of Dona Bay and exit out Venice Inlet. This accounts for the tremendous ebb flow at Venice Inlet regardless of a heavy rain during that period or not. It has been noted that, during a flood tide, there is only a minimal tidal current pushing saline water back through Venice Inlet into the bay region. This counteracting tidal phenomenon has been clearly indicated by the common occurrence of "salt water wedges" at the mouth of Dona and Robert's Bay. A "wedge", defined as a body of fresh water lying over a body of salt water, develops as the result of a head-on collision between two contrasted bodies of water. To help determine the counteracting influence of water flow from Cow Pen Slough, three water volume monitoring stations will be established to determine Shakett Creek's water volume input into Dona Bay. These will be compared to existing hydrological data requested from Mr. Horace Sutcliff (U.S.G.S.).

The preliminary data from this study indicates the relationship and relevance of several other possible causative factors behind the poor (rainy season) water quality conditions in Dona Bay. The average dissolved oxygen reading (mid-July through August) for Dona Bay was 3.5 ppm as opposed to 6.5 and 5.4 ppm for Lyons Bay and Robert's Bay, respectively. Unusually low DO levels were observed in Dona Bay as well as in surrounding waters during July and August. For instance, DO levels between 5.6 and 8.0 ppm characterized those waters mid-July. By the end of July and throughout August, DO readings both at the surface and at the bottom commonly ranged between 1.9 and 3.0 ppm.

The pH average of 7.39 for Dona Bay was significantly lower than the 8.1 and 8.13 averages for Robert's Bay and Lyons Bay, respectively. Although a pH of 7.39 is not dangerously low, it presents selective conditions favorable for only a small group of salt water fishes.

Computer Analysis

Due to the wealth of data that requires careful evaluation, we have enlisted the aid of the Sarasota County Vocational and Technical School computer system to help establish seasonal trends and correlative factors that work within the Bay region. An example of a computer read-out for part of one day's Hydro-Lab sampling can be found in Appendix C. In addition, the computer program is adapted for more general use in evaluating the CPS fresh and tidal station data as well as water quality data collected by the County, other levels of government or other investigators.

Pesticide Monitoring

Collections of oysters (Crassostrea virginica) for pesticide analysis were made as follows:

On May 5, 1974, twelve living oysters were collected at each of the following sites:

Dona Bay at Highway 41 bridge, Venice
Robert's Bay at Highway 41 bridge, Venice
South Creek at Highway 41 bridge
Buck Creek at Highway 775 bridge, Englewood

On June 13, 1974, a second collection was undertaken. Living oysters were found at Dona Bay. At Phillippi Creek-Highway 41 bridge, a few living oysters were found among large beds of empty shells. At South Creek and at Robert's Bay an extensive search was made by two investigators, but they were unable to find any living oysters among the large beds of empty shells. Subsequent communication with other investigators indicated that the mass die-off was in response to a widespread bacterial infestation.

On July 21, 1974, a third collecting effort was made but no living oysters were found at Robert's Bay, South Creek, North Creek or Phillippi Creek. However, enough oysters for analysis were found at Dona Bay.

All samples of oysters collected to date have been shelled and oven-dried in preparation for gas chromatographic pesticide analysis.

Fish, collected during our first biological survey, have been preserved for selection and pesticide analysis.

III. BIOLOGICAL SURVEY

Fishes

On the 17th and 25th of July, 1974, ten stations were surveyed for fishes, six in the Dona and Robert's Bays system and four in South Creek. Freshwater fishes of both systems are homogenous, consistent with recorded Florida species, and appeared healthy and prolific. The quantity of catch at most of the marine stations was greater than that of the May collection, however, there was still a lack of species diversity. The only species taken in abundance was the mojarra (Eucinostomous argenteus) which is very tolerant of wide salinity changes (i.e. euryhaline). Centrarchidae (bass-sunfish family), which are normally considered strictly freshwater, were taken at one "brackish" and two "marine" sites (Shakett Creek, Dona Bay at Highway 41 and South Creek at Highway 41). This indicated that they were flushed over salinity barriers by the force of water currents yet survived in the estuary because of the resulting low saline conditions.

Dona Bay proper was found to be poorer in species diversity and quantity of catch (four species, including the Centrarchidae, and twenty total fish) than adjacent areas. It also had a bottom coating of thick, foul-smelling black muck which was not found at any other marine station. In this muck (collected 17 July 1974) were decaying strands of Elodea/Hydrilla

which made up almost 100% of the freshwater weeds present. This black muck was still present to a depth of at least 4 to 6 inches on 12 September 1974, when our divers descended to study the bottom more intensely. By comparison, similar collections made on 29 May 1974 (before the rains) at the same site had revealed "only a little bottom mud and ... a healthy growth of marine algae". Five species of fishes, 322 total, were collected in Robert's Bay, and seven species, 273 total, at the junction midway between Robert's and Dona Bays. South Creek at its mouth had a small amount of bottom mud containing decaying terrestrial vegetation. Three species, all euryhaline, were collected in South Creek; 124 fishes total.

Statistical analyses are being continued on the species of fishes collected. These data, when completed after the final biological survey, will give an informed estimate of the fish population of the estuarine systems in relation to the time of year and the various water parameters, particularly temperature and salinity changes.

Aquatic Plants

The rains of late June produced a purging effect on the weeds of the Cow Pen Slough. The following are some typical observations made during the critical dry-wet-dry seasonal change. On 22 May 1974, Hydrilla/Elodea were observed in large quantities along the slough. They were particularly thick north of Route 72 (stations 9 and 10) but decreased in quantity as observers moved south (stations 11 and 12). On 27 June 1974, the following observations were made at station 3 (Laurel Road/Shakett Creek), "Quantities of hyacinths and Elodea floating down. Flooded conditions. Elodea/Hydrilla - some long strands, root systems ...."

On 17 July 1974 (after the initial rains), and during the second fish collection, the following was noted at Shakett Creek, between Laurel Road and Control Structure 1: "Fresh water flowed heavily over the dam [Control Structure No. 1] ... Elodea/Hydrilla were piled approximately 60 cm [2 ft.] high against the dam struts on the slough side. Some Elodea, Hydrilla and hyacinth mats were observed floating in Shakett Creek and large quantities of the weeds in varied stages of decomposition, including long strands [some] with roots, were brought up in trawls. On 25 July 1974, during a similar fish collection on the slough, just below Control Structure 2, the following was noted, "Sight observations confirmed that the slough was flushed almost clear of aquatic weeds and of some of the bottom muck". By comparison, on 29 May 1974, during the first fish collection at the same site the following was recorded, "Solid growth of Elodea/Hydrilla from bottom to surface, width approximately 8 feet towards middle of slough from bank, on each side. So solid it stopped our net (heavy boat seine) and made collection almost impossible. We paddled approximately 1/4 mile upstream, seeking clearer area, but found same condition throughout".

On 7 August 1974, during the aquatic plant collections, water hyacinths, Elodea and Hydrilla were sighted in great quantity at the four plant collection

stations beginning with the north shore of Salt Creek (DB-5) and ending with a station just east of Route 41 (DB-2). All were either adrift or caught in the mangroves. Only about 20% of the observable plants were hyacinths and this is probably an overestimate since these plants float more readily than the submergent Elodea and Hydrilla. The majority was Hydrilla with smaller amounts of Elodea.

As a matter of permanent record, monthly aerial infrared photographs as well as color ground photographs taken during almost weekly water collections confirm the above records.

During the first week in August, diatoms, algae and higher plants were collected from nine stations in Dona and Robert's Bays. Unlike previous collections, plants consisted of almost exclusively microscopic algae; blue-greens, greens and diatoms predominating. Many species, which are commonly found in "polluted" water (4-7), were collected and include the following:

Blue-Green spp.:	Anabaena
	Lyngbya
	Oscillatoria
	Phormidium
Green spp.:	Chlamydomonas
	Chlorella
	Chlorococcum
	Spyrogyra
Diatoms spp.:	Gomphonema
	Navicula
	Nitzschia
Euglenoids spp.:	Euglena
	Phacus

Invertebrates

The second invertebrate sampling for the Cow Pen Slough Project was carried out between 27 July and 2 August 1974. Collections were made at 3 invertebrate stations in South Creek and 8 in Dona and Robert's Bays.

There was a marked decline in both the number of species present at each station and the number of individuals per species. Although there was a drastic change in water quality, no new species appeared in this sampling (as compared to the first sampling).

Since the decline in numbers of both species and individuals could be an expected seasonal trend, comparison with hydrographic data, invertebrate literature and further sampling will be necessary before the significance of this faunal change can be determined.

The bottom at many shallow water invertebrate stations remained much the same as in May ranging from shell-mud substrate to sand-mud. The only outstanding difference was in Shakett Creek, where the bottom was drastically changed to a yellow sand whereas in May it was a shell-mud bottom. There were no living invertebrates found in this sample.

A massive buildup in similar sand on the upstream sides of both control structures 1 and 2 began shortly after the late June rains. These observations and the suspended solids data indicate that the Cow Pen Slough is the major source of these bottom-covering solids.

IV. AERIAL PHOTOGRAPHY

Color infrared aerial photos of the twelve sampling stations have been taken at one month intervals. These pictures are providing a good record of algae and higher aquatic plant populations. Comparison of the three sets that have been taken show variations in delineation of salt and fresh water. Drastic changes of the quantity of aquatic plants are portrayed very well in these three sets. It is anticipated that as these pictures are compiled throughout the seasons we will have an excellent visual record of the changes in terrestrial and aquatic plants. These photos will also, of course, provide some information as to water quality.

Aerial photos of the entire project area taken in 1948, 1957, 1960, and 1972 have been very useful for viewing and dating the many geographic changes this region has undergone through the years such as sea-walling, dredging, landfilling and alterations in the slough itself.

Other photos portraying the history of the Dona Bay region are being collected along with interviews of long-time residents of the area. Information and dates provided by these individuals should provide valuable comparisons with known and/or recorded changes that have occurred in the watershed area.

APPENDIX A

Raw Water Quality Data
Stations 1 - 12

July and August, 1974

Coll. No. 7

Date 10 Jul

7 AM	8 AM	9 AM	10 AM	11 AM	12 AM	
14:30	09:40	10:30	11:15	13:55	12:15	Time
F	F	N	VF	I	I	Curr.(6)*
32.0	33.5	34.0	32.0	32.0	36.0	Air. Tmp.
1'	½'	½'	3'	½'	7'	Dpth.(5)
30.6	28.8	31.2	28.2	29.9	29.9	H_2O Tmp.(2)
70+	70+	70+	70+	70+	70+	Color
NA	1/1.5	-	-	0.5/1.5	0.5/1.5	Secchi
						Sal.(3)
0.3M	0.4	0.1M	0.9	0.3	0.4	Dpth.(4)
30.0	28.5	30.0	27.5	29.1	27.8	Temp.
0.15	4.31	10.2	2.90	3.80	3.05	DO
215	18.0	60	125	130	125	Cond.
6.89	7.21	6.85	6.50	6.80	6.60	pH
+135	+180	+190	+221	+279	+265	ORP
-	-	-	-	-	-	S=
19.2	47	12.0	10.9	15.5	11.4	SO_4
(0)	0.43	2.0	(0)	0.15	(0)	BOD-5
						NO_3-N
1.22	1.09	1.12	1.21	1.04	1.22	NH_3-N
2.11	1.99	1.89	1.95	1.78	1:92	$\leq$N
0.678	0.550	0.169	0.229	0.261	0.235	PO_4-P
493.0	306.2	461.8	184.3	71.8	125.7	COD
1	24	4.2	2.5	4.0	3.2	Turb.
						Sal.(1)
$<1^o/_{oo}$	$<1^o/_{oo}$	$<1^o/_{oo}$	$<1^o/_{oo}$	$<1^o/_{oo}$	$<1^o/_{oo}$	Sal.(6)(co
4250	28,800	14,600	10,500	12,900	10,500	SS
16.6	5.40	2.42	4.41	5.73	3.60	Chlor a
11.4	1.88	1.09	4.61	4.18	2.40	Chlor b
29.4	14.0	1.24	7.41	13.9	0.41	Chlor c
57.4	21.3	4.76	16.4	23.8	6.40	$\leq$ Chlor
1200	1100	130	95	50	<10	F. colif.
3300	1900	1800	3100	2000	1600	$\leq$ colif
430	130	120	72	24	80	F. strep.
2.8	8.4	1.1	1.3	2.1	1.2	F colif/ F str

HYDROLAB

FIELD OBSERVATIONS

(6)* None (N), Slow (S), Intermediate (I), Fast (Fa), Very Fast (VF), Flood (Fl).

A-2

TIDAL STATIONS
(pre-high)

Cort. No. 8

Date. 18 Jul

Sta. No.	1		2		3		4		5		6	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Time	09:10	13:45	09:50	-	10:35	-	11:03	-	11:30	-	12:00	16:30
Tid. Act.	I	O	I	O	S	O	S	O	S	O	S	O
Air. Tmp.	27.5	34.0	29.0	32.0	29.5	30.0	29.3	29.5	29.2	31.0	30.5	29.5
Dpth.(5)	0.5M	-	1.0M	1.0M	2.3M	2.0M	1.6M	1.1M	1.8M	2.5M	1.2M	-M
H_2O Tmp.(2)	31.1	31.6	28.0	31.2	29.2	30.8	29.4	29.4	30.6	31.1	29.3	30.3
Color	40	70+	70+	70+	70+	70+	70+	70+	70+	70+	10	35
Secchi	2B/	1.3'/2.0'	1.5'/2B	1/1.5'	1.5'/2'	1.25'/20'	-	0.75'/1.0'	2'/3.5'	1.5'/2.6'	NA	-
Sal. (3)												
Dpth.(4)	0.2M	0.3	0.2M	0.4M	0.3M	0.4M	0.3M	0.4M	0.3M	0.4M	0.4M	0.4M
Temp.	29.5	30.5	28.0	29.5	28.5	25.9	28.5	29.0	30.0	31.5	29.5	30.5
DO	3.45	9.3	5.4	4.4	6.4	5.5	2.8	1.85	5.95	5.40	7.1	-
Cond.	19,500	3,000	10,500	1,200	270	25(v)	170	10	12,000	800	13,000	-
pH	8.20	8.35	7.35	7.60	7.10	7.25	6.70	6.70	7.95	7.55	8.20	8.25
ORP	+270	+271	+245	+270	+315	+285	+310	+280	+265	+289	260	268
S=	-	-	-	-	-	-	-	-	-	-	-	-
SO_4	33.6		34.5		30.3		12.7		27.0		47.2	
BOD-5	1.05		2.29		3.04		2.0		4.45		0.8	
NO_3-N												
NH_3-N	0.412		0.493		0.431		0.457		0.499		0.455	
% N	1.02		2.03		1.16		1.41		1.39		0.91	
PO_4-P	0.100		0.830		0.338		0.815		0.285		0.005	
COD	125.9		132.9		80.3		102.5		94.3		147.4	
Turb.	4.0		2.0		4.4		1.5		3.0		0.5	
Sal.(1)												
Sal.(6)												
SS	10,800		12,300		10,700		8,210		8,560		850	
Chlor a	16.5		15.9		2.79		8.10		10.4		0.62	
Chlor b	11.2		8.65		1.83		4.83		5.32		0	
Chlor c	20.7		7.34		0.59		0.46		8.40		0	
% Chlor	48.4		31.9		5.21		13.4		24.1		0.62	
F. colif	3		142		168		179		246		17	
% colif	< 10		1700		1600		1170		2180		250	
F. strep	1		102		260		64		132		27	
Ratio FC/F	.33		.72		1.5		.38		.80		1.6	

HYDROLAB

A-3
TIDAL STATIONS
(pre-low)

Coll. No. 9

Date 24 July 1974

	1		2		3		4		5		6		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
	0920	1400	0950	1432	1015	1500	1037	1515	1235	1535	1300	1600	Time
	O	I	O	I	O	I	O	I	O	I	I	I	Tid. Act.
	-	31	31.5	31.5	32	31.5	30	32	33	28.9	31	29.9	Air. Tmp.
	1.2M	0.6M	-	0.8M	(1.9M	1.9M)	-	1.2M	2.5M	3.1M	1.1M	1.1M	Dpth.(5)
	29.5	32.0	28.8	32.4	30.8	31.7	29.0	31.5	31.1	33.4	30.9	29.7	H_2O Tmp.(2)
	70+	60	70+	70+	70+	70+	70+	(30)	70+	70+	70+	20	Color
	NA	1.75'	0.5/1'	1/2'	0.5/1'	1/1.5'	0.8/1'	0.5/1'	1/1.5'	1/2.5'	2.5/3.5'	3.5B/	Secchi
													Sal.(3)
	0.5M	0.2	0.2M	0.15	0.2M	0.2M	0.3M	0.2M	0.2M	0.2M	0.2M	0.2M	Dpth.(4)
	29.6	31.9	28.6	32.2	29.5	31.6	28.7	29.5	30.7	32.6	30.3	29.5	Temp.
	6.60	9.90	4.95	11.0	6.80	8.2	2.81	2.2	5.0	7.0	8.10	6.7	DO
	22,000	(10)	750	(10)	170	335	250	(15)	7,000	(10)	19,000	(10)	Cond.
	8.20	8.58	7.60	8.25	7.30	7.48	6.80	6.90	7.60	8.10	8.35	8.35	pH
	+150	+250	+250	+270	+270	305	+280	310	+280	280	+265	275	ORP
													S=
	76		71		23		8		51		72		SO_4
* BOD-6	3.5		3.78		2.0		1.2		0.7		3.81		BOD-5*
													NO_3-N
	0.794		0.787		0.605		0.665		0.754		0.901		NH_3-N
	1.414		1.281		1.466		1.585		1.312		1.306		ΣN
	0.300		0.402		0.244		0.880		0.236		0.090		PO_4-P
	132.6		159.1		117		153.7		83.9		83.1		COD
	3.9		3.5		2.0		1.8		2.5		2.0		Turb.
													Sal.(1)
													Sal.(6)
	10600		11300		9620		6490		7550		6750		SS
	25.5		17.9		16.9		6.64		4.79		8.55		Chlor a
	15.5		10.7		10.3		3.96		2.48		5.39		Chlor b
	28.7		10.2		15.8		4.31		4.77		9.92		Chlor c
	69.7		38.8		43.0		14.9		12.0		23.9		Σ Chlor
	92		134		4		4		28		5		F. colif
	>300		10,200		2430		2300		105		380		Σ colif
	304		510		106		82		23		9		F. strep
	.3		.26		.04		.05		1.2		.55		RATIO FC/F

Field Observations

HYDROLAB

Lab

A-4
F/W STATIONS

Coll. No. 10

Date 7 Augus

7 AM	8 AM	9 AM	10 AM	11 AM	12 AM	
13:45	09:30	10:30	11:30	14:35	12:35	Time
F	F	N	F	S	I	Curr.(6)*
-	-	-	-	-	-	Air. Tmp.
0.2M	0.8M	0.2M	0.3M	1.8M	1.5M	Dpth.(5)
28.8	26.2	29.0	27.0	28.5	27.7	H_2O Tmp.(2)
70+	70+	70+	70+	70+	70+	Color
-	0.75'/1.5'	-	-	-	-	Secchi
						Sal.(3)
0.2M	0.2M	0.2M	0.3M	0.2M	0.2M	Dpth.(4)
28.2	27.0	27.0	26.2	27.5	27.5	Temp.
3.2	4.8	3.0	5.4	6.2	4.8	DO
-	-	-	-	-	-	Cond.
7.00	7.30	6.90	6.60	6.70	6.80	pH
+275	+250	+281	+325	+320	+350	ORP
						S=
23	34	8	Trace	17.	8	SO_4
0.55	0.80	(0.0)	1.22	0.42	0.75	BOD-5
						NO_3-N
0.470	0.465	0.470	0.582	0.518	0.622	NH_3-N
1.60	1.59	1.35	1.78	1.60	2.05	≤N
0.595	1.31	0.209	0.192	0.342	0.260	PO_4-P
65.0	75.3	45.2	61.6	60.4	49.4	COD
3.2	10	3.9	7.5	6.9	-	Turb.
						Sal.(1)
						Sal.(6)
6000	18700	14,400	19700	11700	16700	SS
3.72	1.83	5.84	1.01	2.54	0.87	Chlor a
3.52	0.22	4.66	0.48	1.77	2.82	Chlor b
6.33	3.64	11.32	3.76	7.58	7.28	Chlor c
13.57	5.69	21.8	5.25	11.89	10.97	≤Chlor
40	320	> 200	440	79	250	F. colif
1440	5700	1180	>4000	1100	2300	≤colif
500	410	196	370	200	410	F. strep
.08	.8	~1	1.2	.4	.6	Ratio fc/fs

Field Observations — HYDROLAB

(6)* None (N), Slow (S), Intermediate (I), Fast (Fa), Very Fast (VF), Flood (Fl).

A-5
TIDAL STATIONS
(pre-high)

Coll. No. 11

Date. 16 Aug.

Sta. No.	1		2		3		4		5		6	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Time	0922	1350	0950	1405	1025	1425	1045	1440	1125	1453	1145	1505
Tid. Act.	0	0	0	0	S	0	0	0	I	0	S	0
Air. Tmp.	37	51(v)	34	47(v)	36	48(v)	40	47(v)	35	45(v)	-	49(v)
Dpth.(5)	1M	1½'	1M	NA	2.2M	9.5'	1.4M	3.6'	1.8M	2.4M	1.0	0.7M
H_2O Tmp.(2)	30.1	31.9	29.9	29.9	30.0	31.1	29.2	30.4	31.3	31.6	32.0	33.1
Color	70+	70+	70+	70+	70+	70+	70+	70+	-	70+	30	50
Secchi	½/2.5'	.75'/1.5B	0.5'/1.5'	0.75'/1.0'	½'	0.5'/1.0'	1'/1.5'	NA	1.5'/2.5'	NA	NA	1.5'/3B'
Sal. (3)	10	NA		NA		NA		NA	6	2.5	27	2.5
Dpth.(4)	0.1M	0.1M	0.2M	0.2M	0.2M	0.2M	0.2M	0.4M	0.2M	0.4M	0.2M	0.4M
Temp.	29.5	31.5	27.1	29.3	28.0	29.5	28.4	29.5	31.0	31.0	31.4	32.5
DO	6.95	4.2	3.25	3.05	5.20	6.40	4.51	7.38	6.90	5.92	7.22	7.40
Cond.	-	-	-	-	-	-	-	-	-	-	-	-
pH	8.00	7.45	7.05	7.11	7.20	7.30	6.72	6.70	8.30	7.59	8.50	8.50
ORP	+240	+210	+240	+232	+285	+280	+289	+290	+270	+285	+240	+250
$S^=$	-	-	-	-	-	-	-	-	-	-	-	-
SO_4	116		25		18		8		114		154	
BOD-5	3.75		0.10		3.70		0.40		3.10		0.72	
NO_3-N												
NH_3-N	0.499		0.440		0.241		0.160		0.242		0.030	
ΣN	0.776		0.855		0.691		0.575		0.812		0.030	
PO_4-P	0.350		0.467		0.226		0.432		0.225		0.005	
COD	233		273		203		112		176		144	
Turb.	3.0		3.9		0.8		1.0		0.5		0.0	
Sal.(1)			0.18*		0.15*		0.26*		0.12*			
Sal.(6)												
SS	7880		8430		7680		6880		5880		750	
Chlor a	11.65		1.94		4.88		2.19		10.08		1.51	
Chlor b	6.54		0.46		1.72		0.78		5.83		0.84	
Chlor c	11.88		0.94		0.79		0		11.26		0.61	
% Chlor	30.1		3.3		7.4		3.0		27.2		3.0	
F. colif	78		200		102		53		62		< 1	
% colif	13,600		480		370		640		830		65	
F. strep	150		112		370		216		26		7	
Ratio FC/FS	1.9		1.8		.28		.24		2.4		<.1	

*By $AgNO_3$ titration

Field Observations — HYDROLAB — LAB

A-6

TIDAL STATIONS

(pre-low)

Coll. No. 12

Date 22 Aug.

	1		2		3		4		5		6		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
Time	10:00	1400	1011	1420	1045	1435	1105	1445	1135	1500	1155		
Tid. Act.	O	I	O	I	O	S	O	I	O	O	I		
Air. Tmp.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Dpth.(5)	0.5'		0.5'		1.7M		0.8M		1.2M		0.6M		
H_2O Tmp.(2)	29.8	33.9	29.8	33.1	29.8	33.5	29.0	30.8	30.7	33.5	31.5		
Color	70+	70+	70+	70+	70+	70+	70+	70+	70+	70+	70+		
Secchi	NA	NA	NA	½'	1.5/2'	1.5/2.5'	0.5/1'	½'	1.5/2'	0.5/2'	NA		
Sal.(3)													
Dpth.(4)	0.1M	0.1M	0.2M	0.2M	0.2M	0.2M	0.2M	0.2M	0.2M	0.2M	0.2M		
Temp.	29.4	32.5	28.5	32.0	29.0	30.0	28.3	30.0	30.0	31.7	30.0		
DO	4.85	9.05	3.60	5.90	5.05	6.50	3.55	6.10	4.6	8.60	4.70		
Cond.	20,000	35,000	2,750	3,800	2,200	3,900	400	350	18,000	33,000	40,000		
pH	7.82	8.50	7.50	7.60	7.60	7.70	7.02	7.00	7.72	8.45	8.20		
ORP	+170	+210	+180	+238	+180	+240	+235	+255	+250	+260	+220		
S=													
SO_4													
BOD-5	1.85		4.95		4.0		1.49		2.66		3.61		
NO_3-N													
NH_3-N	0.060		0.106		0.131		0.268		0.035		0.00		
∑N	0.490		0.451		0.475		0.592		0.284		0.364		
PO_4-P	0.290		0.390		0.119		0.434		0.154		0.150		
COD	88.8		74.2		46.8		45.9		72.2		122.3		
Turb.	4.0		4.9		3.1		3.0		3.0		1.0		
Sal.(1)													
Sal.(6)													
SS	6880		6380		6700		3880		10880		5910		
Chlor a												N.D.	
Chlor b													
Chlor c													
∑ Chlor													
F. colif	72		60		26		53		68		51		
∑ colif	2200		3000		1120		2040		887		295		
F. strep	98		136		57		106		6		3		
Ratio	.46		.44		.46		.5		11.3		17.0		

Boat at Dock - no sample taken

FC/FS

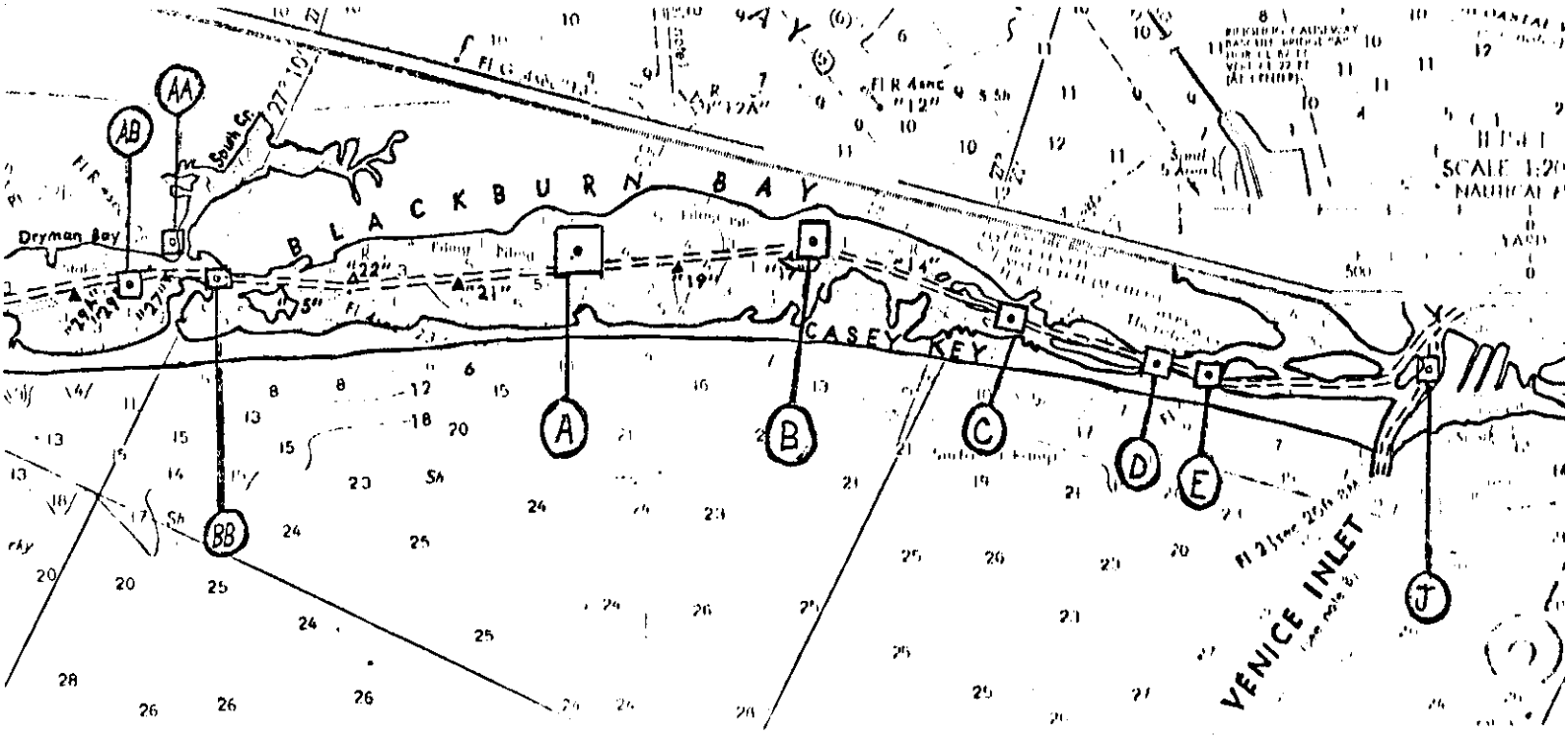
APPENDIX B

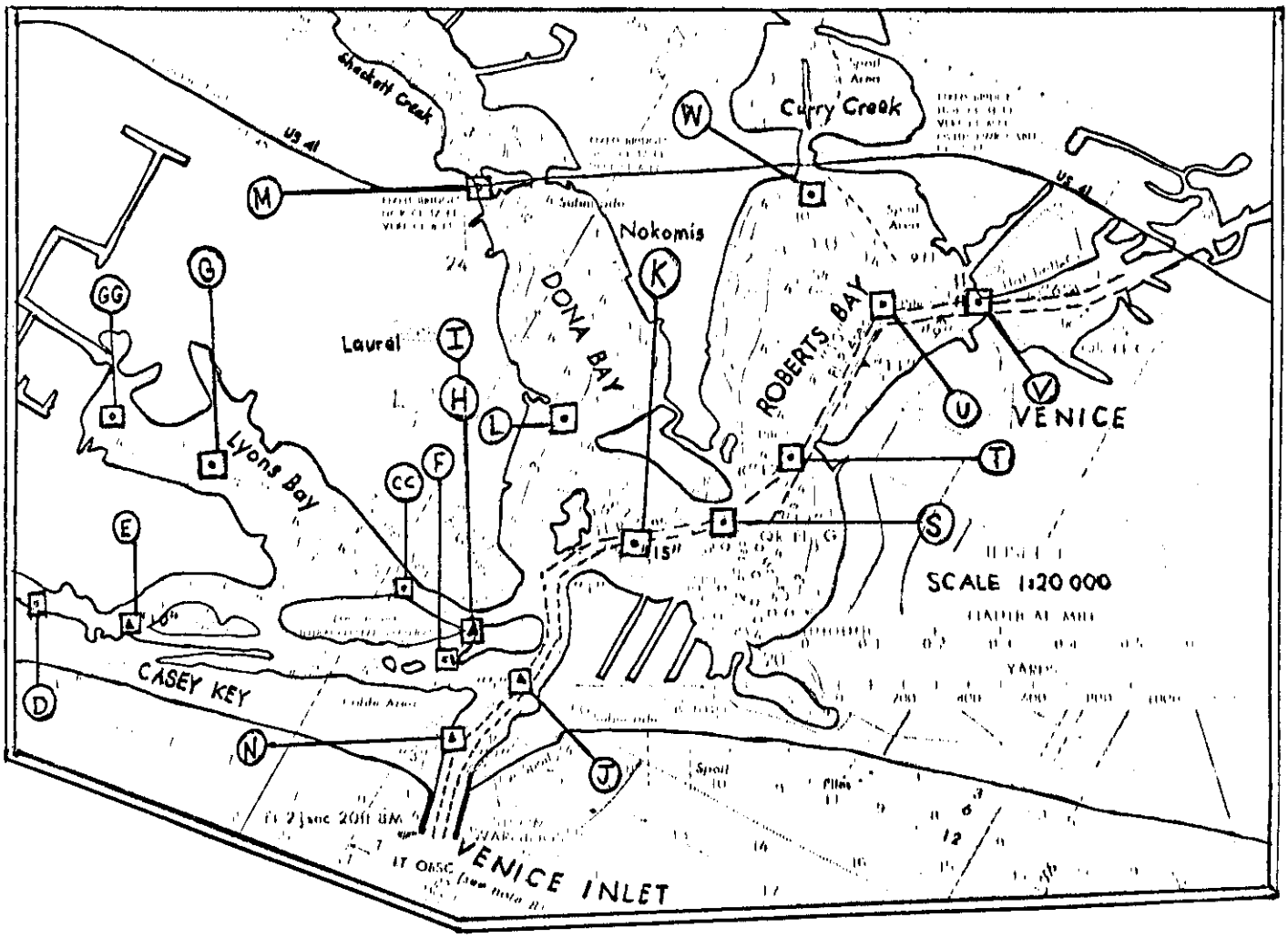
Official List of Monitoring Stations

Special Hydro-Lab Monitoring Study

A	Intracoastal Waterway Navigational Marker (IWNM) #20
AA	Mouth of South Creek, by the marker post
AB	IWNM #29
B	IWNM #16
BB	200 meters south of the South Creek mouth
C	IWNM #13
CC_1	Beginning of Southern exit from Lyons Bay
CC_2	Beginning of Southern exit from Lyons Bay
D	South bridge to Casey Key
DD_1	50 meters west of Venice Inlet Navigational Marker (VINM) #5
DD_2	50 meters west of VINM #5
E	IWNM #10
F	IWNM #7
G	Lyons Bay, middle
GG	Lyons Bay, far end
H	IWNM #4 (clear)
I	IWNM #4 (turbid)
J	VINM #5
K	VINM #15
L	Off Nokomis Point
M	Cow Pen Slough tidal station #5
N	Cow Pen Slough tidal station #6
O - R	deleted from this list
S	VINM #14
T	VINM #12
U	VINM #10
V	VINM #8
W	Route 41, Curry Creek bridge

Location of Bay Region Stations





DATE	SEMI-DIURNAL OR DIURNAL	HIGH /LOW	TIDE	DATUM PLANE	HIGH /LOW	TIDE	DATUM PLANE	STATION	TIME	DEPTH	TEMP	D.O.	COND.	PH	ORP	SULFUR ION
08/01/74	S	H	1124	2.46	L	1937	0.18	AB	1145	0.4	27.50	2.85	19,500	8.15	270	.
08/01/74	S	H	1124	2.46	L	1937	0.18	AB	1145	0.8	27.50	2.80	20,000	8.20	270	.
08/01/74	S	H	1124	2.46	L	1937	0.18	AA	1150	0.4	27.25	2.20	20,000	8.15	270	.
08/01/74	S	H	1124	2.46	L	1937	0.18	AA	1150	0.8	27.25	2.30	21,500	8.20	260	.
08/01/74	S	H	1124	2.46	L	1937	0.18	BB	1155	0.4	27.75	2.80	14,000	8.20	255	.
08/01/74	S	H	1124	2.46	L	1937	0.18	BB	1155	0.8	27.50	2.75	16,000	8.20	255	.
08/01/74	S	H	1124	2.46	L	1937	0.18	A	1205	0.4	28.25	2.85	19,500	8.20	250	.
08/01/74	S	H	1124	2.46	L	1937	0.18	A	1205	0.8	28.00	2.70	20,500	8.20	250	.
08/01/74	S	H	1124	2.46	L	1937	0.18	B	1210	0.4	28.50	3.00	20,000	8.25	245	.
08/01/74	S	H	1124	2.46	L	1937	0.18	B	1210	0.8	28.25	2.85	24,000	8.30	245	.
08/01/74	S	H	1124	2.46	L	1937	0.18	C	1215	0.4	28.50	3.00	23,000	8.30	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	C	1215	0.8	28.50	2.90	23,500	8.30	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	D	1220	0.4	28.25	2.80	21,000	8.25	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	D	1220	0.8	28.50	3.00	26,000	8.35	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	E	1235	0.4	28.00	3.25	17,500	8.25	235	.
08/01/74	S	H	1124	2.46	L	1937	0.18	E	1235	0.8	28.50	2.90	28,000	8.20	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	F	1240	0.4	28.00	3.05	14,000	8.10	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	F	1240	0.8	28.00	3.10	22,000	8.30	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	G	1250	0.4	28.25	2.80	14,500	8.00	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	G	1250	0.8	27.75	1.90	23,500	8.20	245	.
08/01/74	S	H	1124	2.46	L	1937	0.18	GG	1255	0.4	27.50	2.25	12,000	7.85	245	.
08/01/74	S	H	1124	2.46	L	1937	0.18	GG	1255	0.8	28.00	2.35	15,000	7.85	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	CC	1310	0.4	28.25	2.55	19,000	8.15	235	.
08/01/74	S	H	1124	2.46	L	1937	0.18	CC	1310	0.8	28.00	2.55	22,500	8.20	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	HI	1315	0.4	27.75	2.80	12,000	7.90	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	HI	1315	0.8	28.00	2.75	13,500	8.00	240	.
08/01/74	S	H	1124	2.46	L	1937	0.18	J	1320	0.4	27.00	2.70	45,000	5.60	245	.
08/01/74	S	H	1124	2.46	L	1937	0.18	J	1320	0.8	27.00	2.60	13,000	8.00	250	.
08/01/74	S	H	1124	2.46	L	1937	0.18	N	1335	0.4	27.75	3.05	19,000	8.20	250	.
08/01/74	S	H	1124	2.46	L	1937	0.18	N	1335	0.8	28.00	2.95	21,500	8.20	250	.
08/01/74	S	H	1124	2.46	L	1937	0.18	K	1340	0.4	27.00	2.65	3,700	7.60	250	.
08/01/74	S	H	1124	2.46	L	1937	0.18	K	1340	0.8	27.00	2.65	3,800	7.55	255	.
08/01/74	S	H	1124	2.46	L	1937	0.18	L	1350	0.4	27.00	2.85	2,200	7.30	255	.
08/01/74	S	H	1124	2.46	L	1937	0.18	L	1350	0.8	26.50	2.85	2,400	7.20	260	.
08/01/74	S	H	1124	2.46	L	1937	0.18	M	1400	0.4	26.00	3.10	450	7.00	260	.
08/01/74	S	H	1124	2.46	L	1937	0.18	M	1400	0.8	26.00	3.05	455	6.95	265	.
08/01/74	S	H	1124	2.46	L	1937	0.18	S	1405	0.4	27.00	2.70	6,750	7.60	270	.
08/01/74	S	H	1124	2.46	L	1937	0.18	S	1405	0.8	27.00	2.50	8,200	7.65	270	.
08/01/74	S	H	1124	2.46	L	1937	0.18	T	1410	0.4	27.00	2.65	5,850	7.55	265	.
08/01/74	S	H	1124	2.46	L	1937	0.18	T	1410	0.8	27.00	2.55	8,300	8.00	270	.
08/01/74	S	H	1124	2.46	L	1937	0.18	U	1415	0.4	26.50	2.40	2,700	7.10	265	.
08/01/74	S	H	1124	2.46	L	1937	0.18	U	1415	0.8	27.00	2.35	6,500	7.50	260	.

APPENDIX C

A Typical Computer Readout for Part of One Day's Sampling for the Special Hydrolab Monitoring Study

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PERRY W. GILBERT
DIRECTOR

28 January 1975

Mr. E. C. Engman
Research Associate
Planning/Marketing Services, Inc.
1800 Siesta Drive
Sarasota, FL 33579

Dear Gene,

In an effort to organize the literature pertinent to the Cow Pen Slough-Dona Bay Ecological Study, we have assembled a working bibliography. Some of you have already received copies of the first two installments of the project bibliography and can add the enclosed Addendum B to that file. I am trying to make sure that you all have complete sets but if by my oversight you don't have the Bibliography, Addendum A, and now Addendum B, please let me know.

If we have overlooked pertinent references, especially locally-important ones, we would very much appreciate your input.

Sincerely yours,

Jeffrey L. Lincer, Ph.D.
Project Coordinator

JLL/jcl
enc.

Partial Bibliography Compiled

for

Project Entitled:

THE ECOLOGICAL STATUS OF DONA AND ROBERT'S BAY AND ITS RELATIONSHIP TO COW PEN SLOUGH AND OTHER POSSIBLE PERTURBATIONS

Compiled: 14 October 1974

By: Jeffrey L. Lincer, Ph.D.
Project Coordinator

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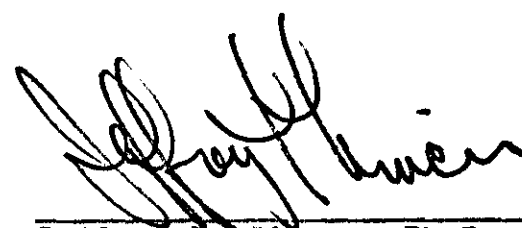
Addendum A
to
Partial Bibliography Compiled

for

Project Entitled:

THE ECOLOGICAL STATUS OF DONA AND ROBERT'S BAY
AND ITS RELATIONSHIP TO COW PEN SLOUGH
AND OTHER POSSIBLE PERTURBATIONS

Compiled: 21 October 1974

By: 

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Addendum B
to
Partial Bibliography Compiled

for

Project Entitled:

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Compiled: 28 January 1975

By: 

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