SEA GRANT REPORT
OF
MARINE TECHNICIAN TRAINING

DEPT. OF MARINE SCIENCE & TECHNOLOGY
SOUTHERN MAINE VOCATIONAL TECHNICAL INSTITUTE
FORT ROAD, SOUTH PORTLAND, MAINE 04106

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SOUTHERN MAINE VOCATIONAL TECHNICAL INSTITUTE
FORT ROAD, SOUTH PORTLAND, MAINE 04106

Tapan Banerjee

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THE PROGRESS REPORT

TAPAN BANERJEE

INTRODUCTION

The Marine Technicians graduating from Southern Maine Vocational Technical Institute complete a two year post/secondary level curriculum related in the marine technology field. They are variously called Physical Science Technicians, Marine Resource Technicians, Deck Support Technicians, Marine Environmental Technicians, Marine Laboratory Assistants, Marine Science Aides, etc. Most definitions refer to duties like collecting data, maintaining field stations, sorting, describing and analyzing samples, surveying and inspecting certain marine environment, operating certain technical equipment, and conducting tests for sea water characteristics.

The marine technician's major role, is to carry out repetitive procedures, gradually becoming highly skilled in these procedures with time. At Southern Maine Vocational Technical Institute, this training of marine technicians was first conceived in 1958 and continued to grow and develop through the years, and is presently training and supplying graduates for many ocean oriented activities.

PROGRAM

The Marine Science Program at S.M.V.T.I., is designed to produce technicians who are conversant with the above mentioned skills. A percentage of the school year is spent at sea on the training vessel. Students are required to participate in sea trips, each semester. Such participation includes deck, engine-room, and oceanographic station watch. When the vessel is in port (other than her home port), the students are also required to stand in-port security watches. Discipline aboard the vessel meets the rigid demands of maritime requirements.

Second year students specialize in either the deck and oceanography or the engineering and oceanography phase of the course. This two year program is available as an Associate Degree or as a Diploma program. The enrollment of students in a degree or non-degree industrial program depends on their academic background and ability to carry related subjects. From the industrial program, the students may receive a degree by acquiring additional courses in the humanities and the natural sciences. (Fig. 1 & Fig. 2). A technician in Applied Marine Biology and Oceanography is a semi-professional with two years of post high school training in physical, chemical, marine biological or general oceanographic studies. Students in this degree program take all college level courses as well as mathematics and humanities required for an associate degree. These students may also pursue their education in this field beyond the associate degree level. (Fig. 3).

THE GRADUATING CLASSES

Since 1961, this institution has enrolled 445 students and has graduated 225 students. (Fig. 4). The high rate of enrollment during 1969, 1970 and 1971 was due to increment of approximately 75 students in the new phase of the program, Applied Marine Biology and Oceanography which was funded by the Sea Grant Office of NOAA.

THE STUDENTS PLACEMENT STATUS

From the records of our graduates for the past six years, it shows that industry has hired 63% of our total output, and 18% of the graduates pursued their higher education at a four year institution, 14% were called for the services and 5% of the students did not reply to our survey. (Fig. 5). The salary range of a technician for the past six years has varied from $8,000 per year to $10,000 per year. The mean range shows $4,500 to $7,500 per year. (Fig. 6). The following list shows a few of the organizations where our graduates have been placed.

Alpine Geophysical Corporation
National Marine Fisheries Service
Casco Bay Lines
Florida Institute of Technology
Narragansett Marine Laboratory
The Research Institute of the Gulf of Maine
Sandy Hook Marine Biological Laboratory
Sea & Shore Fisheries of Maine
Smithsonian Oceanographic Sorting Center
United States Naval Oceanographic Office
University of Rhode Island (Vessel TRIDENT)
Vast, Inc., South Bristol, Maine
DeepSea Ventures, Gloucester, Virginia
University of Texas, Houston, Texas

The following is a list of positions that our graduates have filled from their training background at S.M.V.T.I.

Oceanographic Laboratory Technicians
Fisheries Technicians
Hydrographic Survey Technicians
Limnological Laboratory Technicians
Marine Engineering Technicians
Deck Support Technicians
Oceanographic Instrumentation Technicians
Marine Product Technicians
Underwater Technicians
Scientific Support Party Chief

STUDENTS PARTICIPATION IN DIFFERENT PROJECTS

Project No. I. Hydrographic Studies of Casco Bay.

Six stations have been chosen for this study. Students, along with instructors, spend approximately 8 weeks every semester collecting routine data, which includes oxygen, salinity, pH, total phosphate, plankton samples, bottom grab samples and dredge samples. The data is compiled and published as a technical report series. (A report on this subject included separately in this paper.

Project No. II. Studies of Wave Height and Length Along with Wind Velocity and Direction at Jewel Island, Casco Bay.

This project was a joint venture by S.M.V.T.I. students, faculty members and the scientists of Van Houten Associates, New York. During this study, students were exposed to the most sophisticated equipment and techniques that are used in oceanographic studies. The wind velocity instrument included in this experiment was Hydro Products Model MS 950 - MS 901 along with the rust track ship chart recorder. The wave recorder ASPOS, a product from Holland, was used for continuous recording of wave height and wave length. Both of these instruments were donated to the school by Van Houten Associates on completion of their studies ending in 1969.

Project No. III. Pollution Studies.

S.M.V.T.I. students collaborated with the Water Resources Division of the U. S. Department of the Interior in a routine survey project to collect field data and water samples at two sites in Portland Harbor. The field sampling included pH, dissolved oxygen, temperature, and bacteriological sampling of water for immediate incubation for determining total and fetal coliform. The chemical analysis of the samples was done at the Water Resources Division Laboratory. These field trips occurred every three months and this project is still continuing at our campus.

Project No. IV. Participation in TEKTITE II in the Virgin Islands.

During the months of May, June, September and October of 1970, a total of 95 students and 8 faculty members took part in this project. Our students were specifically assigned to take part in an oceanographic survey in the Caribbean Sea. This included 19 transits extending from approximately the 10 fathom line to the 1,000 fathom line around the Virgin Island platform. The complex survey consisted of 133 oceanographic stations where temperatures, salinity, dissolved oxygen, and nutrients were sampled.

THE ADVISORY COMMITTEE

A new Advisory Committee was created during June, 1971. The purpose of this Advisory Committee is to coordinate activities of the school and the community. The committee's duties also include the determination of community needs, evaluation of the marine science program, helping in the selection of students, guiding and supporting the staff members, promoting adult classes, financial and moral support to the marine science program, and public relations.

Dr. Donald B. Horton, Director of the Research Institute of the Gulf of Maine, was elected as a Chairman for the Advisory Committee for a period of one year. At present, the Advisory Committee is involved in a questionnaire survey to study and to recommend the department in curriculum development, students employability status, future course development, and other pertinent information which will enhance the existing program to meet the objectives of marine technician training at S.M.V.T.I.

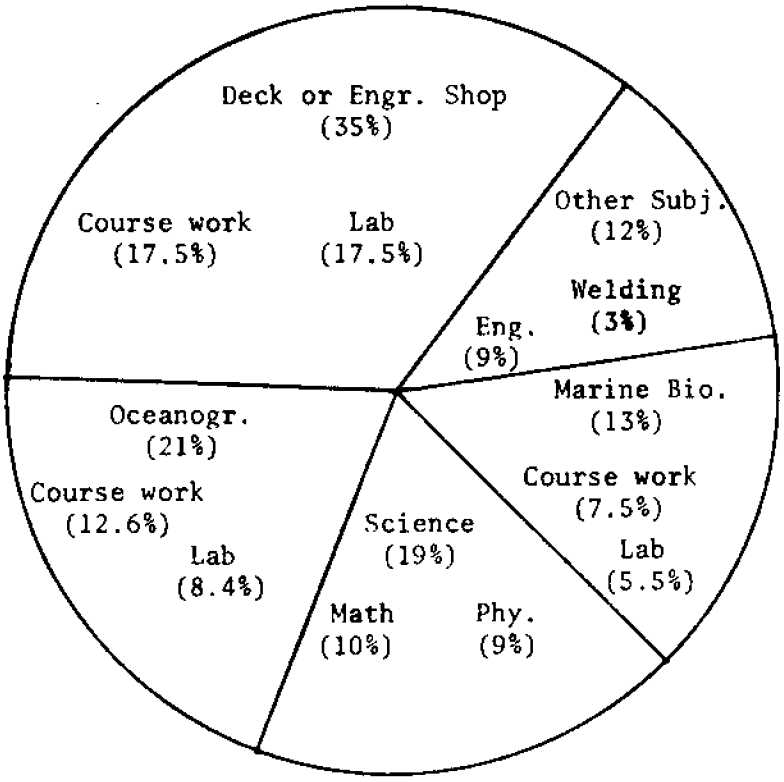

Fig. 1. Curriculum for Training Marine Science Technicians in the non-associate degree program

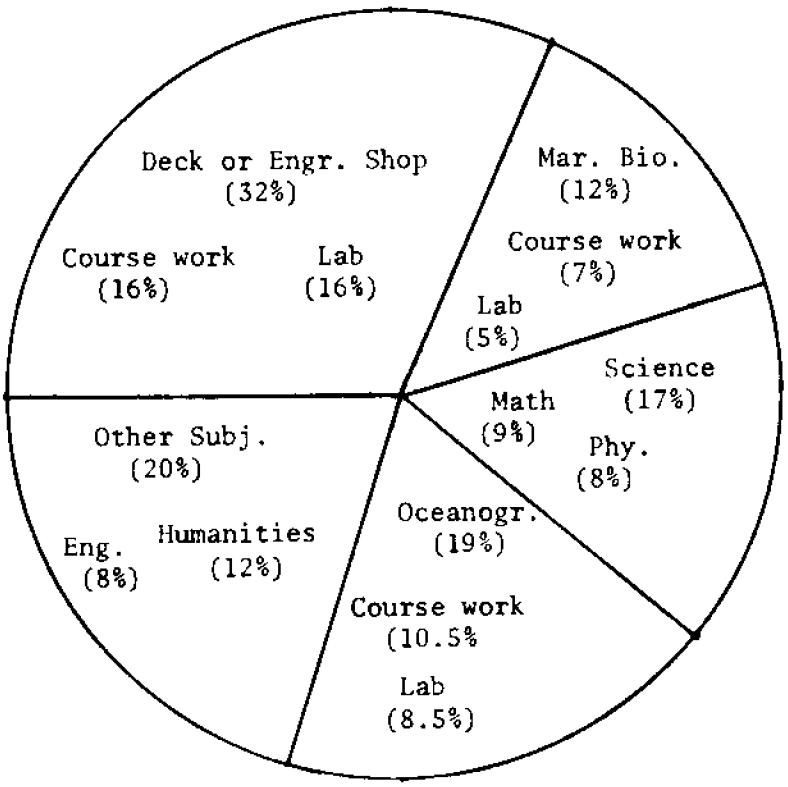

Fig. 2. Curriculum for Training Marine Science Technicians in the associate degree program

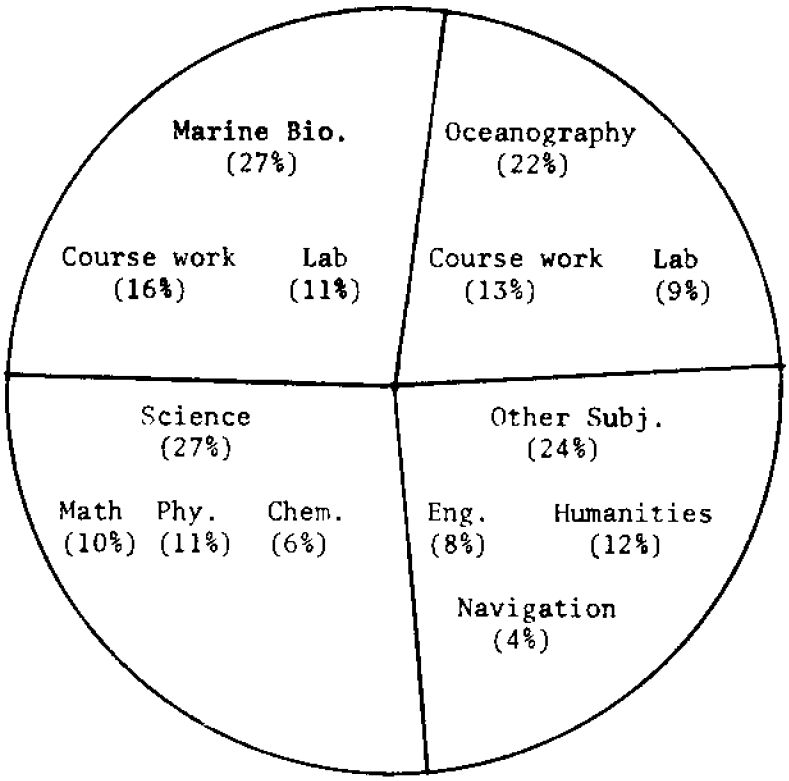

Fig. 3. Curriculum for Training Applied Marine Biology & Oceanography Technicians in the associate degree program

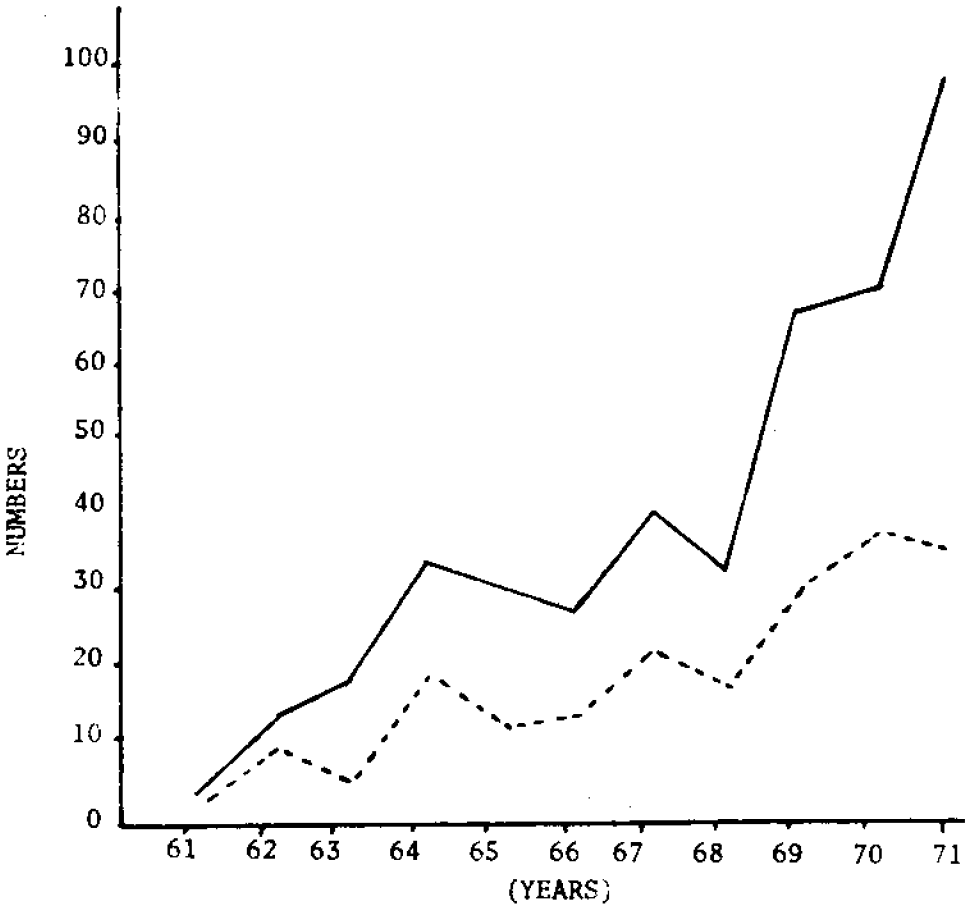

Fig. 4. Student enrollment and graduation numbers since 1961-1970, for the Dept. of Marine Science & Technology.

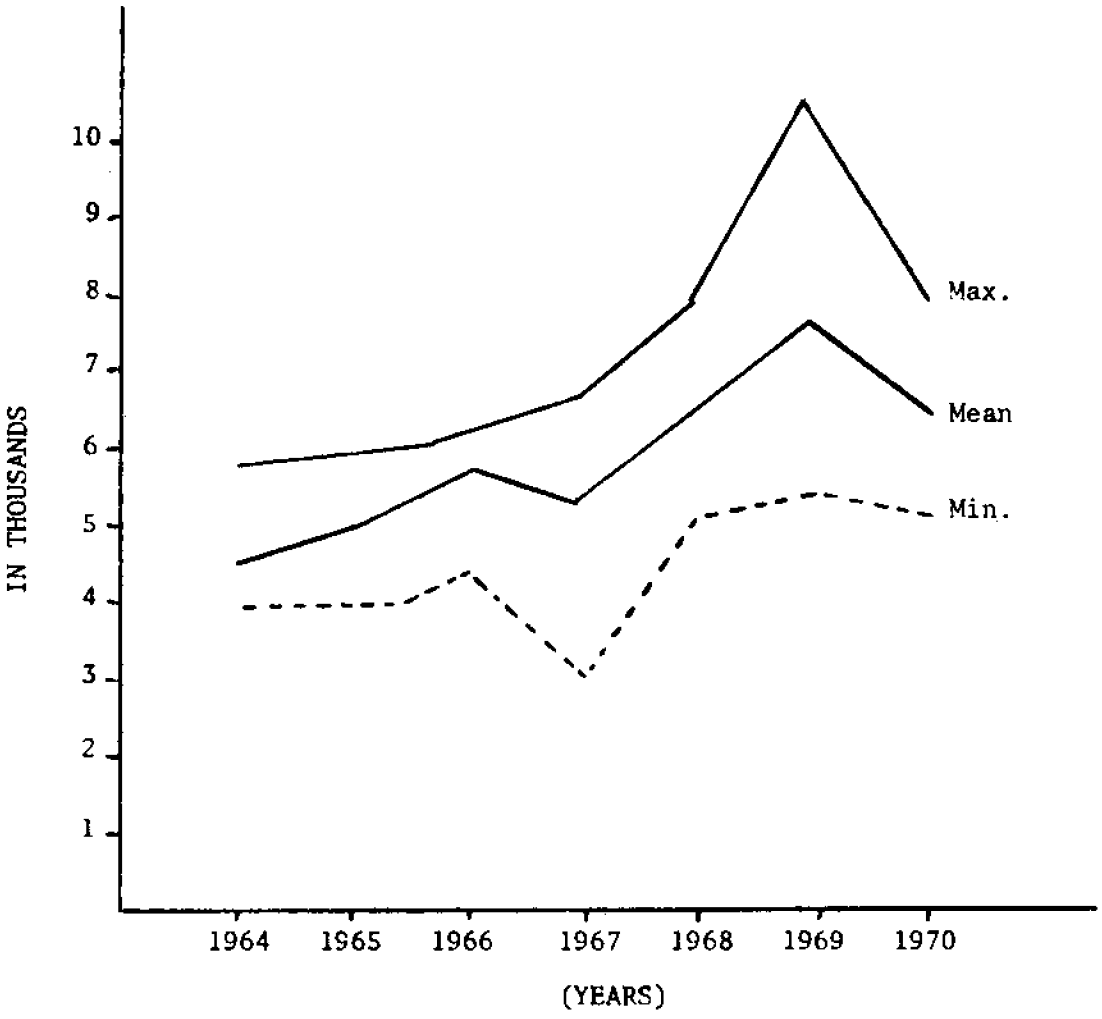

Fig. 5. Salary Range for Marine Science Technicians for past six years (1964-1970).

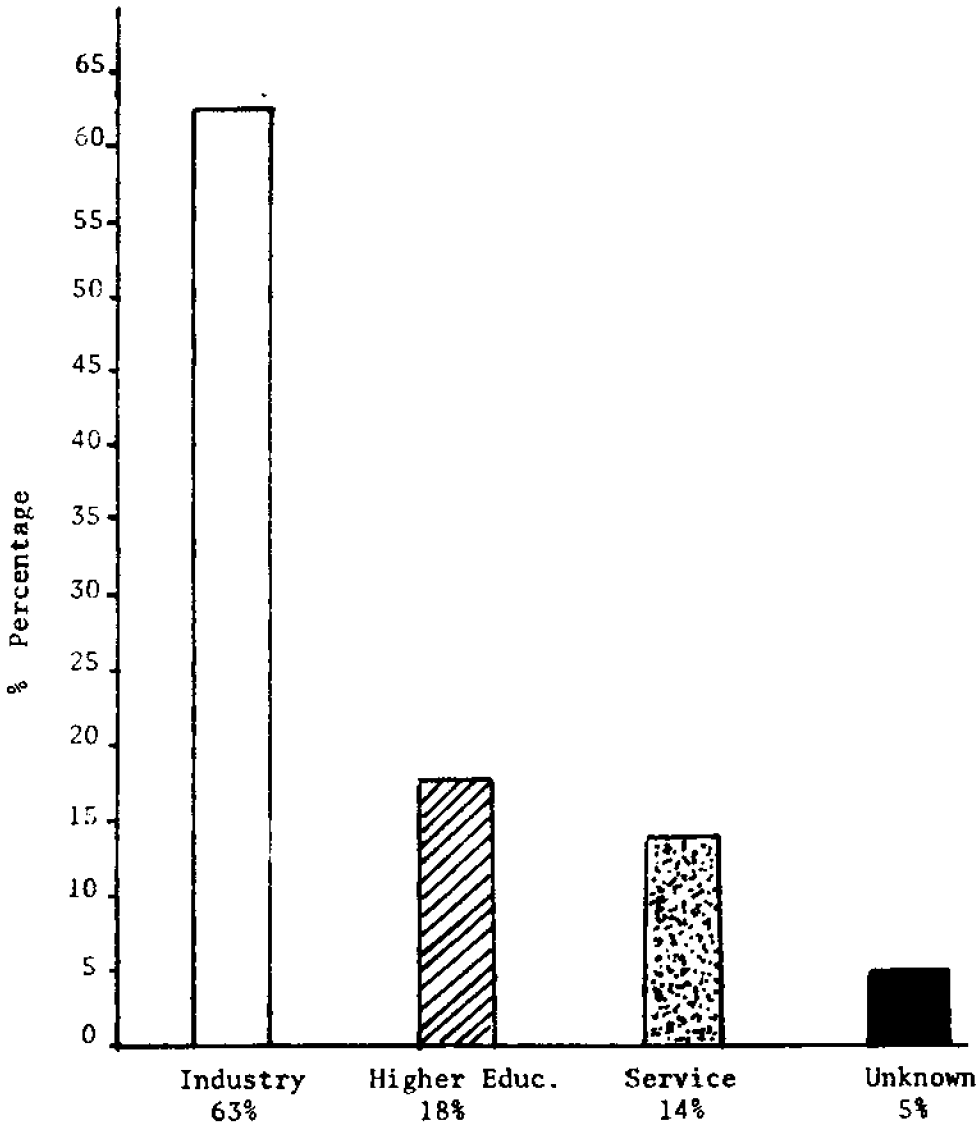

Fig. 6. Marine Technicians Placement Status since 1964-1970.

APPENDIX I

The following is a list of Advisory Committee Members:

Mr. William Altenburg, President
Altenburg, Kirk & Company
Thompson's Point
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Mr. Spencer Apollonio
State Oceanographer
Dept. of Sea & Shore Fisheries
West Boothbay Harbor, Maine 04575

Mr. Robert L. Dow
Marine Research Director
Maine Department of Sea & Shore Fisheries
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Captain Charles C. Dunbar, Jr.
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Mr. Robert Gilmore
Personnel Manager
Sanders Associates, Inc.
133 Pope Avenue
South Portland, Maine 04106

Mr. Ralph Gould
President
Marineast/Marina
Mill Cove
South Portland, Maine 04106

Dr. Donald B. Horton
Director
TRIGOM
96 Falmouth Street
Portland, Maine 04103

Mr. Edward Langlois
General Manager
Maine Port Authority
Maine State Pier
Portland, Maine 04111

Mr. Donald A. MacVane
Graduate of Maine Maritime Academy
Professional Fisherman
39 Fort Road
South Portland, Maine 04106

Mr. Douglas Makinen
Chief Engineer
Vast, Inc.
South Bristol, Maine 04568

Mr. Donald W. Renn
Senior Scientist
Marine Colloids, Inc.
Rockland, Maine 04841

Mr. Terry E. Weymouth
Environmental Improvement Division
S. D. Warren Company
89 Cumberland Street
Westbrook, Maine 04092

APPENDIX II

List of Faculty and Staff

Arlander, Richard P., B.S., - Instructor - Marine Engineering

Banerjee, Tapan, M.S., - Chairman - Dept. of Marine Science & Technology

Doughty, Aftin L., - Assistant Engineer - Vessel

Eayrs, Weston III, B.S., - Instructor - Oceanography

Flahive, William J., Ph.D., - Instructor - Microbiology, Ecology

Goode, Robert E., M.S., - Division Head (AMBO), Marine Biology

Goodwin, Charles F., B.S., - Instructor - Chemistry

Hall, Charles M., B.S., - Instructor - Seamanship, Navigation

Hall, Clarence S., - Captain - Vessel

Hupper, George W., Captain - Division Head (Deck), Navigation

Lomoriello, Luigi S., B.S., - 1st Mate - Vessel

Robertson, Judi A., - Secretary - Dept. of Marine Science & Technology

Siegel, Robert E., M.S., - Instructor - Oceanography

Soucy, Robert C., B.S., - Division Head (Engineering), Marine Engineering

Turner, Norman W., - Chief Engineer - Vessel

APPENDIX III

DEPARTMENTAL PUBLICATIONS

Banerjee, Tapan.

1969. Marine Science Technology Program at Southern Maine Vocational Technical Institute, S.M.V.T.I., South Portland, Maine. (Sea Grant Project #GH-35); pp.22.

1970. Training Marine Science Technicians for the Hydro-space Age. Technical Education News., McGraw-Hill Book Company., 29 (1): 10-12.

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1971. Maturity and Fecundity of the White Seaperch (Phanerodon furcatus) from Tomales Bay, California. Journal of the Fisheries Research Board of Canada., 28 (7): 1051-1053.

Eayrs, Weston III and Tapan Banerjee.

1970. Hydrographic Data from Casco Bay, Maine - Fall, 1968., S.M.V.T.I., Dept. of Applied Marine Biology & Oceanography, Technical Report Series (1): pp. 5. (mimeographed rept.)

Eayrs, Weston III.

1970. Hydrographic Data from Casco Bay, Maine - 1969., S.M.V.T.I., Dept. of Applied Marine Biology & Oceanography, Technical Report Series (1): pp. 11. (mimeographed rept.)

A Summarization of Hydrographic Data of Casco Bay, Maine, (1968-1971) Collected by Students of a Marine Technology Program (Sea Grant) at Southern Maine Vocational Technical Institute

By

Weston Eayrs III[1]

INTRODUCTION

Perhaps the most important part of the training of marine science technicians is in-the-field training in the use of sampling and measuring instruments under the actual conditions of being at sea. Classroom discussions and demonstrations can hardly replace the sensation of working on a rolling deck.

Students in the Marine Technology and in the Applied Marine Biology and Oceanography programs at Southern Maine Vocational Technical Institute spend several days at sea each semester aboard the Institute's training vessel, M/V AQUALAB. The primary intent of these day-cruises is to provide the opportunity for each student to actually use each sampler or instrument. Secondary to this purpose, data is accumulated.

This brief report constitutes a summarization in tabular form of data collected on our student training cruises on Casco Bay, Maine, between 1968 and 1971.

The data reported here is of a strictly hydrographic nature, but one should not assume from this that the students make only Nansen bottle casts. At each station and on all cruises, bottom grab samplers were also used. Plankton samples were collected by streaming a cone net as the vessel rode at anchor. Where the bottom type and configuration permitted, tows were made with box dredges, rock dredges, a 30-foot otter trawl, and short core samples were taken with a Phleger-type corer whenever a bottom of soft sediments was encountered.

No measurement or complete examination was made of these biological and geological samples except for casual and brief on-the-spot examinations. A very few benthic specimens and some sediments were saved for later demonstration and examination in class. The plankton samples were preserved and are being maintained.

As an important parallel to learning sampling tools and sampling procedures, the students also receive training in analytical and measurement procedures and they perform analyses on the samples they have collected.

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[1]Instructor, Oceanography, S.M.V.T.I.

SAMPLING SCHEDULES AND SITES

During the years of 1968 to 1970, a series of six stations were established and visited as the training schedule and weather conditions dictated. As will be seen in the data tables, the stations were visited at somewhat irregular intervals and all stations did not receive the same number of visits.

All of the sampling sites are located in or near Casco Bay (Figure 1.). The station names and their coordinates are listed in Table I. For their exact location, refer to the coordinates and C&GS Chart 1204.

In 1971, the Institute obtained a new training vessel and because of certain limitations under which we could operate the vessel, we could not visit our two outermost (seaward) stations; i.e., Stations #3 and #6. In order that we could maintain our usual number of sampling sites in 1971, we selected Stations #7 and #8 (Figure 1 and Table I.) and visited those sites for the first time in the spring of 1971.

The initial six sampling sites and data for the Fall of 1969 have been described in an earlier report (Eayrs and Banerjee, 1970) and data for the calendar year 1969 have also been presented earlier (Eayrs, 1970).

Most sampling on these training cruises was done at the surface (S), mid-depth (M), and one meter above the bottom (B). Water depth was determined by the ship's fathometer upon arrival on station. When sampling was done at specific depths, other than surface, mid-depth, and bottom, those depths are recorded.

METHODS

All collecting was done by the students. Specific tasks (such as winch operator, platform chief, Nansen bottles, data recorder, etc.) were reassigned each cruise, or each station if two stations were visited in one day, so that each student would be responsible at one time or another for each aspect or phase of hydrographic or bottom sampling.

As soon as the bridge officer informed the supervising instructor that the vessel was on station and the anchor secured, work was begun. The various phases of sampling were conducted from two (or three) outboard platforms simultaneously. This system permitted replicate casts so that the students could get more exposure and practice with each instrument. As soon as one cast was completed on each platform, the crews would be rotated to the next platform. In this manner, each student could work with several different samplers on each station or cruise.

Water samples were collected with Nansen bottles. Temperatures were recorded on location by means of reversing thermometers, thermistor probe (in situ), mechanical bathythermograph (BT), or stem thermometer. On some cruises, all of these temperature recorders were utilized. Salinities were measured in the shore (or ship) laboratory with an induction salinometer. Occasionally, Harvey or Knudsen titrations were performed, or a salinity profile was measured with an in situ salinity probe. Unmodified Winkler titrations were used to determine the dissolved oxygen content. Estimations of pH were obtained on station with a hand-held color comparator. Relative visibilities were determined by lowering a 30 cm black and white Secchi disc.

The data for each station are shown in Table II.

ACKNOWLEDGEMENT

Several instructors of the Marine Science Department at Southern Maine Vocational Technical Institute have helped in this phase of the students' training and in the collection of the data by serving in a supervisory and planning capacity during the sampling. To each of them, an expression of appreciation is extended. And, of course, the data presented in this report could not have been obtained if it had not been for the students of the program. It must be remembered that this report is a direct result of their at-sea training and work. We appreciate the fine efforts and cooperation of the instructors and the students who have helped in the gathering of the data which makes possible the preparation of this report.

LITERATURE CITED

Eayrs, Weston III and Tapan Banerjee. 1970. Hydrographic Data from Casco Bay, Maine - Fall, 1968. Southern Maine Vocational Technical Institute, Department of Applied Marine Biology and Oceanography, Technical Report Series, Number 1. (mimeographed report).

Eayrs, Weston III. 1970. Hydrographic Data from Casco Bay, Maine - 1969. Southern Maine Vocational Technical Institute, Department of Applied Marine Biology and Oceanography, Technical Report Series, Number 2. (mimeographed report).

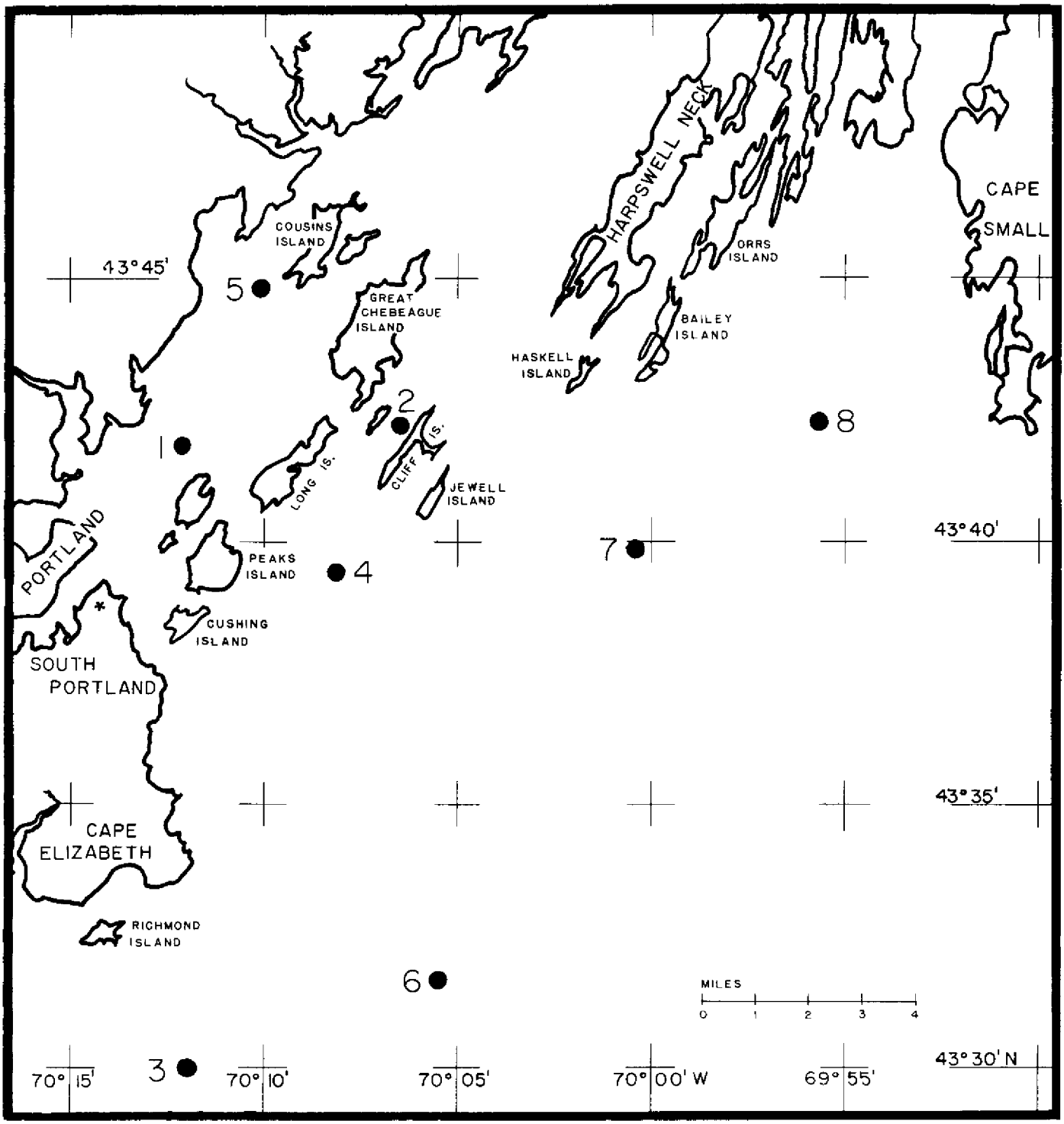

Figure 1.

Map of Casco Bay, showing sampling sites.

(The asterisk in South Portland shows the approximate location of the campus of SMVTI)

TABLE I.

Station Names, Co-ordinates, and Average (MLW) Depths

1).	The Brothers	70°12'07"W x 43°41'50"N	8 meters
2).	Luckse Sound	70°06'30"W x 43°42'13"N	24 meters
3).	Richmond Island	70°12'00"W x 43°30'00"N	60 meters
4).	The Hussey	70°08'07"W x 43°39'25"N	30 meters
5).	Cousins Island	70°10'05"W x 43°44'47"N	13 meters
6).	Portland Lightship	70°05'30"W x 43°31'37"N	37 meters
7).	Halfway Rock	70°00'20"W x 43°39'55"N	43 meters
8).	White Bull Island	69°55'40"W x 43°42'15"N	34 meters

Station 1

(The Brothers)

Date	Time (EST or DST)	Depth Sampled	Temp., °C.	D.O., mg/l	Salinity, °/oo	pH	Visibility, meters
17 Oct 1968	0950	S	13.5		31.7		3.66
		B			31.9		
21 Oct 1968	1335	S		8.2	32.0		2.90
		B		8.0	31.8		
7 Nov 1968	0945	S		7.9	32.2	7.9	3.36
		B		8.0			
13 Nov 1968	1300	S	6.0		31.8		2.44
		B			32.4		
19 Nov 1968	0945	S	6.0	8.8	30.2	6.8	1.83
		B	6.5	9.0	31.5	6.8	
3 Dec 1968	1000	S	5.0	9.0	30.3		3.36
		B	6.1	8.8	32.0		
5 Dec 1968	1300	S	6.0		28.9		0.92
		B	6.0	9.1	28.7		
9 Dec 1968	1100	S	3.5	9.4	31.3	8.0	3.14
		B	3.1	9.4	31.4	7.9	
21 Oct 1969	1130	S (1)	12.0	8.18	31.65	8.0	4.89
		M (8)	13.0	7.94	31.64	8.1	
		B (15)	13.0	7.45	32.03	8.1	
23 Oct 1969	1300	S	10.6	8.18	31.86	7.6	3.06
		M	10.6	7.82	31.91	7.4	
		B	10.6	7.61	32.00	7.4	
6 Nov 1969	1115	S	10.0	8.60	30.49	7.7	2.28
		M	9.7	8.55	30.66	7.9	
		B	9.6	8.65	31.38	7.8	
10 Nov 1969	1245	S	10.0	8.56	29.44	7.7	1.83
		B		8.51	29.45	7.5	
10 Dec 1969	0955	S (1)	5.0	9.25	29.16	8.1	2.14
		M (5)	5.0	9.42	30.54	8.1	
		B (11)	5.5	9.25	33.12	8.1	

Station 1

(The Brothers)

Date	Time (EST or DST)	Depth Sampled	Temp. °C.	D.O., mg/l	Salinity °/oo	pH	Visibility meters
27 Apr 1970	1330	S	9.0	9.89	23.81		
		M		10.46	28.50		
		B		10.17	29.72		
2 May 1970	1100	S	8.5		27.93	8.2	
		B	6.2		29.20	8.2	
24 Apr 1971	1040	S	6.3	10.2	31.49	7.6	2.44
		M	6.0	10.1	29.37	7.6	
		B	5.1	9.9	31.22	7.6	
24 Apr 1971	1315	S	6.4	10.43	29.14	8.0	2.74
		M	6.2	10.62		8.2	
		B	5.8	10.53	29.47	8.2	
30 Apr 1971	1250	S	6.0	11.14	27.2		
		M	5.7	11.82	30.0		
		B	5.2	11.54	31.0		
4 May 1971	1005	S	8.9				1.52
		M	6.4	10.53			
		B	6.1	9.86			
4 May 1971	1310	S	10.0			8.2	0.92
		M	8.3				
		B	8.3		20.22		
12 May 1971	1340	S	10.5		26.25		3.36
		B			28.44		
26 May 1971	1000	S	12.0			8.2	3.06
		M				7.8	
		B	8.5			8.0	

Station 2

(Luckse Sound)

Date	Time (EST or DST)	Depth Sampled	Temp. °C.	D.O., mg/l	Salinity °/₀₀	pH	Visibility meters
14 Oct 1968		S			32.1		
17 Oct 1968	1300	S	14.0		32.0		3.21
		B			32.2		
5 Nov 1968	1330	S		7.7	32.4		6.41
		B		7.2	32.6		
7 Nov 1968	1235	S		7.8	32.5		4.88
		B		7.6	32.4		
14 Nov 1968	1050	S	8.5		32.5	7.9	5.19
		M	7.0		32.0	7.5	
3 Dec 1968	1305	S	6.1	9.0	32.3	6.8	5.26
		B	6.7	8.6	32.4		
9 Dec 1968	1400	S	-1.5	9.0	32.0	7.9	3.06
		B	4.1	8.6	32.8	7.9	
6 Feb 1969	1235	S	2.0	10.3			3.36
		M (18)	2.0	11.8	32.4		
		B (28)	2.0		32.6		
7 Mar 1969	1125	S (1)	1.0	10.9	32.0	8.0	3.06
		M (15)	1.5	10.9	32.0	8.0	
		B (30)	1.5	10.8	32.0	8.2	
4 Nov 1969	1100	S (1)	11.5	9.25	31.98	8.0	4.27
		M (15)	12.0	9.26	32.00	8.2	
		B (30)	12.0	9.12	32.00	8.2	
12 Nov 1969	1100	S	8.5	8.50	30.37	8.0	3.06
		M (13)	8.6	8.50	30.38	8.0	
		M (22)	8.6	8.43	30.73	8.0	
		B	8.9	8.20	31.07	8.0	
3 Dec 1969	1025	S	6.9	8.80	31.64	8.1	5.03
		M	6.9	8.83	31.66	8.1	
		B	6.9	8.78	31.87	8.1	

Station 2

(Luckse Sound)

Date	Time (EST or DST)	Depth Sampled	Temp., °C.	D.O., mg/l	Salinity °/₀₀	pH	Visibility meters
15 Apr 1970	1040	S	4.2	11.38	30.50	7.0	3.67
		M	3.6	11.33	30.95	7.2	
		B	3.4	9.91	31.39	7.2	
22 Apr 1970	1245	S	5.0	10.68	30.39	8.4	3.97
		M	4.4	10.73	30.44	8.2	
		B	3.9	10.20	31.05	8.0	
22 Apr 1971	1400	S	4.9	10.39	30.02	8.1	3.97
		M	4.7	10.39	30.40	8.1	
		B	4.4	10.00	30.68	8.1	
27 Apr 1971	1130	S	5.1		29.7		4.58
		M	4.2		30.3		
		B	3.7		30.6		
27 Apr 1971	1305	S	5.4	10.49	29.52	8.2	5.50
		M (12)	4.2	10.53	30.11	8.2	
		B (24)	3.7	9.64	30.68	8.2	
8 May 1971	0930	S	7.2				
		M	4.4				
		B	4.0				
10 May 1971	1100	S	10.0				2.42
		M (15)			28.40		
		(20)		10.75	26.58		
		B		10.89			
19 May 1971	0805	S	10.0			7.9	4.24
		M	7.2			7.8	
		B	6.7			7.9	

Station 3

(Richmond Island)

Date	Time (EST or DST)	Depth Sampled	Temp., °C.	D.O., mg/l	Salinity °/₀₀	pH	Visibility meters
22 Oct 1968	1300	S	14.0	8.0	32.1	7.5	3.82
		M	12.5	6.8	32.8	7.6	
		B	12.0	6.6	33.0	7.5	
15 Nov 1968	1525	S	8.0		32.6	7.6	1.83
		M	6.9		32.0	8.1	
		B	7.0		33.0	7.9	
11 Dec 1968	1100	S	4.6		32.2	8.0	4.65
		B			32.3	8.0	
7 Feb 1969	1035	S	2.0	10.3	33.1	7.8	3.97
		B	3.0	9.8	33.2	8.0	
17 Feb 1969	1130	S	2.0	10.3	33.3	7.2	4.87
		M	3.0	10.2	32.5		
		B	2.5	7.5	32.4		
4 Mar 1969	1055	S	2.0	10.8	31.9	7.5	1.68
		M		10.6	32.2	7.7	
				10.4	32.5	7.7	
8 Apr 1969	1130	S	4.2			8.0	3.97
		M	3.4			8.4	
		B	3.3			8.4	
25 Apr 1969	1300	S	6.2				2.14
		M	4.3				
		B	3.8				
29 Oct 1969	1350	S	10.4				5.64
		M (16)		8.61	32.22	8.0	
		B (34)		7.50	32.46	8.0	
13 Nov 1969	1255	S	9.5	8.59	30.12	7.4	3.66
		M	9.5	8.34	31.95	7.6	
		B	9.4	8.32	32.28	7.4	

Station 3

(Richmond Island)

Date	Time (EST or DST)	Depth Sampled	Temp., °C.	D.O., mg/l	Salinity °/oo	pH	Visibility meters
14 Apr 1970	1300	S (1)	4.5	12.01	30.02	8.2	4.87
		M (31)	3.3	10.27	31.80	8.0	
		B (61)	3.3	9.60	32.07	8.0	
21 Apr 1970	1100	S	5.8	11.36	28.88	8.2	4.27
		M	3.4		31.81	8.0	
		B	3.4	9.31	31.95	7.8	
29 Apr 1970	1020	S	6.6	10.87	29.86	8.0	5.50
		M	3.4	9.83	31.77	8.0	
		B	3.3	9.48	31.97	8.0	

Station 4

(The Hussey)

Date	Time (EST or DST)	Depth Sampled	Temp., °C.	D.O., mg/l	Salinity °/oo	pH	Visibility meters
5 Nov 1968	1100	S		7.5	32.6		6.55
		B		7.1	32.5		
7 Feb 1969	1220	S	1.5	10.2		7.8	4.28
		B	2.0	10.0	32.6	8.0	
17 Feb 1969	1330	S	3.0	10.2	32.3	7.2	4.58
		M	3.0	10.2	32.4		
		B	3.0	6.7	32.4		
4 Mar 1969	1255	S	4.0	10.4	32.3	8.2	2.90
		B (25)		10.3	31.9	8.2	
2 Dec 1969	1110	S	3.0	8.93	31.61		5.50
		M	5.0	8.74	31.71		
		B	4.0	8.69	31.77		
28 Apr 1970	1335	S	5.9	10.75	29.61	8.0	4.58
		B	4.2	10.28	31.32	7.9	
5 May 1970	1400	S	6.5		27.16	8.2	3.36
		M (18)	4.3		30.78	8.1	
		B	3.9		31.67	8.0	
22 Apr 1971	1115	S	4.8	10.37	29.63	8.1	4.87
		M	4.2	10.26	30.46	8.1	
		B	3.6	10.04	31.10	7.9	
12 May 1971	1015	S	6.5	11.05	29.11	8.4	2.44
		M	4.7	10.44	30.72	8.4	
		B	4.2	9.38		8.4	
24 May 1971	1045	S	7.8				5.18
		M	6.1				
		B	4.8				
24 May 1971	1300	S	8.3				5.18
		M	6.1				
		B	4.8				

Station 5

(Cousins Island)

Date	Time (EST or DST)	Depth Sampled	Temp., °C.	D.O., mg/l	Salinity °/₀₀	pH	Visibility meters
7 Nov 1969	1300	S	9.7	8.80	30.47	8.4	
		M	9.7	8.72	31.06	8.3	
		B	9.7	8.81	31.52	8.4	
17 Apr 1970	1030	S			29.47	7.7	3.97
		M		10.91	29.64	7.7	
		B		10.13	30.41	7.5	
5 May 1970	1030	S	8.0		28.32	8.4	3.51
		M (8)	6.0		29.43		
		B	5.0		29.91	8.0	
30 Apr 1971	1050	S	6.3	11.30	29.14	8.3	
		M	5.4	11.34	29.43	8.4	
		B	5.1	10.74	29.78	8.3	
5 May 1971	1050	S	10.0		27.84		2.95
		B	6.9	11.20			
13 May 1971	1100	S	11.0	11.57			3.36
		M		11.20	26.94	8.4	
		B	7.0	10.73			

Station 6

(Portland Lightship)

Date	Time (EST or DST)	Depth Sampled	Temp., °C.	D.O., mg/l	Salinity °/oo	pH	Visibility meters
4 Nov 1968	1425	S			33.0		
		B			33.0		
31 Oct 1969	1115	S	10.3	8.62	32.40	7.8	4.58
		M (22)	10.0	8.48	32.48	8.2	
		B (50)	9.7	7.39	32.62		
4 Dec 1969	1230	S (2)	7.2	9.02	32.01	8.4	7.63
		M (28)	7.9	8.69	32.44	8.2	
		B (60)	8.9	8.27	32.72	8.2	
28 Apr 1970	1050	S	6.1	10.75	29.90	8.2	4.88
		M	3.8	10.20	31.79	8.0	
		B	3.4	9.48	32.08	8.2	

Station 7

(Halfway Rock)

Date	Time (EST or DST)	Depth Sampled	Temp., °C.	D.O., mg/l	Salinity °/oo	pH	Visibility meters
5 Dec 1969	1240	S	7.8		32.16	8.1	7.32
		M (20)	8.3	8.59	32.22	8.1	
		B (40)	8.9	7.55	32.51	8.1	
21 Apr 1971	1330	S	7.0	10.93	28.96	8.4	5.19
		M	5.0	10.27	31.27	8.2	
		B	4.0	8.76	31.46	8.2	
11 May 1971	1100	S	5.6				4.58
11 May 1971	1300	S	5.8	14.16	28.21	8.4	3.97
		M	4.7	13.26	30.85	8.0	
		B	3.4	11.54		8.3	

Station 8

(White Bull Island)

Date	Time (EST or DST)	Depth Sampled	Temp., °C.	D.O., mg/l	Salinity °/oo	pH	Visibility meters
6 May 1971	1130	S	5.6	10.86		8.2	1.55
		M	3.3	10.75	30.83	8.0	
		B	2.8	8.81		8.2	
25 May 1971	1100	S	8.8				
		M	6.4				
		B	5.1				