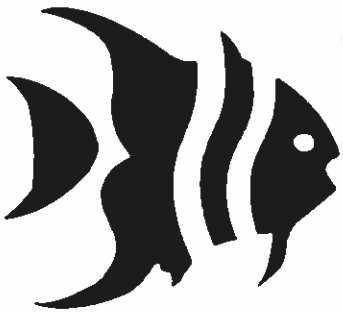
STOUT

DAUPHIN ISLAND SEA LAB

TECHNICAL REPORT



REPORT No. 82-01

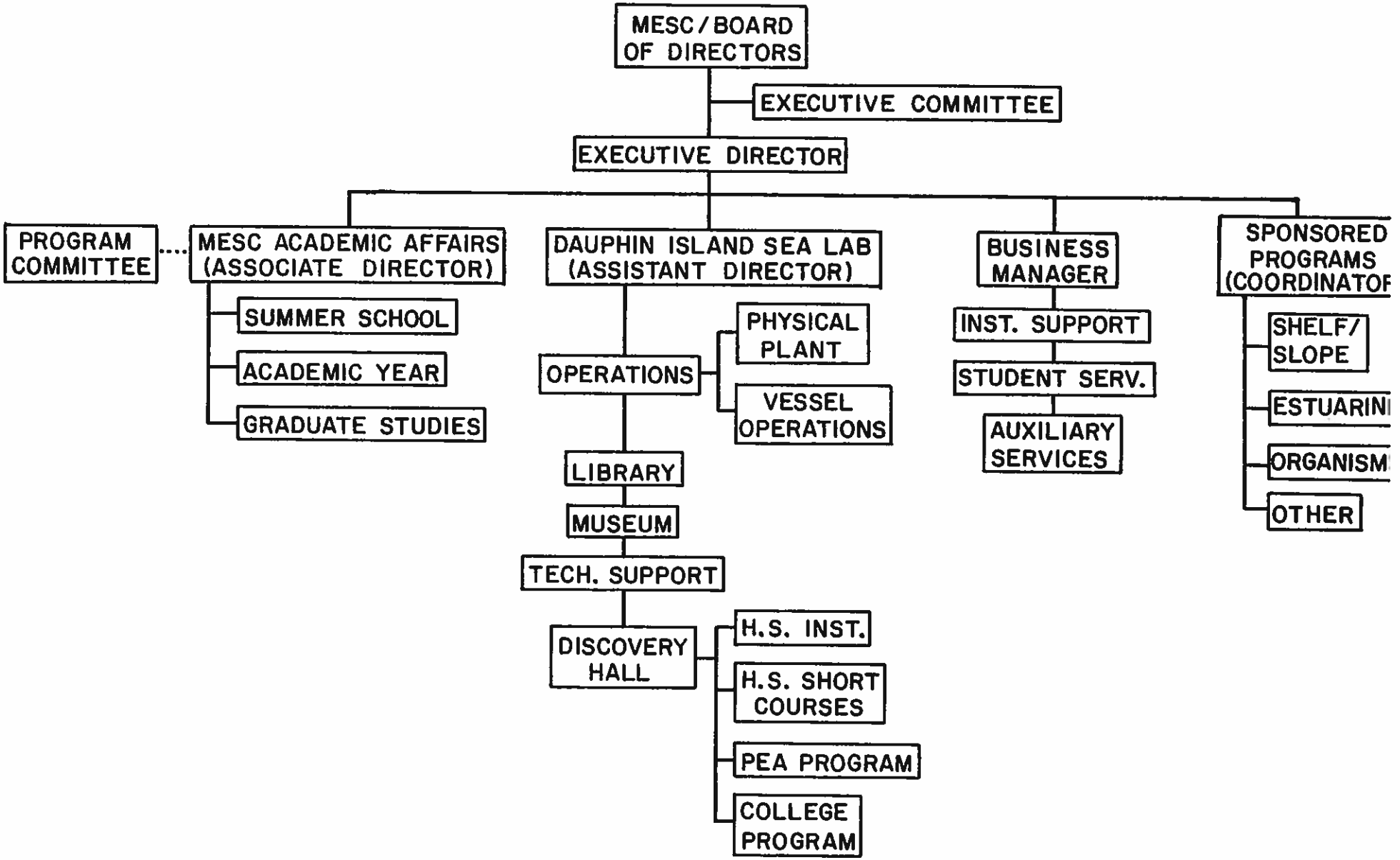
MARINE ENVIRONMENTAL SCIENCES CONSORTIUM ANNUAL REPORT 1980-1981

Dauphin Island Sea Lab
Dauphin Island, Alabama 36528

Director's Preface:

Despite the continuing physical obstacle of just getting back and forth to Dauphin Island, the principal threat to the successful pursuit of marine environmental science in Alabama appears to be the significant lack of understanding and support of things marine, environmental or scientific, at all levels of government. This observation extends even into the educational structure and would seem to be even more lamentable in that context. Of the several coastal states with which I am modestly familiar, our own is facing the most spectacular onslaught of resource allocation problems imaginable. Almost every category of use is under serious and sometimes vehement review.

Within this situation, it seems incredible that the principal apparatus of marine science education, research and service in the state is struggling for survival. Much of the applied research/service role has been supported and significant growth has become evident in the areas of data management and the broad concept of environmental assessment. But the constant erosion of the operation and maintenance budget has placed the entire exercise in real jeopardy. I suspect that the same observation could be made for a number of other states, but few can demonstrate a need of the magnitude facing Alabama. The Consortium is facing the most critical period of its existence and its continued effective performance is in serious jeopardy unless a significant improvement in the operational funding is achieved. Performance levels are projected as declining for the first time in the ten year history of the consortium and it is a direct result of the funding reductions finally crossing the unbearable threshold. The 1982-83 projections (Appendix 1) are based on a continuing hope that the state will reverse its devastating policy of cutbacks.


MESC / BOARD OF DIRECTORS
EXECUTIVE COMMITTEE
EXECUTIVE DIRECTOR
PROGRAM COMMITTEE
MESC ACADEMIC AFFAIRS (ASSOCIATE DIRECTOR)
SUMMER SCHOOL
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GRADUATE STUDIES
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SHELF/ SLOPE
ESTUARINE
ORGANISM
OTHER

I. Instruction

A. Discovery Hall Program

The past year brought about a return of the programs available within the framework of Discovery Hall. With increased accessibility due to a two ferry system, on-island activities were conducted, in addition to the classroom visitation and public environmental awareness programs. A total of 2470 students participated in marine related activities, over 80% of which were enrolled in Alabama Schools (Table 1).

Classroom Visitations

From September - December, Discovery Hall staff provided classroom adventures for secondary school students in cooperation with the Environmental Studies Center of the Mobile County Public School System. A variety of topics from the theory of Continental drift to marine animal physiology were covered utilizing lectures, slide presentations, 16 mm movies, and laboratory procedures (Appendix II). Twelve schools participated in this sequence with 50 programs presented for 1643 students from Davidson, Williamson, Shaw, Baker, Alba, Murphy, Mary Montgomery, B. C. Rains, and Theodore high schools (Mobile County) and Central Park and Glenis Iris Schools of Jefferson County (Table 2). This group of students accounted for 66% of the total participants. This overwhelming interest indicated a definite need for marine education in the public schools of Alabama

Field Trips

During the spring months, field experiences for both college and secondary school students were conducted at the Dauphin Island Sea Lab. Of the 505 participants in this phase of Discovery Hall activities, over 63% of these were Alabama students.

TABLE 1

DISCOVERY HALL PARTICIPANT DISTRIBUTION

PARTICIPANT	PROGRAMS	STUDENTS	% OF TOTAL
MESC	8	185	8
Other Colleges	5	83	3
Mobile Co. Public Schools	43	1588	64
Other Alabama Public Schools	7	172	7
Out of State High Schools	5	120	5
PEA Programs	9	304	12
Summer School		18	1
TOTAL		2470	100

TABLE 2

CLASSROOM VISITATION PROGRAMS

SCHOOL	PROGRAMS	STUDENTS
Baker H.S.	12	375
Alba H.S.	11	99
Murphy H.S.	7	129
Theodore H.S.	4	95
Davidson	2	156
Satsuma	7	288
Williamson	1	122
Montgomery	2	67
Shaw	1	18
Glen Iris	1	30
Central Park	1	25
Rains	1	51
TOTAL	50	1588

High school field trips comprised a variety of activities from half-day excursions to salt marshes or beach and dune systems, cruise programs, to a two-week marine related mini-course. Nine schools participated representing four Alabama counties and the states of Michigan, Illinois, Louisiana and Kentucky (Table 3). Students from Boaz High School (Marshall Co.), the Fairfield Board of Education and Central Park School (Jefferson Co.) and Cale County High School experienced Alabama's coastal environment.

TABLE 3

HIGH SCHOOL FIELD TRIPS

SCHOOL	STUDENTS
Boaz High School	20
Academy of the Sacred Heart	21
Carbondale Community High School	20
Kentucky Country Day School	18
Fairfield Board of Education	9
Central Park School	27
Dale County High School	27
Metarie Park Country Day School	61
Athens Middle School	34
TOTAL	237

College field trip services consisted of logistical support and living space to the Discovery Hall staff conducting entire programs. Six MESC institutions (The University of Alabama , Tuscaloosa; Auburn University; University of South Alabama; University of Alabama in Hunstville; Birmingham Southern; and Talladega) produced 69% of the 268 college participants (Table 4). Other schools attending were Austin Peay State University (TN), Ouachita Baptist University (AR), Calhoun State College (AL), Mississippi State University and the University of Wisconsin.

Summer Programs

Eighteen secondary-level students from six states including seven Alabama counties enrolled in the 1981 DHP Marine Biology Institutes with sixteen receiving credit in their respective school. Including both sessions (June 13 - July 10; July 13 - August 7), Alabama students represented Jefferson and Mobile counties. Other counties represended were Dale, Baldwin, Etowah, Lauderdale, and Madison (Table 5). Enrollment was purposely reduced due to housing complications and the isolation of the Island.

TABLE 4

COLLEGE FIELD TRIPS

SCHOOL	NUMBER OF STUDENTS
Austin Peay St. Univ. (Tennessee)	24
Auburn Univ. (MESC)	35
Ouachita Baptist Univ. (Arkansas)	10
Tuskeegee Institute (MESC)	10
Univ. of Alabama, Tuscaloosa (MESC)	32
Univ. of Alabama, Tuscaloosa (MESC)	25
Univ. of Alabama, Tuscaloosa (MESC)	23
Calhoun State College (Alabama)	17
Univ. of Alabama, Huntsville (MESC)	15
Birmingham Southern (MESC)	30
Mississippi State Univ. (Mississippi)	10
Univ. of Wisconsin (Wisconsin)	22
Univ. of South Alabama (MESC)	15
TOTAL	268

TABLE 5

COUNTIES REPRESENTED IN DHP SUMMER SCHOOL PROGRAM

STATE	COUNTY	STUDENTS
Alabama	Jefferson	5
Alabama	Mobile	4
Alabama	Etowah	1
Alabama	Baldwin	1
Alabama	Madison	1
Alabama	Dale	1
Alabama	Lauderdale	1
Oklahoma		1
Tennessee		1
Kentucky		1
Louisiana		1

Public Environmental Programs

A total of 304 people participated in public environmental awareness programs conducted throughout the year by Discovery Hall Staff (Table 6). Several types were conducted including career day presentation for St. Paul's Episcopal, McGill-Toolen, and Alba High Schools (Mobile County). In addition, programs were presented to the 4-H club of Montgomery High School, SPCA Explorers, and the Girl Scouts of Mobile County. Furthermore, presentations were given by Discovery Hall staff at meetings of the Association of Southeastern Biologists and the Alabama Science Teachers Association. John Dindo conducted a marine awareness workshop for the Mobile Bay and Birmingham Audubon Societies and John Booker served as program director for the Alabama 4-H Marine Conference.

TABLE 6

PUBLIC ENVIRONMENTAL AWARENESS

ORGANIZATION	PARTICIPANTS
Mary Montgomery 4-H Club	25
Alba Career Day	23
ASTA Meetings	34
Girl Scouts	25
APCA Explorers	11
Audubon Workshop	12
4-H Conference	70
St. Paul's Career Day	58
McGill-Toolen Career Day	46
TOTAL	304

Conclusion

In conclusion, the year was very successful in providing Alabama's students with coastal experiences within the scope of Discovery Hall. Much of our success was due to the tremendous cooperation of several outside agencies with the Discovery Hall staff. Many thanks are deserved by the Mobile County Public School System's Environmental Studies Center for their help with the classroom visitation programs. In addition, we greatly appreciate the assistance of the Alabama Highway Department, State Troopers, and ferry pilots for their assistance with the transportation for our on-island programs.

The vast amount of interest in our programs indicates that the coming year should provide a growing surge for the Discovery Hall Programs. Already, classroom visitations are being scheduled, in addition to an overwhelming number of field trip requests.

B. Summer School - 1981

Summer school enrollment during 1981 returned to levels of pre-hurricane years for boarding students, with a total of 80, representing almost every MESC school (see Table 7). Individual class enrollments were also presented, in Table 8.

Faculty evaluations were exceptionally high during summer of 1981. We feel this is due in large part to the enthusiasm generated by several of the new summer faculty, as well as continued effort by the several returning faculty. Summary of evaluations is contained in Fig. 1 and Table 9. By applying data from the Table to the Figure, relative evaluation of various course strengths and weaknesses is obtainable.

The colloquium series was reinstated after lapsing during the reconstruction summer of 1980. Seven guest speakers were hosted, and an extremely diverse and

TABLE 7

SUMMER SCHOOL ENROLLMENT INFORMATION - 1981

	FINAL
Auburn University	7
Birmingham Southern College	3
Jacksonville State University	3
Livingston State University	3
Samford University	1
Spring Hill College	6
Talladega College	2
Troy State University	5
University of Alabama, Tuscaloosa	15
University of Alabama, Birmingham	4
University of Alabama, Huntsville	10
University of Montevallo	3
University of North Alabama	6
University of South Alabama	12
TOTAL	80

TABLE 8

INDIVIDUAL CLASS ENROLLMENTS, SUMMER - 1981

COURSE	ENROLLMENT
Marine Biology	17
Marine Invertebrate Zoology I	21
Marine Geology	9
Marine Botany	14
Marine Tech Methods I	24
Commercial Marine Fisheries	19-(Both Sessions)
Marine Ecology	15 Total
Introduction to Oceanography	5
Recent Marine Sedimentation	9
Marine Vertebrate Zoology	18
Marine Tech Methods II	7
Marsh Ecology	4

C. Academic Year - 1981

Only one graduate course, Marine Animal Physiology, was offered by MESC during the 1981 academic year. This course, with an enrollment of six, was held at the South Alabama campus, due to the inaccessibility of the Sea Lab.

D. Graduate Studies

In keeping with the reduced activity level of graduate student activity in the wake of Frederic, emphasis has been placed on encouraging students to complete programs presently underway. Almost all MESC graduate students present during the storm have completed all or nearly all of their requirements for graduation, and little effort is being expended to recruit new students until the Island's accessibility is improved with the completion of the new bridge. New graduate students in the marine sciences at member institutions are being encouraged to complete all home campus requirements during this period. A new population of island-resident graduate students is thus anticipated for fall of 1982, pending the bridge completion.

Table 10 summarizes the status of graduate students presently affiliated through MESC.

TABLE 10

SUMMARY OF GRADUATE STUDENT STATUS AT MESC

1. Research completed during 1980-81:

Glen Parsons, (USA), M.S.	Charles Harp, (USA), M.S.

2. Research complete, in process of writing:

Douglas Gilbert, (UA), M.S.	Katherine Gilbert,(UA), M.S.
Ross Lysinger, (UA), M.S.	Don Marley, (USA), M.S.
Austin Swift, (USA), M.S.	Mike Dardeau, (USA), M.S.
Larry Williams, (USA), M.S.	Paul Omholt, (UAB), M.S.

In addition, approximately 15 graduate students (2 Ph.D.) are in earlier phases of their programs.

II. Research

A. Continental Shelf/Slope Processes

Artificial Reef Project

An analysis of three years (1976, 1978 and 1979) of summer current data collected at Anderson Reef and sea level and wind data collected at Dauphin Island was carried out by Dr. Schroeder and Drs. Chuang and Wiseman of the Coastal Studies Institute at LSU. The results show that the shelf water response to local wind forcing is frequency dependent: alongshore current and sea level are driven by the alongshore wind at time scales longer than a week, but they are generally not correlated at shorter periods. Since the mean wind direction varies between the three study season, a permanent summer circulation pattern was not observed. The variations in frequency response also indicate that circulation is strongly affected by the density stratification and coastal geometry.

Bottom temperature data continues to be collected at Anderson Reef. To date over 18 months of time series data (one observation per hour) have been obtained since this research project started in 1977. The summer season has the best documentation with three years of coverage while the winter season has the poorest coverage with data from only one year. If 12 to 18 months of additional data can be generated then a composite record can be constructed where nearly each julian day will have a minimum of two data sets to a maximum of four data sets. From this composite record a good picture of the bottom thermal regime of the Alabama inner continental shelf will be able to be drawn.

Diver monitoring of Anderson Reef has continued on an almost monthly basis. The slow growth of encrusting organisms has continued, including live coral. Discrete patches several inches across are becoming numerous. There has been

a significant increase in the numbers of echinoderms in the form of holothurians and echinoids since the hurricane impacted the structure.

Perhaps the most exciting development has been the explosive growth and maturation of the Dauphin Island Bridge Reef. The debris from the old bridge was dumped offshore and a distinctly more successful colonization has taken place. Three factors are probably at work in this process. 1) The non-metallic nature of the material is a more favorable substrate than the sunken liberty ships. 2) The piling of pieces has created more physical niches and hiding places. 3) The most speculative but perhaps significant suggestion is that the scattered and nearly random dumping of the material has resulted in a larger area being influenced. This may have made the site more easily encountered by the pelagic forms and hence increased the early colonization.

Florida Middle Grounds Study

An analysis of the current and hydrographic data collected on the Florida Middle Grounds, beyond that reported in the final BLM report, is presently being carried out by Dr. Schroeder in cooperation with Dr. David McCrail of Texas A & M University. Emphasis is being placed on both an analysis of regularly occurring low frequency processes and the impact of storm events (e.g. hurricanes).

B. Estuarine Processes

MESC has gradually developed a coherent and productive investigation of Mobile Bay. The several projects funded by the Coastal Area Board and the U.S. Army Corps of Engineers have been designed to produce maximum data compatibility and the results are impressive. In the period from March 1980 - April 1981, 3696 macroinfaunal grab samples, 332 each of trawl, phytoplankton and zooplankton samples, 240 ichthyoplankton samples and 1056 sediment samples

have been taken and analyzed. Hydrographic profiles and turbidity data have been taken with most of these biological samples. All the data has been recorded and filed. National Oceanographic Data Center codes have been used and the mechanism for providing the data to NODC is being established. It is interesting to note that the data base is so large that recent attempts to manipulate the data exceeded the capacity of the University of Florida Computer Center.

This overall exercise may constitute one of the largest and most effective attempts at environmental assessment and management in the country. The Coastal Area Board has been the principal stimulus to these projects and the goal of the effort is to provide an efficient and practical management tool. It is obvious that the exhaustive effort is the first of its kind for Mobile Bay.

The results have delineated different communities within the Bay system and distribution patterns are beginning to emerge. This may also be the most detailed mapping of benthic communities in a major estuarine system.

The Coastal Area Board is still supporting the wetlands mapping project and a contract for monitoring the further oil and gas exploration is under negotiation. The data already collected has led us to believe that impact cannot be extrapolated from the existing information.

The Mississippi-Alabama Sea Grant Consortium has begun exploring the feasibility of using the MESC data management system for their ongoing study of Mississippi Sound. If this relationship should mature, then MESC should easily move into a pivotal science/management posture within the region.

The Theodore Industrial Park Project (USCOE) has entered its final year of post-construction monitoring. The final report on the construction phase has been submitted in draft form to the Mobile district. The entire project is expected to terminate in the fall of 1982.

C. Organismic Processes

Dr. Dean is continuing his studies on the physiology and biochemistry of oysters (Crassostrea virginica). With support from a UAB faculty research grant, Dr. Dean is currently measuring the turnover rate of the crystalline style of the oyster, and with a monthly sampling he will test the relationship of the style to the condition of the animal. Paul Omholt (graduate student, UAB) has confirmed the presence of a "cellulase", or B-1, 4-glucan glucanohydrolase in the style, and has begun to purify it.

Dr. Anthony A. Paparo, Department of Anatomy, School of Medicine, Southern Illinois University, returned to the Sea Lab for June and July 1981. Drs. Paparo and Dean continued their collaboration of the effects of environmental variables on the activity of cilia on the oyster ctenidia. They expanded their study to include the effect of toxic and potentially toxic compounds. The results show that ciliary responses may provide an effective bioassay for sublethal effects. Mobil Oil donated drilling muds from their Mobile Bay platform, and the material is now being evaluated for potential toxicity.

Eric Black (graduate student, UAB) has refined his techniques for isolating membrane fractions from mullet (Mugil cephalus) gill homogenates. He will be applying these procedures toward a study of Na^+/K^+ - ATPases.

A major priority for the coming year is the improvement of the wet lab facility. A portable pump and a permanent pipeline are being installed between the Coast Guard dock and the wet lab for greater ease in filling standing and recirculating aquarium systems.

III. Public Service

A. Northeast Gulf Science

During 1980-81 Vol. 4(1) and 4(2) were published. Vol. 4(1) consisted of 72 pages, with three full length papers and eight short papers or notes. Vol. 4(2) consisted of 70 pages, of two full length papers and 10 short papers or notes. As of this writing Vol. 5(1) is in press, and will be the largest number to date, consisting of almost 100 pages.

Cost per printed page has remained unchanged, with about 65% of printing cost recovered from page and reprint charges. Twentieth Century Press continues to publish Northeast Gulf Science.

Although circulation of NEGS is appraoching 500 per issue, several meetings between Dr. Shipp, editor of NEGS and Dr. Charles Lowry, head librarian at the University of South Alabama, were held to formulate a plan to increase library circulation. It is anticipated that this plan will increase library circulation by several hundred.

B. Meteorological Station

The Dauphin Island Sea Lab meteorological station completed its eighth year of operation. The station continues to provide twice daily weather observations to the National Weather Service (Mobile), monthly climatological data to the National Climatic Center (Ashville, N.C.) and specific information needs upon request from numerous federal, state and local agencies as well as basic meteorological data in support of both research and academic activities.

IV. Library

The library holdings were returned to improved facilities just in time for summer school 1981. One journal title, Estuaries (formerly Chesapeake Science) was lost due to water damage. The remainder of the holdings are essentially intact. A number of volumes are still considered missing because of the inability to control and monitor removals during the Hurricane Frederic temporary housing arrangement. An inventory is underway and hopes are that a large portion of these titles will be re-located.

With partial support from Mississippi-Alabama Sea Grant, the library now serves as a state repository for the Marine Educational Materials System (MEMS). The system comprises approximately 7,000 titles on marine topics for K-12 and college. Library statistics are analyzed in Table 11.

Titles are stored on microfiche and a reader/printer has been acquired to make paper copy available to users. This asset has already seen good use and is expected to provide an important service to educators throughout the state.

TABLE 11

LIBRARY STATISTICS FY 1980-1981

		1980-'81 Expenditures
BOOKS:		
Total Book Accessioned	2800	
Books and Publications Processed	15	
Expenditures for Books & Publications		$ 545.00
Books & Publications Purchased FY 80-81	103	
REPRINTS:		
MESC Reprints	5544	
INTERLIBRARY LOANS: FY 80-81		
ILL Requested	77	
Expenditures		$ 161.68
ILL Requests Received	9	
ILL Requests Filled	6	
JOURNALS:		
Current Subscriptions to Faxon FY 80-81	75	
Expenditures to Faxon		$8,628.26
Memberships FY 80-81	5	
Dues		$ 138.00
Current Titles	506	
EXCHANGE PUBLICATIONS:		
Institutions Agreeing to Exchange	85	
BACK ISSUES:		
Number of Issues Received	254	
Expenditures		$ 967.00
HEW GRANT:		
Number of books ordered	48	
Expenditures		$1,900.00
NTIS:		
Number of publications ordered	29	
Expended from deposit account		$ 339.00

V. Academic Support

A. Data Center

The MESC computer facilities have increased modestly over the past year. In addition to the IBM 3774-P2 Romote Job entry terminal and low speed CRT, the lab has recently acquired a GE Terminet teleprinter for retrieval of output interactively and a Graphics terminal and hardcopy unit for graphics displays. These facilities provide the much needed support for MESC contractual obligations as well as for academic/research use.

Plans this year call for completing arrangements for full connection with the computer facilities at USA to provide additional academic/classroom computer time. Hopefully, this will provide for more general student access to the facilities which are currently restricted to the resident faculty and graduate students involved in directly sponsored research programs.

Data collected by MESC are entered into the MESC data base using the remote batch terminal and are stored locally on magnetic diskettes. Individual diskettes are utilized for different data types to insure the fidelity of the data base and to allow for flexible archiving procedures. Editing of the data is accomplished locally using the 3774 terminal. Listings of the raw data can also be obtained locally.

Once the data are entered onto diskettes, they can be transmitted to a central data processor for analysis. Several remote processing centers (hosts) are accessible by the MESC terminal, the University of Alabama in Birmingham (Rust Computer Center), the University of Florida (Northeast Regional Data Center), the University of South Alabama and the Boeing Computer Service. High speed output can be routed to either the MESC office or the Mobile district's ADP center (presently from UF and Boeing only). All

processing centers utilize IBM's operating systems OS/MVS JES2 or CP/CMS. In addition to the remote batch facilities, programs and/or data can be entered and retrieved via low speed ASCII terminals in a time share mode. These facilities allow for more efficient program editing via CRT displays and retrieval of hardcopy output of graphics displays.

B. Faculty Activities

As usual, faculty activities are summarized in Table 12.

C. Plant Operations

The annual utilization report is appended to this report and a detailed review can be found there. The major repairs and replacement buildings have been substantially completed and are ready for full utilization in 1982.

The final documentation and request for audit has been submitted to the Federal Emergency Management Agency (FEMA). Our calculations indicate that we have not expended funds beyond those allowed and in fact we may receive a small amount beyond that advanced to us. The estimate of that figure ranges from $0-$15,000.

Overall facility improvement has continued and there continues to be a real effort to achieve maximum efficiency. The energy costs are particularly impressive (Figure 2).

D. Vessel Operations

The addition of the R/V Deborah B. to the fleet has tremendously enhanced vessel operations. The boat has virtually assumed all of the shallow water research support of the R/V G. A. Rounsefell. The data are presented in Tables 13-17.

Table 12. Faculty Activities.

	INSTRUCTION	RESEARCH/CONTRACTS	PROFESSIONAL ACTIVITIES
E. C. Blancher Research Associate Assistant Professor of Biology University of Alabama (Aug. 15, 1981)		Data Manager -CAB Baseline -COE Theodore Project Proposals -CAB: Fecal Coliform in Mobile Bay. -EPA: Seafood Waste Disposal	Coordinator, Sponsored Programs, MESC Papers Presented: -American Society of Limnology and Oceanography. Milwaukee, Wisc. -Meeting of the Aquatic Plant Management Society, Sarosota, Fl. 4 Publications, 1 Submitted, 1 in Preparation
G. F. Crozier Associate Professor of Biochemistry University of South Alabama	Marine Tech. Methods I (25) Graduate Committees 1 Ph.D. 3 M.S.	COE Dredge Type Comparison ($5,000)	Director, MESC and University of Alabama Marine Science Programs. Member: -Coastal Area Board -Coastal Environ. Educ. Council -Bd. of Directors/MASGC -State Comprehensive Outdoor Recreadion Planning Group -GURC Environmental Council Numerous presentations
R. C. Dean Assistant Professor of Biology University of Alabama in Birmingham	Honors Biology (UAB) -Lecture ENV 103 (UAB) -Lecture Marine Tech Methods II Marine Animal Physiology Comparative Animal Physio. (UAB) Graduate Committees 1 Ph.D. 3 M.S.	UAB Graduate Faculty Research Grant: Biochemistry of oyster crystalline style ($2,000)	Speaker: GCRL Lecture series USA Biology lecture series Auburn Marine Biology Club DISL Colloquium Series Lecture Abstract submitted to American Society of Zoologists. 2 papers in preparation.
T. S. Hopkins Professor Biology University of Alabama	Chairman, 2 Ph.D. 4 M.S. Member 4 M.S. at University of South Alabama	BLM-Florida Middle Grounds 312 K (Completed) CAB - Mobile Bay, 14 mos. (Ongoing) COE - Mobile Bay (Ongoing)	Dredge & Spoil Committee; Sea Grant Advisory to USACE Meetings: International Echinoderm Conf., St. Petersburg Beach, Florids Papers Presented: -International Echinoderm Conf. (above) 1 Publication (BLM Final Report on FMG)
W. W. Schroeder Associate Professor of Biology University of Alabama	Oceanology of the Gulf of Mexico Research Special Topics Introduction to Oceanography Committees 1 Ph.D. 10 M.S. (Chairman 1)	COE - Mobile Bay (Ongoing) MESC - Turbidity Study - Anderson Reef (With LSU) - Florida Middle Grounds (With Texas A & M Univ.)	American Meteorological Society - Committee on Meteorology of the Coastal Zone Univ. of Ala. College of A & S, Marine Science Program Advisory Committee. Sea Grant Advisory Service (Biology) Sea Lab Liaison to the Mobile District COE and the Greater Mobile Indust. Assoc. Participated in the 1981 Audubon Marine Coastal Environment Workshop. Papers Presented: -GERS Symp., Pensacola Beach, Florida (Oct.) -GERS Symp., Hattiesburg, Miss., (May) 3 Publications; 1 submitted, 1 in preparation.
R. L. Shipp Professor Biology University of South Alabama	Lectures in Marine Biology, -Marine Vert. Zoo. -Fishery Science On USA Campus: -Life Science -Systematic Ichthyology Committees: 1 Ph.D. 9 M.S. (Chair. 7)	CAB Assessment of demersal fishes of Mobile Bay. ($90,000) COE-Fisheries Assessment National Marine Fisheries Service: Deep Water Reef Fish Population Assessment.	Associate Director, MESC Member: Special Committees for Gulf of Mexico Fisheries Council: Snapper/Grouper and Tropical Reef Fish. Editor: Northeast Gulf Science Editorial Board: Marine Resources Bulletin of Alabama. MESC Program & Executive Committees. Board of Governors, American Society of Ichthyologists and Herpetologists. 3 Publications; 2 in press.
J. P. Stout Assistant Professor Biology University of South Alabama	Marine Botany Marsh Ecology Committees: 1 Ph.D. 1 M.S.	Atlas of Wetland Habitats & Land Use of the Lower Mobile River Delta. Ala. Coastal Area Board ($52,520) Transportation of Oil and Gas in the Coastal area of the State of Alabama. Ala. Oil and Gas Bd. ($3,009) Marine Educational Materials System (MEMS) Alabama Repository Assistance Miss.-Ala. Sea Grant ($2,683) Library Resource Grant, U.S. Dept. of Education. ($1,900)	Member: Coastal Environ. Education Council Dauphin Island Economic Recovery Council Seminars and Special Programs: -Jackson State U., MS -Auburn University -Women in Science, University of Alabama -Mobile Public Schools Mentorship Program -Audubon Marine Workshop Co-ordinator, Year of the Coast Workshop. Papers presented: -Association of SE Biologists, Knoxville, TN -Miss. Sound Symp., Biloxi, MS 2 Publications

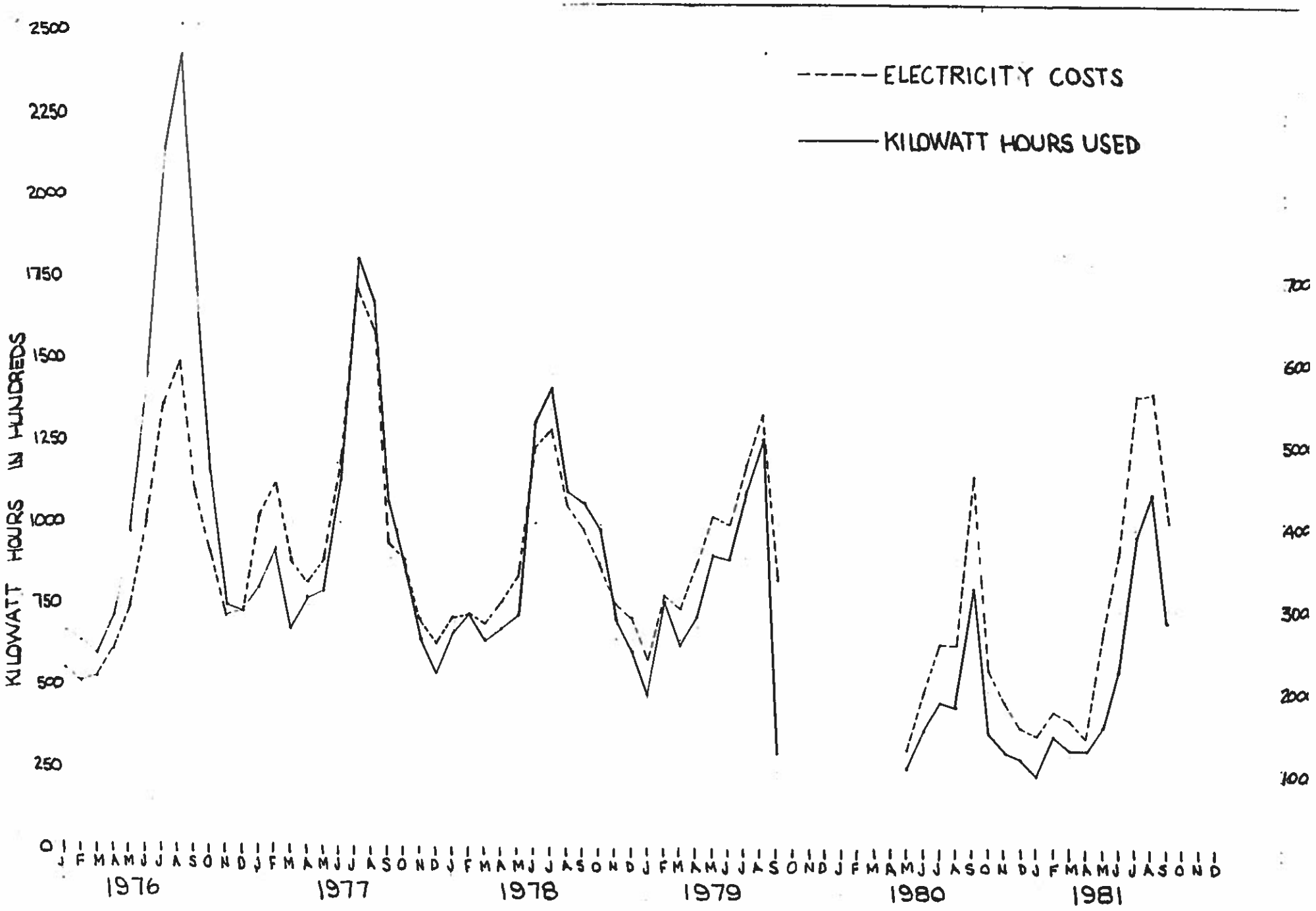

ELECTRICITY COSTS
KILOWATT HOURS USED
KILOWATT HOURS IN HUNDREDS
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
700
600
500
400
300
200
100
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1976
1977
1978
1979
1980
1981

FIGURE 2.

TABLE 13

R/V FLYING TIGER
Utilization Breakdown

Year	1977	1978	1979	1980	1981
Total number of days at sea:	4	62	57	42	9
Total number of cruises:	4	60	48	36	7
Cruise Length:					
Day (0-8 hours)	3	40	27	22	4
Extended day (up to 24 hours)	1	20	21	14	2
Multi-day (24 hrs or more)	0	0	0	0	1
Total number of participants:	17	318	410	124	23
Total nautical miles:	159	2242	1674	996	266
Man hours at sea:	128	2799	4103	1400	379
Man days at sea:	5	114	171	60	16

TABLE 14

R/V G.A. ROUNSEFELL
Utilization Breakdown

Year	1973	1974	1975	1976	1977	1978	1979	1980	1981
Total days at sea:	102	87	112	82	114	109	114	100	90
Total number of cruises:	69	53	85	62	74	88	87	78	66
Cruise Length:									
Day (0-8 Hours)	55	39	63	46	58	65	52	37	44
Extended day (up to 24 hours)	5	3	8	2	1	11	22	28	2
Multi-day (24 or more hours)	9	11	14	14	15	12	13	13	20
Total number of participants:	2055	1026	1614	948	1129	1647	1470	792	945
Total nautical miles:	4725	4290	6110	3829	7964	6310	5044	4490	3537
Man hours at sea:			13235	9668	17472	16055	14615	10098	10098
Man days at sea:			551	402	728	666	601	420	440

TABLE 16

R/V G. A. ROUNSEFELL USERS

	1973		1974		1975		1976		1977		1978		1979		1980		1981	
	NUMBER OF CRUISES	DAYS AT SEA	NUMBER OF CRUISES	DAYS AT SEA	NUMBER OF CRUISES	DAYS AT SEA	NUMBER OF CRUISES	DAYS AT SEA	NUMBER OF CRUISES	DAYS AT SEA	NUMBER OF CRUISES	DAYS AT SEA	NUMBER OF CRUISES	DAYS AT SEA	NUMBER OF CRUISES	DAYS AT SEA	NUMBER OF CRUISES	DAYS AT SEA
TEACHING																		
MESC	49	49	34	34	50	50	39	39	43	43	45	52	35	38	33	34	24	24
Outside	2	2	2	2	4	4	1	1	2	2	15	15	12	12	5	6	8	8
	51	51	36	36	54	54	40	40	45	45	60	67	47	50	38	40	32	32
RESEARCH																		
MESC	18	51	17	51	31	58	22	42	26	44	12	12	25	41	5	6	0	0
Outside	0	0	0	0	0	0	0	0	3	25	16	30	9	17	28	47	34	58
	18	51	17	0	31	58	22	42	29	69	28	42	34	58	33	53	34	58
TOTAL	69	102	53	87	85	112	62	82	74	114	88	109	87	114	78	100	66	90
																	1 Misc.	

TABLE 17

R/V DEBORAH B. USERS

USERS	1981	
	NUMBER OF CRUISES	DAYS AT SEA
TEACHING		
MESC	22	22
Outside	0	0
	22	22
RESEARCH		
MESC	15	15
Outside	24	28
	39	43
TOTAL	61	65

PERFORMANCE STATEMENT

INSTRUCTION

DESCRIPTION: Provides structured educational exercises to state and regional institutions.

OBJECTIVE: Provide marine education at high school, college and post graduate levels.

	1980-81	1981-82	1982-83
Number of college student hours	1,350	1,400	1,850
Number of high school students on campus	8,003	12,450	18,600
Number of high school students off campus	1,527	919	1,315
Number of educational boat days	54	50	100

RESEARCH

DESCRIPTION: Research activities provided to regional and state institutions and agencies

OBJECTIVE: Contribute to the marine research environment in Alabama by providing marine research facilities and scientific expertise to state and regional institutions and agencies.

	1980-81	1981-82	1982-83
Number of research contracts	11	5	3
Research contracts, approx. dollar amount	452,000	327,000	180,000
Number of research boat days	150	112	74
Research man days	1,460	1,600	1,600
Number of environmental samples taken	5,500	2,750	
Graduate students supported	18	7	6

SERVICE

DESCRIPTION: Provides extension/consultant services to local, state and federal agencies.

OBJECTIVE: Respond to specific requests for participation, planning and data input to local study groups.

	1980-81	1981-82	1982-83
Agencies responded to	36	20	40
Regional meteorological reports	712	-	800
Journal issues	1,600	1,600	2,400
Man days/panels, committees etc.	162	169	250

APPENDIX II

SPECIAL OFFERINGS

FIRST SUMMER SESSION
June 15 — July 17, 1981

MARINE BIOLOGY: 4 semester (6 quarter) hours undergraduate credit. A general survey of marine plants, invertebrates and vertebrates; the communities they form and the physical and chemical factors which influence their lives. Prerequisites: General biology. Freeman.

MARINE INVERTEBRATE ZOOLOGY I: 4 semester (6 quarter) hours advanced undergraduate and graduate credit. A comparative study of the major marine invertebrate phyla protozoa through protochordates, which will focus on their morphology, physiology, ecology and phylogenetic relationships. Prerequisites: Introductory course in zoology. Modlin.

MARINE GEOLOGY: 4 semester (6 quarter hours) undergraduate credit. A study of the geology of the ocean basins, with special emphasis on the continental shelves, their sediments and the sedimentary processes at work there. Prerequisites: Introductory geology. Canis.

MARINE BOTANY: 4 semester (6 quarter) hours advanced undergraduate and graduate credit. A general survey of marine algae, vascular, and non-vascular plants associated with the marine and estuarine environment. Structure, reproduction, identification, distribution and ecology are considered. Prerequisites: General Biology. Miller.

MARINE TECHNICAL METHODS I: 2 semester (3 quarter) hours advanced undergraduate and graduate credit. An introduction to the hardware of marine science, sampling procedures, processing, station location, field maintenance/operation. Prerequisites: Advanced undergraduate or graduate status: Basic science major. Crozier.

COMMERICAL MARINE FISHERIES OF ALABAMA: 2 semester (3 quarter) hours undergraduate credit. Exploitation and biology of commercial vertebrates and invertebrates of Alabama and the adjoining Gulf of Mexico, with emphasis on distribution, harvesting technology, processing, and economic values. Laboratory exercises include visits to local processing plants, and a trawling expedition aboard the R/V G.A. Rounsefell. Shipp/Rees.

SEMINAR: 1 semester (1½ quarter) hour, undergraduate and graduate credit. Oral presentation given by each enrolled student on current research, scientific processes and problems in the marine environment with supporting participation by faculty and visiting scientists. Students are not required to enroll in Seminar but must attend to qualify for credit in any other course. Staff.

RESEARCH ON SPECIAL TOPICS: 1 to 6 semenster (2 to 9 quarter) hours advanced undergraduate and graduate credit. Students may enroll by special arrangement. **Prerequisites:** Discussion with and approval by a resident faculty member of a research topic to be undertaken. This must be arranged **before arrival at the Sea Lab.** Resident faculty will be available for special topics both terms. Other instructors will be available only in the time period listed for their respective courses. Staff.

SECOND SUMMER SESSION
July 20 — August 21, 1981

MARINE ECOLOGY: 4 semester (6 quarter) hours advanced undergraduate graduate credit. Lecture and laboratory studies of bioenergetics, commu structure, population dynamics, predation, competition, speciation in ma ecosystems. Prerequisites: General biology, general chemistry, gen physics. Williams.

MARINE INVERTEBRATE ZOOLOGY II: 4 semester (6 quarter) hours advan undergraduate and graduate credit. A special problems course. An in de study of select marine and invertebrate phyla. Focus will be placed on orig relationships, comparative anatomy, embryology, and physiology. requisites: 1 term of invertebrate zoology. Hopkins.

MARINE VERTEBRATE ZOOLOGY: 4 semester (6 quarter) hours advan undergraduate and graduate credit. Biology of marine vertebrates, empha ing systematics, behavior, physiology and ecology of local forms. Prere sites: General biology. Boschung.

MARSH ECOLOGY: 4 semester (6 quarter) hours advanced undergraduate graduate credit. A study of the floral and faunal elements of various ma marsh communities. Interaction of physical and biological factors wil emphasized. Course is structured to provide actual field experience in a tion to lecture material. Trips will be scheduled to acquaint students regional examples of marsh types. Stout.

INTRODUCTION TO OCEANOGRAPHY: 4 semester (6 quarter) hours advan undergraduate and graduate credit. A general introduction to the phys chemistry, geology and biology of the oceans. Prerequisites: General Phys trigonometry and quantitative analysis. Schroeder.

RECENT MARINE SEDIMENTATION: 4 semester (6 quarter) hours advan undergraduate and graduate credit. A study of marine sedimentation emphasis on sedimentary processes and depositional environments. F exposure to modern carbonate (Florida Keys) and clastic (Gulf Coa Mississippi River Delta) environments and to ancient analogs. Prerequisi introductory courses in geology or marine geology.

MARINE TECHNICAL METHODS II: 2 semester (3 quarter) advanced un graduate and graduate credit. Introduction to the laboratory analysis of w samples with emphasis on water quality parameters. Prerequisites: Advan undergraduate and graduate status: basic science major. Marine Techn Methods I is NOT a prerequisite. Dean.

COMMERCIAL MARINE FISHERIES OF ALABAMA: See previous page for cou description.

RESEARCH ON SPECIAL TOPICS: See previous page for course description

SEMINAR: See previous page for course description.

Graduate offerings during fall, winter, and spring of 1981—1982 are contin on reconstruction of the Dauphin Island Bridge. Write Registrar for furt information.

Location and Facilities

The Marine Workshop is held at the Dauphin Island Sea Lab near Mobile, Alabama. The Marine Environmental Sciences Consortium operates the Sea Lab for educational and research purposes. Nineteen colleges and universities in Alabama have pooled their financial, academic and intellectual resources to form one marine campus. Public education in the area of the marine environment is one of the main objectives of the Consortium. To this end, it has joined with the Birmingham and Mobile Bay Audubon Societies in offering this workshop to adult learners.

Located in the Gulf of Mexico approximately 2 miles from the mainland, Dauphin Island forms the western boundary of the mouth of Mobile Bay. Formerly a military installation, the Sea Lab campus is adjacent to Fort Gaines on the eastern end of the island. All

participants will be housed in semi-private rooms in two-story, air-conditioned dormitories (formerly barracks) on the campus. There are limited provisions for family housing in apartment units. A large, well-equipped cafeteria on campus provides complete meals. Pets are not allowed.

Recreation facilities on the Sea Lab campus include tennis court, basketball court, several volleyball courts, an open grassy field for football or soccer, swimming pool, ping pong and pool tables, and television. The west end of Dauphin Island provides sandy beaches on the Gulf of Mexico, excellent for surf swimming. Fishing is popular all over the island. There are many historical points of interest in the Mobile area. Additionally, National Audubon's Dauphin Island Sanctuary is nearby.

Arrangements

The enrollment fee for the 5-day session is $125 for members, $145 for non-members and $50 for non-participating family members. This includes room and board, tuition and insurance. A registration fee of $50 per person, non-refundable after July 15, will be applied to the total fee and must accompany each registration. The total enrollment fee is payable by August 1, 1981 to insure reservations.

Participants should plan to arrive by lunch, Monday, August 10 with scheduled departure Friday, August 14 after lunch. Information on other workshop matters, including transportation arrangements, will be forwarded to all registrants. Do tell your friends about the workshop and have them write.

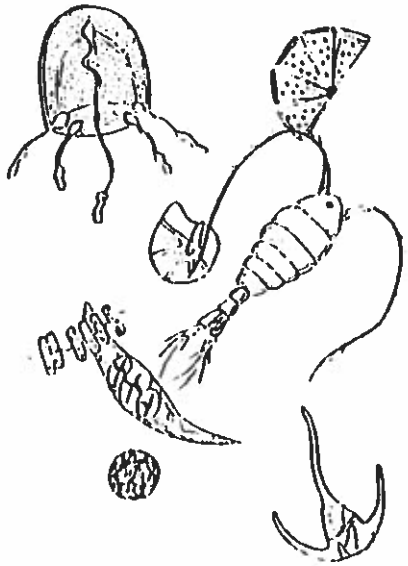
Audubon Marine Workshop
c/o Mobile Bay Audubon Society
P.O. Box 9903
Mobile, Alabama 36609

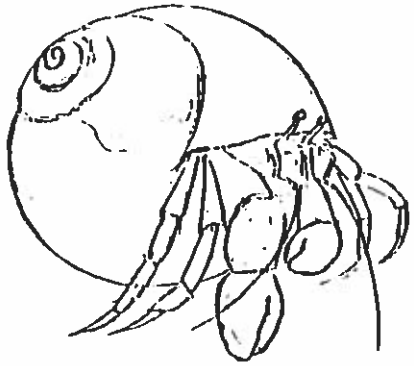
The National Audubon Society operates adult camps in Connecticut, Maine, Wyoming, and Wisconsin. For further information write to The National Audubon Society, Southeast Regional Office, P.O. Box 1268, Charleston, South Carolina, 29402.

SPECIAL TOPICS

Additional programs are also available in special areas for classes desiring a more comprehensive treatment of the marine environment. Representative topics include:

- Commercial Fisheries
- Waves and Beaches
- Physiology of Marine Animals
- Plankton
- Marine Food Chains
- Marine Aquarium Keeping





FIELD PROGRAM

A field experience is also available in conjunction with the University of Alabama Marine Science Program's Point aux Pins Marsh Laboratory. Students will have an opportunity to learn about and gain a respect for our coastal wetlands by performing laboratory and field investigations. Available only during April and May, 1982.

Program Time: 2 hours plus travel time (limited to 30 students)

- PROGRAM STAFF -

Coordinator: Lloyd Scott
MCPSS Environmental Studies Center

Instructors: Johnny Booker
John Dindo
Dauphin Island Sea Lab

* * *

ESC
Environmental Studies Center
MCPSS
MOBILE COUNTY PUBLIC SCHOOL SYSTEM

* * *

- RESERVATIONS -

Teachers wishing to schedule programs for their classes, or who desire additional information concerning the special topics and field programs, should call:

661-0999

* * * *ANNOUNCING* * * *

1981-82

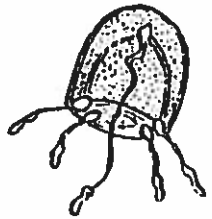
A Classroom Visitation Program

in

MARINE SCIENCE

AND

COASTAL AWARENESS EDUCATION



Cosponsored by

THE MCPSS ENVIRONMENTAL STUDIES CENTER AND THE DAUPHIN ISLAND SEA LAB'S DISCOVERY HALL

APPENDIX III

ANNUAL UTILIZATION REPORT - 1981

Dauphin Island A.F.S., Alabama SA-IV-447 now referred to as "Dauphin Island Sea Lab."

1. Utilization of building facilities is described below:

BLDG. NO.	BUILDING AND IMPROVEMENTS ACQUIRED AND EDUCATIONAL USE
4000	BE Maintenance Shop (Civil Engineers' Bldg.) Maintenance support to the facility.
4001	Miscellaneous recreation facility (Beach Club) Destroyed. FEMA Project (598-92013 #129) Replacement building to be completed by September 13, 1981.
4002	Open Mess, NCO Club (Discovery Hall) Destroyed. FEMA Project (598-92013 #131) Replacement building to be completed by September 13, 1981.
4003	Guest House Now being used to house faculty.
4004	Recreation Workshop (Endeavor Hall) This building has been remodeled to house a classroom and geology lab downstairs. Second floor has been completely renovated as classroom and office space. Building has been air conditioned.
4007	Rad Mars (Laundromat) Converted into laundromat building and relocated between buildings 4000 and 4072.
4038	Storge Shed Small-boat vehicle storage and buoy program.

BLDG. NO.	BUILDING AND IMPROVEMENTS ACQUIRED AND EDUCATIONAL USE
4070 (cont.)	office were added in 1980-81 through renovation of previous bowling alley. (FEMA)
4071	Motor Pool (Technical Support Shop) Shop area for construction, repair, maintenance of technical equipment and field gear.
4072	BOQ (Albatross Hall) Living accomodations for married students and staff. Completely renovated 1980-81 (FEMA)
4074	Guard Station Programmed for diving locker complex.
4079	Radome Tower Not used - reassumed from USAF-ADC in 1981
4085	Guard Station Storage
4089	Storage Shed Storage for maintenance shop facility.

2. All real properties are now being utilized in support of our educational mission except the randome tower (4079) which were leased from MESC at the request of the Department of Defense. These buildings were returned to MESC on January 1, 1981. Space utilization plan and renovation prospectus underway.

The thirteen family housing units have all been connected to sewer, water and electricity and are occupied by summer faculty. Several are utilized year-round by resident technicians and students. House #4110 has been renovated for faculty housing. Propane heat as a back-up system has been added to houses. Nos. 4112 and 4104 have been refloored.

3. Not applicable.

4. Personal Property Statement.

Most properties as listed in the transfer have been utilized in support of the operation of the facility. Many items of dormitory furniture were destroyed or damaged beyond repair by Hurricane Frederick and subsequent exposure and were disposed of.

5. Personal Property

(See No. 4 above)

6. Major Improvements; 1980-81

A. Refloored 2 houses (4112,4111) - $2,225.00

B. New flooring in Guest House (4003) - $155.

C. New Furnishings dormitory (4068) - $1,866.50

D. Insulated Shutters (4069, 4070) - $1,013

7. No complaint of discrimination has been received in connection with use of facility.

8. The Marine Environmental Sciences Consortium operated on a FY 80-81 State appropriation $512,000 almost all of which is allocated to the operation of the Dauphin Island Sea Lab.

In addition, the University of Alabama provided a budget of $75,000 their Marine Science Programs based at the Sea Lab. These funds have supported part of the professional staff as well as vessels used by members of the consortium for research and education.

9. All members of the MESC are fully accredited by the Southern Association of Colleges and Universities. All courses at the Sea Lab have been approved and included in the various degree programs of the member schools. The facility itself has no independent educational program at the college level and must be considered as a specialized extension of each of the member schools. Most of these have the standard programs and commitments to the Veterans Administration and appropriate agencies.

10. This summer 14 of the 19 member institutions of the MESC were represented by 80 students at the Dauphin Island Sea Lab. The Spring Discovery Hall Program hosted over 500 students from 22 universities and high schools in 7 states during the 12 month reporting period.

There are at present 7 graduate students in residence at the Sea Lab. Additional students utilized housing & laboratory facilities, but have moved to the mainland since Hurricane Frederic. These students are all engaged in various research programs of the resident staff and are expected to return to Dauphin Island upon completion of a bridge in February, 1982.

Plans for the coming year center around re-establishment of all academic programs with the completion of a bridge in February, 1982. A graduate student recruitment program is underway. In addition, modifications and renovations to Bldgs. 4063 and 4079 should be initiated within the utilization year. However, due to the unique design of this complex full utilization in the near future is not expected because of the great capital investment required. The second dormitory will be refurnished by June, 1982 to accomodate a full student load.

APPENDIX IV

BALANCE SHEET

MARINE ENVIRONMENTAL SCIENCES CONSORTIUM

SEPTEMBER 30, 1981

ASSETS

Cash	$ 32,249	
Accounts receivable	132,135	
Refund due from I.R.S.	12,083	
Inventories	5,739	
TOTAL ASSETS		$182,206

LIABILITIES AND FUND BALANCE

Accounts payable	$ 10,209	
Accrued fringe benefits and withholdings	4,047	
Fund Balance	167,950	
TOTAL LIABILITIES AND FUND BALANCE		$182,206

STATEMENT OF CHANGE IN FUND BALANCE

Fund balance at beginning of year	$ 98,521
Net revenue for the year	69,429
FUND BALANCE AT END OF YEAR	$167,950