PROGRAM

(Commission Chairman Walter O. Sheppard, Presiding)

Thursday (October 20)

8:30 - 9:30 AM

REGISTRATION MEZZANINE FLOOR

9:30 AM

CALL TO ORDER—GENERAL SESSION QUEEN ANNE ROOM

INVOCATION
Reverend William F. Mayo
Gentilly Methodist Church
New Orleans, Louisiana

ROLL CALL

WELCOME ADDRESS
Honorable Jack P. F. Gremillion
Attorney General
State of Louisiana

RESULTS OF RECENT OYSTER FEEDING EXPERIMENTS
Robert M. Ingle, Director of Research
Board of Conservation, State of Florida
Tallahassee, Florida

[redacted]ERATION HOURGLASS — FLORIDA'S OFF-[redacted]ORE EXPLORATORY FISHING PROGRAM
Martin A. Moe, Jr., Ichthyology Project Leader
Florida Board of Conservation
Marine Laboratory
St. Petersburg, Florida

POND SHRIMP STUDIES
J. G. Broom, Marine Biologist
Louisiana Wild Life & Fisheries Commission
Marine Laboratory
Grand Isle, Louisiana

11:00 AM

RECESS *Fifteen Minutes*

11:15 AM

FLORIDA EXPLORATORY CLAM RESEARCH
Edwin A. Joyce, Jr., Senior Fisheries Biologist
Florida Board of Conservation
Marine Laboratory
St. Petersburg, Florida

SHELL PLANTING FOR OYSTER SEED
Theodore B. Ford, Chief
Division of Oysters, Water Bottoms & Seafood
Louisiana Wild Life & Fisheries Commission
New Orleans, Louisiana

12:00 NOON

ADJOURNMENT *Luncheon*

2:00 PM

FEDERAL & STATE COOPERATION AMONG THE GULF STATES THROUGH PUBLIC LAW 88-309
Seton H. Thompson, Regional Director
Bureau of Commercial Fisheries, Region 2
St. Petersburg Beach, Florida

MARKETING PROMOTION IN FLORIDA FOR SEAFOOD
Randolph Hodges, Director, and
Harmon W. Shields
Florida Board of Conservation
Tallahassee, Florida

RECESS *Fifteen Minutes*

ADVANTAGES OF INTERSTATE COMPACTS FOR THE FISHING INDUSTRY
Ernest C. Mitts, Executive Director
Atlantic States Marine Fisheries Commission
Tallahassee, Florida

4:00 PM

ADJOURNMENT

4:30 PM

MEETING OF RESOLUTIONS COMMITTEE

Friday (October 21)

8:00-10:00 AM

COMMISSION EXECUTIVE SESSION
BREAKFAST ROBERT E. LEE ROOM

10:00-12:00 NOON

GENERAL SESSION QUEEN ANNE ROOM

EIGHT YEARS SINCE THE GENEVA CONFERENCE
William R. Neblett, Executive Director
National Shrimp Congress
Key West, Florida

Order - 450 mailed - 259

A STATUS REPORT ON THE GULF EXPLORATORY FISHING AND GEAR RESEARCH PROGRAM

Harvey R. Bullis, Jr., Base Director
Bureau of Commercial Fisheries
Exploratory Fishing & Gear Research Base
Pascagoula, Mississippi

ANNOUNCEMENTS

ADJOURNMENT

★

Gulf States Marine Fisheries Commission
312 Audubon Building
New Orleans, Louisiana 70112

Commissioners

Order of listing: Administrator, Legislator, Governor's Appointee

Alabama

Claude D. Kelley
L. W. Brannan, Jr.
Vernon K. Shriner (Vice Chm

Florida

W. Randolph Hodges
J. Lorenzo Walker
Walter O. Sheppard (~~Chairman~~)

Louisiana

Dr. Leslie L. Glasgow
~~Spencer G. Todd~~
James H. Summersgill (~~Vice~~-Chairman)

Mississippi

Charles Weems
Ted Millette
~~Joseph V. Colson~~ (Apr.)

Texas ① J. R. Singleton

~~W. J. Cutbirth, Jr.~~
Richard H. Cory
Virgil Versaggi

① Appointed after programs were mailed

GULF STATES MARINE FISHERIES COMMISSION

Seventeenth Annual Meeting

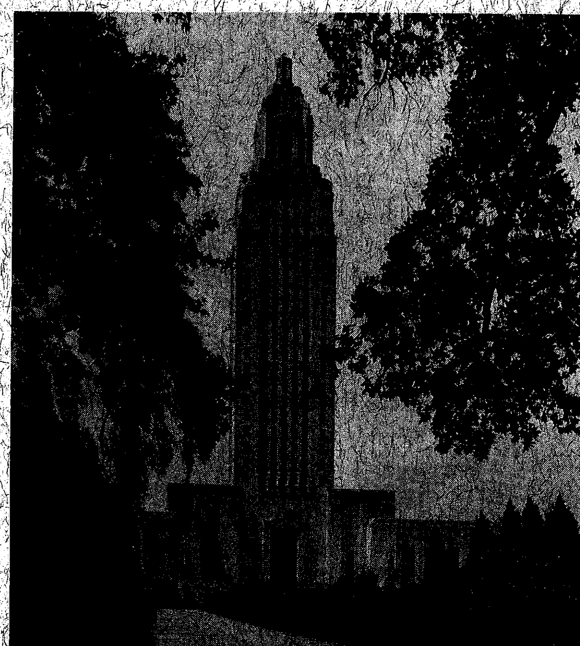
New Orleans, La.

The Monteleone Hotel

Queen Anne Room

October 20 (Thursday) - 21 (Friday), 1966

A cordial invitation is extended to all interested in the proper utilization of the marine fishery resources of the Gulf of Mexico. (Convention rates: \$9.50-\$14.50 single, \$14.50-\$20.50 double.)

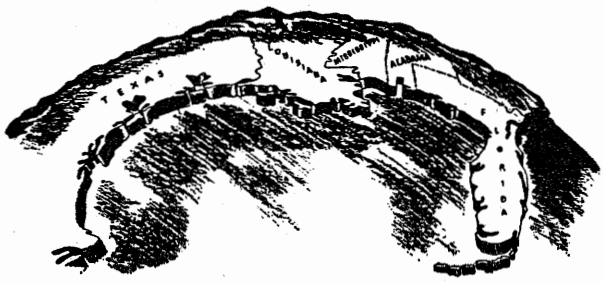


THE CAPITOL
STATE OF LOUISIANA
BATON ROUGE

Gulf States Marine Fisheries Commission

CHAIRMAN
WALTER O. SHEPPARD
POST OFFICE DRAWER 2139
FORT MYERS, FLORIDA 33902

VICE-CHAIRMAN
JAMES H. SUMMERSGILL
1819 SOUTH BAYOU DRIVE
GOLDEN MEADOW, LOUISIANA
70357



DIRECTOR
~~W. DUDLEY GUNN~~

OFFICE SECRETARY
MRS. WALTER B. HOOVER

HEADQUARTERS OFFICE
312 AUDUBON BUILDING
NEW ORLEANS, LOUISIANA 70112
TELEPHONE: 524-1765

NEW ADDRESS: Room 225 Louisiana Wild Life & Fisheries Building
400 Royal Street
70130

DIRECTOR: Joseph V. Colson

M I N U T E S

REGULAR MEETING

MONTELEONE HOTEL

NEW ORLEANS, LOUISIANA

OCTOBER 20-21, 1966

GULF STATES MARINE FISHERIES COMMISSION
Room 225, 400 Royal Street
New Orleans, Louisiana 70112

MINUTES
17th Annual Meeting
October 20-21, 1966

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GULF STATES MARINE FISHERIES COMMISSION
17th Annual Meeting
October 20-21, 1966, New Orleans, Louisiana

A T T E N D A N C E

COMMISSIONERS:	Present:	Absent
ALABAMA	George W. Allen, Proxy for Claude D. Kelley Vernon K. Shriner, Proxy for L. W. Brannan, Jr. Vernon K. Shriner	
FLORIDA	W. Randolph Hodges J. Lorenzo Walker Walter O. Sheppard	
LOUISIANA	Dr. Leslie L. Glasgow Dr. Lyle St. Amant, Proxy for Spencer G. Todd James H. Summersgill	
MISSISSIPPI	George Williams, Proxy for Charles Weems Ted Millette Joseph V. Colson	
TEXAS	J. R. Singleton Virgil Versaggi	R.H. Cory

GUESTS:

Former GSMFC Commissioner:
Ernest Mitts, Florida

State Government Representatives:

ALABAMA: J. H. Crance

FLORIDA: Jay Dunathan
E. A. Joyce, Jr.
William G. Lyons
Martin Moe, Jr.
Harmon W. Shields

LOUISIANA: Gerald Adkins
Barney Barrett
Jerry Broom
Hayden Eswirth
Dr. T. B. Ford
Bennie J. Fontenot, Jr.
Hon. Jack P. F. Gremillion
Ralph Latapie
W. R. Mock
W. S. Perrett
J. F. Pollard
H. Schafer
Max Summers
Jimmie Thompson

MISSISSIPPI: W. J. Demoran

TEXAS: Paul Brashear
Terrance Leary
R. G. Mauermann

(ATTENDANCE, Continued)

Federal Government Representatives:
BUREAU OF COMMERCIAL FISHERIES:
Harvey Bullis; I. B. Byrd; J. S. Carpenter; Charles R. Chapman; Ed Hueske; M. J. Lindner; Ed Macklow; J. K. McNulty; James Sykes; Seton Thompson; and, George Snow.
BUREAU OF SPORT FISHERIES & WILDLIFE:
John G. Degani
U.S. CORPS OF ENGINEERS:
Charles E. Knight
U.S. PUBLIC HEALTH SERVICE:
Jos. A. D'Alfonso

University Representatives:
Ray Authement; Charles Caillouet; J. Y. Christmas; Allen R. Comeaux; J. L. Gaines; Lewis T. Graham; Gordon Gunter; H. D. Hoese; R. M. McPherson; Walter R. Nelson; F. Rees; George Rounsefell; C. D. Rose; E. B. Stueben; and, Burt Wilson.

Representatives of Industry:
A. J. Buquet; J. M. Jurisich; Paul Kalman; O. M. Longnecker; Harry McGinnis; W. R. Neblett; J. R. Nelson; Mack Rodrigue; L. W. Strasburger; J. R. Ramos; and R. A. Richards.

CLERGY, NEWSMEN, AND OTHER SPECIAL GUESTS:
Reverend William F. Mayo; S. W. Corbino; Jim Rollins; Arthur L. Gross; and Mal Xavier.

GULF STATES MARINE FISHERIES COMMISSION
Room 225, 400 Royal Street
New Orleans, Louisiana 70112

Chairman:
Walter O. Sheppard, Florida

17th Annual Meeting
Monteleone Hotel, New Orleans, Louisiana

General Session, 9:40 a.m.
Thursday, October 20, 1966

The first General Session was called to order by Chairman Sheppard. Reverend William F. Mayo, Pastor, Gentilly Methodist Church, New Orleans, rendered the Invocation, after which the Session paid tribute to the late W. Dudley Gunn with a moment of silence. Chairman Sheppard especially thanked Reverend Mayo, Dudley Gunn's pastor, for his participation in the program.

The Roll was called by states, and the Chairman reported a quorum present.

Commissioners recently appointed were introduced, as follows:

Dr. Leslie L. Glasgow, Administrative Member, Louisiana
Hon. J. R. Singleton, Administrative Member, Texas

Hon. Jack P. F. Gremillion, Attorney General of Louisiana, welcomed the Commissioners and guests to the State of Louisiana, and he spoke on the topic, "Recent Developments in the Tidelands Controversy" (Appendix 1, Page 8).

Chairman Sheppard stated that with the untimely passing of Director Gunn, it became his duty as Chairman to complete the agenda of the 17th Annual Meeting, and he expressed deep appreciation to all those who had helped formulate the program.

The Chairman introduced Mrs. Ellen Hoover, Secretary to the Gulf States Commission, and he told the commissioners of her immeasurable assistance to him since the death of Director Gunn. He expressed appreciation to the Atlantic States Commission and Ernest Mitts for assistance rendered in formulating the program and recording and publishing the Minutes of the 17th Annual Meeting.

Speakers introduced during the morning session included:

"Operation Hourglass - Florida's Offshore Exploratory Fishing Program," Martin A. Moe, Jr., Florida Board of Conservation. Slides (Appendix 2, Page 14).

"Pond Shrimp Studies," J. G. Broom, Louisiana Wild Life and Fisheries Commission. Slides (Appendix 3, Page 17).

"Exploratory Clam Research in Florida Waters: Summary," Edwin A. Joyce, Florida Board of Conservation. Slides (Appendix 4, Page 21).

Recess for Lunch -

General Session, 2:05 p.m.
Thursday, October 20, 1966

Chairman Sheppard called the meeting to order and introduced Seton H. Thompson and I. B. Byrd. Mr. Thompson, Director, Region 2, Bureau of Commercial Fisheries, spoke on "Federal and State Cooperation Among the Gulf States Through Public Law 88-309" (Appendix 5, Page 23). Mr. Byrd showed slides to illustrate PL 88-309 projects of the Gulf States.

Topics and speakers during the afternoon included:

"Marketing Promotion in Florida for Seafood," Hon. Randolph Hodges, Director, Florida Board of Conservation; and, Harmon W. Shields, Director of Marketing, Florida Board of Conservation. Mr. Shields showed examples of promotional material. (Appendix 6, Page 26)

"1966's Shell Planting for Oysters," Dr. Ted B. Ford, Chief, Division of Oysters, Water Bottoms and Seafood, Louisiana Wild Life and Fisheries Commission. Slides (Appendix 7, Page 31)

"Advantages of Interstate Compacts for the Fishing Industry," Ernest Mitts, Executive Director, Atlantic States Marine Fisheries Commission, Tallahassee, Florida (Appendix 8, Page 32)

Chairman Sheppard appointed to the Resolutions Committee:

George Allen, Alabama
J. Lorenzo Walker, Florida
James H. Summersgill, Louisiana
Ted Millette, Mississippi
Virgil Versaggi, Texas

Recess until 8:00 a.m., Friday, October 21 -

GULF STATES MARINE FISHERIES COMMISSION
17th Annual Meeting
Monteleone Hotel, New Orleans, Louisiana

Executive Session, 8:00 a.m.
Friday, October 21, 1966

The Commissioners met for Breakfast, followed by an Executive Meeting, which adjourned at 9:58 a.m.

General Session, 10:15 a.m.
Friday, October 21, 1966

Chairman Sheppard called the meeting to order.

He introduced Mrs. Mary Knowles Gunn, widow of William Dudley Gunn, and presented to Mrs. Gunn the Resolution adopted by the Gulf States Marine Fisheries Commission memorializing the death of her late husband, and Director of the Gulf States Marine Fisheries Commission, reading the Resolution, as follows:

RESOLUTION MEMORIALIZING THE DEATH OF WILLIAM DUDLEY GUNN

WHEREAS, WILLIAM DUDLEY GUNN departed this life on July 25, 1966, and in his passing, the GULF STATES MARINE FISHERIES COMMISSION lost an outstanding and devoted employee of the Commission; and,

WHEREAS, The history of the GULF STATES MARINE FISHERIES COMMISSION was indelibly impressed by the useful life and deeds of this outstanding executive Director; and,

WHEREAS, It is fitting and proper that this Commission, through its Board of Directors, take notice of the death of WILLIAM DUDLEY GUNN and pay deserved tribute to his memory;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF GULF STATES MARINE FISHERIES COMMISSION:

That this Board of Directors does hereby direct that there be inscribed upon its permanent records in the Minutes of this Commission this expression of bereavement over his loss:

IN MEMORIA - WILLIAM DUDLEY GUNN

WILLIAM DUDLEY GUNN was born on the 12th day of January, 1904, at Pensacola, Florida. He became the executive Director of the Gulf States Marine Fisheries Commission in November 1949 and continued with the Commission until his passing. He was a member of the Gentilly Methodist

Church of New Orleans, Louisiana, and was a Member of the Escambia Masonic Lodge, Pensacola, Florida. He was also a Member of the Military Order of the World Wars. He was a good citizen, a good neighbor, a loyal friend and a devoted employee of this Commission. In his passing, the Gulf States Marine Fisheries Commission has lost a valuable leader, servant and respected and honored citizen.

BE IT FURTHER RESOLVED That a copy of this Resolution be spread upon the Minutes of the Gulf States Marine Fisheries Commission, and be made a permanent record of the Minutes of the Meeting of the Board of Directors of this Commission.

BE IT FURTHER RESOLVED That the original of this Resolution be presented to the surviving spouse of WILLIAM DUDLEY GUNN, MARY KNOWLES GUNN.

S/ Walter O. Sheppard
Chairman

ATTEST:
S/ J. H. Summersgill

On behalf of the Gulf States Marine Fisheries Commission, the Chairman presented Mrs. Gunn a plaque engraved:

"GULF STATES MARINE FISHERIES COMMISSION
Awarded to W. Dudley Gunn
In Recognition of His Outstanding Service to the Member States
Commission Secretary and Treasurer from 1949 to 1966"

The Chairman invited Mrs. Gunn to attend future meetings of the Commission. Mrs. Gunn expressed her appreciation to the members of the Commission.

During the Executive Session, the three Resolutions of appreciation adopted were directed to the Monteleone Hotel; Ernest Mitts, Executive Director of the Atlantic States Marine Fisheries Commission; and, Mrs. Mary R. Branan, Atlantic States Marine Fisheries Commission.

In reporting other actions of the Executive Session, Mr. Sheppard announced that Joseph V. Colson, Mississippi, had been named to succeed W. Dudley Gunn as Director of the Commission.

Officers elected for the coming year were: James H. Summersgill, Louisiana, Chairman; and, Vernon K. Shriner, Alabama, Vice-Chairman.

The next meeting of the Commission will be held in Brownsville, Texas, March 17-18, 1967.

Mr. Sheppard presented a gavel to In-coming Chairman Summersgill, on behalf of the Commission.

Chairman Summersgill presented a plaque to the Out-going Chairman, and read the inscription:

"GULF STATES MARINE FISHERIES COMMISSION
Awarded to Walter O. Sheppard
In Recognition of His Outstanding Service to the Member States
Commission Chairman, 1965-66"

Speakers during the morning session included:

"Eight Years Since the Geneva Conference," William R. Neblett, Executive Director, National Shrimp Congress, Key West, Florida (Appendix 9, Page 37)

"A Status Report on the Gulf Exploratory Fishing and Gear Research Program," Harvey R. Bullis, BCF, Pascagoula, Mississippi. (Appendix 10, Page 44)

The meeting was adjourned at 11:15 a.m.

GULF STATES MARINE FISHERIES COMMISSION
Minutes, Executive Session
October 21, 1966

The Executive Session opened with Breakfast at 8:00 a.m.

Chairman Sheppard called the meeting of the Executive Session to order at 8:40 a.m. The roll was called by states, and the following were present:

ALABAMA	George W. Allen (Proxy for Commissioner Kelley)
	Vernon K. Shriner (Proxy for Commissioner Brannan)
	Vernon K. Shriner
FLORIDA	Harmon Shields (Proxy for Commissioner Hodges)
	J. Lorenzo Walker
	Walter O. Sheppard
LOUISIANA	Dr. Leslie L. Glasgow
	Dr. Lyle St. Amant (Proxy for Commissioner Todd)
	James H. Summersgill
MISSISSIPPI	Ted Millette
	Joseph V. Colson
TEXAS	J. R. Singleton
	Virgil Versaggi

The Chairman reported a quorum present.

Commissioner Shriner moved to dispense with the reading of the Minutes of the March 18, 1966, meeting, and moved approval; seconded by Dr. St. Amant, and the motion carried.

The Financial Report, submitted by Peat, Marwick, Mitchell & Co., CPA, New Orleans, was discussed. Chairman Sheppard stated a cash balance at the end of the fiscal year, June 30, 1966, of $7,477.99, with all member states having paid their contributions. There being no question, the audit report was approved as submitted.

Discussion of the Suggested Budget, 1966-67, followed. The Chairman stated all current contributions from member states had been received. He indicated Bank Balance as of October 21, 1966 to be $25,744.03. The Budget Item "Depreciation" was reviewed, and the Chairman stated the total represented depreciation on a 1956 Chevrolet automobile, office furniture and equipment. The item "Travel" was discussed, and Chairman Sheppard stated the new director might make a budget adjustment and ask for ratification by the Commission at the March, 1967 meeting if it became necessary to

over-extend the budgeted amount of $1,800.00. There being no further question, Mr. Millette moved adoption of the Suggested Budget; seconded by Mr. Summersgill, and the Budget was approved, as suggested. (See Page 7-C).

Mr. Versaggi moved that 1000 additional copies of Informational Series No. 3, "The Shrimp Fishery of the Gulf of Mexico," be printed at the printer's special price of $30.00; seconded by Dr. St. Amant, and the motion carried.

The Chairman proposed the investment of Commission funds, over the director's anticipated total of need for three-months' operating costs, in U.S. Treasury notes, at approximately 6% interest, stating that such an investment is authorized under the By-Laws. George Allen moved that the director be instructed by the Commission to invest all unneeded funds into short-term government securities. Mr. Versaggi proposed a finance committee be appointed to work with the director in this regard, and that Mr. Allen's motion be amended to that effect. This was seconded by Mr. Shriner, and the amended motion carried.

Chairman Sheppard then named to the Finance Committee Mr. Summersgill, the in-coming Chairman; Dr. Glasgow; and, the director.

Mr. Shriner moved that the Traveling Fund of $250.00, a fund under the By-Laws advanced to Director W. Dudley Gunn, and held by him at his death, be expensed out; seconded by Mr. Walker. There being no further discussion, the motion carried.

The disposal of the 1956 Chevrolet automobile owned by the Commission was the next item on the agenda. Mr. Colson stated that as director, he would prefer to use his personal car. Chairman Sheppard recommended the 1956 Chevrolet be sold, and expenses incurred in travel by the director be charged to the Travel Expense budget item. Mr. Versaggi suggested that personal contacts might be made by the director in traveling if the Commission owned or leased a car, which might even be cheaper than flying, and he proposed that the Commission furnish a new car to the director to be used for business purposes. Dr. St. Amant concurred. Mr. Allen concurred, stating he felt the more contacts the director made, the better for the Commission. Mr. Millette stated he felt the director would need an automobile, but he thought the subject premature at this time. It was agreed that the Commission pay the director mileage at the rate of 10¢ per mile until the meeting in March, 1967, and the director was instructed to keep a record of all travel expense and give a complete report to the Executive Session at the March, 1967, meeting, at which time the subject would again be discussed to determine the feasibility of purchasing a motor vehicle for the director.

SUGGESTED BUDGET FOR FISCAL YEAR 1966-67

Estimated Income F/Y 1966-67

Alabama	$3,500.00		
Florida	4,500.00		
Louisiana	6,000.00		
Mississippi	1,500.00		Estimated
Texas	6,000.00	$21,500.00	Funds Available
Cash on hand close F/Y 1965-66		7,477.99	$ 28,977.99

EXPENSES

	Budget 1965-66	Spent 1965-66 (Per Audit)	Suggested Budget 1966-67
Salaries	$ 14,000.00	$ 14,000.00	$ 14,000.00
Traveling	1,600.00	937.96	1,800.00
Office rent	1,080.00	1,080.00	1,200.00
Stationery, printing and supplies	400.00	385.10	450.00
Telephone & telegraph	500.00	418.40	550.00
Postage	250.00	210.10	250.00
Electricity	42.00	41.00	50.00
Equipment maintenance	50.00	62.06	75.00
Accounting	250.00	250.00	250.00
Insurance	265.00	269.78	275.00
Meeting expense	650.00	396.10	700.00
Publication expense	570.00	609.40	700.00
Payroll taxes	433.70	366.53	500.00
Depreciation	75.00	69.86	100.00
Sundry	90.00	54.13	100.00
	$20,255.70	$19,150.42	$21,000.00

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True Bank Balance, 9/30/66		$14,983.89
Texas dues deposited 10/3/66 . . .	$6,000.00	
Miss. dues deposited 10/12/66 . . .	1,500.00	
Ala. dues deposited 10/19/66 . . .	3,500.00	11,000.00
Anticipated funds for 1966-67		$25,983.89

There being no objection, Chairman Sheppard directed the sale of the 1956 Chevrolet immediately, at the best obtainable price, by the director as soon as the director assumes his duties.

Mr. Versaggi suggested the possibility of a return premium on prepaid automobile liability insurance when the insurance is cancelled. Mr. Colson stated he would handle the sale of the car and that he will have the automobile insurance cancelled. He further stated that as director, he hopes to do more traveling than has been done in the past and hopes to make many personal contacts.

Chairman Sheppard reported that the Commission's lease on office space in the Audubon Building expired September 30, 1966, and that the Commission had been notified of a raise in rent to $100.00 per month. Arrangements have been made to rent on a month-to-month basis until the October, 1966, meeting, when a decision could be made regarding renewal of the lease. He stated the Commission has now been advised that the building has been sold, and that he has no knowledge of the amount of rent desired by the new owners. Dr. St. Amant suggested that office space for the Commission might be available in the Louisiana Wild Life Building at either a nominal rental fee, or gratis. Mr. Summersgill stated he felt this to be a better location for the Commission office, and he might be able to determine if space were available within a week or two, if arrangements could be worked out with the owners of the Audubon Building to continue to rent on a temporary basis. Mr. Colson suggested the Commission needed more office space if larger offices were obtainable in the Wild Life Building. Mr. Summersgill stated expenses incurred to install airconditioning and to modify the office space in the Wild Life Building would have to be borne by the Commission, and the expense of heating and utilities also would have to be borne by the Commission. Chairman Sheppard reported the Commission would attempt to refrain from entering into a lease at the Audubon Building. He recommended that the discretion be left to the in-coming chairman as to whether to negotiate a lease for present office space in the Audubon Building, if space were not available in the Louisiana Wild Life Building.

The Commissioners ratified payment of Mr. Sheppard's expenses for telephone and travel from the date of Mr. Gunn's death through September 1, 1966, in the amount of $333.60, for which Mr. Sheppard had previously been paid. Mr. Versaggi moved reimbursement of Mr. Sheppard's present expenses for travel and other items totaling $225.00; Mr. Colson seconded, and without objection the motion carried. Mr. Sheppard stated he desired no payment for salary during the three weeks he spent away from his office on Commission business.

The next meeting will be held in Brownsville, Texas, March 16-17, 1967. Mr. Versaggi stated he would confer with the Texas delegation on a hotel or motel site and would report to the Commission during

the Gulf-Caribbean meeting. He stated the necessity of having prior information from those who planned to fly to the Texas meeting, including airline flight schedules, estimated time of arrival, and city of arrival in Texas, since state conservation department cars would be available to meet planes in Brownsville and Harlingen, Texas. Mr. Colson was asked to include this request in his letter of invitation to the commissioners and interested parties. Mr. Versaggi expressed the hope that entertainment for the ladies will be provided at the Brownsville meeting. Whereupon Chairman Sheppard stated that announcement of hotel site would be made at a later date.

The fall meeting will be held October 19-20, 1967, in Alabama, and the Alabama delegation designated Mobile as the location.

The Chairman advised that the Resolutions Committee had approved the normal resolutions, and the resolution memorializing the death of W. Dudley Gunn (Resolution No. 1). Mr. Shields moved that the reading of the resolution regarding Mr. Gunn be dispensed with, and its adoption; seconded by Mr. Colson, and Resolution No. 1 was adopted without dissent. Resolutions Nos. 1 and 2 are, as follows:

RESOLUTION No. 1

RESOLUTION MEMORIALIZING THE DEATH OF WILLIAM DUDLEY GUNN

WHEREAS, WILLIAM DUDLEY GUNN departed this life on July 25, 1966, and in his passing, the GULF STATES MARINE FISHERIES COMMISSION lost an outstanding and devoted member of the Commission; and,

WHEREAS, The history of the GULF STATES MARINE FISHERIES COMMISSION was indelibly impressed by the useful life and deeds of this outstanding Executive Director; and,

WHEREAS, It is fitting and proper that this Commission, through its Board of Directors, take notice of the death of WILLIAM DUDLEY GUNN and pay deserved tribute to his memory,

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF GULF STATES MARINE FISHERIES COMMISSION:

"That this Board of Directors does hereby direct that there be inscribed upon its permanent records in the Minutes of this Commission this expression of bereavement over his loss:

IN MEMORIA - WILLIAM DUDLEY GUNN

WILLIAM DUDLEY GUNN was born on the 12th day of January, 1904, at Pensacola, Florida. He became the

Director of the Gulf States Marine Fisheries Commission in November 1949 and continued with the Commission until his passing. He was a member of the Gentilly Methodist Church of New Orleans, Louisiana, and was a Member of the Escambia Masonic Lodge, Pensacola, Florida. He was also a Member of the Military Order of the World Wars. He was a good citizen, a good neighbor, a loyal friend and a devoted employee of this Commission. In his passing, the Gulf States Marine Fisheries Commission has lost a valuable leader, servant and respected and honored citizen.

BE IT FURTHER RESOLVED That a copy of this Resolution be spread upon the Minutes of the Gulf States Marine Fisheries Commission, and be made a permanent record of the Minutes of the Meeting of the Board of Directors of this Commission.

BE IT FURTHER RESOLVED That the original of this Resolution be presented to the surviving spouse of WILLIAM DUDLEY GUNN, MARY KNOWLES GUNN."

S/ Walter O. Sheppard
Acting Director

ATTEST:
S/ J. H. Summersgill

RESOLUTION No. 2

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express its most sincere appreciation to the management and staff of the Monteleone Hotel for the cordial hospitality and service enjoyed by the group on the occasion of the October 20-21, 1966 meeting of this Commission in New Orleans, Louisiana

The Chairman asked the commissioners to pass additional resolutions thanking the Atlantic States Marine Fisheries Commission and its Executive Director Ernest Mitts, and Mrs. Branan, for their assistance in coming to New Orleans and reporting the meeting. Dr. St. Amant moved adoption; seconded by Mr. Millette, and the resolutions were adopted without dissent. Resolutions Nos. 3 and 4 are, as follows:

RESOLUTION No. 3

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express its most sincere appreciation to the Honorable Ernest Mitts, Executive Director, Atlantic States Marine Fisheries Commission, for his help in formulating the program for the Seventeenth Annual Meeting of this Commission held in New Orleans, Louisiana.

RESOLUTION No. 4

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express its most sincere appreciation to Mrs. Mary R. Branan, Administrative Assistant, Atlantic States Marine Fisheries Commission, for recording the proceedings and the many other courtesies extended during the course of the October 20-21, 1966 meeting of this Commission in New Orleans, Louisiana.

The Chairman appointed to membership on the Committee to Amend the By-Laws Mr. Summersgill; Vernon Shriner; George Allen; Virgil Versaggi; and Walter Sheppard, and he stated the suggested changes would be acted upon at the March, 1967 meeting. He further stated within a short time the director would circulate through the mail the Suggested Changes to the committee members, and that he felt the work of the committee could be handled satisfactorily through the mail. However, should the committee feel a meeting necessary, one could be arranged.

Under the Commission's system of rotation, the State of Louisiana will have the in-coming chairman, and Dr. St. Amant of the Louisiana delegation nominated Mr. Summersgill; seconded by Mr. Singleton. Mr. Versaggi moved the nominations be closed, and Mr. Summersgill was unanimously elected.

Under the Commission's system of rotation, the State of Alabama will have the in-coming vice-chairman, and Mr. Allen of the Alabama delegation nominated Vernon Shriner; seconded by Mr. Versaggi. Dr. St. Amant moved the nominations be closed, and Mr. Shriner was unanimously elected.

Mr. Sheppard announced that Joseph V. Colson has been selected as the new Director of the Commission.

As Further Business, Mr. Millette reported to the Executive Session from the Estuarine Technical Coordinating Committee. At the March 18, 1966 meeting, the Executive Session requested this committee to investigate the feasibility of the GSMFC, through its representative states, sponsoring estuarine films emphasizing the value of estuarine areas and the compilation of the areas, and requested that committee to report back at the October, 1966, meeting. Mr. Millette reported that representatives of all states except one were present at the committee meeting April 28, 1966, in New Orleans, and that representatives of the Bureau of Commercial Fisheries also attended. The committee agreed that this was a worthwhile project. Further, it was agreed that the GSMFC should serve as the agent for the states; that the contract for the work be on an individual basis with the Bureau of Commercial Fisheries sharing one-sixth of the cost, and each state sharing one-sixth of the cost, for a sum not to exceed $8500.00. Of this sum, $600.00 is to be contributed by each state

towards travel costs of the BCF representative who will direct the film; and whatever amount that is not used in travel costs would eventually be refunded to the states. The committee felt it would like to give emphasis to the GSMFC in the film title as a cooperative project. Mr. Millette urged those states which have not already done so to complete their agreements, stating that Alabama was the first state to do so.

Whereupon the Chairman declared the Executive Session adjourned at 9:58 a.m.

(end)

APPENDIX 1

Welcome Address:

RECENT DEVELOPMENTS IN THE TIDELANDS CONTROVERSY

Hon. Jack P. F. Gremillion
Attorney General, State of Louisiana
Baton Rouge

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 20, 1966

The use of the term "recent developments" herein is relative. The contest between the United States and the State of Louisiana over the ownership and control of navigable water beds and the resources thereof, both inland and coastal, has existed for more than three decades and things of importance that have happened in the controversy since 1952 or 1953 are treated as recent.

Thus limited in coverage, this article foregoes mention of the circumstances which changed a dormant dispute into a full-scale controversy in 1936 and early Congressional legislation that was sought to terminate the dispute by quitclaim in favor of the States.

The year 1953 would seem to be an appropriate starting point, for it was in that year that Congress adopted the Submerged Lands Act. [1]/ It is essential, however, to mention three landmark decisions of the Supreme Court of the United States involving the tidelands issue that were previously rendered. In United States of America v. State of California, decided in 1947 [2]/ the Court aforesaid held, among other things, that the State of California had no title to or proprietary interest in lands, minerals or things of value seaward of the low water mark along the coast and outside inland waters; then, in 1950, the Court made the same pronouncement in United States of America v. State of Texas [3]/ and in United States of America v. State of Louisiana. [4]/

Those three decisions were not only a severe blow to the states involved and other states, but they opened a Pandora's box of difficult, complex and vexation problems, even perplexing the Federal Government in its understanding of the strange doctrine of "paramount rights and power" which the Court pronounced that the

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1/ Act, Cong., May 22, 1953, Public Law 31, 83rd Cong., Chap. 65, 1st Sess.; 67 Stat. 29, 43 U.S.C. Supp. V, Secs. 1301, et seq.
2/ 332 U.S. 19
3/ 339 U. S. 707
4/ 339 U. S. 699

United States possessed in the disputed area and vaguely described as transcending the rights of a "mere property owner." One crucial question arose as to whether "paramount rights and power" included title or whether oil and gas leases could be granted in the absence of ownership in the area to be leased.

Congress was equally confused. After some eight years of Committee hearings, our national lawmakers finally adopted the Submerged Lands Act in an earnest attempt; first, to clear away the legalist turmoil wrought by the three tidelands cases, and second, to do equity to the states by granting or restoring to them submerged lands and the resources thereof which they had considered their own, free of adverse Federal claim, since respectively they entered the Union.

Two views may be taken as to the nature of the Submerged Lands Act; first, that it is a grant to the states, and second, that it constitutes a restitution to the states. Mr. Justice Black, in his dissenting opinion in United States of America v. State of Louisiana, et al,[5/] in referring to the Act, said: "It is not a gift; it is a restoration."

The Submerged Lands Act recognized and confirmed title in the states to three main classifications or categories of submerged lands within their boundaries: First, those within inland navigable waters; second, those "filled in, made, or reclaimed which formerly were lands beneath navigable waters," and third, those "permanently or periodically covered by tidal waters up to but not above the line of mean-high tide and seaward to a line three geographical miles distant from the coast line of each state and to the boundary line of each such state where in any case such boundary as it existed at the time such state became a member of the Union, or as heretofore approved by Congress, extends seaward (or into the Gulf of Mexico) beyond three geographical miles."

Insofar as the last classification of lands is concerned, the Submerged Lands Act limits the confirmation or grant to those lying at no greater distance than three marine leagues from coast into the Gulf of Mexico and to the international boundary line in the Great Lakes. As to all states bordering the Atlantic or Pacific Ocean, the confirma- or grant was restricted to those lands lying no greater distance than three geographical miles seaward from coast.

The Submerged Lands Act did not establish or delimit the seaward boundaries of Texas, Louisiana, Mississippi, and Florida as being

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5/ 363 U. S. 1

three marine leagues from their respective coasts but only permitted them to prove that they had seaward boundaries before or at the time they entered the Union, or as subsequently approved by Congress, exceeding three geographical miles from coast, the area being limited in any case to three marine leagues seaward from coast.

In spite of the fact that the Submerged Lands Act used the clearest language possible in granting or quitclaiming to the states all filled in, made, and reclaimed lands formerly beneath navigable waters, the Director of the Bureau of Land Management of the Department of the Interior rendered an administrative decision in 1956, in connection with the application of Floyd A. Wallis (BLM-A03 7435-0 and BLM 042017) for a Federal oil and gas lease, that Section 2(a) (3) of the Act only applied to lands artifically formed and not to lands naturally created. The decision was affirmed by the Secretary of the Interior in 1958. Louisiana was very disturbed by that decision inasmuch as areas within the Mississippi River passes were studded with mudlumps and other naturally formed islands. The President of the United States was successfully prevailed upon to request the Solicitor General of the United States to review the administrative decision aforesaid. The Solicitor General's opinion of December 20, 1963 led to the nullification of the administrative decision and resulted in the cancellation of a large number of Federal lease applications. It was his firmly expressed view that the lands dealt with in Section 2(a) (3) of the Submerged Lands Act contemplated both artificially formed and naturally created lands.

In the same year 1956, the Department of the Interior, acting for the United States, threatened to conduct Federal lease sales covering submerged lands in the disputed areas off coast and, at least on one occasion, consummated the threat. That practice was terminated by proceedings instituted on behalf of the State of Louisiana in the Fourteenth Judicial District Court, Calcasieu Parish, Louisiana,[6/] in which a temporary restraining order was granted. The United States District Court for the Eastern District of Louisiana maintained the temporary restraining order when the case was removed to that Court. The Supreme Court of the United States then acted, asserting and exercising its jurisdiction, enjoining both the United States and the State of Louisiana from granting further leases and drilling new wells in the disputed area, except upon agreement filed with the Court.

6/ State of Louisiana v. Anderson Pritchard Oil Corp., et al, No. 38, 780, 14th Judicial District Court, Calcasieu Parish, Louisiana.

It should be pointed out that the United States instituted two actions against the State of Louisiana, involving tidelands, in the Supreme Court of the United States. The first suit and the results thereof have been mentioned above. The second action, then entitled United States of America v. State of Louisiana,[7] was filed in December, 1955. In the latter suit the United States sought a judicial declaration that it was entitled to the exclusive possession of, and full dominion and power over, the lands, minerals and other things underlying the waters of the Gulf of Mexico more than three geographic miles seaward from the coast of the state to the edge or outer rim of the Continental Shelf. In 1956 the complaint was amended by order of the Court to join Texas, Mississippi, Alabama and Florida as defendants with Louisiana. That case has been thereafter entitled "United States of America v. State of Louisiana, et al," No. 9 Original.[8] The Court held in that case on May 31, 1960 that Texas and Florida had seaward boundaries each of three marine leagues into the Gulf of Mexico from coast, but that Louisiana, Mississippi and Alabama had each a seaward boundary of only three geographic miles into the Gulf of Mexico from coast.

To remedy the disparity, bills have been introduced in Congress to equalize the seaward boundaries of all the Gulf Coast states as being three marine leagues from coast into the Gulf, but they have not as yet gone as far as a Committee hearing.

The injunctive action in the case last mentioned above led to the Interim Agreement between the United States and the State of Louisiana of October 12, 1956. That agreement, among other stipulations, defines the disputed area; divides it into four zones; permits drilling and new leasing therein, subject to certain conditions and restrictions, and provides for the impoundment of lease revenue derived from such area.

One important outgrowth of the Conference on the Law of the Sea, called by the United Nations and held in Geneva, Switzerland, was the adoption in 1958 of the Convention on the Territorial Sea and the Contiguous Zone, commonly called the Geneva Convention, which set up principles and criteria for the establishment of baselines along the coasts of nations from which coast lines the territorial sea is measured. It was ratified by the United States Senate on May 26, 1960 and, after ratification by a sufficient number of signatory nations, was declared by the President of the United States

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7/ This case was orally argued and briefed, but no decision was rendered therein until after Texas, Mississippi, Alabama and Florida were joined with Louisiana as defendants. See footnote 9.

8/ 363 U. S. 1(1960)

an international treaty on September 28, 1964.[9] The highly technical provisions of the Convention shall not be explained in order to move on to other developments; however, it should be said that a Joint Federal-State Coast Line Committee undertook in 1962 to apply the Convention to the Louisiana coast, purely as an experiment without binding effect; that it came into vital focus in the California Case that was decided in 1965[10] and that it holds promise of having effect on the outcome of the yet pending case of United States of America v. State of Louisiana, et al[11] in which the Court shall determine the location of the Louisiana coast line.

The case of United States of America v. State of Louisiana, et al, supra, decided on May 31, 1960, was left open for further orders and decrees. The all-important question of the location of the Louisiana coast line remains for judicial determination. There must be found a starting place for the measurement of the State's presently existing seaward boundary, three geographical miles from coast.

Following an interim adjustment, reached after extensive negotiations between the parties, acting through their respective counsel, the Supreme Court of the United States entered a Supplemental Decree on December 13, 1965 in the yet pending case of United States of America v. State of Louisiana, et al, whereby certain areas along four separate segments of the Louisiana coast were judicially declared to lie within or above the coast of Louisiana and to constitute Louisiana property. Those lie in the Calcasieu Pass, Atchafalaya Bay, East Bay and Breton Sound-Chandeleur Islands areas. The Interim Agreement of October 12, 1956 had required the impoundment of all lease revenue from the disputed offcoast areas and from such impounded funds the United States paid $34,547,227.42 to the State of Louisiana as a result of the Interim Adjustment and Supplemental Decree aforesaid, the sum of $26,897,138.61 constituting royalties and $7,650,888.81 in severance taxes; also, as a result, Shell Oil Company paid $1,145,641.97 in severance taxes to the state, having had that sum returned to it for payment to the state.

It should be stressed that the interim adjustment was not a partial settlement of the tidelands case but the elimination of certain areas from dispute and a concomitant and resulting release of certain impounded funds to Louisiana.

For more than a year now, I have, with Dean Paul M. Hebert of L.S.U., and a team of nine prominent and capable lawyers, been

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9/ 51 Dept. State Bul. No. 1318, p. 452
10/ 381 U.S. 139
11/ See footnote 5.

building our case for future litigation. Governor McKeithen is doing everything possible to aid us in our case, joined in by other officers and department heads of Louisiana. We are working together with the support of everyone in our state. We have the aid of Louisiana's Congressional Delegation, and the Legislature, at the request of our Governor, has given us funds with which to work.

Our work in preparing for the future coast line litigation shall continue, in spite of the possibility, should it arise, of another interim adjustment, and in spite of the highly interesting and assuasive report that Congress might classify the entire offshore area beyond state seaward boundaries (wherever that might be in the case of Louisiana), as public lands of the United States, located theoretically for revenue purposes as being within the boundaries of the coastal states. As of now, however, we do not have a choice between litigation and a plan to divide the revenue.

If Congress should take the action aforesaid, Louisiana would receive about 37½% of all revenues derived from areas under present Federal law (from the Louisiana coast seaward to the outer rim of the Continental Shelf).

There has been considerable speculation that the Federal Government should, as a moral consideration, and for other reasons, give this percentage of revenues from the areas in which the United States has paramount rights to the coastal states because of the many economic advantages that the coastal states, such as Louisiana, provide to the Federal Government, its agencies, its lessees, etc. Louisiana and other coastal states do not collect any taxes whatsoever in the area or on the products thereof, and this would be fair and just compensation or reimbursement for the schools we provide, Louisiana highways that are used, police protection and police powers made available by the coastal states, the regulation of the oil and gas industry, recreational facilities and many other benefits -- hospitals, sewage districts -- too numerous to mention here.

The Interstate Oil Compact Commission has favored such move, and this idea, I understand, is now being considered by the Public Lands Law Review Commission created by Congress. In my opinion, this would be an ideal means of settling this long dispute; however, high level Federal officials have not yet recommended such course of action to Louisiana officials and we can only hope that the plan shall become a reality in the relatively early future. Meanwhile, we are preparing to meet the next Court challenge or move by the Federal Government, whenever that may be.

(end)

APPENDIX 2

OPERATION HOURGLASS - FLORIDA'S OFFSHORE EXPLORATORY FISHING PROGRAM

Martin A. Moe, Jr.
Florida Board of Conservation

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 20, 1966

Abstract of talk given to the Gulf States Marine Fisheries Commission at the Seventeenth Annual Meeting:

The southeastern Gulf of Mexico is no longer an unknown virgin territory, at least within the depth range of present commercial gear. Shrimp and fish harvesters as well as exploratory fishing vessels have fished this area to the point that we have a fairly good picture of the fauna to depths of about 50 fathoms. It is possible, but unlikely, that a biological bonanza such as the Tortugas pink shrimp grounds is yet to be discovered in this area.

We felt an exploratory fishing program that would provide basic data on the commercially valuable and potentially valuable fishes and invertebrates of this area would be of great importance. Also, the ecological aspects of this program would greatly enhance our knowledge of the fauna in the southeastern Gulf.

In August of 1965 the Florida Board of Conservation Marine Laboratory began a two year series of systematic monthly collection from specific stations in the southeastern Gulf. The configuration of the cruise pattern of the R/V Hernan Cortez resembles the outline of an hourglass, hence the project title. The Hourglass cruise takes place on or near the first of each month. The five fishery stations due west of Egmont Key (Stations A. B. C. D, and E at 20 feet, 10, 20, 30, and 40 fathoms) are sampled first and the vessel then moves to Fort Myers. The five fishery stations due west of Fort Myers (I, J, K, L, and M, also at 20 feet, 10, 20, 30, and 40 fathoms) are sampled a day or so later and the vessel then returns to St. Petersburg. Red tide and chemistry stations are also made on the Hourglass cruises.

Samples are taken at each station with an otter trawl, plankton net, and dredge. The entire catch is taken back to the Laboratory for identification, measurement and examination of stomach contents and gonadal development. A great deal of important biological and ecological information will be obtained from this project. A summary of the data that will be developed on the more common and

valuable species is outlined below:

1. Abundance
   A. relative species abundance
   B. seasonal peaks of abundance
   C. approximate depths of greatest abundance
   D. comparison of abundance of Latitude 27°37'N and 26°24'N
   E. correlation of temperature and abundance
   F. correlation of bottom type and abundance

2. Size and Growth
   A. seasonal fluctuation of size groups
   B. correlation of size range and depth
   C. variation in size (if any at Latitude 27°37'N and 26°24'N
   D. monthly rate of growth for various size ranges of the population

3. Spawning
   A. size at first spawning
   B. time of spawning at various depths and two latitudes
   C. correlation of spawning with temperature

4. Availability
   A. comparison of species and numbers taken with a flat 20 foot otter trawl, a full balloon 20 foot otter trawl, a 45 foot balloon fish trawl, and a steel dredge
   B. availability of animals to the 20 foot trawls and dredge during daylight and night hours

5. Ecological parameters
   A. time of feeding
   B. food items, at various seasons and at different size ranges
   C. determination of species associations
   D. variation of faunal communities with depth and latitude

Approximately 650 species of invertebrates and 175 species of fishes have been identified from the first year of Hourglass collections and much unidentified material remains to be worked. A few of the commercially important and potentially valuable animals taken include: scorpionfish, sea bass, snappers, sand perch, grunts, goatfish, flounders, pink shrimp, rock shrimp, spanish lobster, stone crabs, scallops, and clams.

This project Hourglass is an ambitious undertaking. It involves many man-hours of washing and sorting catches, identification of specimens, and recording of biological data. When this phase of the project is completed, the exhaustive work of data analysis, literature research, and writing of results begins. Hopefully, the first papers on the Hourglass program will appear within a year after the completion of sample collections. These papers will be made available to both the fishing industry and scientists. A progress report on the first year of collections from project Hourglass is in preparation and can be obtained from the Florida Board of Conservation Marine Laboratory.

Martin A. Moe, Jr.
Ichthyology Project Leader
Florida Board of Conservation
Marine Laboratory
St. Petersburg, Florida

(end)

APPENDIX 3
POND SHRIMP STUDIES

J. G. Broom
Louisiana Wild Life and Fisheries Commission

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 20, 1966

There has been an increasing interest in pond cultivation of shrimp for the last several years. Because this cultivation has been successful in several Far-Eastern countries, it would seem possible to raise shrimp commercially in this country. However, several aspects of this cultivation must be explored before pond raising of shrimp can become economically feasible. First, a supply of small shrimp must be obtained to introduce into the pond. This may be done by either catching naturally on tides or by some form of artificial propagation. Second, the proper number of shrimp to be stocked per unit area of water must be established to insure an optimum return, both in size and number. Third, an economical and efficient feed must be found to provide maximum growth and yield. And finally, harvesting methods must be developed to provide an easy and cheap way to recover all of the animals stocked.

We began our studies at the Louisiana Wild Life and Fisheries Commission's Marine Laboratory in the spring of 1962. Our objectives were to determine:

1. If pond cultivation of shrimp was feasible.
2. The best stocking rate
3. The basic shrimp productivity with no fertilization or supplemental feed.
4. The best species of shrimp for pond cultivation.

For this study we built a ¼ acre pond near our laboratory and in April stocked it with 18 thousand juvenile brown shrimp per acre (Table 1). In 60 days, when the pond was drained, the shrimp had grown, from the near 20 pounds per acre at stocking, to near 80 pounds with a mortality of 26 percent. It seemed that the stocking rate had been high and in August, 12 thousand juvenile white shrimp were introduced into the pond. After 63 days, the white shrimp had increased in weight from 30 to 200 pounds per acre with 14 percent mortality. In March of 1963, the pond was stocked with postlarvae at a rate of 20 thousand per acre. After 75 days, the pond was drained and 145 pounds of brown shrimp per acre were recovered. Mortality was 55 percent. In August, the pond was again stocked with postlarvae. This time the rate was 12,800 per acre.

When, after 62 days, the pond was drained, only 13 percent were white shrimp and the rest brown. The total weight recovered was 771 pounds per acre and the mortality was 38 percent.

It may be concluded from the above that:

1. Pond cultivation of shrimp should be feasible.
2. The best stocking rate for juvenile shrimp is near 12 thousand per acre when no supplemental feed is given. The rate for postlarvae should be higher because of the increased mortality.
3. A return of 76 to 200 pounds per acre can be expected without fertilization or feed.
4. The white shrimp is better suited for pond cultivation than the brown shrimp.

In 1964, four 1/200 acre concrete block ponds were constructed under the laboratory building. The ponds were to be used to determine:

1. If higher rates could be stocked than those in the ¼ acre pond, using supplemental feeds.
2. What feeds would give the best conversion ratios.
3. What feeding rate could best be utilized.

In the summer of 1964, 600 juvenile white shrimp were stocked in each of the four ponds. This is a rate of 120 thousand per acre. They were fed at rates of one and three percent of their body weights each day. The two feeds used were a pelleted fish pond chow and ground, frozen mullet. In the one percent ponds no growth was indicated after 20 days and the feeding rate was increased to five percent. The pond being fed mullet was not able to utilize the additional feed and was drained after 31 days. The remaining ponds were drained at the end of 48 days. The results are shown in Table 2.

In the summer of 1965, 60 juvenile brown shrimp were stocked in each pond. This rate, 12 thousand per acre, should have resulted in a higher gain than 1964 if crowding was a factor. However, the gain in pounds per acre per day was lower in 1965 than in 1964. This was probably due to the species of shrimp, but shows no relation to crowding. These ponds were drained after 60 days. From the results of this study the following conclusions may be made:

1. Supplemental feeding will increase the carrying capacity of shrimp in ponds.
2. The white shrimp is better suited for pond cultivation than the brown shrimp.

No conclusions have been drawn as to the best feed or feeding rate.

Six, new ¼ acre ponds are presently under construction at our laboratory and should be available for use in spring of 1967. Plans for their use include more basic productivity, further work on stocking rates, fertilization and feeding, and use of non-competitive supplemental species.

Table 1

POND DATA 1962 and 1963

	1962		1963	
	Spring	Fall	Spring	Fall
Starting Date	4-6	8-22	3-22	8-6
Duration (days)	60	63	75	62
Ending Date	6-5	10-24	6-5	10-7
Stocking Rate/Acre	18,000	12,000	20,000	12,800
Recovered/Acre	13,216	10,352	8,992	7,960
Stocking Weight (lb)/Acre	19.23	29.61	--	--
Recovered (lb)/Acre	79.88	201.48	145.00	76.80
Count Recovered	166	50	62	B-122 W-55
Gain: Pounds/Acre/Day	1.01	2.73	1.93	1.24
Mortality Rate	26.24%	13.73%	55.04%	37.81%
Salinity Range 0/00	23-26	26-35	32-35	23-35
Temperature Range-F	73-90	93-56	59-89	96-80

Table 2 POND FEEDING STUDIES

	1964 - White Shrimp			
Pond	C-1	C-2	C-3	C-4
Number Stocked	600	600	600	600
Number Recovered	476	491	525	528
Mortality, %	20.7	18.2	12.5	12.0
Stocking Weight in Grams	908.7	809.5	826.6	871.3
Recovery Weight in Grams	1301.7	801.6	1029.0	1271.5
Growth Weight in Grams	393.0	--	202.4	400.2
Feeding Rate, %	3	1	1	3
Feed	Pellets	Mullet	Pellets	Mullet
Feed Conversion	4.3	--	7.1	3.8
Gain: Pounds/Acre/Day	3.8	--	1.86	3.67

	1965 - Brown Shrimp			
Pond	C-1	C-2	C-3	C-4
Number Stocked	60	60	60	60
Number Recovered	52	54	55	56
Mortality, %	13	10	8	7
Stocking Weight in Grams	105	66	110	69
Recovery Weight in Grams	217	235	185	191
Growth Weight in Grams	112	179	75	122
Feeding Rate, %	5	10	5	10
Feed	Pellets	Pellets	Pellets	Pellets
Feed Conversion	4.3	5.6	5.8	6.0
Gain: Pounds/Acre/Day	0.82	1.32	0.55	0.89

(end)

APPENDIX 4

EXPLORATORY CLAM RESEARCH IN FLORIDA WATERS: SUMMARY

Edwin A. Joyce, Jr.
Florida Board of Conservation

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 20, 1966

The Florida Board of Conservation has for many years been interested in the commercial clam potential in the large shallow water estuaries of the state. Consequently, from December, 1964 through June, 1965, a preliminary survey on the hard clam (Mercenaria campechiensis) and the surf clam (Spisula solidissima similis) populations in the Tampa Bay area was conducted. The purpose of this study was to locate the areas of heaviest clam concentration and to see if a correlation existed between bottom sediments and clam abundance.

Results of this study indicate that there may be a commercial clam potential especially in the lower sections of Tampa Bay and Boca Ciega Bay. Very little correlation was found between the occurrence of clams and bottom sediments; however, the largest populations usually occurred in areas covered with seagrass or where the bottom was comprised of larger particles.

This preliminary study paved the way to the submitting of a project proposal to the federal government to study the hard and surf clam potential of several Florida bays, utilizing commercial hydraulic clam gear. This project was accepted and will be subsidized by the federal government on a 50/50 basis under Public Law 88-309. Preparations are now underway to purchase and/or construct the boat and gear which will be patterned after the commercial conveyor dredges now in use in the Great South Bay off Long Island. This project will run for at least three years and will cost approximately $30,000 per year.

These hydraulic conveyor dredges are limited to a working depth of twelve to fifteen feet or less. Consequently, the study will be limited to these depths. However, the vessel will be designed so that a complete change of gear will be relatively easy, and if results warrant, some later work will be done using the Nantucket type hydraulic dredge. This gear is capable of commercial production in 100-foot depths or more.

The Florida Board of Conservation is also engaged in a two-year systematic sampling program called "Project Hourglass." A major

part of these samples consists of trynet and dredge tows taken in 20, 60, 120, 180 and 240-foot depths off Egmont Key and Sanibel Island. These ten stations are sampled once each month and temperature, salinity and other hydrological data are recorded.

These samples are providing some very interesting data on the occurrence and abundance of some species of clams which are not now being utilized commercially. Most of these are taken in the 20 and 60-Foot stations and the most promising species are Macrocallista maculata, Noetia ponderosa, and Aequipecten gibbus.

(end)

APPENDIX 5

FEDERAL AND STATE COOPERATION AMONG THE GULF STATES THROUGH PUBLIC LAW 88-309

Seton H. Thompson
Regional Director, Bureau of Commercial Fisheries

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 20, 1966

The Commercial Fisheries Research and Development Act of 1964 was enacted to promote commercial fishery research and development by the states. It authorizes and directs the Secretary of the Interior or cooperate with the state conservation agencies in carrying out projects for these purposes. Probably most important of all, it makes federal funds available to supplement and increase available state funds.

This is the most recent effort to make the state and federal conservation agencies full partners in the development and proper utilization of our fishery resources. It is something we both asked Congress to do, and in the Gulf States the results have been most rewarding.

The need for cooperation between federal and state fishery agencies in the Gulf was first formally recognized by the Act of Congress that created this Commission in 1949. That Act requires the Fish and Wildlife Service, in its designated capacity as the primary research agency of the Commission, to cooperate with the research agencies in each state. Before that, such cooperation was largely on a person-to-person basis. Since then, I believe I am correct in saying all of our work in the Gulf -- biological and technological research, exploratory fishing, gear development, statistics, marketing, etc.-- has been responsive to recommendations and resolutions of the Commission.

There is a fundamental difference between the cooperation authorized in 1949 and that authorized in 1964. Under the former, programs recommended by the Commission, when funded, were federal programs, carried out by federal employees. Such programs are always in competition with a multitude of other programs, fisheries and otherwise, for the federal dollar, and too often they have to be started at less than the optimum level, or even be deferred. By contrast, the programs under the Commercial Fisheries Research and Development Act are state programs, carried out by state personnel. Inevitably, this will develop stronger, better staffed and better equipped state agencies to handle the problems of the rapidly growing fishing industry in the Gulf. Already, in less than two years,

27 technical specialists have been added to the rolls of the fishery agencies of the Gulf States, and a number of additional professional staff members are being recruited.

These state programs must, of course, be designed to ultimately improve the domestic fishing industry, as the Act requires -- improve the productivity of the fisherman or the processor; expedite diversification of the existing industry or establishment of new industry; or lead to increased comsumption of domestic fishery products.

We in the Bureau of Commercial Fisheries review these proposals to be sure these and other requirements are met. We have two men giving their full time to this activity and, through frequent meetings and frank discussions, there has been a minimum of false starts and unnecessary work. We want to keep it that way.

I said earlier the results of this federal aid program in the Gulf have been rewarding. The five Gulf States have obligated $1,408,389, or approximately 75 per cent of the federal funds allocated to them since July 1, 1965. This amount, matched by state funds, is financing 18 projects representing new efforts which otherwise would not have been undertaken for some time because of financial limitations.

The approved projects cover a broad spectrum. They include eight biological research projects concerned with shrimp, oysters, clams, and environmental studies; five development projects for planting oyster cultch, marketing seafoods, and placing boundary monuments on state lands leased for oyster culture; four construction projects providing for an experiment station, research ponds, a vessel, and public landing facilities; and there is one coordination project.

The Gulf States are also utilizing their federal aid funds to participate in two cooperative efforts. The first is an inventory of Gulf of Mexico estuaries -- their general description, hydrology, biology, and sedimentology. Work has started, and the resulting data will be incorporated into an atlas. This overall cooperative effort is being coordinated by the Estuarine Technical Coordinating Committee of this Commission.

The second cooperative project is production of an audio-video film to illustrate the relation and importance of estuaries to our commercial fishery resources. All five states of the Commission and the Bureau are sharing the cost of this undertaking. The film will be produced under contract with a commercial film agency. The Bureau will be responsible for supervising production, and distributing films through its nation-wide film libraries. Also,

each state will have a number of copies of the film for distribution. This will be a signficant educational tool with which to acquaint the public with the danger to these valuable inshore areas from pollution, land development, and engineering projects.

We consider these cooperative projects two of the most important in our Region. They could not be accomplished in any other way. Aside from their individual importance, a precedent has been set for similar endeavors in the future.

Already we are noting benefits from the PL 88-309 program in the Gulf States, even though the majority of the projects have not been active for a full year. I will briefly mention some of the more outstanding results:

Texas has collected, and continues to collect, data which will be used to evaluate the effects of the estuarine engineering projects.

Louisiana has planted 36,000 cubic yards of shell for oyster cultch, and repdrts a successful spat set of 80 per cent. Louisiana also has established a district set up for biologists, and this year has systematically collected information regarding shrimp movement throughout the delta in relation to environmental conditions.

Mississippi has initiated an estuarine research project, and during the past season collected valuable information while maintaining surveillance on shrimp populations.

Alabama has developed an initial design for three dimensional oyster culture rafts, and has successfully planted 36,000 cubic yards of shells for oyster cultch.

Florida has experienced success with a seafood marketing project to an extent that states in other areas are interested in initiating similar projects.

Other projects also are progressing well in all of the Gulf States, and will soon provide knowledge, facilities, and management tools needed for the enhancement and proper utilization of our commercial fisheries.

All in all, the success we have experienced with the PL 88-309 program has been due to the high degree of interest, enthusiasm, and cooperation with which the Gulf States have received the program. We are looking forward to a continuation of this fine relationship.

(end)

APPENDIX 6

MARKETING PROMOTION IN FLORIDA FOR SEAFOOD

Hon. Randolph Hodges, Director; and,
Harmon W. Shields, Director, Division of Marketing
Florida Board of Conservation

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 20, 1966

COMMISSIONER HODGES:

Ladies and gentlemen, it might appear to you when you first glance at the program that the State of Florida is trying to monopolize the program here today, but I assure you that this is not true. It just so happens that we are so full of enthusiasm over our programs, particularly our marketing and our research programs, that we just don't miss an opportunity to shove ourselves in on anybody's program if they will give us half a chance.

I am going to be very brief in my remarks, and then I am going to ask Harmon Shields, our Director of Marketing, to give you the specifics about the program.

For many years I have felt that the prime responsibility of the Salt Water Fisheries Division of the Board of Conservation of Florida was to afford the leadership for the full development of our salt water fisheries potential, not only commercially but in sportfishing. And, this we are attempting to do through our research department and through our marketing division.

When I was in the Legislature, I felt the need for this type service to the industry and to the people, and although I was successful in being a member of the Appropriations Committee in the Senate for several sessions, I was listened to very patiently and I thought very warmly received, but in the end when the Legislature was over, we had no money. So, then in 1964 -- and I might say that due to a very unique form of government which we have in Florida which we think is one of the best -- under our Cabinet System, the governor and the six elected members of the Cabinet serve as the Florida Board of Conservation. They also serve as the Budget Commission, and they hold the purse strings. So, I was able to interest these gentlemen, as members of the Board of Conservation, in a marketing program. Therefore, prior to the enactment of PL 88-309, which has just been described to you, we worked out and negotiated a cooperative agreement with the Bureau of Commercial Fisheries for $15 thousand of state money which the Cabinet sitting as the Budget Commission made available to the Board.

So, we were, you might say, already geared up and ready to go when PL 88-309 was enacted, and I might say that this $15 thousand program which we worked out with Seton and Jack Brawner and others in the Bureau certainly shows benefits, even though it was small.

So, when PL 88-309 was enacted, we were ready to go. We, after much searching, found who we thought was the right man to head up this program, Harmon Shields. It turned out that we were correct. Harmon has done an outstanding job in this, and when he started off he was the only employee in his division, his marketing program. He worked with Jack Brawner and Seton and others down there, and then Buck Byrd came into the picture, and now we have twelve employees in this program. The program is being financed jointly by the state through research money which has been made available by the Legislature, also by the industry who voluntarily agreed to double their license tax and earmark the increase to go into this marketing program.

So, Harmon now has twelve employees; very probably by the end of the year, he will have twenty-one. He has six home economists. And, as Buck says, all of them equally as beautiful as the one you saw here on the slides, and if they can't sell seafood, I just don't believe it can be sold. And, we will have by the end of this year, we will have a program which will total nearly $400 thousand, marketing Southern seafoods. And, I am going to ask Harmon Shields to give you a few of the specifics of this program

Thank you.

MR. SHIELDS:

Thank you, Senator Hodges, and thank you gentlemen for inviting us here to talk and discuss with you and try to bring you up to date on our Marketing Program in Florida.

Buck Byrd did a splendid job of outlining the program and telling you a little bit about it. The Senator has given you the history of how it was formed, so I will just take a few minutes of your time to tell you what we have tried to do in the past two years.

Senator Hodges is the first man in the history of Florida, my boss, that really tried to do something for the markets of Florida. The citrus people have a budget of $9 million to sell oranges and the fruits of Florida, and the people of the fishing industry show every ounce of appreciation for this marketing program, because they never had anybody try to do anything for them in markets before. And it makes us feel good.

Back in the start of the program, we began to parallel, and still do, all of our efforts along the lines the federal bureau

has been using for years using home economists, fish marketing specialists, working with the news media, newspapers, radio and television, promotional materials, etc., and we are finding this to be most effective. But, first we caused ourselves to do a small survey to find out just what is the market. What can we do to improve the markets of Florida. What is our competition. What are they doing.

And after observing the food store chains and a lot of the restaurant chains that are moving food in volume, we found that they were not using Southern seafoods. They weren't using our species, they were using fresh-frozen processed goods;portion controls; pretty packages, where the houswife doesn't have to clean any fish. And looking back at home station, we find that all of our fish are shipped in the round, or we are just getting started in the fresh-frozen market, and that's about it, and very few fillets are being processed anywhere in the Southeastern United States.

We looked a little further to our school system, one of the largest markets in the world. Florida, alone, and I am sure other states are equal, feeds 750,000 meals a day, five days a week to our own school children. Every Friday fish is served. We are talking about $30 million worth of fish, and all of this comes from somewhere other than Florida. And then we became quite concerned. Then it made us realize our responsibilities are more than just promotional materials or radio and television, but that we need to work with industry to modify our methods of processing fish and catching fish.

So we have been engaged in helping to develop a filleting machine to fillet mullet and mackerel and other species. We have worked with freeze dry; we have presented it to the national food service organization with the military forces. It has shown good prospects. We have worked with a group of technicians exiled from Cuba that really know their business in canned seafood, and we have successfully helped establish a fish canning plant in Miami, Florida, known as "Florida's Finest Seafood," and Buck has shown you a couple of shots of it. They have processed already since May better than a quarter of a million pounds of fish, and all of it has been sold. Last Friday, we fed the schools of twenty counties in Florida, that's about what we had of the quarter of a million pounds, and it was well received. And we have been successful in some exports to the Congo. We sold some $36 thousand worth. It is in the process of being produced now.

We also have other projects, but the main project at this canning plant -- we are canning mackerel; we have found that we can can it economically, as economically as we can mullet. We can roe, and bonito and all these products have been well received. We have

worked with fish blocks; we found that if we are to be competitive in the world market, we have got to produce a fish block. This is a portion control fish, and this is a hard one. We are doing it by hand and they are in the experimental stages now. We have a filleting machine and we think we are just around the corner from success, and then we will become world competitive. We think we have the rancidity problem licked; our St. Petersburg Laboratory has been putting in full time on this project, and we have come up with about four items and we have stuff that is ten months old now and is still good and not rancid.

We have a good skinning machine that is already in operation. So we feel like we are just on the edge of a big bonanza as far as this world market is concerned with mullet. You know, most of you gentlemen here are technicians. You know that we produced here last year some 35 million pounds of mullet, and we know too that there are about 200 million pounds of mullet that are available for harvest without hurting reproduction. So with the shortage of raw materials throughout the world, and we know of some large companies that are having difficulties supplying the demand that this big source of raw material is being looked at closely, and we are trying to get it ready.

Now as to the marketing program as for our advertisement. As the Senator pointed out, we do have now a staff of twelve people. Six of these are home economists, and they are graduate home economists, well qualified, trained under the federal bureau's direction at the Pascagoula Laboratory and in College Park, Maryland, for both consumer and institutional work, and they are doing cookery demonstrations now throughout the Southeast on up into Washington and Philadelphia and places of this nature. They are doing television shows; they are doing video tapes. We recently sent out video tapes to all the television stations in the Southeastern United States, and two one-minute spots to all radio stations in Florida. And this was well received.

We have established offices in Miami, St. Petersburg, Jacksonville, Pascagoula, Mississippi, Tallahassee, and Atlanta, Georgia, and we are constantly growing in demand for the cookery demonstrations. We try to play the role to chefs and people that can do us the most good, agricultural extension service, etc.

We have a fish marketing specialist working with us now; we have prospects of hiring two more, and we will be hiring two more home economists in the very near future. We are in the process now, just cleared last week, and we are going to build a mullet film, and Mr. Macklow with the federal Bureau will help direct this with Pete Barton of the Florida Development Commission. This contract was completed last week, and we are going to try to build a film

that will help glamourize mullet and put it in the place in the market that it should be. It is a delightful fish, and as you know, in a lot of parts of the country it is known as a bait fish. This is not true -- this Florida, Southeastern United States mullet is delicious, and we should take advantage of it.

Now if you can bear with me just a minute, I would like to get some of our promotional materials and show you some of the things we have been trying to create. (Shows promotional materials on oysters, Royal Red Shrimp, Florida mullet, blue crab, and mackerel, including restaurant placemats, posters, bumper strips, menus, table tents, freezer strips for blue crabmeat, recipes, seafood pamphlets, and newspaper articles)

Our funds -- PL 88-309, Florida monies contributed as the Senator said by the industry, themselves, raising their wholesale fish licenses, and a little bit of our shellfish money -- none of the money comes from the General Revenue Fund of Florida, and the PL 88-309 funds helped to pay for transparencies that the food industry, as you are familiar with, love to use as long as somebody does the work for them, and does the layout. Our home economists do this, and we have wide distribution throughout on this.

This covers a lot of our promotional materials, and all of these are available by just writing the Florida Board of Conservation, and during this next coffee break, we will ask you to sample the canned mullet being canned in Miami, Florida, and other items of bonito and roe, and so on.

That pretty well covers our program. We appreciate the cooperation that the federal bureau and other states have given us so far in this program. We would like to be of service to all of you, because if we help promote your species, we help promote Florida's, and we think we can become world competitive.

Thank you, sir.

(end)

APPENDIX 7
1966's SHELL PLANTING FOR OYSTERS

Ted B. Ford
Louisiana Wild Life and Fisheries Commission

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 20, 1966

The fourth major planting of shells for catching oyster spat was completed between May 12 and June 1st in two areas east of the Mississippi River. The two sites, Bay Boudreau in St. Bernard Parish and Black Bay in Plaquemines Parish, lie in the sprawling natural oyster seed grounds area. Each site was carefully selected on the basis of suitable bottom and water conditions as well as their history of good catches; each comprised approximately six hundred acres. The planting rate was 30 cubic yards of selected clam shells per acre, or 18,000 cubic yards at each site. Representatives of the Louisiana Oyster Dealers and Growers Association recommended clam shells and assisted in the selection of the two sites at our request.

Funds for this program came from Public Law 88-309 appropriations and state matching funds. Eighty percent of the cost of the shells will be reimbursed due to the substantial damage to the oyster fishery by Hurricane Betsy, while the remaining twenty percent will be a 50-50 cost-sharing under another phase of the Commercial Fisheries Research and Development Program.

Providing good stocks of seed oysters for planting on leased bottoms in the fall of 1967 seems to be the most effective means of assisting in the recovery of this fishing industry. The planted areas will be closed until September 1, 1967 when the fall season opens, provided satisfactory "sets" of oysters occur and good seed oysters are available. Then, all oysterfishermen will have an equal opportunity to fish for seed.

Spot sampling observations of shell distribution on the bottom were made by diving. Generally satisfactory "spreading" of the shells was obtained by spraying with the high pressure hoses. Additional examinations will be made over the next several months to evaluate the success of this project by determining the percent of catch of young oysters. A more comprehensive report will be given then.

(end)

APPENDIX 8

ADVANTAGES OF INTERSTATE COMPACTS FOR THE FISHING INDUSTRY

Ernest Mitts, Executive Director
Atlantic States Marine Fisheries Commission

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 20, 1966

Mr. Chairman, Commissioners and guests, since I have been a former GSMFC Commissioner, I feel like I am among friends, and it is always a pleasure to come over here and see you people again.

I want to tell you briefly a little bit about our Commission. I am going to be critical of our commission, and if I may without you people thinking I am coming over here trying to tell you how to run yours -- which I am certainly not, I want to tell you some things in my opinion that might be worthwhile for your commissioners to consider for your commission.

I have a real problem. We have fifteen states; they are divided in such a way that we have so many varied interests. We have a North Atlantic Section, Middle Atlantic Section, Chesapeake Bay Section which is only two states -- Maryland and Virginia, and then our South Atlantic Section. So, we do most of our work in sections.

I can remember when I used to sit out there in that auditorium and be very critical of Wayne; I said well this is a sorry program, listening to all these scientists and looking and listening to these grafts and so forth. It looked to me like we could come up with something more interesting. Well, I am here to inform you it is not as simple as it sounds.

To begin with, I think to have a successful interstate compact -- and we have many today, the fisheries are the oldest, and the GSMFC was copies after the Atlantic States which was formed in 1942 -- it is necessary to have your states interested in the compact. I think you are to be congratulated; you have ten commissioners present today, which is good, and four commissioners are represented by proxy. I can remember times in both commissions when it was embarrassing to find enough proxies to call the roll and say you had a quorum present. Realizing that politics are what they are, I can understand that a governor has a friend that he has to appoint to something -- and this is insignificant and would be a good way to get his name in the paper and get him off his back -- but it seems to me that if we were a little more diligent with our governors and with our legislators to see that the people who would take an interest in these compacts were appointed to the commission and be present,

the commissions would be able to function much better. It gives me a lot of heart to see somebody like Virgil Versaggi -- I read your minutes every time even if I don't come to all your meetings -- and I don't think Virgil has missed a meeting and I believe Virgil probably has a financial statement something like Howard Hughes. When a person like that is willing to take the time to come to a meeting like this, I think he is certainly to be congratulated.

Probably the biggest thing in the fisheries business that we have talked about a whole lot today is PL 88-309. There were twenty some-odd bills in the three or four years before this became law; we couldn't even get them out of committee; we were in trouble with the Bureau of the Budget; we were in trouble with the Administration; we were in trouble with the House and the Senate. Our Commission finally sat down with the Bureau of Commercial Fisheries and their legal staff, and after some two months we came up with this particular law, with the approval of the late Congressman Bonner and I would also like to say that the late Congressman from Louisiana, Congressman Thompson, was most helpful. This bill was finally passed; the Gulf States Commission was extremely helpful in this matter, and I think it has probably done more for federal-state cooperation than we have ever had done before in regards to our fisheries. We have come to these meetings, passed resolutions, and they have taken them back to Washington and they write us the form letter that they are sorry -- it is a wonderful program, but they don't have the funds. We are now in a position to help choose the things that we need done and put a little of our money into it.

I am conservative, and I am certainly not for the hand-outs. I am a little concerned, however, since this program is not under the poverty program, that we have to fight every year for additional appropriations. This year the Bureau of the Budget gave us about $2½ million and, of course, we were trying to get close to $5 million. Our Commission appeared in front of the Appropriations Committee, and if the poverty program expands much larger I am sure that we will probably have a more difficult time next time. This program just has some two more years to run -- we lost one year without any money -- so I think we ought to all be thinking about the progress that we have made and with the cooperation of the Bureau, be able to have a good record to show them so that we might continue this program and also get the appropriations the next two times.

So, PL 88-309 was the biggest thing that has probably ever happened to our interstate compacts, and I would like to take my hat off to the Southern Bureau of Commercial Fisheries. Everybody is jealous of Seton, because Seton probably has less problems -- everybody likes Seton; he does a good job, and there is probably not a better diplomat in the Bureau of Commercial Fisheries than Seton Thompson. So, what I am going to say now, Seton, you are

certainly not included in this. I heard a real astute politician one time -- it was a person who was involved in administration -- and he didn't like this particular person. He didn't think he was doing a very good job, but every time you picked up the paper you read where he had him and his wife over for dinner, made all the cocktail parties, and had his arm around him out in public. And, I finally went to him and said, "Well, how in the world can you dislike this person and feel the way you do about him and then put on this outward appearance." He said, "You got to be smart. You have got to know what he is thinking." And I think that is the way with the Bureau; I think that you ought to insist that they send some of their top brass down here -- not that we want them to tell us what to do, but we want to know what they are thinking.

When we got our agenda up this year, we were having trouble getting speakers and most of them were out of the country, or this, that and the other. There is a little friendly competition up there between the Commerce Department and the Bureau of Commercial Fisheries on the oceanographic program, so we happened to have a friend in the Commerce Department and we made arrangements to have the Under Secretary of Commerce attend our meeting and maybe even get the new research vessel to come up to Portland for them to look over. Of course, we weren't going to do it, but it did sound good and we shook them all up. The next morning they came up with an under secretary to speak at our meeting; the new Director of the Bureau of Commercial Fisheries was there; the Assistant to the Commissioner was there; Mr. Norris was there, the head of the PL 88-309 program. So, I think that with a little urging, we can get them to our meetings and we have found out that it works real well to sit down and find out how they think about things and how we think, and a lot of progress can be made. So, I think we have got to make a little extra effort maybe to get some of the brass down not to tell us what to do, but to just see what they are thinking about so we can get them on the right wave length.

One of the things that we think is most important in our Commission at the present time is statistics for sportfishing. We have got the Bureau of Sport Fisheries and Wildlife to put in a pilot study on this. Our scientists feel like this is an urgent need. I do think that we might be a little way away from having this come to pass -- as most of you know, we have some political problems as well as scientific problems and money problems in regards to this.

One thing I think that it might be wise for your Commission to look at is that maybe you should only have one meeting a year. In our group, we have one meeting a year; our scientific group meets in between. The By-laws are such that any particular section that

wants to call a meeting for their particular section can do so. This is just a suggestion.

I could understand it would be extremely difficult in a six months' period of time to come up with an interesting agenda. I think that your Director has to keep that in mind. I know they tell me that maybe if we don't get the proper program, we don't have the interest in the Commission, so I think that you might consider that if the commissioners just met once a year, you might be able to come up with better programs and then let your scientific people meet twice a year.

I talked with Dudley several times and I have talked with Walter about some of your administrative problems, and I think that you can find a way that you could streamline that. Your chairman is generally either an administrator or a busy businessman, and he doesn't have time for some of the mechanics that this Commission is still going through.

One of the most important things that I would like to say again is let's get your commissioners interested; let's get them to your meetings; let's see if we can't encourage the governors to appoint people who will take an interest and I think it has been proven in the past even that sometimes he doesn't necessarily have to be a fisherman or even in the fishing industry. I can recall a commissioner from the State of Alabama who was a doctor, and I don't think he missed a meeting and he took a very active part in it.

I think that your Director, your chairman, and whoever it takes, should make an extra effort to see that all of your commissioners are present. I think that all of your commissioners should have an opportunity before each meeting to suggest items for the program that he might think interesting. I think that we should take our hats off to our biologists -- some ten or eleven or twelve years ago, everybody was scared of them -- I think they have done an outstanding job. They have gotten more practical, so I can even understand some of the things they talk about now. I think they can have their meetings and make their recommendations to the Commissioners, and get more on the practical side of the situation, such as your marketing program this morning which I think was excellent, and then I think that will, in turn, hold the interest of your commissioners.

I would like to pledge to the Commission any help that we might give in Tallahassee. Mrs. Branan and I, while you are having these trying times and are trying to get straightened out, our Commission will do anything that we can to help. We have a selfish

reason -- we have 192 Congressmen in our fifteen states, and if we take the Congressmen you have in these five states, there is not a bill in the federal government that we can't pass or defeat, and it is very important for you to have the person who can get the job done in Washington, because that is where we are going to have some of our problems. Any way we can help you, I certainly will be more than happy to.

I enjoyed being here. Thank you.

(end)

APPENDIX 9

EIGHT YEARS SINCE THE GENEVA CONFERENCE

William R. Neblett
Executive Director, National Shrimp Congress

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 21, 1966

Scientists interested in heredity can use control groups of white mice to compress into a few years the development of certain factors over many generations. The opposite extreme is the growth of International Law which, much more than domestic law, lags behind the events of a changing world.

We have to thank the United Nations for a proper forum for nations to come together for the consideration of problems affecting all. In 1950 they established the International Law Commission which sat yearly for eight years and made a number of recommendations which served as a base for the Geneva Conference on Law of the Sea in 1958.

As fisheries people we are interested in the Conventions that were adopted. These were: (1) The Territorial Sea and Contiguous Zone; (2) The regime of the High Seas, (3) The Convention on Fisheries and (4) The Continental Shelf. Each one of these affects U. S. Fisheries in greater or lesser degree. All of these Conventions are in effect, having been ratified by the requisite number of nations, and the U. S. has ratified each one, so we are bound.

This was eight years ago, and for the first five or six years after Geneva, 1958 there was so little ado that even the minimum number of nations needed to ratify had not come forth, except for the Convention on Continental Shelf, where oil and mineral interests predominate. Quite unlike the white mice, the ratification was ponderously deliberate and frustratingly slow. And this eight year advance, in the case of the Convention on Fisheries, means that only 22 nations have ratified. There were 87 nations represented at Geneva in 1958; now the U.N. has about 120 in its membership.

Believe me, an international convention ratified by 22 out of 120 nations is still a strong, forward and positive factor in International Law. Where before there was indecision, now there is decision. Where before there were voids, now there is some criteria; some guidelines.

There is an eruption of interest in this country about this whole field for two reasons: (1) We are made increasingly aware of the exploding population of the earth and the need soon for better sources of food; (2) Our industries need the oil and minerals

from the Shelf. These are matters of sufficient national concern to require new national policy. To the people in the industries affected these are matters of pressing concern and call for exploration and exploitation.

The huge industrial firms of this country are alerted to the new challenge. In two and a half short years, the Marine Technology Society has evolved from an idea to a well-supported reality. Their concern is primarily with the resources of the Shelf, but they are as involved as the fisherman in international law. Besides the marvelous scientific exhibits and technological speeches, at the June meeting of this Society I was privileged to chair the second general afternoon session on "Legal and Social Aspects of Ocean Exploitation," and this is a partial list of the speakers and subjects:

(1) Development of National and International Law for Ocean Activities; Prof. William L. Griffin, Temple University School of Law.
(2) Effects of U.S. Commitments on Ocean Exploitation; Ambassador Arthur H. Dean (who was Head of the U.S. Delegation, Geneva, 1958).
(3) Toward a Political Theory of the Ocean; James W. Oswald, Underseas Division, Westinghouse Corporation.
(4) Risk Incentives for Ocean Exploitation; L. E. Kust, Vice-President and General Tax Counsel for Westinghouse Corporation.
(5) Education and Manpower Requirements for Ocean Exploitation; Dr. H. W. Menard, Office of Science and Technology, Executive Office of the President.

The same morning I had attended the session on "Ocean Environments and Fisheries Engineering," chaired by Dr. Clare P. Idyll, of the Institute of Marine Science, University of Miami, which featured excellent talks by marine scientists.

None of this feverish activity would have occurred without the Geneva Conventions of 1958. Here the Conventions had become the real springboards for the more certain future exploration of the oceans, and the nations of the earth had at least established some guidelines and agreements in 1958 which made this possible.

Recall that over a hundred years ago the vast plains and rugged mountain country of our own nation were conquered by the building of railroads. In like manner we now look to the sea. Recall further that to stimulate education there were established in many states the "land-grant colleges." In similar fashion we now are trying to establish "sea-grant colleges," which can educate and coordinate the personnel for the new sea sciences, which include marine biology, chemical engineering, geology, economics, law and many other activities which we may loosely lump under the title of "Oceanography." There

is great competition and a scramble to enter in and develop this field, in which a few universities have pioneered. Obviously, trained manpower is needed.

In June of this year (1966) the University of Rhode Island scheduled a week-long "Law of the Sea Institute" which had for its primary purpose the review of the 1958 Geneva Conventions, with a view not only to discussing them and noting their use and progress, but also in the critique to suggest some needs for future modifications. At one afternoon session, a report was given by Mr. William C. Herrington, Special Assistant for Fisheries and Wildlife to the Secretary of State, on the Convention on Fisheries and Conservation of Living Resources. We have just lost Mr. Herrington to retirement; he was promoted to Ambassador, which he richly deserved, for he was the architect of this Convention on Fisheries. I followed Mr. Herrington on the program with a capsule paper on "The Conventions on the Territorial Sea and Contiguous Zone, The High Seas, and the Continental Shelf," which is quite a mouthful, as the hardest thing for a lawyer is to condense into a few pages the meaningful millions of words that could be said, and on the opposite side there is danger in oversimplification. I lived again those tense moments in Geneva, 1958, when a group of nations tried in Committee Four to attach shrimp to the Continental Shelf, and where the movant lost on a tie vote, because parliamentary procedure requires that if you make a motion it must carry by at least one vote. But, when you have a small part observing the making of history the most exciting thing that can happen comes afterwards, in observing the development and growth and application of all the theoretical mumbo-jumbo.

Even the literature in this field is limited. Only the international lawyer is interested in reading The International Law Journal, which may well be Greek to the layman. I want to recommend to you two recent books, rather long ones, but preeminent in the field of ocean law of fisheries and written for the layman rather than the lawyer. These are: (1) McDougal and Burke: The Public Order of the Oceans, Yale Univ. Press, and Johnston: The International Law of Fisheries, Yale Univ. Press. Professor Johnston is a Scotsman whose Master's Degree was taken at McGill University, so he has a Canadian slant; and he did his doctoral work at Yale under Professor Myres McDougal, who co-authored the first book I mentioned. Dr. McDougal is also a powerful speaker and at the University of Rhode Island meeting he spoke interestingly and informatively for two hours without notes.

Besides having a Committee on International Law and a Committee on the International Law of Fisheries, the parent body of lawyers, the American Bar Association, now has a Committee on Oceanography, which is a subsection of the Section on Mineral and Natural Resources Law. This new Committee, in co-sponsorship with the University of Southern California, is also sponsoring a Law of the Sea Institute in

Long Beach, May 31-June 3, 1967. Its chairman, Robert B. Krueger of Los Angeles has invited me to participate. This shows that there is quite a shortage of persons familiar with this field. The University of Rhode Island plans to repeat its Institute next summer, and the Marine Technology Society will again present a program next June.

At the Congressional level and in the White House there is recognition and emphasis on Oceanography and now funds are becoming available and our leaders are seeking a proper organization or agency to oversee oceanographic development.

What is our position? With all the power and money and influence of the great industrial corporations massed behind the mineral development of the ocean, fisheries are like the tail wagging the dog. And yet, the fisherman has existed since the beginning of man. Small in number, fishermen have been loud of voice. I have heard congressmen grumble and say: "You fishermen exert an influence far beyond your numbers or the value of your industry." Let me say to you that unless the handful of informed fishery people stay busy and infiltrate all of these meetings and many more I have not mentioned, the fisheries will be lost in the shuffle. The whole future scope and policy of this nation with regard to the oceans is being reshaped and reformed this very minute and it will continue to snowball. Fishing personnel and funds are in scant supply. One of the most effective and hardest working of our people is Dr. Wilbert Chapman of the Van Camp Foundation. He was one of the fishery advisors in Geneva in 1958. Another was George Steele, now with Van Camp, and a relatively young man. Another was Edward Allen an attorney from Seattle, in his late seventies and ready to retire. Another was Milton Brooding, of CalPac, a man of energy but not young. I was the fifth, no longer chicken, and I am bound to no particular firm or corporation, but only to serve the interests of the United States shrimp fishery. Able government people are still available, though we will miss Bill Herrington but the voice from the waterfront is most important. There should also be heard the voices of the state conservation directors. In Washington I am always meeting Walter Kirkness, fisheries director of Alaska, and the conservation directors of the states of Washington, Oregon, California, and New York. I would strongly urge and recommend that those administrators of conservation comprising your Commission, take on the added duty of standing up for fisheries in those circles where the international implications are heavy, such as in matters pertaining to the Continental Shelf, or perhaps, through this Commission funnel the influence of the states constituting this compact into this new field of oceanography, to the end that the needs and future of fisheries shall not be eclipsed or forgotten.

I ask your pardon for departing from the specific theme assigned me, but the urgency of this message has compelled me as the challenge is fresh and the situation cries for a remedy.

We come to a brief summary leading to a conclusion of these remarks. We return to illustrate a few concrete examples of messy situations resolved since Geneva, and to highlight the positive achievement of getting world agreement while admitting that Conventions are far from perfect and in many ways reflected compromises of opposing views.

Geneva 1958 was a real step forward in the Law of the Sea despite the unresolved matters remaining: FIRST, in certain areas it codified existing law and by large majority votes put an end to speculative and argumentative theories; SECOND, it focused attention on other subjects and crystalized thinking to a sharp point by the interaction of opposing theories in debate; THIRD, often where full accord was not reached, it provided some weight of authority by actual votes recorded as greatly in favor of certain premises and opposed to others; FOURTH, the enunciating of principles made it easier for later bilateral and multilateral agreements between nations; FIFTH, it has placed restraints upon nations who would move against the principles enunciated whether or not those nations ratify the respective conventions.

I give you a concrete example of the solution of one "messy" situation. In the last few years the King Crab industry of Alaska developed very rapidly. The Japanese and Soviet fishermen could have destroyed these stocks. It was found upon scientific investigation that the king crab at the harvestable stage is in constant physical association with the Continental Shelf and thus classifiable as a creature of the Shelf, which belongs to the U.S. A twelve-mile fishing zone would not have resolved this problem, but to Alaska it means some $15 to $20 million a year. Incidentally, on behalf of the shrimp industry I have joined with Tuna in opposing the Congressional action which just approved a 12-mile fishing zone. Scientifically it does very little for any existing fishery, while it provides some complications for those adventurous American fishermen who fish off foreign coasts including a substantial part of our shrimp fleet. Please note that the 12-mile legislation as enacted into law denies to the states of the union any control over fisheries beyond the present three-mile limit. How can you have one set of state conservation laws up to three miles and possibly conflicting federal law from 3 to 12, and then international law beyond 12? I say that the states have been double-crossed, as this was just lately added to the bill by amendment. This is another reason for urging more intensive state participation at the national and international level.

The trend around the world is to expand fishery borders. A small nation full of new national pride adds thus to its geography, even if its limited fleets can neither gather the harvest from the sea nor patrol it effectively. The protein available from the sea can feed a world population triple that now existing.

Come with me for a moment into a perfectly selfish, patriotic and nationalistic computation in which I place my country, the United States of America above all other interests, and the welfare of my children's children together with it.

We first admit that there are large resources of unused fish off the coasts of the United States beyond twelve miles and, let us say, in some places up to 100 miles from our coasts. The first hysterical impulse is to protect what we already have and reach out for the adjacent bounty of the sea under the premise, perhaps, that the catch can be made closer to home port. But if we in the United States give way to this impulse, then under international law, we must recognize similar action elsewhere. As you project this picture, the resources of the sea ultimately available to us become really smaller and smaller rather than larger, and we are, in truth, restricting ourselves from future world-wide availability of the sea's protein.

I mourn this short-sighted view and turn back the years to the glorious days of Yankee Clippers which brought us tea from China and whose crews typified the adventurous American spirit of meeting competition and besting it. Now we cringe before the advent of modern fishing fleets from Soviet Russia and Japan which, like our Clippers of old, range far from their home shores to harvest the distant oceans. Is this my country? Are these my countrymen that weep and run to the Congress and cry, "Save me!"

If the scientists are right about the exploding world population and the need for the sea's protein we could be on the threshhold of the Golden Age of Fisheries. With proper national policy and the aggressiveness and technological know-how of our people we can beat any other nation at taking fish anywhere in the world, unless we become a supine party to fencing a small part of this rich pasture, thus sealing off the larger pasture forever, unless later we want to go to the extreme of war, or use the blackjack on less powerful nations to get enough food.

If you follow this analysis and project it into the future, you will see that I am not talking about shrimp which is a fancy food -- a delicacy not measured by tonnage as are other seafoods. We are talking about tons upon tons of fish for direct human consumption; for necessary addition to the feeding of poultry and pigs; for fertilizer for richer land crops. I fervently hope that we will hold

the line at twelve miles and turn our attention to capturing more and more fish wherever they may be.

If I have not used the word "conservation," it is deliberate because there has been some crazy, mixed-up talk this year which has debased the concept of conservation. We should all fight to conserve the living resources of the sea, for the benefit of all mankind but we should face facts like men: Catching fish is exploitation. After they are conserved, the question comes up: Who gets them? If our forecast is that we will need to catch them, let us evolve the best national policy possible for the future.

We already have, in the Geneva Conventions of 1958, fine and noble principles of conservation requiring scientific evidence. It is the power struggle which will continue - who gets the fish!

As a member of a small advisory group I have constantly fought against the convening of any new world conference on fisheries which would concern itself with jurisdiction. Each nation in the United Nations has one vote. Believe me, the Lilliputians that once pinned the giant Gulliver to the ground were pikers compared to what the now nearly 120 nations could do to the United States on the question of fisheries jurisdiction. The inferences were crystal clear at Geneva, 1958.

The Department of Defense has shrugged its shoulders again at fishermen, saying, in effect, that as long as you don't bother the three-mile limit for the territorial sea they can care less what happens to fisheries zones. I say to you, sincerely, that keeping the oceans of the world free for our future fishery needs parallels the national defense policy on keeping the seas open for our warships and airplanes. I say that close to home port we can outfish foreigners because we are close to our base of operations and can do it with smaller boats at less expense. I say that we need to look far ahead and begin now to recapture a higher place in the production of fish and fishery products the world over. The world can be our oyster in this field of operations. The message comes loud and clear to us, eight years after Geneva. We must again go down to the sea in ships. We must quit building fences and push forward to limitless horizons.

(end)

APPENDIX 10
A STATUS REPORT ON THE GULF EXPLORATORY FISHING AND GEAR RESEARCH PROGRAM

Harvey R. Bullis, Jr., Director
Exploratory Fishing and Gear Research Base, BCF

17th Annual Meeting
Gulf States Marine Fisheries Commission
October 21, 1966

Mr. Chairman, Commissioners, ladies and gentlemen, I would like, first, to express my personal appreciation for the most fitting and beautiful tribute paid to the late Dudley Gunn, and I would like to add that I think his presence at these Commission sessions will be with us into the far distant future. I think some very tangible evidence is presented here today, when I see that I am again the last one on the program. Since my first commission meeting in 1951, somehow or other Dudley always managed to put me last on the program, with the rather fine compliment that he was saving one of the best for the last. The real secret though was that he was never really sure what I was going to say, and at the end of these sessions we generally had a reduced audience and he was running fewer risks this way.

Today I would like to very briefly summarize the present status of a number of our exploratory fishing and gear research activities presently in progress at Pascagoula. All of these, with possibly one exception, have been discussed in great detail at the past several meetings of this Commission, so I will attempt to avoid repetition and confine my remarks to an attempt to bring you up to date on the progress that is being made.

Perhaps first and foremost in my mind is the status of the construction of our new exploratory vessel, OREGON II. As you know, at the Commission meeting two years ago, we transferred the OREGON out of the Gulf of Mexico to the South Atlantic Coast when it became certain that we would have construction funds for a new exploratory fishing vessel. In 1964, we presented the specifications and plans and mission for this vessel to the Commission with the hope that within two years the vessel would be available and engaged in research in the Gulf. Things didn't work quite that fast, but I am very pleased to report that construction started at Ingall Shipyard in Pascagoula last August. The shipyard insists that construction is on schedule; fabrication is about 65% complete and about 30% of the vessel has been assembled. Launching is scheduled for this coming February, and delivery of the vessel is scheduled for May. Hopefully, if funds materialize for final outfitting, at about this time next year we will be completing our shake-down cruise and the vessel will

be engaged in exploratory fishing and gear research missions in the Gulf of Mexico.

At the next meeting of this Commission, we would like to present an outline of the work plan and operational schedule that is being developed for OREGON II.

This two-year period, awaiting delivery of OREGON II, has provided a most unusual opportunity for our program. Most research programs, in fact all research programs, are usually caught in the treadmill of once having started something, you can never really stop and take a good close look at what you are doing; there is little time for reflection, very little time for cross-analysis. We have had two extremely profitable years; we have been able to take advantage of the tremendous backlog of data, data that was associated; secondary data collected during the course of our surveys. We have had a chance to get into the unfinished manuscript pile. At the 1964 meeting, I think we estimated that we had approximately 100 manuscripts on the fauna and resource potential of the Gulf and Caribbean area sitting in file drawers, on desks, that we just didn't have time to get out and complete. In this respect, I think we have made some pretty good progress. Since the 1964 meeting, thirty-six of these have been published; we have twenty-nine more awaiting publication, and the final twenty-five are nearing completion, so I think that we are going to come out with our anticipated publication of past data just about the time we take delivery of our new vessel.

At the time, two years ago when we made this request to terminate active field programs in the Gulf until the delivery of OREGON II, we promised the Commission that in two years, we would prepare the Gulfwide summary of our total exploratory fishing effort over the preceding fifteen years. I am quite sorry to report that it didn't quite work out that way. The tremendously wide scope of our data just presented problems and analyses that we are coming to grips with at the present time; this is partly due to the fact that exploratory fishing data just isn't gathered in a way that lends itself to standardized analytical methods. A major accomplishment though has been achieved in taking all of the fishing data for this period and putting it on to automatic data processing cards. This fauna library of the Gulf and Caribbean area now represents approximately 300,000 distributional records of fish and shellfish from about 14,000 different localities. The data has been reduced to different standard values, catch per unit of effort value, and has provided an extremely useful consulting library not only to the scientific community interested in the Gulf and Caribbean region, but I would say, even more so to the fishing industry, itself.

One of the unanticipated workloads that we have handled over the past two years has been the expanding interest in the U.S. fishing industry of the Southeastern United States area in moving fishing operations beyond the territorial limits of the United States, much in keeping with the comments that Bill Neblett made just a few minutes ago. I would say in general terms that we are now handling about 300 individual consultations per year with members of our fish meal industry, shrimping industry, and other industry members from the United States.

Some of these requests are quite simple to handle; some of them are merely running tabulations of records and turning them over to fishermen for their own interpretation, but just looking at our correspondence files for the past three months, we can see that we are actively engaged in consulting, advising U.S. industry members that have interest in or are working in the general proximity of Guiana, Surinam, Trinidad, Barbados, Brazil, Venezuela, Columbia and Panama. Also, we have U.S. fishing interests moving down into Puerto Rico, setting up substations, processing plants, marketing outlets. We have devoted almost an unbearable amount of time to providing consultation on vessel design, gear design, and giving some guidance in fishing techniques, fishing operations. We are in the process of attempting to take our faunal data that has a direct bearing on the resource potential of the Gulf and Caribbean area and converting this into what we are calling maximum instantaneous yield models. Now this is perhaps about the biggest departure from the concept of maximum sustained yield that you can think of, but when you are dealing with the assessment of an unutilized resource, why do you come to grips with what the yield potential is? We have just thrown in the towel on the problem, and when you see that the menhaden industry can be studied for fifteen or twenty years before we start getting a good picture of the potential sustained yield, we have come to the realization that exploratory fishing is not going to give this type of a picture. So what we are trying to do is organize our data to show where a resource can be exploited in time and space on a monthly basis, presenting the maximum expected yield as based on our exploratory fishing data.

Six years ago, we announced to the Commission that we were embarking on a research project that was concerned with the development of electrical shrimp trawls. The objective of this project was to develop shrimp fishing gear that would permit daytime fishing for brown and pink shrimp which, of course, meant that around-the-clock fishing operations could be carried out by the major segment of our shrimp fleet. The progress report was presented to the GSMFC about a year ago by Norman Pease. I am extremely pleased to report that this research is now reaching terminal stage. We have conducted all of the field experiments and field tests, laboratory tests that we feel are necessary to turn out a useful prototype electrical

shrimp trawl. The three final cruises to test the prototype unit will be completed by December. The first two of these are already completed; the first was in the North-Central Gulf area and was conducted late this summer, and we were able to achieve catch rates on brown shrimp of about 109% during the daytime of what a standard trawl could catch at night. Statistically, 109% is not a significant figure to look to; what is significant is that we could more or less get comparable catch rates in the daytime to what could be achieved at night. Our second cruise was in the Northwest Gulf area, recently completed; here we were able to achieve an average of 96% catch rates during the daytime. The big proof of the gear, we feel, is going to be in the Dry Tortugas area and the GEORGE M. BOWERS is on the way to this area today. We feel that if the tests prove out in the Dry Tortugas area anywhere nearly as well as they did in the sand and mud areas off Texas and the muddy areas off the Louisiana and Mississippi coasts, we will have an extremely versatile electrical shrimp trawling system almost in shape to be immediately adopted by shrimp fishermen.

We have attempted to project the impact of this type of radical new gear on the fishing industry, and really gave up the job. I think that many questions must be answered which we cannot answer at this time: How much one of these units can be produced commercially still remains to be seen. I think industry acceptance is going to be a vital factor in not only how soon electrical shrimp trawling will come into being, but whether it is ever truly an economically feasible innovation in fishing techniques. The advantages of around-the-clock operations, I think, are very encouraging, and the potential size selectivity of electric shrimp trawl is going to be a very important consideration. Perhaps at the next meeting we will have a final report also to present to the Commission on just exactly what these shrimp trawls are capable of doing.

We have two associated shrimp gear efficiency studies in progress at the present time dealing with tickler chain design and efficiency, and trawl door efficiency. Both of these projects were started some time ago. The progress has been very slow due to the priority given to the completion of the electrical trawl system, so we have nothing special to report on these at the present time. This project which was anticipated to take four years actually is also behind schedule, largely due to the fact that halfway through the research necessary to obtain the background behavior information, the industry hired our entire staff to work on the problem in industry. So it was necessary to stop for a year and reassemble another staff, and this is the reason for our rather tardy completion of this project.

As the major effort on the electrical shrimp trawl work is phased out, we hope to move into a very intensive program -- five year program -- on stock assessments and harvesting methods of Gulf anchovies, sardines and herring-like school fishes. The program

has already been rough drafted and submitted through channels within the Bureau; we hope to have this out in at least minimal form as soon as we get further information on budget allocations next year, but in essence, the concept of this program is to run a two-phase research project, the first phase dealing with a more detailed assessment of the potential of anchovies, sardines, thread herring and other industrial species, schooling species; and the second is to work on improved harvesting methods and the introduction of harvesting methods from other parts of the world that might be successful in commercial exploitation in the Gulf. Our survey methods will include, and we have already started this phase of the work, high altitude aerial photo reconnaissance of the Gulf. The first step in this project is one of fish school identification and school quantification. Is there some way that we can, shall we say, fly two or three or five or ten transepts of the Gulf weekly or monthly; obtain serial aerial photographs and provide some form of documentation on the daily, weekly, monthly, seasonal changes, appearances, and disappearances of surface schooling fishes. This will have a direct bearing on how we can direct our research in harvesting them.

We also, throughout the Bureau, are conducting preliminary studies on the effective uses of sonar in fish school identification. This project will also get underway next year.

From the standpoint of harvesting, we are already doing preliminary experiments on light attraction, and very likely we will put heavy emphasis on this over the next five years. Now we have had extremely promising results so far. We have found that as many as 30 or 40 very important commercial species are readily attracted to light at night under certain conditions, at least, and with this as a starting point, we hope to move into the field of electrical fishing. More or less the big picture would be the attraction of fish at night to the vessel with lights, the control of their behavior through electrical fields to pumps for direct harvesting by large fish pumps. We have tested out scale models of this concept in recent Caribbean cruises where we have had ideal water conditions and could observe fish behavior, and again we have achieved very promising results, and we think this is going to be an extremely promising area of research as far as the utilization of many of these Gulf species is concerned.

In summary I would like to reflect on a few aspects of the fishery development of the Gulf of Mexico. My first contact with this Commission was in the spring meeting of 1951 held in Pensacola. Loaded with enthusiasm after about six months of exploratory fishing experience on the OREGON, I participated in a panel discussion on the resource potential of the Gulf of Mexico, and my rather enthusiastic presentation was followed by a most ominous speech that informed us that the Gulf lacked the necessary nutrients to provide any hope for a major fishery expansion. And, this was the prophetic statement

that made the headlines, and this was the statement that we all go back to so many times when we review recent developments in the Gulf of Mexico. Unfortunately, I was sitting there with virtually no contradictory evidence and I suffered through it. I would say the situation has changed measurably in these fifteen years; I'd say now we have a lot of contradictory evidence. First, we can look back say at a thirty-year history of our national fisheries, and have found that United States fisheries have expanded perhaps about 150% in the past thirty years. Out of this expansion, the Gulf alone, according to my calculations, has supplied well over 50% of the total expansion, and of the Gulf expansion about 90% of the increase can be attributed to the exploitation of species not fished commercially in the mid 1930's. The Gulf menhaden was not fished before 1939 and now yields 400 to 500 thousand tons per year. The pink and brown shrimp, which furnish over 60% of our total shrimp landings, were virtually unutilized until the late 1940's, and the industrial bottom fish, the spots and other Sciaenids are presently yielding some 40 to 45 thousand tons per year from very, very small fishing grounds.

There seems to be little room for argument that the direction of the expansion of Gulf fisheries is the development of our great and unutilized fishery resource potential. In very rough terms, we can now estimate that at best we are extracting no more than 10% of what is available.

At the last meeting of the Commission, Jim Carpenter presented a resume of some of the aspects of this great potential, so there is no need to repeat the details here and resummarize it, except to again emphasize our optimism for a long-range continuation of increased fishery yield in the Gulf of Mexico.

Thank you.

(end)

GULF STATES MARINE FISHERIES COMMISSION
312 Audubon Building
New Orleans, Louisiana 70112

SUGGESTED BUDGET FOR FISCAL YEAR 1966-67

Estimated Income F/Y 1966-67

Alabama	$3,500.00		
Florida	4,500.00		
Louisiana	6,000.00		
Mississippi	1,500.00		Estimated
Texas	6,000.00	$21,500.00	Funds Available
Cash on hand close F/Y 1965-66		7,477.99	$ 28,977.99

EXPENSES

	Budget 1965-66	Spent 1965-66 (Per Audit)	Suggested Budget 1966-67
Salaries	$ 14,000.00	$ 14,000.00	$ 14,000.00
Traveling	1,600.00	937.96	1,800.00
Office rent	1,080.00	1,080.00	1,200.00
Stationery, printing and supplies	400.00	385.10	450.00
Telephone & telegraph	500.00	418.40	550.00
Postage	250.00	210.10	250.00
Electricity	42.00	41.00	50.00
Equipment maintenance	50.00	62.06	75.00
Accounting	250.00	250.00	250.00
Insurance	265.00	269.78	275.00
Meeting expense	650.00	396.10	700.00
Publication expense	570.00	609.40	700.00
Payroll taxes	433.70	366.53	500.00
Depreciation	75.00	69.86	100.00
Sundry	90.00	54.13	100.00
	$20,255.70	$19,150.42	$21,000.00

- -

True Bank Balance, 9/30/66		$14,983.89
Texas dues deposited 10/3/66 . . .	$6,000.00	
Paid 10/12/66 ~~Due (7/1/66)~~ Mississippi	1,500.00	
Due (10/1/66) Alabama	3,500.00	11,000.00
Anticipated funds for 1966-67		$ 25,983.89

Gulf States Marine Fisheries Commission

CHAIRMAN
WALTER O. SHEPPARD
POST OFFICE DRAWER 2139
FORT MYERS, FLORIDA 33902

VICE-CHAIRMAN
JAMES H. SUMMERSGILL
1819 SOUTH BAYOU DRIVE
GOLDEN MEADOW, LOUISIANA
70357

DIRECTOR
W. DUDLEY GUNN

OFFICE SECRETARY
MRS. WALTER B. HOOVER

HEADQUARTERS OFFICE
312 AUDUBON BUILDING
NEW ORLEANS, LOUISIANA 70112
TELEPHONE: 524-1765

New Orleans, Louisiana
Monteleone Hotel
October 20-21, 1966

EXECUTIVE SESSION - OCTOBER 21, 1966

(Commission Chairman Walter O. Sheppard, Presiding)

8:00 AM	BREAKFAST	ROBERT E. LEE ROOM
8:30 AM	BUSINESS SESSION	Minutes Last Meeting Financial Report Budget Future Meetings: Brownsville, March 16-17, 1967 _____ Hotel October 19-20, 1967..Where in Alabama?
	REPORT OF RESOLUTIONS COMMITTEE	
9:00 AM	ELECTION OF OFFICERS	Chairman, State of Louisiana Vice-Chairman, State of Alabama
9:15 AM	SELECTION OF DIRECTOR	
10:00 AM	FINAL GENERAL SESSION	QUEEN ANNE ROOM

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MRS. WALTER B. HOOVER

HEADQUARTERS OFFICE
312 AUDUBON BUILDING
NEW ORLEANS, LOUISIANA 70112
TELEPHONE: 524-1765

October 5, 1966

TO: The Commissioners

FROM: Walter O. Sheppard

SUBJECT: QUARTERLY REPORT - STATES' ACTIVITIES - JUNE THROUGH AUGUST, 1966

ALABAMA: (From George W. Allen)

Oysters: The Alabama oyster season remained open throughout the summer months for the taking of oysters by tongs only. In the past the average number of oyster catchers operating throughout the summer has been around 10 or 15 per day. During this past summer however, the average number of catchers has been from 50 to 75 per day and near the end of August activity expanded to over 100 boats per day on the reef. The average catch during the summer has been around 6 barrels of oysters per catcher. The price has remained high and averaged approximately $6.50 per barrel. The growth rate and density is such that the increment is exceeding the harvest as of this date. As a result it is anticipated that there will be even more oysters available during the fall and winter months.

Shrimp: As anticipated in the last quarterly report the opening of shrimping season was later than usual. The season opened concurrently with that of Mississippi which was June 24. The volume has been relatively low on inside waters but the market has remained very high and stable. Offshore catches and landings have increased in the last year.

Laboratory Activities: The University of Alabama has continued its contract operations which are: 1) estuarine biomass study; 2) snapper reef investigations; 3) oyster reef sampling and; 4) the cooperative project with the U. S. Public Health Service. The PL 88-309 projects are underway but restrictions are being encountered because of personnel limitations.

TEXAS: (From Terrance Leary)

Hydrographic Studies: Continued rainfall during the summer, after heavy spring rains, resulted in moderate amounts of run-off. Flooding, even though relatively less than in the previous quarter, had its greatest effect in early June.

Salinity ranges were generally lower than last year as a result of the influx of fresh water.

QUARTERLY ACTIVITIES (contd)

Texas (contd)

Temperatures generally increased and followed normal seasonal trends. Tides returned to normal after the high tides experienced in May.

Blue Crab Studies: Hard crab landings for the period January-July, 1966, were down 4.5 per cent from 1965 figures. An increase in crab landings was noted in the Matagorda and Aransas districts, but production in the Galveston district declined 240 thousand pounds.

Only three crab processing plants were operating, as compared to four in 1965. The reduction in total landings is mainly attributed to changes in market demand. The frozen crab meat market was flooded with pasteurized crab meat during the spring of 1966, which resulted in a sharp drop in frozen meat prices. Texas operators, unable to compete with larger out-of-state operators, were forced to reduce their frozen meat output and cut operation costs. Thus, a reduction of price (paid to the commercial crabber) and a cutback in total production was induced.

Commercial landings were sampled monthly in Galveston and Matagorda Bays. In Galveston Bay, male crabs composed 75% of the catch in June, 72% in July and 66.5% in August. Mature females were prevalent in the East Matagorda Bay samples until August, when they became scarce throughout the lower bay.

Catch per effort values (expressed as pounds/pot in Galveston Bay compared favorably to those recorded in 1965. A drop in the availability of crabs, especially mature females, was noted in late August. This reduction in availability was most pronounced in the Matagorda area, where catch per effort dropped to about one pound/pot.

The summer wave of juvenile crabs (from spring - summer spawning) was detected in the Aransas area in June and in Matagorda and Galveston Bays in July.

Sampling of the availability and condition of female crabs in the Gulf surf at Galveston was initiated in May. Blue crabs, obtained from beach seiners, were examined for the presence of the parasitic nemertean, Carcinonemertes carcinophilia, which was used as an indicator of the spawning history of the blue crab.

Shrimp Studies:

The abundances of brown (Penaeus aztecus) and white shrimp (P. setiferus) appeared to be reduced from 1965; however brown shrimp were abundant in the early June samples from Aransas and Corpus Christi Bays. The most marked declines were in the samples from the upper coast and the Laguna Madre.

Through July, 1966 shrimp landings were reduced 2.3 million pounds from 1965. This decline was mainly due to low brown shrimp production from Galveston and Matagorda Bays in June and July, and a drop in pink shrimp landings from Campeche. Spring brown shrimp landings increased over 1965 in

Texas (contd)- Shrimp Studies

in San Antonio and Aransas Bays, but poor bait catches were reported from the former. The Galveston Bay bait production (species combined) in June and July decreased 64 thousand pounds from the corresponding months in 1965.

In June fair to good catches of large white shrimp were caught between Cameron, Louisiana and Matagorda Bay. White shrimp catches from the bays were poor in August, but good catches (600 to 700 lbs.) were reported from Corpus Christi Bay. Many trawlers left the Galveston area to fish in Matagorda Bay, but unconfirmed reports were received in early September that the boats were returning to Galveston Bay.

Fall bay shrimping may improve if late white shrimp broods are recruited to the fished population soon. As the quarter ended, evidence of a second large wave was not apparent.

Finfish Studies: Intensive sampling for adult finfish with drag seines was accomplished in Galveston, Aransas, Corpus Christi, and upper Laguna Madre Bay areas. Fish population densities were calculated and some 4,300 fish were tagged and released.

FEDERAL AID PROJECTS:

Estuarine Engineering Studies: A study on the effects of a hurricane levee across the entrances of two small bays was continued. Adult fish populations and water current patterns were monitored.

Gulf Research Vessel: A contract was awarded to a ship building company for construction of a 72 foot steel hull Gulf research vessel. Construction has begun on the vessel, which will be used to monitor commercial fish and shrimp populations off the Texas coast.

Pond Experiment Station: A contract has been negotiated for purchase of a 40 acre tract of land to house a salt water pond experiment station. At the site, on Matagorda Bay near Palacios, a series of ponds will be constructed to provide controlled habitat conditions for fishery research.

Estuarine Film: The Parks and Wildlife Commission has approved this department's joint participation in producing a film on Gulf Coast Estuarines. Approval of the interstate payment arrangements must now be obtained.

MISSISSIPPI

Gulf Coast Research Laboratory (From Gordon Gunter and J. Y. Christmas)

During the Summer Teaching Session five formal courses in marine biology and two in marine geology were taught. Seventy-nine students registered in the formal courses and six students took special problems. Three doctoral and two master students were also registered for thesis courses.

The National Science Foundation Geology Conference for College Professors from thirty institutions was held at the Laboratory as a joint venture of this institution and Millsaps College. These people stayed at the Trade-winds Motel in Biloxi and came and went by chartered bus. The College-High School Institute, which is also a National Science Foundation program in marine science, was held at the Laboratory, with six high school teachers and thirty high school students.

Mr. J. Y. Christmas continued work on the Estuarine Project. Additional equipment acquired during this period included a Gulf V Plankton Sampler, a Direct Reading Balance, and a Goldberg Refractometer. A system for the electronic determination of five hydrographic parameters has been completed. In this sytem, water from various desired depths will be pumped across probes fixed in a glass manifold. Calibration of the system is nearing completion. An extensive search of the literature covering all phases of this project is well underway. This information will be used for comparison of past with current data and for a description of the area involved. Dr. R. B. Channell gave the project staff valuable instruction on the identification of local algae, aquatic grasses and marsh plants. Active sampling has been expanded during this quarter by the establishment of stations in the Pascagoula River system. The Biloxi Bay transect has been extended inland along the Tchouticabouffa River to fresh water.

Mr. Gordon Garwood and Mr. Tom McIlwain investigated one of several fish kills reported in the area. They found a number of dead fish, mostly menhaden, in the Bayou Casotte area. This kill was not extensive and followed a heavy rain. They were not able to investigate the report of a "Jubilee" on the Pascagoula beach, but a number of people were questioned about what happened at Pascagoula. This evidently was not a "Jubilee" like the one for which Mobile Bay is famous. Reports indicate that fish and crabs were actually killed along the Pascagoula beach. It has been reported that discolored water which moved out of the Pascagoula River on a very low tide moved back in toward the beach on the following rising tide and trapped fish and crabs along the beach. The extent of this kill is not know.

The channel to the Laboratory harbor was deepened so as to provide sufficient water depth for the M/B HERMES at most tide stages. A new small boat dock was extended and adjacent bottoms were dredged to provide efficient moorings for Laboratory skiffs and small boats. The old wooden museum area was remodeled so as to provide four new, air-conditioned, research offices in the east end of the building. Construction of the new dormitory and of the shop was continued during the summer. The shop is now virtually completed and the dormitory should be ready in a few months.

MISSISSIPPI (contd)

Mississippi Marine Conservation Commission (From William J. Demoran)

Between June 8 and August 23 the Mississippi Marine Conservation Commission planted 45,195 barrels of oyster shells on the natural reefs in state waters and on new areas where experimental plantings were successful two years ago. Of the shells planted 16,509 barrels were dead reef shells dredged from buried deposits in Mississippi Sound. In spite of high salinities, summer mortality on the outside reefs which could be attributed to drills and other causes were at a minimum.

During the quarter the Mississippi Marine Conservation Commission met with the State Game and Fish Commission for the purpose of re-establishing fresh-salt water jurisdictional lines in the state.

Sport fishing in both inside and outside waters in Mississippi was outstanding during the month of August, with good catches of Channel Bass, Speckle and White trout being taken.

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Louisiana and Florida will be included in the next quarterly report.

cc:Cooperators

GULF STATES MARINE FISHERIES COMMISSION
312 Audubon Building
New Orleans, Louisiana 70112

RESUME OF STATE AND FEDERAL GULF RESEARCH AND EXPLORATORY ACTIVITIES FOR THE PERIOD, OCTOBER 1965 - 1966

This consolidation will not be reviewed or discussed as part of the October 20-21, 1966 Commission meeting at New Orleans, La. However, representatives of the contributing agencies listed below will be available for private consultation regarding their respective activities.

ALABAMA DEPARTMENT OF CONSERVATION

FLORIDA BOARD OF CONSERVATION

LOUISIANA WILD LIFE AND FISHERIES COMMISSION

MISSISSIPPI MARINE CONSERVATION COMMISSION

TEXAS PARKS AND WILDLIFE DEPARTMENT

BUREAU OF SPORT FISHERIES AND WILDLIFE

BUREAU OF COMMERCIAL FISHERIES

(Not a publication - prepared for administrative uses)

A L A B A M A

ALABAMA DEPARTMENT OF CONSERVATION

Laboratory Activities: The incorporation of the Federal Aid to Commercial Fisheries Act, PL 88-309 and its availability as a source of funding for the development of commercial fisheries increased the laboratory program of the Seafoods Division as well as funding certain phases of the shell and oyster planting program. At the present time, we have five active laboratory projects underway. The PL 88-309 projects are: the Cooperative Estuarine Survey, Oyster Raft Investigations, Oyster Pond Construction, and the State financed program consists of Artificial Reef Investigations, and the Population and Ecology Studies of the Mississippi Sound and Mobile Bay Area. In addition to these projects, the laboratory is assisting the U. S. Public Health Service in the collection and sampling of monitoring stations for the determination of pesticide residue, and periodic sampling of the primary oyster reefs for the determination of growth rate and commercial size density determinations.

The laboratory has employed a new director in charge of all laboratory operations, both contract and State operations. Employment and recruitment of personnel is continuing insofar as funding and availability of personnel will permit.

Oyster Production: The reporting period included one of the largest harvests of commercial oysters that has been on record for many years. An excellent crop, together with a high market demand brought production to a 300 percent increase over the past years. For the first time in many years the main producing reefs were in a condition to allow the removal of steam oysters, and the industry profited thereby. In addition to the above, the private oyster growers were able to obtain seed oysters in quantities that enabled them to enter into planting programs at a level that was not possible up to the present. Examinations of the reefs at this time lead us to believe that the population density and general condition of the reefs will allow the Department to repeat the operations for another year.

Shrimp Production: The shrimp landings into Alabama increased considerably over the past reporting period. The development of larger fleets and bigger vessels has enabled the local operators to take advantage of the good off-shore shrimping operations, and the landings have increased proportionately. Inshore shrimping has also been better than normal in that the price has remained high, and the supply, while not exceptionally large, has remained steady. At present the fall run of white shrimp is anticipated to be very good, and should this condition remain, the annual harvest should again establish a new record of production.

Reef Development: The Department of Conservation again increased their planting efforts in both the planting of shell and seed oysters. This year there was planted around 80,000 barrels of seed oysters, together with about 50,000 barrels of shop shell on the public reefs. In addition to this the Department contracted for the planting of 36,000 barrels of dead reef shell in the vicinity of the seed oyster areas. These should provide adequate seed oysters for further planting by both the private lease holders and the Department efforts towards the public reefs.

F L O R I D A

STATE BOARD OF CONSERVATION - MARINE LABORATORY
ST. PETERSBURG, FLORIDA

FISHERIES

Oysters: Work has continued on oyster nutrition and results using finely ground cornmeal have been extremely gratifying. Glycogen content was substantially increased, color was improved, and shell growth was noted.

Additional substances (mostly cereal grains) are also being tested. With a known nutritional factor, other variables may now be measured, and studies are planned to determine temperature and salinity effects and optima.

A study on the occurrence of the marine fungus Dermocystidium marinum in Florida west coast oysters is underway. Oyster mortality from this fungus has seriously affected production in several areas.

Clams: Preliminary studies completed in Tampa Bay have shown a commercial clam potential. Because of the results from this study and the availability of federal funds under PL 88-309 a large scale study of the clam populations of Tampa Bay and other areas has been initiated.

Fish: The studies on age, growth, and reproduction in the red grouper, Epinephelus morio are continuing. Preliminary results show that the red grouper matures as a female in four to five years. Many of these females then become the functional males of the population at eight to fourteen years of age. No males have been found with a standard length of less than 20 inches.

In conjunction with the samples received from Project Hourglass, an ecological analysis of offshore bottom fishes along the lower west coast of Florida is underway. This project will provide indications of population size, growth rate, seasonality and spawning activity of many common bottom fishes.

Also in progress is a report taken from the available literature concerning the spawning times of Florida shore fishes. This will provide a handy reference for summary spawning data of many common species.

The Florida Board of Conservation fish reference collection is still being expanded and fishes are available for loan to any interested scientists. An annotated listing of the specimens in the collection is now available.

Larval Fish: A recent publication has linked the larval forms of the worm eel Myrophis punctatus to the adult. There are several other species of fish beside the eels which have a leptocephalid type of larva, and studies are in progress to link the larval with the adult forms. Manuscripts are currently being prepared on the tarpon, bonefish, and ladyfish.

Fisheries Technology: Experiments are being conducted to find multiple uses for sharks and shark products. Vitamin A from the livers is no longer in demand, but shark hides are still valuable. By finding other commercial uses (fishmeal, fresh meat, etc.) it is hoped that shark fishing may again become a profitable business.

Studies on the production of fishmeal from various fish sources, (scrap fish, waste from filleting operations, shark carcasses, and others) are also underway. If uses can be found for these waste products, this will reduce costs and increase profits for commercial interests.

Different types and methods of handling frozen lisa fillets are being tested with regard to their efficiency in inhibiting rancidity. Objective chemical tests and taste panel judgments are used to determine which methods are preferable.

Invertebrates: The reference invertebrate collection begun in January 1965 is still growing rapidly and now contains over 700 Florida species of mollusks, decapod crustaceans, and echinoderms.

The Hourglass program is the largest contributor to the collection. With this continuing systematic sampling, it is now possible to determine seasonal periodicity, depth ranges, spawning seasons, growth rates, and other biological patterns of many invertebrates. This processing and record keeping now dominates the activities of the invertebrate section.

An additional trawling and trapping cruise is made each month by the R/V Hernan Cortez for the purpose of determining if there is a commercial potential for the shovel-nosed (scyllarid) lobsters off the west coast of Florida. A much clearer picture of the life history of this lobster will also result from this study.

Spiny Lobsters: Spiny lobster studies dealing with larval and postlarval periodicity, habitat preferences, salinity tolerance, age, and growth rates are in progress at the Stuart and Key West field laboratories. Some additional larval examinations have been done recently in St. Petersburg.

Larval Crabs: Studies of the larval stages of the blue crab, stone crab, and related species is continuing. Attempts are being made to raise many of these larvae from the eggs and additional stages are being separated from plankton samples. Detailed information on spawning grounds, spawning periods, growth, migration and natural habitats will be available when this study is completed.

SEAWEEDS

Interest in commercial utilization of seaweeds prompted a preliminary survey of the west coast of Florida for concentrations of these plants. A preliminary report is being prepared.

Samples from the Hourglass cruises are being retained for study.

DRIFT BOTTLE STUDIES

A cooperative study by the Florida Board of Conservation and Woods Hole Oceanographic Institution is in progress. This study is using drift bottles and seabed drifters to obtain additional information on the speed and direction of seasonal currents in the Gulf of Mexico. Such information is necessary for the complete understanding of larval transport.

RED TIDE

Chemistry: Chemical studies to determine the concentrations of iron, phosphate, nitrite, silica, salinity, humic acid, carbohydrates, organic nitrogen, and amino acids in both fresh and salt waters are continuing. It is hoped that some of this information may be correlated with the occurrence of the Red Tide organism Gymnodinium breve. Such a correlation has been found with heavy rainfall, increased iron content in rivers, and increased fresh water runoff.

A comprehensive study of the nutritional, chemical, and physical factors influencing the growth and reproduction of G. breve in the laboratory has also been initiated.

Bioassay of Sea Water for Vitamins: Water samples are also being analyzed for the presence of certain vitamins(B_{12}, Thiamin, Biotin) in an effort to link the presence of these vitamins to blooms of the Red Tide. No such correlation has yet been found.

Dinoflagellates: Studies on the dinoflagellates occurring in conjunction with the Red Tide organism G. breve (also a dinoflagellate) are continuing. To date, over 120 species and 31 genera have been identified.

Diatoms: These important unicellular algae are a major contributor to the primary food chain. Studies are being conducted to determine the species present and to gather data on their abundance and seasonality. This information will be used to determine the possible role of diatoms in relation to outbreaks of Red Tide.

Artificial Cultivation of Phytoplankton: Many of the more common phytoplankters are being cultivated in the laboratory to determine ease of maintenance and nutritional requirements.

RELATED RESPONSIBILITIES

Research Vessel Hernan Cortez: The primary sampling program of the R/V Hernan Cortez is called Project Hourglass, and has been designed to meet the scientific requirements of the Fisheries and Red Tide Divisions of the Marine Laboratory. This program consists of monthly samplings in an offshore area between Ft. Myers and St. Petersburg, out to a depth of 40 fathoms. The same stations are sampled each month and the catch is preserved and brought back to the laboratory for study.

This project is considered one of the most important programs now in progress and is supplying vast quantities of data on hundreds of different

species. From these data we are gathering information on the growth rates, size ranges, spawning periods and areas of seasonal occurrence and abundance of a large number of species, many of which are commercially important, and more of which may become commercially important.

Additional cruises are made during the remainder of the month, involving trapping, trawling or other sampling as requested by laboratory project leaders.

Library: The Florida Board of Conservation Marine Laboratory library continues to expand and now has 762 books, 312 microfilms, 298 sets of microcards, 6400 reprints, and a journal collection of several thousand serial publications.

Survey and Management: The normal work of reviewing coastal projects detrimental or beneficial to marine resources is continuing.

The publication of pamphlets and educational material concerning marine resources is being accelerated, and a wide variety are now available on request.

LOUISIANA'S 1965-66 REPORT WILL BE DISTRIBUTED

WHEN RECEIVED.

(La. #1)

M I S S I S S I P P I

GULF COAST RESEARCH LABORATORY

The 1965-1966 summer classes in marine zoology, botany and geology, and the National Science Foundation program for selected high school students was continued. The proximity of the nearby waters of Mississippi Sound and the Gulf to the classes enable the students to actually see that which they are studying. A Geology Institute for college professors was carried on under the joint sponsorship of Millsaps College and the Laboratory.

Approximately eleven acres of the old Coast Guard station at Point Cadet, Biloxi have been obtained and will be developed as an annex of the GCRL during the coming years.

A conference on oceanographic research was co-sponsored by the Laboratory at the American Embassy in Mexico City to acquaint Mexican scientists and government officials with the research conducted in the central and southern Gulf of Mexico.

The Laboratory is participating in the Pesticide Monitoring Project being conducted by the U. S. Fish and Wildlife Service through various coastal marine laboratories from Maine to Alaska, and is responsible for the collection and preliminary processing of organisms being monitored in our area. The results of these analyses will be used to gather a better idea of the amount of pesticides present in the marine environment and monthly and seasonal variations.

Extensions of the microcosm studies, particularly large scale field tests of phenomena observed in laboratory studies, along with the construction of estuarine ponds for larger studies is underway with funds provided by a Rockefeller Foundation Grant.

Population Studies of Exploited Crustaceans and Fishes in a Northern Gulf of Mexico Estuary with Special Reference to the Effects of Brood Success on Commercial Availability is in progress under Fisheries Research and Development Act of the Congress, Public Law 88-309, Project 2-25-R. Regular collection of data in Mississippi Sound and adjacent waters has been established.

Research projects also under Public Law 88-309 are a Study of Coliform Bacteria and Escherichia coli on Polluted and Unpolluted Oyster Bottoms of Mississippi and a Study of Depuration by Rebedding; and a Study of the Offshore Animals and Plankton of the Gulf of Mexico from Mississippi Sound Out to 50 Fathoms in depth.

MISSISSIPPI MARINE CONSERVATION COMMISSION

Plans were worked out by the commission to insure delivery of all shells owed the commission by the seafood packers and dealers; some dealers have been reluctant to turn over the 50 per cent of shells owed the state in past years.Extensive shell planting and seed oyster moving has been completed. 14,000 barrels of reef shell were planted. These shells were used primarily on new areas where oysters had not grown previously. Early checks on the shells that were planted this summer show some encouraging results. However, it is still too early to determine the success of the plantings, as this can be determined only after the fall set of young oysters.

T E X A S

PARKS AND WILDLIFE DEPARTMENT

HYDROGRAPHIC PROJECT

Hydrographic studies have been conducted continuously in all Texas Bays for the past eight years. Because of increasing emphasis on environmental conditions and the effects these conditions have on coastal fisheries, a separate hydrographic project was initiated in 1965. This project monitors tide, rainfall, runoff, salinity, turbidity,temperature, siltation and habitat modifications affecting nursery areas.

Tide gauge readings were available from only a few of the coastal bay areas: however, both the upper and lower Coast experienced high tides resulting from the autumnal equinox in September. Tides of two to three feet were present for a period of ten days in the Matagorda area. The Corpus Christi Bay area had tides of 1.86 feet above mean low tide in September and the Lower Laguna Madre had tides of 1.30 feet above mean low tide during the same period.

Rainfall varied with each area but generally increased from the lower to the upper Coast. Heavy rainfall was recorded at all coastal bay stations during the spring. Rainfall totals for March, April and May ranged from 21.39 inches in Galveston to 7.38 inches in the Lower Laguna Madre. The heaviest rainfall was during late May.

Flood waters from most rivers reached bay areas in May and some rivers were still at flood level during the first part of June. Turbidities increased throughout the area at this time.

The increased rainfall and heavy runoff during the spring months resulted in the lowest salinity readings, in most areas, since 1960. Upper Galveston Bay, Trinity, Clear Lake and adjacent small bays were virtually fresh during May when the highest salinity recorded in Trinity Bay was 4.1 ppt. Average salinities during the three month period of March through May ranged from 11.6 ppt in Galveston to 33.3 ppt in the Lower Laguna Madre. Matagorda Bay area salinities averaged15.3 ppt, San Antonio Bay was 14.8 ppt, Aransas Bay was 19.2 ppt, the Corpus Christi Bay average was 28.6 ppt, the Upper Laguna Madre was 39.1 ppt, and the Lower Laguna Madre was 33.3 ppt. Salinity samples taken in the Gulf of Mexico during the period of heavy runoff averaged 25.00 ppt off Port Aransas and 30.03 off Port Mansfield.

Water temperatures followed normal seasonal trends. Temperature differences usually averaged from one to four degrees between the upper and lower Coast but at times the gradient was as much as ten degrees, depending on latitude and average depth of individual bay systems.

Nursery area surveys indicate approximately 364 acres were lost in the Aransas Bay area due to dredging operations. The Corpus Christi, Upper Laguna Madre and Lower Laguna Madre area combined had 113 acres of nursery grounds destroyed.

Silt monitoring stations showed some erosion of bay bottoms and in some areas rapid siltation. Vertical filling of 16.5 inches occurred near Padre Island in the Upper Laguna Madre, while the west shore of the Laguna Madre had negligible siltation.

SHRIMP PROJECT

The Shrimp project, now 8 years old, was begun to study the habitat, growth rates, migrations, sizes and seasonal abundances of commercial shrimps in Texas estuaries. Shrimp, for study, are collected systematically with trawls and seines. The findings are used to manage the fishery.

Many important brown shrimp nursery areas on the upper coast were not fully used this spring, because salinities were greatly reduced by excessive fresh water influx. The young shrimp left the altered areas to enter saltier bay regions and began invading the Gulf in late May. The poor conditions of the upper coastal bays, which may have caused heavy shrimp mortalities, plus the below par abundance of shrimp in biological samples was indicative of a poor to mediocre brown shrimp season. However, another wave of small brown shrimp, detected in May, should contribute to the fished population. Commercial landings through July were below the 1965 level and most were caught south of Galveston.

Small white shrimp appeared in the samples late this year and were not abundant. Moderate catches were made early in the fall bay season in Matagorda Bay, but early catches, in general, were poor. Usually, prerecruitment waves of white shrimp enter the bays in September; hence bay shrimping should improve.

Shrimp research and management programs continued. The exchange of new findings and ideas between members of the Gulf States Marine Fisheries Commission has led to a better understanding of shrimp biology, the status of the fishery and management procedures.

CRAB PROJECT

Information of seasonal abundance, growth, movements, and environmental relationships was used to study trends in the blue crab, Callinectes sapidus, population while a survey of the commercial fishery was made to collect information on sizes caught, sex composition, catch per unit of effort, and market conditions.

Fall spawned crabs (8-18mm) were predominant in winter and spring catches, whereas, crab brood from the spring spawning were detected in July-August. The apparent abundance of juvenile crabs in Aransas Bay was at the highest level since sampling began in 1961 and the return of a commercial fishery to this area in the fall of 1966 is anticipated.

Growth studies in Galveston Bay indicated that most crabs will reach commercial size within one year after hatching. Limited growth occurred during winter, but low temperatures appeared to extend the time period between molts and had a greater effect on larger crabs.

Factors related to crab distribution within the bays were studied. Food availability, bottom type, size, sex and season were some of the factors

related to congregation of crabs in certain areas. Studies to provide information of the effects of these factors on the success of reproduction and survival are being planned.

Tagging studies were continued in lower Galveston Bay and adjacent Gulf of Mexico waters. A new phase of study, aimed at determining the fate of spent female crabs was initiated in May.

Semi-monthly quantitative plankton samples taken in gulf passes to major bays were discontinued when analyses of data failed to reveal a clear relationship between the number of megalops entering the bay and the number of juvenile crabs present in nursery areas. Likewise, peaks of spawning could not be deduced from the data.

In 1965, crab landings (3.6 million pounds) increased 56% over 1964, but were one million pounds below the record year, 1962. Crab landings fluctuated with the availability of crabs to the fishery and market conditions.

FIN FISH PROJECT

Greater than normal rainfall and runoff kept salinities down over the entire coast throughout the year. Temperatures were moderate; no severe freezes were noted and no significant fish kills were noted from any causes; natural or man-made.

Juvenile fish samples indicated a generally successful redfish spawn with the first fingerlings appearing in December and continuing in all bay areas throughout the spring months. Flounder, trout and sheepshead spawns were successful, but the black drum spawn appeared to be poor in all areas.

Successful spawns and absence of catastrophic mortalities in recent years have resulted in an abundance of trout, redfish, flounder and sheepshead in most areas. While some sectional and seasonal variations were observed, no serious or permanent shortage of any of these species occurred. Numbers of black drum, however, decreased in some areas and generally declined, coastwide, in abundance.

In the fall of 1965, monthly sampling continued as in previous years but starting with the spring samples in 1966, adult sampling was condensed and intensified in an effort to obtain a more representative picture of the adult fish populations in each bay area.

Other work done under this project during the period included the survey of the Brown Cedar Cut area of Matagorda Bay area to determine the effects of pass opening and closing, the survey of the fish of the inshore waters of the Gulf of Mexico and an ecological survey of St. Charles Bay.

OYSTER PROJECT

Oyster stocks in Aransas, San Antonio, Matagorda and Galveston Bays were monitored through tray stations with emphasis on mortality rates among seed and market oysters. Reef sampling was discontinued in all areas except Galveston Bay.

The moderate to heavy mortalities among oyster stocks observed in most bay areas during 1965 were not repeated in spring and summer 1966. Both

Dermocystidium and "Aransas Bay disease" appeared to be curtailed (at least temporarily) by low salinities resulting from spring flooding. Late summer mortalities, however, increased in Matagorda and Galveston Bays although these were due, in part, to predation by conchs (Thais haemastoma).

Flood waters killed oysters in Tres Palacios Bay and Trinity Bay, but damage to commercial oyster grounds was light. Private lease holders in Trinity Bay suffered heavy losses due to flood waters, and their major sources of transplanting stock, the upper Trinity Bay reefs, were destroyed.

The 1965-66 oyster harvest established a new record. As in past years, most of the oysters were harvested in Galveston Bay with limited production from East Matagorda Bay, upper Lavaca Bay, upper San Antonio Bay, and South Bay. Increased fishing pressure, rather than an increase in market oyster stock, was responsible for the high harvest in Galveston Bay.

GULF PROJECT

White Shrimp of 150-200 mm. were abundant in the shallow Gulf off Port Aransas and Port Mansfield in the late part of August and early September. In May, June and July, 1966 large white shrimp were ripe, but were not abundant.

Small brown shrimp were plentiful from the middle of May through July. At the start of this period, browns of 60 to 100 mm. were taken in depths of less than 8 fathoms. Shrimp of 80-140 mm. were taken at depths of 8-14 fathoms. Toward the end of the period, most brown shrimp were 100 to 140 mm. long. The abundance was the same as in the previous year.

Fewer brown shrimp were caught off Port Mansfield and Port Isabel than in the waters north of this area but the size range was similar in both areas.

Most of the pink shrimp were caught in June. The size range was 80 to 160 mm.

Few commercial blue crabs were caught. Those taken in June and July were all females and over 80 per cent were in sponge. The Gulf blue crab was abundant throughout the year. Large numbers of box, shame-faced and speckled crabs were commonly caught in gill nets set over the inshore reefs off Port Mansfield.

The Atlantic croaker was the most abundant fish taken. Other common fish were the spot croaker, the two sand trout, the bumper and the Gulf whiff. Gill net sets produced a few shark and large hardhead catfish. Trot-line sets were mainly unproductive except for small shark.

Bottom water temperatures varied from a low of 14°C. in February off Port Aransas to 31°C. in August off Port Mansfield. Salinities varied from 29.0 to 36.0 ppt.

ESTUARINE ENGINEERING STUDY

Federal cooperation with the States in research, development, and conservation of fishery resources was provided by the Commercial Research and Development Act of 1964. A portion of the funds are provided for the study of Texas coastal resources.

The purpose of Project 2-12-R is to evaluate the effects of estuarine engineering projects. Research on various alterations, including channel dredging, spoil placement, bulkheading and levee construction, are needed so that recommendations can be made to minimize harmful effects and maintain suitable fisheries habitat.

Study was begun in March, 1966, to determine the effects of the Texas City Hurricane Protection Levee, an earthen sea wall designed to protect low elevation areas from tidal intrusion during storms. In 1964, preliminary work was completed on an extension of the levee across the mouth of Moses Lake, a shallow, low salinity arm of Galveston Bay. Ultimately, the project will be completed by the construction of a navigation channel and hurricane lock. A project is proposed which would extend the levee across Jones Bay, an arm of West Bay. A survey of Jones Bay is being carried out in advance of construction so that conditions before, during, and after construction of the levee can be determined.

PESTICIDE MONITORING PROJECT

This study was initiated to determine the source, amount, and areas of pesticide contamination within some Texas bays. The commercial oyster was used as the indicator organism. Whole oysters were prepared for analysis by electron capture gas liquid chromatography. Analyses were made in a cooperative study with the U. S. Bureau of Commercial Fisheries for the following chlorinated hydrocarbons: Aldrin, BHC, Dieldrin, DDD, DDE, DDT, Endrin, Heptachlor, Heptachlor epoxide, Lindane, and Methoxychlor.

The estimated crop land within each watershed being sampled was determined. Approximate pounds of each pesticide applied per year were determined to pinpoint areas of high application.

It was found that the lower Laguna Madre oysters contained more pesticides than other areas, and the watershed had the most pounds of pesticide applied per acre of cropland. Other areas of high application and contamination were upper San Antonio Bay and Tres Palacios Bay.

It appears that agricultural uses, rather than domestic uses from metropolitan areas, are the main source of pesticide pollution where sampled.

OTHER PROJECTS

Under the Federal Aid to Commercial Fisheries Research and Development Program, the department began construction of a 72 foot steel hull gulf research trawler. The vessel is equipped to trawl to 800 fathoms and will be used to monitor shrimp and fish stocks along the Texas Coast.

Also under the Federal program the department has contracted to purchase a 40 acre tract of land on Matagorda Bay for use as the site of a salt water pond experiment station. A series of ponds will provide controlled environment for fisheries research.

U. S. FISH AND WILDLIFE SERVICE ACTIVITIES

October 1965 - October 1966

BUREAU OF SPORT FISHERIES AND WILDLIFE

Primary activities of the Bureau of Sport Fisheries and Wildlife which are of interest to the Gulf States Marine Fisheries Commission include the status of the marine game fish research laboratory sites and activities conducted under the authority of the Fish and Wildlife Coordination Act.

Panama City, Florida, and Port Aransas, Texas, have been selected as the laboratory sites for marine game fish research. These laboratories are now being designed. Construction funds have been appropriated to cover site preparation which is expected to begin in early 1967. This will involve primarily installation of sea walls and filling.

Activities under the authority of the Fish and Wildlife Coordination Act have continued on public works projects and private Federally-licensed projects through the Regional Director's office, Atlanta, Georgia. Projects of interest include the Central and Southern Florida comprehensive water plan and the comprehensive review report, Mississippi River and Tributaries project. The latter project was authorized by the 1965 Flood Control Act in which Congress did authorize construction of the structures necessary to divert fresh water from the Mississippi River below New Orleans into the coastal marshes.

BUREAU OF COMMERCIAL FISHERIES
(Gulf and South Atlantic Region)
Report to
Gulf States Marine Fisheries Commission
1965-66

Bureau fishery research and services in the Gulf area are directed by the Regional Office at St. Petersburg Beach, Florida. These activities are aligned, insofar as facilities and funds will permit, with recommendations from the Gulf States Marine Fisheries Commission. The needs of the fishing industry in the Gulf are many and varied so that it is often not possible to attend to all aspects of these problems simultaneously. However, the outlook for obtaining more oceanographic information, especially in the western Gulf waters, has been improved by the start of a new program and the assignment of the well-founded oceanographic vessel Geronimo to the Galveston, Texas laboratory. Other general encouragement comes from progress being made on the construction of the new exploratory fishing vessel Oregon II at Ingalls Shipyard, Pascagoula, Mississippi, which will replace the veteran vessel Oregon based at the same city. A summary of all Bureau activities in this region for the year ending September 30, 1966, follows:

GULF OF MEXICO EXPLORATORY FISHING AND GEAR RESEARCH PASCAGOULA, MISSISSIPPI

Since the transfer of the Oregon to St. Simons Island, Georgia, activities of the Gulf exploratory program have been limited mostly to analyzing data and preparing reports. Evaluation of the past 16 years of exploratory fishing data for scheduling Oregon II cruises was continued to fill in gaps in seasonal and geographic coverage. Evaluations of fish trawling effort have now been completed. A manuscript on estimates of the potential yield of fish and shellfish stocks in the Gulf was started. Calculations have been completed for most fish and shellfish categories and the total is in the neighborhood of 20 billion pounds. This estimate of Gulf stocks is about 15 times greater than present production.

Several briefs were completed on unutilized and underutilized fish resources in the Gulf. One such report on alternate resources was presented to the Gulf States Marine Fisheries Commission at the annual spring meeting. Thread herring are considered to be among the most important surface schooling species available. From Bureau shipboard and aerial observational data and from data yielded by commercial trials using conventional gear, the Gulf thread herring stocks alone are estimated at one million tons.

Faunal Survey

The shrimp resources atlas was completed to the point of final editing. This publication, to be the first in a series of resource atlases, summarizes commercial and exploratory data for the three major species of Penaeus in the Gulf of Mexico. Studies on the commercial royal red shrimp (Hymenopenaeus robustus) grounds of the Gulf are presently underway to provide a better understanding of the distribution and abundance of the species. Similar studies and evaluations are being made on the calico scallop (Pecten gibbus) grounds in the southeastern Atlantic.

Recent improvements in ADP make it possible to update data files with new cruise information within 10 days of their completion. This year, 15 exploratory cruises were incorporated into the data file, 8 by the R/V Oregon, and 7 by the R/V George M. Bowers. Studies by base personnel have placed an almost daily demand for data tabulations on the ADP center, creating a maximum level of activity throughout the year. Because of a growing demand for greater sophistication in the treatment of data, contacts have been established for providing statistical treatment of exploratory data outside the base center. The 9-digit bionumeric code in use at Pascagoula to catalog faunal species was presented at the AIBS meetings in Berkeley, California, in December. Although other codes have been theorized and proposed, the Pascagoula system is the only one in use in the taxonomic field.

A total of 10,426 specimens were shipped to cooperating institutions, museums, and individuals this year.

Menhaden

Off-season explorations for menhaden and other clupeoid fishes were conducted for the third consecutive period in the northeastern and eastern Gulf. Operational procedures were similar to previous years in that aerial observations were made along flight tracks between Panama City and the Florida Keys on a monthly basis. Sampling stations were occupied from Tampa Bay to Cape Sable in 2 to 32 fathoms.

Objectives of aerial operations were to search for visible fish schools, measure sea surface temperatures, and collect operational data pertinent to fishing and aerial spotting operations in the area during the off-season period. During the five flights completed, 375 fish schools were observed at 45 stations.

Objectives of the 4 sea operations with the George M. Bowers were to sample fish schools with monofilament gill nets and plankton nets.

A total of 162 stations were occupied during the four cruises. Menhaden were caught along the coast from St. Petersburg Beach to below Cape Romano only in sets made in water depths of 5 fathoms or less. Other clupeoid fishes, e. g., thread herring, scaled sardines, and Spanish sardines, were also caught in this area in water depths of 10 fathoms or less. None of the sampling efforts in deeper waters yielded any clupeoids.

Flight and cruise reports were prepared and distributed after each activity and a summary report of the three years' work is in preparation.

Gear Research and Development

The gear research and development station at Panama City was closed during the year and activities transferred to Pascagoula, Mississippi. This unit has been developing an electro-shrimp trawling system. During the first half of the year, efforts were devoted to recording the reaction of shrimp to varying electrical voltages using underwater cameras. The individual response of nearly 1,000 shrimp was obtained on 16mm color motion picture film by SCUBA divers. Measurements of shrimp reaction made from the resultant movie footage provided data necessary for the design of the trawl's electrical system.

The design and fabrication of the individual components for the system were completed by engineering staff members during the second half of the year. The system is composed of four primary components. These are the power control panel aboard the vessel, an electrical cable which supplies power from the vessel to the trawl, an electronic pulse generator mounted on one of the trawl doors, and an electrode array.

At year's end, there was time for one brief fishing gear trial off the Mississippi coast. During the trial, two 40-foot trawls were dragged simultaneously. One trawl was equipped with the electro-trawling system and the other was equipped with only a single tickler chain. A daytime catch rate of better than 2:1 was achieved by the electrical trawl over the non-electric for the series of drags completed.

BIOLOGICAL LABORATORY
GALVESTON, TEXAS

A Gulf oceanographic program was added last year to the four existing programs. This activity will give greater capability in offshore research and complement information being acquired in current programs.

Shrimp Biology

In December 1965, the field phase of the synoptic study of the

initiated 4 years ago, was terminated. Efforts have since been directed toward analysis of data and formulation of studies designed to answer more specific questions regarding the life histories of the brown, white, and pink shrimp.

Two papers on the seasonal distribution and abundance of larval shrimp, one on the pink shrimp in Florida waters and the other on Penaeus spp. in the northwestern Gulf, were prepared during the past year. Two topics of particular interest discussed were: (1) the apparent direction of larval transport from the Tortugas spawning gounds to the nursery areas, and (2) the possibility of larval and/or postlarval brown shrimp overwintering in offshore waters of the northwestern Gulf.

Both the white shrimp and the seabob were successfully reared to postlarvae from eggs spawned in the laboratory. In addition, mass culture techniques were developed which should permit large numbers of shrimp larvae to be grown for either detailed physiological studies or stocking of enclosed brackish-water ponds for future harvesting.

One year of study has been completed on the feasibility of growing shrimp in ponds under seminatural conditions. In the first experiment, brown shrimp, stocked at an average size of about 1/2 inch total length, grew to approximately 3 inches in 120 days. White shrimp, however, grew to an average length of about 5 inches. In the second experiment, which is still in progress, 4,000 white shrimp spawned and reared to postlarvae in the laboratory have, during a 3-month period in one of our culture ponds, increased in size from 1/2 inch total length to about 4 inches.

In Florida Bay, differences have been observed between catches of juvenile pink shrimp, and associated benthic fauna in the various types of habitats being studied. In addition, a 1-year abundance estimate has been obtained for postlarval pink shrimp entering a part of the bay.

Shrimp Dynamics

The structure of this program was altered during the past year to incorporate a former project, Commercial Catch Sampling, into another project entitled Population Studies. This change marks the end of studies designed to evaluate the accuracy of published shrimp landing data and an expansion of research involving the influences of commercial fishing on shrimp stocks. Work within the Population Studies Project includes investigations of the selectivity of shrimp nets, studies of the seasonal changes in the size composition of shrimp off the central Texas coast, and a detailed investigation of interactions between the Tortugas pink shrimp stock and the commercial fishery.

Improvements in both techniques and equipment have made it possible to conduct mark-recapture experiments involving large numbers of shrimp, thereby increasing the reliability of resulting estimates of shrimp growth and mortality. New equipment includes a large cooling unit to reduce the water temperature in holding tanks, automatic reloading syringes for injecting stain into shrimp, disposal containers for transporting marked shrimp to the sea floor, and light weight holding tanks. Two experiments, involving 7,000 and 12,000 stained shrimp were conducted during the year.

The Postlarval and Juvenile Shrimp Project has had considerable success in efforts to measure the abundance of brown shrimp at the postlarval and juvenile stages and has demonstrated that predictions of commercial harvests are possible. To date, predictions made on the basis of the abundance of postlarvae have been somewhat less reliable than those based on juvenile catches, but the postlarval method has greater potential value because predictions can be made almost 2 months earlier. Emphasis is currently being placed on the development of methods to improve the postlarval index to abundance.

Estuarine

A major purpose of the Estuarine Program is to develop the basic facts needed to document the dependency of fishery resources on estuaries, the specific type of estuarine habitat that is the most productive, and the value of such areas in terms of their production of renewable fishery resources.

From a detailed anaylsis of the bottom sediments, organic distribution and habitats of Galveston Bay, the significant nursery grounds of many estuary-dependent species, including the commercially important white and brown shrimp, are being determined. Not unexpectedly, the peripheral edge of this estuary (exemplified by bordering marshes, small stream or bayou complexes, and protected shorelines) is utilized more extensively by the young of these animals than any other part of the estuary. Unfortunately, such valuable edges are being converted to residential and industrial sites at an alarming rate, causing serious losses of primary nursery habitat.

Technical assistance and participation in field studies with universities, private industry, and state and Federal agencies, is a part of the Bureau's activities. In cooperation with Texas A&M University, the fishery resources of the lower Trinity River Delta were surveyed before the area is inundated by a reservoir.

During the past year, plans were reviewed for 435 projects pro-

over the previous year. Coordination was also initiated with the U.S. Army Corps of Engineers to advise on hurricane protection proposals for the Texas coast. Assistance was given in the development of a format for the Estuarine Atlas being considered by the Estuarine Technical Coordination Committee, Gulf States Marine Fisheries Commission.

Experimental Biology

The Experimental Biology Program continues the investigation of environmental factors on shrimp. Factors studied this year included temperature, salinity, and food.

Postlarval brown shrimp will burrow into a suitable substrate as temperature falls and emerge when the temperature again rises. Postlarval white shrimp did not respond to decreasing temperature in this way. The burrowing response of brown shrimp may help explain the greater cold tolerance of this species as compared to white shrimp. In addition, it points out the requirement for certain bottom types during the time when the young shrimp may be exposed to sudden cold temperatures.

Both short-term survival and month-long growth experiments indicate that postlarval white shrimp tolerate warm temperaturess (above 90°F.) better than do postlarval brown shrimp. These results aid us in explaining differences in distribution patterns of the two species.

The amount of food consumed by young shrimp differs both between individuals and between species. Such studies may enable us to understand how the species compete on the nursery grounds.

Gulf Oceanography

The Gulf Oceanography Program has begun with a modest appropriation. The oceanographic vessel Geronimo has been recently transferred to the Galveston laboratory preparatory to getting this program on a field operating basis, but funding is still a problem. Two oceanographers were placed on the staff and were able to (1) analyze historical oceanographic data and (2) acquire some additional data near shore to fill some gaps in historical information.

In 1958, there was a distinct cooling off of the climate in the northern Gulf. This "deterioration" continued through 1965, during which time the mean annual temperatures were as much as 2.5°C. below normal. This cool period is the longest experienced in the northern Gulf since 1906 when a 9-year "cool spell" ended.

The Caribbean climate warmed at the same time that the Gulf coast cooled. This is not unusual, for the mean annual temperatures in Puerto Rico have been "mirror images" of those in New Orleans since 1900 (the year of first records on the island).

The cool temperatures extended to Key West in 1958 and 1964, but in the other years since 1958, the mean annual temperature there has been at or above normal. Thus, Key West is apparently in the transition zone between the climates of the northern Gulf and northern Caribbean.

The cool annual temperatures have resulted mainly from winters which were colder than usual. February of 1958, for example, had mean temperatures as much as 8° C. below normal (at Mobile).

The cooler air has corresponded with cooler waters in the western Atlantic Ocean since 1960 and, thus, cooler waters in the Gulf. The sea-atmosphere coupling of this system is not yet clear, but is seemingly associated with variations in the intensity of the Bermuda High Pressure System over the central Atlantic Ocean.

The waters which bathe the shrimping grounds of the Gulf, and which make up the significant water mass to depths of 200 meters, originate in the Atlantic Ocean to the east of the Virgin Islands. The water mass (called the Subtropical Underwater) comes into the Caribbean Sea over the Antilles Ridge and through the passage between Puerto Rico and Cuba. It is mixed during its time in the Caribbean Sea with warmer and less-saline waters. Thus, it enters the Gulf through the Yucatan Straits at depths of 150 to 200 meters, with a salinity of 36.7 parts per thousand and a temperature of 22°C.

As the Subtropical Underwater spreads through the Gulf, it is (1) mixed with shelf water and (2) modified by reactions between the sea and the atmosphere. The salinity and temperature are changed, the manner and extent depending on which of the two processes dominate during the period under consideration. Thus, the identification of Subtropical Underwater over the western and northern Gulf shelves is sometimes impossible by measuring only temperature and salinity. (It is hoped that the biologic constituents of the water can be learned so that they may be used to trace the water mass.)

The modifications of the Gulf waters by extreme weather conditions were analyzed from data collected before and after Hurricane Betsy. The investigations of the waters marked the first time in the history of oceanography that precise before-and-after hurricane data were available.

BIOLOGICAL LABORATORY
GULF BREEZE, FLORIDA

Pesticides Research

The evaluation of new pesticides and new formulations of those already in use continues to be a fundamental laboratory project. Tests are conducted under controlled laboratory conditions and, consequently, indicate the relative toxicity of one pesticide to another rather than the actual effect that would take place under field conditions. During the year, approximately 225 tests were conducted. These established acutely toxic levels that would cause damage in 24 to 96 hours. Several chronic toxicity tests are underway in which fish and crabs are exposed to sublethal concentrations for periods of six to nine months to determine what effect this chronic type of pollution might have on economically important species.

Two major projects have been completed and the reports are being prepared for publication. In the first, an inventory of macroscopic animals and plants occurring in the Pensacola Estuary during a 2-year period was made. This establishes current population densities and seasonal variations that can be expected. In the second study, the population dynamics of two common species of fish in the estuary were evaluated over a 2-year period. In both cases, the objective was to document these aspects of the biota while Pensacola Bay is still relatively unpolluted. These data will serve as a foundation in later years for interpreting the importance of man-made changes in the estuarine environment.

The monitoring program initiated last year to determine existing levels of organochlorine pesticide pollution in shellfish populations continues to expand. There are now more than 150 stations on the Atlantic, Pacific, and Gulf coasts where shellfish are collected at 30-day intervals and sent to this laboratory for residue analysis; about 1,200 chromatographic analyses were completed. The program has already been useful in pin-pointing sources of pesticide pollution.

The monitoring program is being expanded now to identify areas in which organophosphorus pollution has affected fish populations. Samples for analysis are being received from eight cooperating agencies on the Atlantic and Gulf coasts.

Residues of DDT are essentially everywhere in the estuarine animals of the Gulf coast. A long-term study of the mechanisms by which this chemical gets into the food web has been started.

A second important aspect of the pesticide pollution problem concerns the subtle effects pesticides may have on animal behavior without causing obvious mortalities. There is concern, for example, that pesticides may alter an animal's reaction to changes in salinity. Such a result could cause drastic changes in the migration patterns of shrimp, crabs, and menhaden, for example. Increased funds provided for the fiscal year beginning in July will permit initiation of research in this critical area.

There are so many areas urgently requiring research on the effects of pesticides on marine animals that the present laboratory facilities are no longer adequate. Consequently, a significant portion of the program now underway is by contract with research staffs at three universities.

The laboratory has continued its policy of making its research data available to other agencies as early as possible. All of the new data are distributed on a provisional basis at the end of each three months period. During the year, progress reports of our research were made by staff members at eight public meetings in the Gulf area. Eleven final project reports were published or approved for publication.

BIOLOGICAL LABORATORY
ST. PETERSBURG BEACH, FLORIDA

Estuarine Ecology

Principal functions of this laboratory center around studies to maintain estuaries. In this respect, there is participation in the Estuarine Technical Coordinating Committee of the Gulf States Marine Fisheries Commission. The principal research areas are currently within the central Florida estuarine complex where biological, hydrological and sedimentological studies are pursued. Resulting data were used to demonstrate the magnitude of the loss of an estuarine fish nursery where conversion to a fresh-water lake is planned. The 11,000-acre area is exceptionally productive of commercial species which constitute Gulf fisheries. Its present and potential values were effectively placed on record with regulatory agencies.

The laboratory cooperated with members of Gulf States research units in planning a Gulf-wide estuarine inventory consisting of four parts; area description, hydrology, sedimentology, and biology. An inventory of the Florida estuaries was initiated in accordance with the generally accepted plan.

Standard codes for biological, physical and chemical data are not available for estuaries on a national scale, although some good

systems have been developed independently at various laboratories. This Bureau laboratory has been working with the National Oceanographic Data Center toward the perfection of an all-inclusive estuarine data system which will become available to interested agencies upon completion.

Research continued in the determination of methods useful in rehabilitating degraded coastal waters. Experiments in the laboratory sea-water system indicate that Thalassia testudinum is the most suitable type of vegetation for reestablishing bottom cover in local denuded areas. Erosion appears to detract from the success of transplantation in bay bottoms. Additional studies were begun in an attempt to provide anchoring methods and to protect transplants from that hazard. Oyster rafts were placed in dead-end canals between dredged real estate sites to determine whether or not they would prove suitable for shellfish cultivation.

Red Tide

In the Bureau of Commercial Fisheries Red Tide Symposium of 1964, one of the eleven proposed research objectives was the isolation and characterization of toxin produced by Gymnodinium breve. The design for a toxin research program was completed, and a contract was awarded the University of South Florida. The first phase--that of culturing a stable supply of the organism--was brought to completion. The second phase of isolating toxin through gas chromatographic methods was initiated.

Staff work with National Oceanographic Data Center (NODC) resulted in an atlas of oceanographic properties in Tampa Bay and adjacent Gulf of Mexico waters. Vertical sections of the date, including G. breve counts, were plotted automatically by the NODC 564-670 CALCOMP plotter. The atlas is nearing publication and is expected to be useful to biologists and oceanographers, particularly those interested in physical and chemical components of eastern Gulf waters.

BIOLOGICAL LABORATORY
BEAUFORT, NORTH CAROLINA

Menhaden

The Gulf menhaden biological research program, which began in 1965, is aimed principally at assessing the species composition and biological characteristics of the commercial catch; determining the magnitude and extent of the fishery; and developing methods for estimating the relative abundance of juvenile menhaden for each year

Systematic sampling of the catch was conducted at several ports throughout the fishing season, and analyses of these data indicate that the bulk of the catch of menhaden in the Gulf of Mexico consists of only one species. Furthermore, scale samples collected from these fish indicate that 1- and 2-year-old fish make up the bulk of the catch.

Commercial fishing effort increased in 1966, both in the number as well as in the size of the fishing vessels. In spite of these additional vessels, the 1966 catch declined significantly compared with 1965. The increase in fishing effort was mainly in the earlier part of the season, but fell off rapidly in August as a number of vessels withdrew because of poor fishing.

Studies to estimate the relative abundance of juvenile menhaden have encountered considerably more difficulties than experienced with similar studies on the Atlantic coast. The young menhaden are very widely dispersed through the vast estuarine area of the Gulf, making adequate sampling difficult. The two methods of estimation currently used are surface trawl catches and estimates from aerial surveys.

Surface trawl data indicated that the 1965 year class of Gulf menhaden was considerably smaller than the abundant 1964 year class. However, estimates of abundance based on aerial surveys did not agree, so no definite conclusions could be reached. In view of the subsequent decline in the commercial catch in 1966, it appears that the trawl catch data were the more representative as to the actual abundance of the 1965 year class.

Preliminary catch data by surface trawl indicate that the 1966 year class is more abundant than 1965, but considerably less abundant than 1964. Aerial surveys will be conducted later in the year to obtain independent estimates of abundance. Effort on estimating juvenile abundance will be increased significantly in the coming year in order to improve the consistency and reliability of the estimates.

Biologists from the Beaufort laboratory participated in exploratory fishing cruises operated from the Pascagoula base to collect menhaden specimens and plankton samples.

TECHNOLOGICAL LABORATORY
PASCAGOULA, MISSISSIPPI

Chemistry

This laboratory is designed as the national headquarters for study of the composition and nutritive value of fish and shellfish. During the

year, special emphasis was placed on studies of amino acid and lipid content of ocean perch, Dungeness crab and croaker. The amino acid pattern was shown to be similar to that of other sources of protein and nutritionally well balanced. Seasonal variations in amount, but not kind, of amino acids present were evident in all of the species studies. A new method developed at the laboratory allows the identification of a large number of compounds present in marine oils that were not identifiable by other techniques. A study of the body oils of the Chesapeake Bay blue crab showed differences in amount and kind of fatty acids in the various oil components. The polyunsaturated character of the body oil was similar to that of other species of fish and shellfish. The new technique for trace mineral analysis - atomic absorption spectrophotometry - has proved an extremely useful and reliable one in the analysis of fish and shellfish. Methods were adapted which allow the determination of nine trace minerals essential to human and animal nutrition normally present in foods in extremely minute amounts. Microbiological procedures for the assay of the quantity of the water soluble vitamins present in fish and shellfish were developed. The completion of the aforementioned methods development studies ends the necessary technique studies and will allow the rapid characterization of the quantity of these components in the species presently under study. The next species to be considered are croaker and mullet.

A second canned shrimp symposium was held to present research finds to the industry. It showed that shrimp blanched in salt, packed at present fill-of-container weights in 75 grain salt brine had the best organoleptic characteristics over a 24-month storage period with the exception of the texture score. A suggestion of improvement in the texture of canned shrimp through the use of added polyphosphate proved helpful in this regard during the first half of an experiment designed to cover a year's period. Work was initiated concerning the effect of various product storage methods upon the connective tissue of shrimp. In this effort to determine best means of retaining product quality, it was necessary to prepare a quantity of pure shrimp collagen for experimental purposes. Shrimp collagen proved to be quite different from that of other marine collagens, particularly in size and sensitivity of the molecule to outside influences.

A continuation of the study of the pesticide residue content of Gulf of Mexico fishery products showed a trend toward seasonal variation in quantity and type of residue present. There appeared to be an increase in the amount of DDT, DDE, and DDD during the early spring months, accompanied by the occasional appearance of small quantities of endrin, dieldrin, and heptachlor epoxide. It was determined, however, that the normal preparation of fishery products for market - i.e., filleting fish, heading shrimp, etc. - would decrease the pesticide residue levels

present by at least a factor of two and at times by a factor as great as ten. Other studies indicated that certain of the residues were decreased during heat processing by a mechanism as yet unknown. Decreases can also be attained by such methods as are employed in oil polishing processes. Controlled laboratory studies on the effect of heat and of phase separation upon the reduction of pesticide residues are now underway.

Microbiology

Results from the Atomic Energy Commission contract-financed survey of the Gulf of Mexico for the presence of Clostridium botulinum Type E revealed the presence of all known types (A-F) in the sampling area. The area concerned extended from Key West, Florida, to Brownsville, Texas. The sampling area did not extend beyond the 10-fathom curve. Attempts to utilize the fluorescent antibody-antigen technique for detection of Type E botulinum to large numbers of sample proved to be inadequate.

Prior to the completion of this work by the Bureau in the Gulf, a second joint venture was entered into, again with AEC, for a similar study to be conducted on the east coast (Staten Island, New York, to Key Largo, Florida). Sample collection and analysis are currently underway on this study.

Also completed during the past year was a study to determine the presence of coliforms, E. coli, coagulase-positive staphylococci, fecal streptococci, and Salmonella on precooked seafoods. Those products examined included shrimp, shrimp creole, and fish sticks and portions. In general, data collected during this investigation reflected a very good bacteriological record for these products.

Processing parameters for fish meal are being scrutinized with regard to heat effect on Salmonella survival. Also receiving attention are the problems of Salmonella survival, detection, enumeration, and thermal inactivation in fish solubles.

The microbiology program has been strengthened by the activation of a project dealing with marine microorganisms and the effects they produce on various fishery products. Many problems relating to product quality improvement may ultimately be solved.

SEAFOOD INSPECTION AND CERTIFICATION

Processing plants under the USDI voluntary inspection program produce a variety of inspected fishery products. Of the 12 plants under

this program in the Gulf and South Atlantic Region, 10 are located in the States of Texas and Florida. Each plant is under the continuous surveillance of a resident inspector to assure production of high quality fishery products which merit the U.S. grade shields. These services are financed by the participating firms and include lot inspection when requested, as well as the continuing inspection. The Commodity Exchange in Chicago requires shrimp traded there to be U.S. grade and many states now have the same requirement for seafoods purchased for institutional use.

RIVER BASIN STUDIES

This program, closely coordinated with the activities of the Bureau of Sport Fisheries and Wildlife, is devoted to problems arising from man's alteration of the marine environment. During the past year, 84 reports were reviewed involving marine resources and several field surveys were made.

STATISTICS

The continuing Bureau program in cooperation with state agencies for collection of detailed shrimp statistics has been adequate to meet research and industry basic needs. Collection of the data on a daily basis permits dual utilization by issuing it in the Market News daily reports as well as having it available for monthly and annual summarizing. Information collected on specific areas from which shrimp catches were taken, and fishing effort expended, has provided state and Federal research agencies with the type of data essential to their scientific programs. Statistics personnel also assisted in a special survey of crew accommodations on selected Gulf fishing vessels. This provided background information for U. S. delegates at the International Labor Conference in Geneva, Switzerland, where a convention for minimum standards for accommodations on fishing vessels was being considered. An analysis of the Gulf statistics was also made to develop patterns of vessel operations in relation to changes which were being sought in the Gulf oil rig light and signal regulations.

The increased use of fishery statistics data in connection with both domestic and international issues requires more effort to better pin-point the areas of capture for major species other than shrimp.

MARKET NEWS

Monthly summaries issued by the New Orleans market news office were terminated at the end of 1965 as a cost reduction and manpower

conservation measure; greater effort will now be expended in establishing a much earlier release date for annual summaries. There were no major changes in the format or content of the daily Fishery Products Reports which were mailed daily to over 1,200 subscribers. Comments from subscribers on the annual recirculariza tion notice indicate that the daily reports are still vital to members of the fishing and allied industries in planning day-to-day and long-range operations.

MARKETING

Excellent results were achieved in increasing the use of fishery products in restaurant chains. Grouper, frozen mullet loins, soft clams, royal red shrimp, canned mullet, and calico scallops were introduced into four restuarant chains, with the smallest chain having more than 30 restaurants.

Special marketing and technical assistance was rendered a group of businessmen in Miami in establishing the first major fish canning plant in Florida. Initially, two products are to be canned --mullet and bonito. Future plans are to also can king mackerel and tuna. Experiments presently are being conducted on the canning of thread herring for possible export. Although this plant is on the Florida east coast, substantial supplies of fish for canning will come from the Gulf.

In the 18-month period ending June 30, 1966, southeastern newspapers having a combined circulation of over 77 million devoted the equivalent of 280 full pages to seafoods using Bureau-produced materials. Bureau films and video tapes were shown 208 and 188 times respectively on television in the same area.

The cooperative market promotional program involving the Florida Board of Conservation, Southeastern Fisheries Association, and the Bureau has been effective in increasing outlets for several seafood products and is continuing.

FEDERAL AID TO STATES

Under the Commercial Fisheries Research and Development Act of 1964, the five Gulf States have obligated $1,408,389 of available Federal funds for 18 projects to date. These projects include eight research projects consisting of studies on shrimp, oysters, clams, and environmental characteristics; five development projects including the planting of oyster cultch, marketing of seafoods, and the placing of oyster lease control structures; four construction projects providing for a coastal fisheries experiment station, research ponds, public landing facilities, and a research vessel; and one coordination project. Four states and the

Bureau are participating in a cooperative Gulf of Mexico estuarine inventory. Also, as a joint effort, five of the Gulf States and the Bureau are producing a film on the value of Gulf of Mexico estuaries. Completion of this film is expected within a year. The Gulf States have now been able to employ and equip technical staffs for the research and development of their marine commercial fisheries resources at a level that was heretofore impossible. The total approved project costs to date, including state matching funds, for the respective Gulf State are as follows: Alabama $109,720; Florida $613,884; Louisiana $725,085 (includes $100,000 under Section 4(b) for commercial fishery disasters caused by Hurricane Betsy); Mississippi $162,113, and Texas $309,792. It is expected that all remaining allocations to the Gulf States now totalling $501,511 will be obligated before July 30, 1967.

FINANCIAL ASSISTANCE

Vessel operators are continuing an active participation in the Bureau's financial assistance programs. To date, 390 applications requesting $12,521,043 have been received from the fishing industry in the Gulf States for all three programs.

The vessel mortgage insurance program highlighted financial activities with 30 applications received requesting $1,738,450 over the past 12 months. Mortgage insurance is designed primarily for financing new vessels, and it provides banks a safe means of making vessel loans with low interest rates and long maturities.

Over the past year, 22 fishery loan applications requesting $739,328 were received. Such loans are granted to commercial fishermen for refinancing vessel debts, repairs and equipment, and purchasing new or used vessels. Applicants must prove that reasonable financing is not otherwise available.

Although 11 applications for vessel subsidies requesting $762,500 have been processed, no subsidy contracts have been executed in the Gulf area. Shipyard bids have been too high, and the subsidies granted have been too low.

With the increasing interest rates and short supply of funds currently being experienced throughout the money market, it appears that industry will find these Federal programs increasingly useful in the future.

PROGRESS REPORT: DEPURATION STUDIES (SLIDES)
Wm. F. Hill, Jr., Deputy Director for Research
Gulf Coast Shellfish Sanitation Research Center
U. S. Public Health Service
Dauphin Island, Alabama

BRIEF SUMMARY: PL 88-309 GULF STATES' PROJECTS TO DATE
I. B. Byrd, Federal Aid Coordinator
Bureau of Commercial Fisheries, Region 2
St. Petersburg Beach, Florida

THE MISSISSIPPI OCEANOGRAPHIC PROGRAM (FILM)
Kirby L. Drennan, Oceanographer
Gulf Coast Research Laboratory
Ocean Springs, Mississippi

ADJOURNMENT

★

Gulf States Marine Fisheries Commission
312 Audubon Building
New Orleans, Louisiana 70112

Commissioners

Order of listing: Administrator, Legislator, Governor's Appointee

Alabama
Claude D. Kelley
L. W. Brannan, Jr.
Vernon K. Shriner

Florida
W. Randolph Hodges
J. Lorenzo Walker
Walter O. Sheppard (Chairman)

Louisiana
Joe D. Hair, Jr.
Spencer G. Todd
James H. Summersgill (Vice-Chairman)

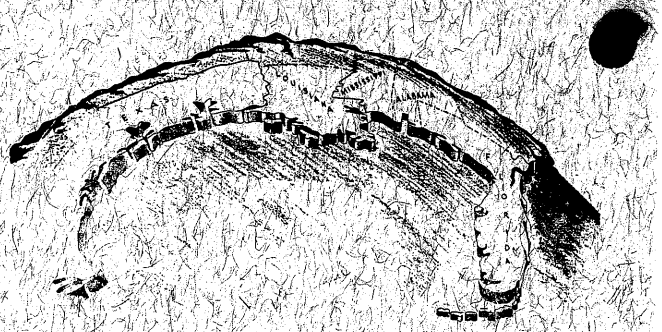
Mississippi
Charles Weems
Ted Millette
Joseph V. Colson

Texas
J. Weldon Watson
Richard H. Cory
Virgil Versaggi

★

W. Dudley Gunn
Director

GULF STATES MARINE FISHERIES COMMISSION

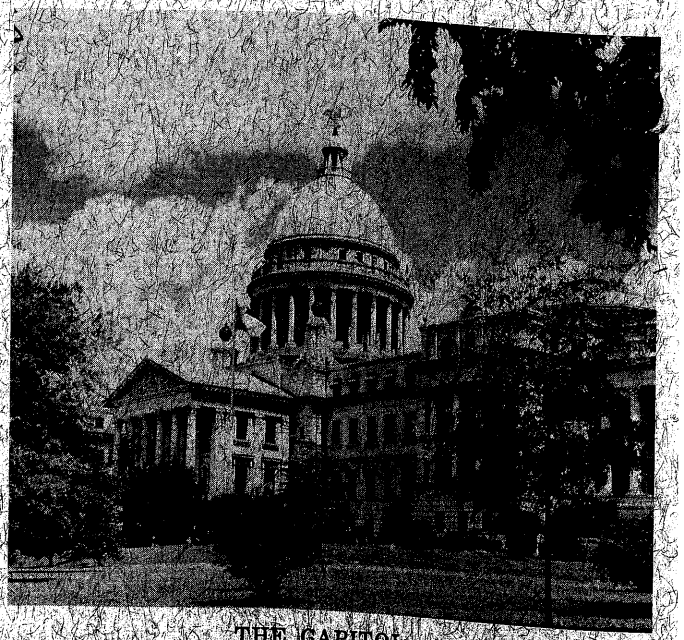


Annual Spring Meeting

THE BROADWATER BEACH HOTEL

Biloxi, Mississippi

March 17 (Thursday) - 18 (Friday), 1966



THE CAPITOL
STATE OF MISSISSIPPI
JACKSON

PROGRAM

(Commission Chairman Walter O. Sheppard, Presiding)

Thursday (March 17)

8:30 - 9:30 AM

REGISTRATION FIRST FLOOR LOBBY

9:30 AM

CALL TO ORDER—GENERAL SESSION
CORONET ROOM

INVOCATION
Father Paul Hession, Pastor
Our Lady of Fatima Parish
Biloxi, Mississippi

ROLL CALL

WELCOME ADDRESS
Gordon Gunter, Director
Gulf Coast Research Laboratory
Ocean Springs, Mississippi

ADDRESS
John S. Gottschalk, Director
Bureau of Sport Fisheries & Wildlife
Washington, D. C.

PROGRAM OF THE RESEARCH AND DEVELOPMENT CENTER
J. R. Peterson, Director
Market Analyses, Industrial Location Division
Research & Development Center
State of Mississippi
Jackson, Mississippi

REVIEW: CURRENT FEDERAL LEGISLATION—GULF FISHERIES
R. T. Whiteleather, Deputy Regional Director
Bureau of Commercial Fisheries, Region 2
St. Petersburg Beach, Florida

RECESS *Fifteen Minutes*

11:15 AM

THE SHRIMP FISHERY OF THE GULF OF MEXICO (GSMFC INFORMATIONAL BULLETIN NO. 3 MATERIAL)

PANEL:
Milton J. Lindner, Director
Biological Laboratory
Bureau of Commercial Fisheries
Galveston, Texas

Lyle S. St. Amant, Assistant Director
Louisiana Wild Life & Fisheries Commission
New Orleans, Louisiana

STATUS OF THE GULF OYSTER FISHERY PANEL:
Robert M. Ingle, Assistant Director
Board of Conservation, State of Florida
Tallahassee, Florida
George W. Allen, Chief
Division of Seafoods
Alabama Department of Conservation
Dauphin Island, Alabama
William J. Demoran, Commissioner
Mississippi Marine Conservation Commission
Biloxi, Mississippi
Theodore B. Ford, Chief
Division of Oysters, Water Bottoms & Seafood
Louisiana Wild Life & Fisheries Commission
New Orleans, Louisiana
Terrance R. Leary, Coastal Fisheries Coordinator
Parks & Wildlife Department, State of Texas
Austin, Texas

12:00 NOON

ADJOURNMENT

1:00 PM

SEAFOOD LUNCHEON
Gulf Coast Research Laboratory Cafeteria

2:30 PM

TOUR OF GULF COAST RESEARCH LABORATORY FACILITIES

4:30 PM

MEETING OF RESOLUTIONS COMMITTEE

Friday (March 18)

7:30 - 9:15 AM

COMMISSION EXECUTIVE SESSION
BREAKFAST CROWN ROOM "A"

9:30 - 12:00 NOON

GENERAL SESSION CORONET ROOM
ALTERNATE RESOURCES FOR GULF INDUSTRIAL FISH PRODUCTION (SLIDES)
James S. Carpenter, Assistant Chief
Gulf Exploratory Fishing Program
Bureau of Commercial Fisheries, Region 2
Pascagoula, Mississippi

UTILIZATION OF ALTERNATE FISHERY RESOURCES (SLIDES)
Travis D. Love, Director
Technological Laboratory
Bureau of Commercial Fisheries
Pascagoula, Mississippi

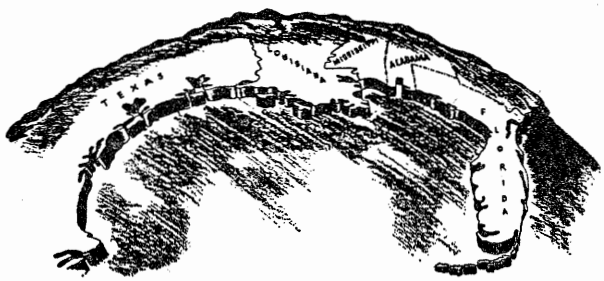
REPORT: GSMFC ESTUARINE TECHNICAL COORDINATING COMMITTEE
Theodore B. Ford (Committee Chairman)

RECESS *Fifteen Minutes*

Gulf States Marine Fisheries Commission

CHAIRMAN
WALTER O. SHEPPARD
POST OFFICE DRAWER 2139
FORT MYERS, FLORIDA 33902

VICE-CHAIRMAN
JAMES H. SUMMERSGILL
1819 SOUTH BAYOU DRIVE
GOLDEN MEADOW, LOUISIANA
70357



DIRECTOR
W. DUDLEY GUNN

OFFICE SECRETARY
MRS. WALTER B. HOOVER

HEADQUARTERS OFFICE
312 AUDUBON BUILDING
NEW ORLEANS, LOUISIANA 7011[illegible]
TELEPHONE: 524-1765

M I N U T E S

REGULAR MEETING

THE BROADWATER BEACH HOTEL

BILOXI, MISSISSIPPI

MARCH 17-18, 1966

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MINUTES, GULF STATES MARINE FISHERIES COMMISSION
REGULAR MEETING, BILOXI, MISSISSIPPI, MARCH 17-18, 1966

GULF STATES MARINE FISHERIES COMMISSION
312 Audubon Building
New Orleans, Louisiana 70112

M I N U T E S

REGULAR MEETING, MARCH 17-18, 1966
THE BROADWATER BEACH HOTEL
Biloxi, Mississippi

OFFICIAL ATTENDANCE OF COMMISSIONERS

	PRESENT	ABSENT
ALABAMA	Vernon K. Shriner	Claude D. Kelley L. W. Brannan, Jr.
FLORIDA	Walter O. Sheppard	W. Randolph Hodges J. Lorenzo Walker
LOUISIANA	James H. Summersgill	Joe D. Hair, Jr. Spencer G. Todd
MISSISSIPPI	Charles Weems Ted Millette Joseph V. Colson	
TEXAS	J. Weldon Watson Richard H. Cory Virgil Versaggi	
PROXIES	George W. Allen Walter O. Sheppard Lyle S. St. Amant	(For Claude D. Kelley) (For J. Lorenzo Walker) (For Joe D. Hair, Jr.)
STAFF	W. Dudley Gunn	

FORMER COMMISSIONERS PRESENT: Will G. Caffey, Jr.

OTHER STATE GOVERNMENT REPRESENTATIVES PRESENT:

George W. Allen, J. G. Broom, Ted Ford, Wilson J. Gaidry, Larry Gillespie, Edwin A. Joyce, Jr., Terrance R. Leary, Woodrow R. Mock, Jr., J.R. Peterson, Harmon W. Shields, C. J. White.

FEDERAL GOVERNMENT REPRESENTATIVES PRESENT:

BUREAU OF COMMERCIAL FISHERIES: I. B. Byrd, James S. Carpenter, Charles R. Chapman, M. J. Lindner, Travis Love, Russell T. Norris, George W. Snow, R. E. Stevenson, James E. Sykes, John R. Thompson, R. T. Whiteleather.

BUREAU OF SPORT FISHERIES & WILDLIFE: John S. Gottschalk, Albert H.Swartz.

COAST GUARD: B. P. Clark.

PUBLIC HEALTH SERVICE: James W. Carpenter, Jack L. Gaines, R. J.Hammerstrom.

REPRESENTATIVES OF INDUSTRY PRESENT:

Millar Brainard,Jr., A. J. Buquet, Albert King, O. M. Longnecker, Jr., Harry I. McGinnis, Kenneth R. McLain, J. S. Ramos, Ted Shepard, Harvey Smith, L. W. Strasburger.

UNIVERSITY REPRESENTATIVES PRESENT:

John L. Bell, Jr., Charles Caillouet, J. Y. Christmas, Allen R. Comeaux, William Demoran, Douglas Farrell, Bennie J. Fontenot, Jr., Gordon Garwood, Gordon Gunter, E. S. Iversen, Ronald H. Kilgen, Thomas D. McIlwain, Walter R. Nelson, William S. Perret, Ernest H. Powell, Jr., Fred Rees, David M. Soileau, N. G. Vick.

CLERGY.....NEWSMEN PRESENT:

Reverend Paul Hession

S. W. Corbino, Winston Leonard

GENERAL SESSION, MARCH 17, 1966

Commission Chairman Sheppard called the meeting to order at 9:50 a.m. and introduced Father Paul Hession, Pastor, Our Lady of Fatima Parish, Biloxi, who rendered the invocation.

Following calling of the roll and the introducing of Commissioners and proxies, Dr. Gordon Gunter extended a very cordial welcome to the State of Mississippi. His and other program presentations appear in these Minutes on pages listed in the Table of Contents.

A series of three addresses was heard during the session, prior to a recess, in the following order:

MARINE GAME FISH RESEARCH IN THE GULF OF MEXICO, by John S. Gottschalk, Director, Bureau of Sport Fisheries.

PROGRAM OF THE RESEARCH AND DEVELOPMENT CENTER, by J. R. Peterson, Director, Market Analyses, Industrial Location Division, Research and Development Center, State of Mississippi.

REVIEW: CURRENT FEDERAL LEGISLATION-GULF FISHERIES, by R. T. Whiteleather, Deputy Regional Director, Bureau of Commercial Fisheries, Region 2.

Following a fifteen minute coffee break, Dr. Lyle St. Amant, Assistant Director, Louisiana Wild Life & Fisheries Commission, was introduced by Chairman Sheppard for the purpose of presenting a report:

REVIEW: THE SHRIMP FISHERY OF THE GULF OF MEXICO (GSMFC INFORMATIONAL BULLETIN NO. 3 MATERIAL).

The Chairman announced that because of the lateness of the hour a panel report on the status of the Gulf Oyster Fishery would be rescheduled. The session was adjourned at 12:20 p.m., and the group motored soon after to Ocean Springs where the Mississippi Marine Conservation Commission and the Gulf Coast Research Laboratory jointly hosted the Commissioners and delegates to a seafood luncheon. Following luncheon, the group toured the recently completed laboratory facilities of the latter.

Meeting at 4:30 p.m. was the Resolutions Committee appointed earlier by the Chairman. Serving on the Committee were Commissioners Summersgill (Chairman), Shriner, Versaggi, Millette and Sheppard.

FRIDAY (MARCH 18)

The Commission Executive Session began with the serving of breakfast at 7:30 a.m. This session terminated at 9:15 a.m. The closing General Session was called to order by Commission Vice-Chairman James Summersgill at 9:30 a.m.

The Chairman called upon the Director to inform the delegates of action of general interest taken at the Commissioners' breakfast session. He reported:

The adoption of a resolution which requests the Bureau of Commercial Fisheries to extend its good efforts in exploration and technological research to those species of Gulf fishes considered most desirable for the manufacture of fish protein concentrate and praises the Bureau for prior accomplishments in these two areas.

The adoption of a resolution which requests the Estuarine Technical Coordinating Committee to consider the development of an estuarine atlas and commends the Committee for its past endeavors.

The passing of a motion requesting the Estuarine Technical Coordinating Committee to coordinate the production of an estuarine film with the member states and the U.S. Fish and Wildlife Service.

Before the taking of a recess, three presentations were heard in the following sequence:

ALTERNATE RESOURCES FOR GULF INDUSTRIAL FISH PRODUCTION (SLIDES), by James S. Carpenter, Assistant Chief, Gulf Exploratory Fishing Program, Bureau of Commercial Fisheries, Region 2.

UTILIZATION OF ALTERNATE FISHERY RESOURCES OF THE GULF OF MEXICO (SLIDES), by Travis D. Love, Director, Pascagoula Technological Laboratory, Bureau of Commercial Fisheries.

REPORT: GSMFC ESTUARINE TECHNICAL COORDINATING COMMITTEE by Dr. Theodore B. Ford, Chief, Division of Oysters, Water Bottoms and Seafood, Louisiana Wild Life and Fisheries Commission.

Resuming, three papers were presented in the following order:

DEPURATION STUDIES: EXPERIMENTAL SYSTEM (SLIDES), by Dr. Wm. F. Hill, Jr., Deputy Director of Research, Gulf Coast Shellfish Sanitation Research Center, U. S. Public Health Service, Dauphin Island, Alabama.

BRIEF SUMMARY: PL 88-309 GULF STATES' PROJECTS TO-DATE, by I. B. Byrd, Federal Aid Coordinator, Bureau of Commercial Fisheries, Region 2.

THE OCEANOGRAPHIC RESEARCH PROGRAM AT THE GULF COAST RESEARCH LABORATORY (SLIDES), Kirby L. Drennan, Oceanographer, Gulf Coast Research Laboratory.

(M-44)

With no response on call for other matters to be presented, Chairman Summersgill thanked the speakers for their participation, and the delegates for their attention, and extended a most cordial invitation to the New Orleans, October 20-21, 1966 meeting.

The meeting was adjourned at 12:10 p.m.

Prepared by: W. Dudley Gunn
Director

(M-44)

M I N U T E S

EXECUTIVE SESSION, BILOXI, MISSISSIPPI, MARCH 18, 1966

Following breakfast, which began at 7:30 a.m. and ended at 8:15 a.m., Chairman Sheppard called the Executive Session to order.

Dr. St. Amant (proxy for Commissioner Hair)moved that the Minutes of the October 1965 meeting be approved without reading. Commissioner Shriner seconded and upon vote the motion passed.

The Director reported that all member states had paid their dues for the current fiscal year and that he anticipated a year-end balance to be in the neighborhood of $6,000.

Following a brief discussion as to a meeting site for the March 1967 meeting in Texas, Brownsville was decided upon.

Commissioner Summersgill, Chairman, Resolutions Committee, read a Committee-approved resolution which requests the Bureau of Commercial Fisheries to extend its good efforts in exploration and technological research to those species of Gulf fishes considered most desirable for the manufacture of fish protein concentrate. Following discussion Commissioner Colson moved for its adoption. Commissioner Weems seconded and upon vote the resolution, which appears immediately below, was adopted:

WHEREAS, it is the purpose of the Gulf States Marine Fisheries Commission to promote the better utilization of the fisheries of the seaboard of the Gulf Coast states, and

WHEREAS, there are certain fisheries that are not being exploited, and others that are not being fully prosecuted, which could contribute greatly to the national harvest of fishes desirable for the preparation of fish protein concentrate.

NOW, THEREFORE, BE IT RESOLVED that the Gulf States Marine Fisheries Commission commends the Department of the Interior, Bureau of Commercial Fisheries, for the Gulf exploratory fishing effort and requests that explorations be continued with particular reference to those species considered most desirable for the manufacture of fish protein concentrate; also, that the Bureau be lauded for the technological research which has resulted in the preparation of fish protein concentrate, and be requested to extend such research to include fishes common to the Gulf of Mexico.

* * * *

A second Committee-approved resolution was read and discussed. Such proposed resolution requests the Estuarine Technical Coordinating Committee to consider the development of an estuarine atlas and acknowledges the fine work which that Committee has accomplished. Commissioner Cory moved for adoption of the resolution. Commissioner Millette seconded and upon vote the resclution was adopted. It reads:

WHEREAS, the Gulf States Marine Fisheries Commission has recognized the value of estuarine areas and the need for the preservation and wise management of such areas for the past decade, and

WHEREAS, there is increasing competition for these areas through expanding population pressures, and

WHEREAS, this Commission created the Estuarine Technical Coordinating Committee to investigate estuarine problems and advise the Commission thereon, and

WHEREAS, an assessment of estuarine space and productivity is required if these nursery grounds are to compete successfully in multipurpose planning and development, and

WHEREAS, the accomplishments of the Committee clearly indicates its competency to undertake an investigation of such major proportion.

NOW, THEREFORE, BE IT RESOLVED that the Gulf States Marine Fisheries Commission act as a coordinating agent through the Estuarine Technical Coordinating Committee in supporting a program to develop an estuarine atlas and that participation be by the several members of the Committee according to each group's capabilities.

* * * *

A motion was made by Mr. Allen, proxy for Commissioner Kelley, which requests the Estuarine Technical Coordinating Committee to coordinate the production of an estuarine film with the member states and the U. S. Fish and Wildlife Service and with request that a progress report be rendered at the Commission's October 1966 meeting. Mr. Colson seconded the motion and upon vote it was passed.

Three resolutions of appreciation to the Mississippi Marine Conservation Commission and Mr. George Williams and staff; to the Gulf Coast Research Laboratory and Dr. Gordon Gunter and staff; and to the Broadwater Beach Hotel, were presented. Commissioner Shriner moved for their adoption. Dr. St. Amant seconded and upon vote the three resolutions were adopted. The resolutions appear below in the order listed:

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express to the Mississippi Marine Conservation Commission its most sincere appreciation for the kind invitation to the delectable seafood luncheon tendered March 17th on the campus of the Gulf Coast Research Laboratory.

BE IT FURTHER RESOLVED that this Commission particularly express its gratitude to Mr. George Williams and members of the enforcement staff for the preparation and serving of a luncheon long to be remembered by the entire group.

* * * *

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express to Dr. Gordon Gunter and staff of the Gulf Coast Research Laboratory its sincere appreciation for the scheduling of a tour of the Laboratory in connection with the March 17-18 meeting of this Commission at Biloxi, Mississippi, and for the delightful seafood luncheon which preceded it.

BE IT FURTHER RESOLVED that this Commission extend its best wishes for the continuing effort being made by the Gulf Coast Research Laboratory in interest of the marine fishery resources of the seaboard of the Gulf States.

* * * *

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express its most sincere appreciation to the management and staff of the Broadwater Beach Hotel for the cordial hospitality and splendid food and service enjoyed by the group on the occasion of the March 17-18, 1966 meeting of this Commission at Biloxi, Mississippi.

* * * *

No further business remained to be transacted and the session was adjourned at 9:15 a.m. for the final General Session.

Prepared by: W. Dudley Gunn
Director

(M-44)

(COPY)

GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"WELCOMING ADDRESS"

Gordon Gunter, Director
Gulf Coast Research Laboratory
Ocean Springs, Miss.

We are glad to have you with us here in Mississippi again during this salubrious spring season which heralds the growth and burgeoning of life not only on land in our Gulf coast area but also in the waters. I think that we would all wish that this were a good omen for the development and growth of beneficient activities of this Commission. However, the simile is not quite apt because we have passed the springtime in the organization and growth of the Gulf States Marine Fisheries Commission. This has been a very powerful and fruitful organization for the Gulf coast. Its influences have been considerable and they have extended far and wide in ways which sometimes are not recognized.

When this Commission was first organized there was an attitude of intense rivalry and sometimes ill-feeling between the commercial fishermen of the various states. I can remember the time when Mississippi and Alabama fishermen who worked in the fertile waters of Louisiana had to come through a checkpoint at Grand Pass and declare their loads to Louisiana officials. Their boats were well known and their sizes were well known and some of those people could take a look at a loaded boat and tell within a few barrels how much shrimp or oysters were on board. Nevertheless, the fishermen were required to unload their boats completely and measure the loads of shrimp and oysters a barrel at a time on the dock. You can well understand the extra time and labor and loss of ice and decrease in quality of the product this all entailed. The purpose of this activity was not really to collect the precise amount of severance tax due, but it was to harass and to discourage the out-of-state fishermen. There is another instance. I remember seeing a very large Louisiana shrimp boat come out of the Gulf during stormy weather and come through Aransas Pass at Port Aransas, Texas. Up to that time it was the largest fishing craft I had ever seen and I was much impressed by its size. It traveled up the channel towards the city of Aransas Pass for about half the distance and then turned around and headed out to sea again in the face of some very blustery weather. I never knew the precise details but I knew the general situation, and I came to the conclusion that the fishermen had been in radio contact with their agents on shore and decided that they would face the storm rather than those terrible Texas game wardens and the $2500 a year license which would be slapped on them if they ventured into harbor. Since that time there has been a great change in attitude and

an abatement of the rivalry. And as generally happens when peace and quiet and cooperation reign in the affairs of men, everybody is better off. No one area of the coast has had its fish populations decimated and the fishing commerce is doing better.

Not too long ago our sister state, Alabama, came to the Mississippi Marine Conservation Commission with the request that it be allowed to get seed oysters from our waters because its oyster beds had been virtually wiped out in Mobile Bay by fresh water. The man who was in charge of the Alabama Seafood Commission came into my office at that time and said somewhat ruefully that when he presented this request he was hoping that Mississippi would not remember the answer Alabama had given to Mississippi when a similar request had been made some several years before. Please understand that I am not trying to put the bee on Alabama, but am just using this as an example because it is one that I remember. Similar examples of uncooperation extend back throughout the years involving every state in our compact. Anyway, Mississippi came to the assistance of Alabama and it now has a flourishing oyster industry which is most helpful to that State and to Mississippi and to everybody along the Gulf coast, especially since disease has cut so deeply into the production of the middle Atlantic states and the hurricane has caused such damage to Louisiana.

I believe that we would like to see the fishing industry of all states prosper. I cannot conceive of the fishing industry of Alabama falling into poor and miserable circumstances while we prosper in Mississippi, or vice versa. In any case there has been a great change in attitude during the past twenty years and it is all for the better. Part of this change has no doubt been due to a simple maturing process in the minds of the people in the fishing business. However, certain organizations, including even the courts, have helped to create the cooperative atmosphere, but none has been more important in this respect than the Gulf States Marine Fisheries Commission, and it is my personal opinion that if this Commission had not accomplished another single thing it still would have been well worth its creation and the efforts so many dedicated men have put forward to make it successful.

Another great work of this Commission has been the promotion of research for the benefit of industry. A great deal of this has been in terms of technology such as the preservation and handling of the raw product and its preparation for marketing, etc. This is out of my line and I do not know much about it, but we are particularly interested in this state because of our large and productive Bureau of Commercial Fisheries laboratory at Pascagoula, where so much work has been done on the exploration for new fishery resources, the types of gear to be used and the preservation and preparation of seafoods. Here is also centered the inspection services for shrimp canning. Nowadays we are prone to forget the value and the importance of these activities because we

accept them as a matter of course, but I would call your attention to the fact that the shrimp industry certainly would not have developed rapidly or well if a few people were poisoned every now and then by the consumption of canned shrimp. And so we are indebted to this service probably more than we are to other things which we consider to be much more spectacular. The Pascagoula laboratory carries on studies in the preparation of seafood for the table. If you have time, you should visit it and call upon the lady who is in charge of the cookery. I understand that she holds a Ph.D. degree. Possibly she will give you a taste of Snappy Tom Snapper, or some other new concoction which might take the country by storm.

But the Gulf States Marine Fisheries Commission has probably had its greatest success in promoting biological work upon the fishery populations through the Bureau of Commercial Fisheries. We now have the large station at Galveston and another one at Gulf Breeze, Florida. This latter one was an oyster station and it was saved at one time by this Commission some years ago after being written off the budget. It has now gone on to bigger and better things and is widely recognized for the work done there on the various pesticides and herbicides and their effects upon marine animals.

The Bureau of Commercial Fisheries itself has helped the various states with research grants with the aid and advice of this Commission and this Commission has also played a powerful part in seeking helpful legislation in the national Congress.

At this point I should like to suggest that the Commission seek some way to promote, if it can, the increase of fishery research within the states themselves. Some of our state legislatures are very reluctant to put any money into this field of activity. Some states along this coast are in the forefront and they have marvelous research programs. Others have very little legislative support. My own laboratory legislative appropriation is less than one-tenth of what the State of Virginia appropriated for the Virginia Fisheries Laboratory ten years ago, and in fact it was only restored to that level after a lapse of ten years. Some of you may ask then, "How is it that your laboratory is growing so much?" My reply is that you have to beat the devil around the bush, but what concerns me is that there are some devils I can't beat. So I would suggest that after such outstanding success in other fields that the Commission give some thought to how it can stimulate the legislatures of all states to take the proper view of the commercial fisheries and the research that will be necessary to maintain them in a flourishing condition in the future.

We have problems in the whole fishing industry and I have not called attention to these but mostly to certain successes which the industry and this Commission have enjoyed. Nevertheless, we do have problems and they will grow with the population, but I think it is time to call attention to one of our great blessings. The Gulf of Mexico produces about 25 per cent of all the fishery products of the United States and the landings from Pascagoula, Mississippi to

Port Arthur, Texas make up 20 per cent of the weight and the value of the United States fisheries. So here you are meeting within the arc of what I have called the Fertile Fisheries Crescent, which is the most productive fishing area in North America.

And now I wish to say that I personally always feel at home and at ease with the commercial fishermen and I am glad to be among the representatives of the industry. I made my living in the industry for some years and I feel a special affinity for men who fish for a living. I once pointed out at one of these meetings that they were among God's anointed and one-third of the twelve Apostles, four men, were commercial fishermen. However, I don't want to whitewash the fishermen because there are some more earthy characters among them with whom my real affinity lies.

* * * * *

(COPY)

GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"MARINE GAME FISH RESEARCH IN THE GULF OF MEXICO"

John S. Gottschalk, Director
Bureau of Sport Fisheries & Wildlife
Washington, D. C.

It is a privilege and a pleasure to come to this spring meeting of the Gulf States Marine Fisheries Commission. Today I propose to review with you our plans for marine game fish studies in the Gulf of Mexico. The time for this review is especially appropriate because we are on the threshold of a new and major research effort in this region.

From my observations as I travel around the country, I have concluded that the Gulf of Mexico poses a paradox, a contradiction of opinions and attitudes with established facts. I am quite well acquainted in a general way with your coastal areas, the great bays and estuaries, the Delta, and the attenuated reaches of barrier beaches still relatively unspoiled. The Gulf of Mexico, where our interests join today, possesses great and untapped opportunities, not the least of which are those of a recreational nature. In a sense the Gulf is our last frontier.

Like our other last frontiers, yours is endangered--not from the direct result of too many people in the region (although they do have an important impact)--but from headlong exploitation of its natural resources. The oil wells, the lumber and pulp mills, the monoculture farming, the dredging of coastlines for shells-- all part of your expanding economy--are contributing to the degradation of our aquatic resources and thus to the reduction of the marine-based economy and our people's opportunities for recreation as well. The mill wastes, silt loads, chemical effluents, and destruction of shell beds are taking their toll.

The paradox I mentioned is one of apparent attitudes. As a visitor here, I detect or suspect a regional lack of regard for the balanced picture of natural resource conservation, and a preoccupation with "economic progress" in exploiting natural resources, whether they be oil or commercially important fish species.

At the same time, I note hopeful if belated stirrings of public recognition that unlimited exploitation may lead to disaster, that critical estuarine habitats must be protected and preserved. This embryonic conservation ethic still is essentially tied to resources with a direct economic significance. It ignores the recreational fisheries because their contribution to our economic base is not well recognized. Moreover, as in all frontiers of our

country, fishing for fun is regarded as a light-hearted activity not to be equated with the efforts mature men put into making a living. The social and economic values of the marine game fish resources of the vast Gulf area are not well established in the public mind, and the serious conservation issues associated with them are only dimly perceived.

These are general observations, not directed at any one State, region, or organization. Indeed, they might characterize the rather cavalier treatment our estuarine-dependent resources have received at the hands of "major industry" planners on every coast and in the Great Lakes as well. Consider how the salmon has fared in the Northwest, or what has happened in the past to his New England counterpart, the Atlantic salmon. There is much in history to document my belief that in a contest with other users of the ocean's edge, the fisheries have frequently been forced to a position of secondary importance.

Part of this result lies in our failure to gather the facts needed to convince the American public of the unity of the ocean's edge. The vast expanse of ocean even today is regarded as a disposal area for much of the effluvium of our booming population, and only when its effects are concentrated in a limited area, such as an estuary, does there follow public realization of some rather nauseating realities.

The other reason for the present state of affairs is a direct corollary of the first. Lacking provable facts, we have not tried very hard to expand our public support beyond the immediate users. In a race for popularity, the commercial fishing industry will always come up second best because it involves directly but a very small fraction of the public. On the West Coast, certain people valued kilowatts and economic expansion more than they valued the preservation of an economic structure operating on a dynamic base, even though they knew that, properly managed, that base could suppport the salmon-fishing industry forever, and even though they were willing to see the power users pay some rather substantial surcharges to try to maintain the salmon resource artifically.

Apathy is not the personal property of any one class of people, particularly when we are dealing in problems related to the marine sport fisheries. It took much doing to secure the authorizations of the "Lennon Bill" back in 1959.

It is extremely important that the importance of the Lennon Bill be recognized, not merely because of its intrinsic merits, but because it has the potential to upgrade public support for the fisheries, marine conservation, and estuarine preservation, to the point where these considerations will take on real significance in resource planning and management. It is the recreational marine fisheries that can open the barriers to public support for all marine endeavors. Public interest in marine sport fishing already is tremendous, it is growing, but it is largely unorganized and ineffective. What it needs is a period of truly loving care by someone or some group that appreciates the fruits that could be brought forth.

The people are ahead of us. Marine anglers in this region, as around the continent, are a substantial and growing portion of the public we serve. They and the service industries and coastal resort communities that cater to their needs want and deserve recognition as a potent political and economic force. They want the resources upon which they depend protected and developed. In 1960, a survey by the Bureau of Sport Fisheries and Wildlife showed there were 1.4 million anglers in the Gulf of Mexico who fished 18 million man-days in a single year, caught 185 million fish, and spent $145 million. Some of these are the people who gave local support for a Federal program of marine game fish research in the Gulf of Mexico. It is heartening to see the concern and interest of this public take the form of support for two new research centers. Why is this so?

Thirty years ago salt-water angling was a little known pursuit practiced by a few shore dabblers and an even lesser number of wealthy sportsmen who fished the deep blue waters for finny monsters in the Zane Grey tradition. All this has changed in the space of three short decades. Now salt-water angling is the sport of millions from all walks of life. Their catch is measured in hundreds of millions of pounds, and for some species equals or exceeds the commercial catch.

In the days not so long ago, when ocean fish resources were virtually untapped and their habitat was unspoiled by pollution, pesticides, and developments, it was sufficient for a few lonely biologists to pursue their studies at a leisurely pace, often with leaky boats and torn nets or by examining dead fish from the market. Today this approach will not do. The demands upon these resources are such that only a major effort can conserve them. Conditioned as they are to the miracles of science, today's angling public wants a full-fledged research and development program. It recognizes that nothing less than a major effort will provide the broad background of knowledge and understanding that must precede sound management.

This intuitive public awareness reinforces my own analysis of the state of our knowledge. We are woefully short of the facts needed to answer even the everyday problems like we should. All of you are aware of these problems. Our plight in the Everglades is an example. Here water-diversion plans threaten to change the character of estuaries and make them too salty for the survival and growth of pink shrimp and as nurseries for a host of other fishes. Urgent research programs and stop-gap pumping projects are now underway to help solve the emergency water problem in the Everglades. Consider the Texas Basin Project, which involves the fresh-water supply of nearly the whole Texas coast and its complex of estuaries. The Fish and Wildlife Service and the State of Texas are working, with the full cooperation of the Bureau of Reclamation, I might add, to assess the possible effects of this potential project in an effort to establish construction and operation criteria for the protection and enhancement of the vast and valuable food and recreation fisheries. We simply do not now have all the facts which we need to make those assessments. We have substituted our best trained judgment, for the time being, but we are hopeful that a major estuarine research effort can be included as a part of that project if it should be authorized.

(Gottschalk #4)

Billfishing in the Gulf of Mexico is a recently discovered and exciting sport, attracting well-heeled tourists to coastal resorts with facilities and know-how to serve them. On the eve of its development, this resource is threatened with greatly intensified exploitation.

A tremendous public clamor has arisen about the greatly accelerated billfish catch by commercial fishermen of two other nations, both in the Atlantic and the Pacific Oceans. Yet we have only the sketchiest ideas of how many of these giant gamefishes there are, or where they come from and where they go, or about their life histories, and the factors that control the populations. Conservation without these elemental facts is an exercise in frustration, futility, and foolishness.

In our own recent studies to select sites for our laboratories, several otherwise choice areas were rejected because of pollution and turbidity. We know that these conditions disarrange the ecological system, but we are not sure how or why. These are just a few of the many examples of immediate and practical research needs.

Up to now, our conservation efforts in the Gulf of Mexico on behalf of marine game fishes have been largely in the hands of our River Basin Studies people. They have worked closely, and we believe effectively, with you to protect these resources against the many adverse developments that are the price of advancing civilization: the draining, ditching, filling and diversions. In these efforts we have depended heavily upon the advice and help of fishery biologists from the coastal States and of those of our sister Bureau of Commercial Fisheries. More often than not, these activities are characterized by short deadlines with no time for research and a forced dependence on a few scanty facts or informed guesses.

Our agency has fallen far short of its responsibility to provide the broad background of basic knowledge and information needed to back up your management responsibilities and ours. I believe the Federal Government is naturally and ideally suited to take on a larger role in the field of research, and I look forward to the opportunity to lead our agency in a greatly strengthened program of marine game fish research.

Started in 1960, the program is now underway on the Atlantic and Pacific Coasts, with laboratories at Sandy Hook, New Jersey, and Tiburon, California. A third laboratory is now under construction at Narragansett, Rhode Island, with completion scheduled for July 1966. Though we come late to the Gulf of Mexico, the beginnings are auspicious. This year we have planning and design funds for two new laboratories--one to be at PanamaCity, Florida, and the other at Port Aransas, Texas. Both will be modern and well-equipped facilities. If our plans materialize, and I am determined that they will, the Bureau will be ready to support its share of a coordinated and comprehensive attack on the conservation problems of marine game fishes in the Gulf of Mexico.

I think it is premature to comment here, except in general terms, on program elements. They will concern the same broad subjects that have occupied us on the Atlantic and Pacific coasts: life histories, behavior, habitat needs, environmental surveys, and pollution. If there is a dominant theme to this research, it is this: to determine how and why the abundance, distribution,

migration, survival and well-being of marine game fishes are influenced by natural and man-made variations in the environment.

We hope to focus a great deal of attention on the estuaries for the very good reasons that most of the important game fishes of the Gulf are estuarine-dependent at some stage of their life cycles. Even the offshore predators such as mackerel, bluefish, snappers, and groupers, which seldom enter estuaries, feed on the hosts of mullets, menhaden, anchovies, croakers, and shrimp that move back and forth. All of us know too well that the critical estuarine habitat is being degraded and destroyed at an ever increasing pace.

I would bring this discussion to a close on a subject that is perhaps more important than any of the preceding. Although I call it compartmentalized research, it is just another aspect of coordination. Too much of our research in the past has been compartmentalized, both by specialists and by agencies. In a recent talk, Assistant Secretary Stanley A. Cain said:

> "Fish and Wildlife biologists are ecologists, and many of them are very good ones. But let us ask ourselves whether we have confined attention and research on species, or whether we have gone on to explore the communities and environments in which each species plays a probably minor role. How much of our attention has gone to understanding the ecosystem as a whole?"

These are fundamental and perceptive questions. Rather than be a collection of compartmentalized scientists, specializing in species, oceanography, microbiology, parasitology, and so forth, our laboratories will strive to take a broad ecological approach.

The second concept of compartmentalized research concerns the walled-off agency programs. Lest my previous remarks leave you the thought that we would like to do it all, I assure you again of my recognition that there is far more than all of us can do. To avoid both gaps and duplication, we must work closely with you as individual States and with your Commission, both in program planning and execution. I share with Director Donald L. McKernan a determination that our cooperative programs, particularly on estuaries, be handled at our end as those of a Fish and Wildlife Service effort rather than as separate efforts of the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries, respectively. In our selection of laboratory sites, a prime consideration was to secure locations which would complement our sister Bureau in the immense and never-ending task of monitoring environments and fish populations.

Finally, we hope to continue our close and mutually profitable association with the coastal universities having strong interests in marine sciences. Again, in selection of our laboratory sites, proximity to such institutions was an important consideration.

I hope you will regard these laboratories as new contributions to the scientific and cultural aspects of their communities, as new allies in the fight to retain the coastal environments which are so vital to both sport and commercial fishing resources, and as new fact-finders that will help to gather basic data useful to everyone working in the Gulf. We want these laboratories and their staffs to be a substantial part of the Gulf economy, sharing with you a belief in the Gulf's future.

To implement my intentions, I have recently taken steps to strengthen and formalize our ties with your Commission. Paul E. Thompson, Chief of the Division of Fishery Research, has been designated to serve as liaison between our agency and the Commission, and Albert H. Swartz, his assistant, to serve as our representative on your biological committees. They are old friends to many of you. I can assure you that they will work closely with you as our program develops.

We look forward to the establishment of even closer ties with the Gulf States Marine Fisheries Commission than we have enjoyed in the past. You have a legal and moral obligation to provide the leadership and guidance for the programs we will be embarking on. We trust we may continue to depend upon and merit, your support.

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GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"PROGRAM OF THE RESEARCH AND DEVELOPMENT CENTER"

J. R. Peterson, Director
Market Analyses, Industrial Location Division
Research & Development Center
State of Mississippi
Jackson, Miss.

The title of my talk as listed in the agenda is "Program of the Research and Development Center". I would like to add to that title "and How It Affects You."

I would like to start off this talk by telling you first about the objectives of the Research and Development Center. The objectives, as stated in the law that established the Center, are rather complex and lengthy. Essentially, however, our objective is to accomplish all the research needed to determine what is necessary to provide enough payrolls to keep Mississippians in Mississippi and to raise the per capita income (that is, income per person) to the national level by the year 2000. This latter objective is one we established for ourselves shortly after we set up our program.

Most people would feel that to accomplish this objective, it is only necessary to bring in enough industry. If enough plants are brought into the state then the per capita income will eventually be forced up to and even past the national average. Actually, this approach would not accomplish the goal. If it would, then Tennessee and North Carolina would already have passed Georgia's per capita income. Instead Georgia's per capita income is rising faster than either North Carolina's or Tennessee's, despite the fact that both North Carolina and Tennessee add more manufacturing employees than Georgia each year. New York, on the other hand, with manufacturingwages below the average for the nation, has a per capita income of $3,200.

Our approach will be, primarily, one of research, working with the action groups. Our research will be directed toward such questions as "What are Mississippi's assets and liabilities?"; "What can be done about the liabilities?"; "What are our resources for economic development?" and here we are not just talking about a listing of resources but an actual quantification. Other questions to be examined would include "What economic mix do we need and how do we go about getting it?"

We will work on bringing in industry, for this is part of the job. In such a case the action group would be the Mississippi Agricultural & Industrial Board or the economic development districts within the state -- but we will also work on helping industry that is already here, on the theory that the industry that is already here is the best industry. For the industry

already here (and this will largely be small industry) we would offer management services that would cover anything from help with management -- to markets -- to plant layout. We will also be doing research on export-import potentials; on possible new markets (and I will come back to this later); on community problems; on transportation; and on manpower, which could turn out to be the most important effort of them all.

To accomplish these aims, we will not only have our own staff for the applied work but we will work very closely with the schools and laboratories in the state for research in fields in which these organizations are competent. When our building is constructed in Jackson, there will be a Universities Center Building built at the same time. This will give us an opportunity for close personal association and will permit us to work with the personnel of the Universities Center. We also expect to continue working with researchers at the universities themselves. And, of course, we will work with the Gulf Coast Research Laboratory.

Now, so far, I have been speaking in very general terms and none of this can have much real meaning to you. Therefore, let me discuss to some degree, some specifics. Let me talk about some kinds of research that will have some meaning to you personally. First, I would like to describe how our research ties in with the research of other groups. The Mississippi Marine Conservation Commission and the Gulf Coast Research Laboratory anticipate that landings in Mississippi in 1975 will be worth approximately $24 million dollars. Based on the trend, this is actually a conservative estimate. On the other hand, in some of the work that Mississippi State University has done for us, they anticipate that there will be $20 million dollars input into the economy for this same source. What has happened to the other 20% or even more than 20% when you consider the fact that the estimate of $24 million dollars was really quite conservative? What is involved here is something the economists call "propensity to consume." If you give a family more money, how much of it is likely to go for seafood? If the sales of seafood rose at the same rate as income, $24 million dollars would probably not be high enough as a figure. However, purchases of seafood do not go up as fast as income. What the economists are saying is that Mississippi's share of the 1960 market will expand to $20 million dollars in 1975 if you don't do something about it to get a larger share of the market.

Now, how do you go about getting a larger share of the market? Well, there are two possibilities. One, is to take business away from somebody else. This is a perfectly acceptable approach and can be accomplished by either promotion, increased efficiency or both. The promotion in this case would be designed to make people accept Mississippi fish in preference to those from other sections or in preference to imported fish. A second approach would also involve promotion but of a more sophisticated kind and probably in cooperation with commercial fishermen throughout the United States. In this case, there would be a promotion program aimed at increasing people's propensity to consume fish, especially your fish. Those of you who expect to be in business nine years from now might want to give serious consideration to these alternatives.

(Peterson #3)

Here is a case where we did not do any of the research at all but we are merely acting as coordinators, interpreters, advisors and, in the end, assistants. This is a case where we have tried to anticipate a problem involved in limited consumption but instead of merely stating the problem, we are willing to be of help in attempting to solve it.

There are other kinds of research we are active in right now that are not directly related to your own operations but are of a nature that you will certainly understand them and perhaps see other areas in which we can fit in with your own interests. We are working with the School of Pharmacy at the University of Mississippi in several projects at present. One project coming up has to do with the pharmaceutical uses of oyster shells. In another project we are attempting to determine the economic effects on a Mississippi industry of salmonella bacteria in turtles. A third project concerns the feasibility of a frozen catfish enterprise in Mississippi. These are all types of activity which I believe are sufficiently close to your own interests to make our research understandable. There are also some kinds of research we might be interested in in the not too distant future. We have given some consideration to work on the cost-benefit ratio of cleaning up pollution in certain areas of the Mississippi Coast. We are also interested in methods for expanding markets for products of the sea. To date we have done nothing on these at all and could not possibly do so before the next fiscal year. Then, of course, there are kinds of research in we might be interested, but we must await more basic research which we do not feel is in our field. As an example, we might very well be interested in the effect of river control on oyster beds. Once again, I am speaking of the economic effects. However, we do not feel that this sort of thing would be profitable unless there were already sufficient studies of the rivers themselves.

Now here is a place where it is probably worth stopping or at least digressing. The important thing is to make sure we understand each other. Most people have strong feelings on pollution and I can easily see a possibility that one of you might report that the Research Center wants to clean up the pollution of the Gulf Coast. Another might take my statement to mean that we feel that pollution is strictly a matter of dollars. Someone from the Corps of Engineers might pick up the reference to "cost-benefit ratio" and interpret in the way the Corps defines the term.

Our interest is in what will do the state the most good, and there will definitely be disagreements as to what constitutes pollution. Some oystermen probably consider the estuary polluted if there is too much fresh water in it.

Therefore, if we do get into an examination of pollution, we shall have to define it. Once we have defined it, maybe no one else will agree with us.

Now since you have your objectives and we have ours, we may not always agree but at least, I hope, we will not misunderstand each other. I do hope that we will understand each other when we seem to agree on the objectives. One thing is quite certain and that is that we are not dogmatic about our ideas and we are perfectly willing to listen to convincing arguments from people who want us to change them.

(Peterson #4)

I have tried to give you an idea of our particular approach to our particular objectives and to indicate how these approaches will interface with your own objectives at least from the point of view of the state of Mississippi.

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GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"REVIEW: CURRENT FEDERAL LEGISLATION - GULF FISHERIES"

R. T. Whiteleather, Deputy Regional Director
Bureau of Commercial Fisheries
St. Petersburg Beach, Florida

Speaking on the subject of legislation is like walking into a deep, dark forest - one needs to pick a clear path to keep from getting lost. In the first session of the 89th U.S.Congress last year, 16,000 bills were introduced. Congress passed about 1,000 of these. Of all the bills introduced, 323 had to do, in one way or another, with fish or fishing. Only a few of these became law before Congress adjourned. Narrowing this even more, I can take a path that leads only to that legislation having some effect on Gulf of Mexico fisheries. To refresh your memory about legislation in this category, I will start by simply mentioning a half-dozen most pertinent bills that became law in the last session of Congress:

1. PL 89-85, Extension and Expansion of the Fisheries Loan Program, broadened the loan authority and continued the program until 1970.

2. Pesticides Act (PL 89-232) which upped the dollar limit on this research relating to fish and wildlife to 3.2 million dollars in 1966 and to 5 million dollars in 1967 and 1968. This is an authorization Act and not an appropriation, however.

3. Anadromous Fish Bill (PL 89-304) basically authorizes up to 50 percent federal aid to states on anadromous fish projects. This probably will have limited application in the Gulf States because of the few resources of this type here.

4. The Water Resources Planning Act (PL 89-80) sets up a Water Resource Council and River Basins Commissions.

5. The Water Pollution Control Act (PL 89-234) establishes a Water Pollution Control Administration under the Department of Health, Education, and Welfare. The President has recently sent a reorganizational plan to Congress concerning this administration. I will give you the details later.

6. Foreign Aid Act (PL 89-171) has a provision allowing consideration of restricting aid to any country that harasses U.S. vessels by imposing penalities or sanctions against them while fishing in international waters. As of yet, I know of no application of this provision. The authority is there, however.

All of the foregoing legislation, especially that pertaining to improved water quality, should aid Gulf fisheries.

(Whiteleather #2)

From here on, I would like to discuss mainly some of the legislative bills that are, at the present time, pending action in the current session of Congress. Some of these again will be of more direct concern to Gulf people than others but all will have influence on the Gulf fisheries.

Perhaps the most talked about is S.2720, a bill co-sponsored by Senators Bartlett (Alaska) and Magnuson (Washington), authorizing the Secretary of the Interior to develop, through use of experimental plants, practical and economical means for production of fish protein concentrate. Congressman Rivers has introduced an identical bill in the House, HR-12269. These bills would authorize Federal Government construction of five fish protein concentrate plants in various locations to be operated on a demonstrational basis through contracts with private organizations or through other means. Plants will have to serve this purpose in a period not to exceed ten years from the date of the passage of the Act, and they shall be disposed of, as promptly as practicable, in accordance with federal surplus property procedures. This measure contemplates that the Government will not stay in the fish protein concentrate business any longer than absolutely necessary to get it going. The bill further authorizes an expenditure of 5 million dollars for the construction of the plants, together with additional sums that may be necessary for operation and maintenance and conduct of the total program. Hearings on these proposals have recently been announced for April 25 in Aberdeen, Washington, but there are still a number of complexities. The Department of the Interior has petitioned the Food and Drug Administration to approve fish protein concentrate as a food additive. Hopefully, FDA will act favorably on this matter, but its approval will be needed before this program can be gotten into high gear. Beyond this, a money appropriation as authorized in the bill will be needed. It seems almost certain that the first plants constructed would be set up to handle those species of fish for which Bureau research has already established suitable and reliable processing techniques.

Currently stirring up much interest is S-2218, introduced by Senator Bartlett, and three identical bills in the House which would establish a fisheries zone nine nautical miles beyond our territorial sea, thus making a total fishery jurisdiction of twelve nautical miles outward from U.S. coasts. Senator Bartlett said this in an address about a month ago and I quote "I hope that the Senate and House can proceed early this session with consideration of a bill I introduced last year which should extend jurisdiction over coastal fishery resources out to twelve miles. This has been a very controversial proposal and a number of fishing interests in the United States are not in favor of it." The Senator also goes on to point out generally that the tuna fishermen fear some adverse effect of such legislation. Others who fish more in our coastal waters are concerned whether the Federal Government or state governments would get regulatory control over the fisheries in the new zone between three and twelve miles outward. Extension of state boundaries, in some cases, might even produce over-lapping areas of state jurisdiction. There are some apprehensions that regulations dominated by sport fishing groups might restrict commercial fishing under certain circumstances. I have recently heard that interest in this legislation has been stimulated even further by the

recent group concern of sport fishermen about foreign vessels commercially longlining tuna, swordfish, marlins, sailfish, etc. in international waters where traditional sport fishing tournaments have been held. How all of these factors ultimately will be reconciled certainly is not clear at this time, but it would appear from the interest generated that hearings will be held on these bills in the not too distant future.

During recent years, a great many bills concerning oceanography have been introduced in the Congress. These bills have contained statutory establishment of goals, methods for accomplishing the goals, organization of agencies to do the work, and methods for review and reorientation of programs. Most of the action so far has centered on S-944, a bill containing a declaration of policy and an authorization for the establishment of a high level council to advise and assist the President. In addition, there would be a fifteen-member self-liquidating commission drawn from government, industry and the academic community to make recommendations on organizational structure and the conduct of Federal activities. The House passed a bill using the Senate Number 944 but giving it a considerably different text. With each House having passed its own version of the same bill, normal procedure is the appointment of a conference committee to iron out the differences. The wording of each of the bills passed in this case,however, was so far apart that no action was taken in the first session toward House-Senate conference. Statements made by Senator Magnuson who has shown great interest in this legislation indicate that efforts are being made to get a conference committee organized. He said this recently, "We have a space program. We do not have a national oceanographic program, although legislation to establish such a program is pending. It passed the Senate last year, the House finally passed another version, and we are about ready to see what can be done in conference---." From this it sounds to me like some action is brewing.

Pursuant to President Johnson's persistent emphasis on the control of pollution and the improvement in water quality, a proposal by the Secretary of the Interior has very recently been introduced by Senator Muskie (Maine) as S-2987, and several companion bills have been introduced in the House. These all are titled "The Clean Rivers Restoration Act of 1966." This proposed Act has four main parts:

1. It is aimed at cleaning up entire river basins through development of comprehensive pollution control and abatement plans for selected river basins,

2. It provides for attack on the pollution on a statewide basis by making more federal grant funds available to development of water treatment works,

3. It amends present legislation in that it doubles the appropriation authorization for grants to states and interstate agencies in developing, carrying out, and enforcing water quality standards, and

4. It enables private citizens to bring suit in federal courts to obtain relief from pollution under certain conditions.

(Whiteleather #4)

To the best of my knowledge, no hearings have been scheduled on this bill yet, but it is a good sign for the fish producers, and especially the shellfish people, that so much interest is developing in water pollution control. Right along this same line, under the terms of the Reorganization Act of 1949, the President has sent his Plan #2 to Congress which would centralize in the Department of the Interior a great deal of water quality work that heretofore was spread between the Department of Health, Education, and Welfare and the Department of the Interior.

Now, before closing I should mention very briefly Senate Joint Resolution 29 pertaining to an extensive survey of the coastal fishery resources of the United States. The resolution provides for the Bureau of Commercial Fisheries to make this survey and authorizes $200,000 for the commencement of this work. Although this resolution has been introduced, no hearings on it have been held as yet.

Another bill, S-1734, proposes to increase the duties sharply on fishery imports when any nation conducts fishing operations in a manner that diminishes the effectiveness of domestic fishery conservation programs. This bill was aimed principally at the protection of the Pacific salmon fishery and passed the Senate but was later annulled for technical reasons. Some modifications have now been made which make it applicable to domestic fisheries in general.

Last, but by no means unimportant, is S-2439 which was introduced by Senator Pell (Rhode Island), and an identical bill in the House by Congressman Tupper (Maine) to amend the National Science Foundation Act so as to authorize the establishment and operation of sea grant colleges. Such colleges and their programs of education, training, and research in the marine sciences would be financed by using 10 percent of all bonuses, rentals and royalties paid to the Federal Government for leases under the Outer Continental Shelf Lands Act. The bill also proposes cooperation with public and private agencies, institutions of higher learning, museums, foundations, and other groups concerned with marine sciences. No action or hearings have been scheduled on this to date. However, at a symposium last fall in Newport, Rhode Island, college and university representatives virtually endorsed this concept of sea grant colleges.

From the foregoing, it is rather obvious that the fisheries have not been forgotten in the legislative branch of the Government, and there may even be quite a little excitement on the horizon as action takes place on these matters.

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GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"REVIEW: THE SHRIMP FISHERY OF THE GULF OF MEXICO
(GSMFC INFORMATIONAL BULLETIN NO. 3 MATERIAL)"

Lyle S. St. Amant, Assistant Director
Louisiana Wild Life & Fisheries Commission & Chairman GSMFC Shrimp
Biological Research Committee
New Orleans, La.

ABSTRACT:

Since the publication in 1959 of Informational Bulletin No. 2 on the Shrimp Fishery of the Gulf of Mexico, a sizeable amount of research has been carried out by the U. S. Fish and Wildlife Service, the various States bordering the Gulf of Mexico, and by universities operating under federal or state contract. In general, the knowledge gained confirms the summary of information offered in bulletins Nos. 1 and 2, but the considerable amount of additional and excellent data now on hand makes it desirable that the most recent thinking and conclusions on shrimp biology and management be made available to the industry and the administrators charged with the management of this important fishery.

The new information on shrimp biology offers no startling panacea to shrimp production but does offer an important contribution to the knowledge of shrimp biology and the management of the shrimp industry. Some of the more important information now on hand includes:

1. More detailed information on the life cycle, habits, growth rates, and movements of all three commercially important species, i.e., the white shrimp, Penaeus setiferus, the brown shrimp, P. aztecus, and the pink shrimp, P. duorarum. In particular, information about the latter two species is now equivalent to that of the white shrimp.

2. Much of the data is of a quantitative nature which affords a system of correlating early stages in the annual shrimp cycle with later production figures. This has led to some successful predictions of shrimp abundance in advance of the harvesting seasons and has afforded administrators better information upon which to regulate the industry.

3. Annual variations in the timing of the shrimp cycle and the localized effects of weather and water conditions on shrimp growth, movements, and densities are better understood.

4. Standardized methods of collecting data in all research efforts along the northern Gulf delimit the difference in time and appearance of shrimp populations in different areas and suggest possible differences in the timing of the cycles from one embayment to another. This information when more complete should afford much more efficient management of the resources.

5. Studies on shrimp movements and population dynamics, though still in progress, already offer some useable information with respect to the relation between shrimp size at which to begin harvesting, the ultimate poundage of the catch, and the point of maximum economic value of the harvest.

The information recited has resulted from several Committee conferences since the October 1965 Commission meeting and appears in a "Preliminary draft - - subject to revision" which has been circulated for comment to cooperating marine fishery scientists. Additionally, the preliminary draft contains a biological summary which is not intended to be an extensive technical discussion of shrimp biology, but rather a statement of biological information useable by fishery administrators and industry for understanding and managing shrimp production.

It is hoped a final draft manuscript can be prepared by late spring of this year and INFORMATION BULLETIN NO. 3 printed and made available by June 1.

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GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"ALTERNATE RESOURCES FOR GULF INDUSTRIAL FISH PRODUCTION"

James S. Carpenter, Assistant Chief
Gulf Exploratory Fishing Program
Bureau of Commercial Fisheries, Region 2
Pascagoula, Miss.

Our presentation today will be a showing of 35 mm colored slides illustrating some of the resource potentials in the Gulf and along the southeastern Atlantic coast - and possible future harvesting methods for these stocks.

Since the beginning of our exploratory work in the Gulf, a wealth of data has been accumulated on surface and sub-surface fish stocks. At first this information did not fit into the general picture because we were involved with shrimp and bottomfish projects. As a result, this data was filed in the records at our Exploratory Base in Pascagoula. In the mid 1950's, however, the Gulf States Marine Fisheries Commission requested that we take a look at the potential surface and sub-surface fish resources in the Gulf. As a result of this request and in view of the fact that we had preliminary information on these stocks, and because some encouraging mid-water work was being done in New England, a mid-water trawling program was initiated. This program, concerned primarily with gear studies, was carried out from 1957 to 1960.

During this period some of the problems we encountered were worked out satisfactorily. A number of problems developed, however, that went unanswered. Particular obstacles that prohibited us from simulating commercial production of mid-water fish resulted from the fact that these fish have tremendous escapement capabilities, our winches did not have sufficient power and the vessel's hardware was generally inadequate for this type fishing operation.

Because of these factors, and since we were involved with other projects, it was decided to discontinue this program until the delivery of Oregon II which would be outfitted for this type work.

Since the termination of the mid-water trawling program, we have continued to gather data on surface and sub-surface fish species. This information was accumulated through several investigative approaches, i.e., experimental fishing gear trials, night light attraction studies, lampara seining and gillnetting, depth recorder tracings of mid-water fish, aerial and shipboard observations of surface fish schools and data furnished to us by the commercial fishing industry.

In the winter of 1963-64 an off-season menhaden aerial survey was started. During this period flights covered an area from Florida to Texas. In the

(Carpenter #2)

1964-65 winter we focused our attention on the eastern half of the Gulf and this past winter aerial flights were made along the Florida west coast. Through aerial observations and gillnet sampling of fish schools sighted, we have been able to obtain invaluable information not only on menhaden, but other schooling surface fish as well.

As the total picture of the resource potential gradually emerges we are able to get an idea of the tremendous supply of the untapped surface, mid-water and bottomfish that is available and which could supply alternate resources to the fishing industry.

We have assembled and summarized much of our information on alternate resources in the form of a visual presentation. This material was presented to a joint Industry-Government meeting in Washington this past December and we thought it would be appropriate to give it to the GSMFC at this time.

Before we get started I would like to mention that details are not stressed in these slides. We are attempting to show only the broad resource picture -- a synoptic review. If, during the presentation you have any questions, please speak out. I will be unable to see your raised hands, since the lights will be out.

The following high spots will be discussed during this presentation:

1. Resource estimates in the Gulf and southeastern Atlantic coast:

Outlined in this table are our estimates of the resource potential of interest to the fish meal industry. This summary will be discussed in greater detail on the following slides and should answer some of the questions that may arise. For discussion purposes the stocks have been categorized by depth strata (or ecological zones) where we believe harvesting will take place; these are surface, midwater and bottom. The bottomfish situation needs little discussion since they are being fished for in the Gulf and southeastern Atlantic.

Shown are Gulf and Atlantic surface, mid-water and bottomfish annual average commercial landings for a 5-year period (1959-64), our estimates of the potential tonnage available whether or not the potential tonnage could be harvested by present methods, whether or not vessels and gear are available and number of years of research needed before harvest of these resources could be accomplished. Included in surface fish group (herring-like and sardine-like fishes) are menhaden. Our estimates of potential tonnage of surface fish is based on no increase in menhaden production over that of the 5-year annual average.

Butterfish, harvestfish, and scad are given as representatives of the mid-water group. Several other fish, however, such as bumpers and other stomateids as well as the carangids or jacks are also present in large concentrations. Croaker, spot, and porgy are some of the common representatives of the bottomfish. Over 170 fish species, however, have been identified in the commercial bottomfish landings.

(Carpenter #3)

Although the fish species we are discussing have been categorized by depth strata where they are commonly found, this does not mean that these fish always occupy these depth zones. Vertical migration does occur.

2. Industrial fishery of the southeastern U.S. "today," depicted as average landings for 1959-64:

Menhaden and bottomfish fishing grounds are shown for the Gulf and Atlantic coasts. As you can see, these grounds are relatively confined geographically and are restricted by depths. The fishing grounds lie close to the reduction plant facilities which are illustrated here by the open circles. Several small localized operations are not shown on this chart.

3. Industrial fish potential of the southeastern U.S. unutilized pelagic and bottomfish stocks:

This chart, of the same area as the previous slide, shows the extent of fishing ground involved in our estimates. As shown by the increase in area of fishing grounds, a large expansion is possible both in the Gulf and southeastern Atlantic. As seen here, the potential grounds are farther offshore and they are spread out to cover almost all of the Continental Shelf area. The potential pelagic and bottomfish stocks in the Gulf are estimated at about 3 million tons, whereas off the south Atlantic coast they are about 2 million tons.

4. Surface and mid-water fish species:

These are representative of some of the more important unutilized fish species in which we are interested. They are divided into surface and sub-surface or midwater categories. Sizes of these fish are not necessarily comparable to one another. As mentioned on the first slide, there are several potentially important species that we have not shown here. These not only include some of the stomateids and carangids, but also several anchovy species.

5. Recorder tracing of a scad school:

This is a typical depth recorder tracing showing a school of scad located about 5 to 10 fathoms off the bottom. Although these fish are sometimes close to the bottom, most of them would be missed with a bottom trawl. As you can see, a midwater trawl, modified to fish close to the bottom, is needed to effectively harvest these fish. The distance between arrow points represents about 3/4 mile. The tracing with the high peaks and over-lying the scad, appears to be a bumper or harvestfish school.

During our midwater gear studies, fish schools that were shown on the depth recorder tracings were fished. By correlating species caught with the school configurations shown on the recorder tracings, we have reached a point so that we can now determine with reasonable accuracy the identity of fish schools by the type configurations or patterns they make on recorder tracings.

(Carpenter #4)

6. Recorder tracing of a butterfish school:

Butterfish is one of the more common midwater fish. These fish are widely distributed and are found in large concentrations. Catches of over a ton were taken during our midwater trawling program. We have in our film library underwater movies of escapement of these fish from midwater trawls.

7. Recorder tracing of a harvestfish school:

Harvestfish are widely distributed from Cape Cod to Brazil to the Gulf. Although in the Gulf these fish seem to be less abundant than some of the other midwater fish, we have recorder tracings showing large concentrations.

8. Recorder tracing of a bumper school:

Bumpers are also widely distributed and are present in large quantities --1/2 to 1-ton catches were made with midwater trawls even though recorder tracings indicated the school to be small.

All the midwater species we have "hit on" are also caught in bottom trawls, but volume production awaits midwater trawls or other new harvesting methods.

9. Protein yield of some Gulf and middle Atlantic fish species:

This data on protein content was abstracted from the Bureau of Commercial Fisheries Technological Laboratory files. It has been accumulated over the past 6 years. Samples were collected on a monthly basis and data are shown as annual averages. Tons of protein in 1,000,000 fish, shown at the top of this table, may be misleading to the industry people. Actually, 1,000,000 fish equals 333 tons. In menhaden about 14.5 percent of this weight is protein. This would amount to 48-49 tons of protein in 333 tons of fish. The horizontal yellow line extending through the vertical columns illustrate tons of protein yield for menhaden. Following this line, you can see the protein values for thread herring, butterfish, anchovy, razorbelly and bumper are considerably higher than menhaden. This relates to long periods of high oil yield in menhaden, which is inversely related to protein.

10. Oil yield of North Central Gulf thread herring and menhaden:

The BCF Technology Lab. has extensive data on oil yield of north Gulf menhaden and thread herring. Thread herring provides an ideal "off-season" potential if high oil yield is desired. This nicely complements menhaden for a year-round fishery. Thread herring fishing during high oil periods would provide somewhat lower protein yield than is shown in the annual average.

11. Oil yield for other North Central Gulf fish species:

Oil yield for razorbellies, bumper, butterfish, and anchovy shows lower percentages but there are seasonal highs in late winter to early spring. Anchovy appears to be the only species yielding sufficiently low oil to meet feed buyer's maximum oil content standard.

(Carpenter #5)

12. Fish school sightings along the Florida west coast:

This chart, which was shown at the IPD meeting in Moorehead City this past November, is an "off-season" school sighting record for the Florida west coast. Numerous other schools were sighted during this flight, but concentrations of less than 10 schools are not shown. During a flight conducted last December, approximately 500 surface schools were observed between Ft. Myers and Tampa Bay.

13. Aerial observations of surface fish schools:

This photograph shows an aerial observation of surface fish schools off west Florida. This past December an estimated 300 schools were observed in the areas of Gasparilla and Sanibel Islands. Some schools were estimated to contain more than 100 tons of fish. A few schools were also sighted south of Venice inside 5 fathoms or about 1-2 miles from the beach. Also, during a scouting flight in the first week of this month, an estimated 2,000 tons of schooling fish were observed south of Cape Romano.

14. Aerial observations of surface fish schools:

This slide also shows surface fish schools. The land mass in the background is Sanibel Island.

15. Gillnet catch of thread herring during off-season menhaden sampling program.

This photograph shows a gillnet catch of thread herring being brought aboard the Bureau's gear-research vessel George M. Bowers. These fish were taken in February off the west Florida coast during an off-season menhaden sampling cruise.

16. Operational areas for harvesting studies:

Shown here are potential operational areas for gear testing and methods engineering and commercial-scale fishing trials. Year round fishing is promising for west Florida. This is the only suitable area for year-round studies of harvesting methods. All conditions and all the important species are present. The north central Gulf and Georgia-South Carolina area appear to have best surface school fish indications during seasons coinciding with the menhaden fishery. Spring to fall commercial-scale fishing trials could be accomplished in these areas.

17. Thread herring stocks in the Gulf of Mexico:

This chart depicts the basis for estimating thread herring stocks in the Gulf. Our estimates are based on data obtained from BCF work of the Bowers and Oregon and aerial scouting -- and also from data yielded by commercial trials with conventional gear by Leon Kenny, Charles Bennett and George Castigliola.

(Carpenter #6)

We have divided the Gulf into two areas -- Florida and Texas to Alabama. In Florida waters, surface and midwater schools are present all year. Commercial trial catch rates have averaged about 30 tons per set, although catches of up to 60 tons per set have been made. From observations of thread herring schools along the Florida west coast, we estimate their density to be one surface school per square mile. There are 25,000 square miles of fishing grounds inside of 20 fathoms along the Florida coast. By multiplying tons of fish caught per set times the number of schools in one square mile times the fishing area, we come up with an estimated tonnage of 750,000.

In the Texas to Alabama area, our observations on thread herring are not as numerous as those observations for the Florida coast. Estimates of thread herring stocks in this area have been derived strictly from assumptions -- and are admittedly crude. We do know, however, that in this area surface schools are present in the summer, and midwater schools are present year round. Although the 250,000 ton value is strictly empirical, we think it to be a conservative estimate.

Our estimates of 750,000 tons of thread herring in Florida waters and 250,000 tons in waters from Texas to Alabama comes to a total of one million tons for this resource in the Gulf.

18. Thread herring catch:

This is a photograph of a thread herring catch in the hold of the Sea Rover. These fish were caught by Leon Kenny this past November off the Florida west coast and were landed in Pascagoula. Four sets were made on good bottom and three sets produced 101 tons of thread herring. This is an example of good catches that can be made when fish are in the right localities. Much of the time, however, they are in or over bad bottom.

19. Research and engineering for harvest:

In today's commercial fishery for surface school fish, a search to capture operation is carried out. We believe, however, with this type operation, a large segment of the resource potential is not economically available because of the present dependence on traditional methods, vessels and gear. Research and engineering for harvest is necessary to develop new fishing techniques. These studies can be grouped into three categories:

1. Attraction
2. Guidance
3. Control

In the fishery of tomorrow it will be possible to attract, guide and control fish until harvesting is accomplished. The following slides provide a glimpse of some of the possibilities in this relatively new area of fishing.

20. Attraction of fish schools into turbid water:

This slide shows a school of fish being lured from rough bottom area into an artificial sediment cloud. There is evidence to believe that several species

prefer turbid to clear water. If this should prove to be conclusive, then fish could be brought from bad bottom areas of clear water to clear bottom areas of turbid water.

21. Night-light attraction:

An example of how night-light attraction raised a school of scad from near bottom to surface is depicted in this slide.

While steaming between stations during an Oregon cruise, a school of scad was picked up at a depth of 225 feet on the depth recorder. The vessel was stopped and allowed to drift while a sub-surface night light was placed overboard and turned on. Here you can see fish responding to the light. They migrated from near bottom up through the water column and followed the drift of the vessel until the school was positioned directly under the light. Night-light attraction is very promising and we are doing limited work on it at the present. Nothing is really new about this type fishing, however, as the Japanese and Russians have been using it for some time.

22. Guidance using bubble curtains:

Everyone here, I believe, is familiar with the bubble curtain developed by the BCF in New England. This technique has been used with success on Maine sardine and herring. A few tests on menhaden, however, were not too successful. With further development and testing, this type fishing apparatus may prove to have widespread application for moving menhaden schools out of prohibited fishing areas into open waters - or moving schools from bad bottom to clear bottom.

23. Guidance over a large area:

Illustrated here is an example of how school movement may be subjected to guidance over a large area with the use of bubble curtains. I believe a large number of you are quite familiar with the area shown here -- the Chandeleur Sound, Breton Sound and Mississippi Sound areas. In this shoal water area, it is known that tremendous quantities of surface school fish are present in the summer months. By setting up a series of bubble curtains it may be possible to guide these fish to deeper, clearer bottom areas where harvesting can be accomplished. This, perhaps, is not as "way out" as it looks. It does not appear too costly if guidance requirements can be determined.

24. Control of fish with electricity:

Applications of electrical fields seem to offer the most promise for controlling fish. The passive use of electricity would be in combinations with bubble curtains and lights, etc.-- where fish are guided and attracted to the electrical field. Once in the electrical field the fish are controlled until they are pumped aboard the vessel. There may be a number of species highly susceptible to this technique. Active use of electricity would be the eventual possibility of school pursuit where towed electrodes can be used. Figure 1 shows a vessel towing an electrode approaching a school of fish. In Figure 2 the vessel encircles the school and in Figure 3 the school is caught and controlled in the electrical field between the vessel and the electrode.

(Carpenter #8)

25. Night surface trawling:

The 3-boat surface trawl is less sophisticated but exemplify other channels of promising research and development in harvesting surface schooling species. This may prove to be a promising fishing method in areas where there are numerous small schools, i.e., anchovies.

In this slide fish that have congregated around the anchored submerged light attractors or are being caught with the surface trawl. Rotation of boats would seem practical in this type operation. When the boat working the cod-end is filled, it would assume a towing position and an empty boat would drop back and load fish.

There appears to be some promise for variations of this method to be used both day and night.

26. Incidental filefish catches:

One of the many examples of still-to-be considered protein sources of the southeastern U.S. are the filefish. This slide shows large incidental catches of these fish taken during a snapper trawling survey off the southeastern Atlantic coast. Presently, there is no market for these fish. The skin is considered too leathery for the fish to be ground for meal....it clogs up the choppers.

27. Incidental shark catches:

Sharks are another example of protein sources in the Gulf and southeastern Atlantic waters. The estimated production cost for shark is about $75 to $100 per ton -- this cost could be reduced with new fishing techniques. Bi-products, such as valuable fins and hides, may make the fishery feasible again. We estimate the average density to be 10 sharks per square mile. This would amount to 1 billion pounds available in the Gulf. During our longline tuna work in the mid 1950's,we did everything in our power to keep from catching sharks. Still, we caught a great many, i.e., 69,300 lbs. were taken in 32 sets off the Mississippi River Delta along the 1000-fathom curve.

28. Resource estimates:

A quick return to slide No. 1 on resource estimates re-emphasizes the vast supply of unutilized raw material available. Some, such as bottomfish, are immediately available; however, intensive research and engineering is needed to bring much of the rest into ready availability within a few years. The total picture on resource potentials appears very encouraging.

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GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"UTILIZATION OF ALTERNATE FISHERY RESOURCES OF THE GULF OF MEXICO"

Travis D. Love, Director
Technological Laboratory
Bureau of Commercial Fisheries
Pascagoula, Mississippi

Most of the more valuable and presently exploited species of fish and shellfish of the Gulf are being utilized to the fullest extent. Consumer acceptance and monetary rewards usually bring maximum utilization of such species as shrimp, oysters, menhaden, red snapper, and speckled trout.

It should not be forgotten that we have a large resource of yellow fin, black fin, and other tunas in the Gulf of Mexico. Exploratory fishing and the catch by the two older type boats from the Van Cleave canning plant amply demonstrated that tuna could be taken in commercial quantities and that the product could compete favorably in the trade. The gear has been developed and technological knowledge exists which will permit ready use of these tuna stocks by some enterprising firm with good boats and a plant on the water front. Additional profits are now available from utilization of the tuna scrap in a premium catfood. The affluent society has a carriage trade in the catfood business.

I would like to point out that several processing methods are available to permit utilization of those species named by the previous speaker as available by presently known methods of fishing gear. In addition pet food and mink food are using large tonnages of croakers, silver eels, small flatfish, spot, small hard heads, and other fish taken for those industries. There are indications from exploratory fishing and from the large areas involved that a tremendous volume of these so called "trash fish" are under utilized. Added to the 12 or more additional species listed by Mr. Carpenter as available, it would seem that we have a tremendous resource of protein and oil from non-food fish for which some use should be found.

The Bureau's Technological Laboratory at College Park is developing processes for utilization of these huge stocks of fish as fish protein concentrate. These methods will permit volume handling by the processing plant of all marine animals on a round-the-clock basis. By this method we simply dump fish in one end of a chemical or enzymatic digester and out the other end comes an odorless, white, almost tasteless powder, similar in appearance to unbleached wheat flour.

At your joint meeting in Miami last year, Mr. Allen of our Washington Office, showed several slides illustrating the potential and the methods for processing FPC or fish flour. Many of you did not see those slides and I take the liberty of rerunning them here.

(Love #2)

Slide 1 shows diagrammatically that there is a potential yield in the U.S.A. of 7-1/2 million pounds of trash fish.

Slides 2 and 3 contrast the inadequacy of a continuous vegetable protein diet with a diet containing ample animal protein.

Slide 4 is a diagram showing the simplicity of the chemical process developed at the College Park Laboratory.

Slide 5 shows the simple enzymatic, or biological process, also used at College Park.

Slides 6, 7, and 8 show the new building and chemical equipment constructed as a scale pilot plant by the College Park Laboratory.

Slides 9 and 10 show equipment used to make an enzymatic digestion FPC. This method would be the one of choice nutritionally since it has been demonstrated that enzymatic digestion sometimes is accompanied by vitamin production.

The Pascagoula Laboratory has a research program going to determine protein, ash, oil, amino acids, trace minerals, and vitamins in several species of these Gulf fish. When new utilization occurs, we will have the nutritional data to support the industry in a consumer acceptance program.

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GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"REPORT OF CHAIRMAN, GSMFC ESTUARINE TECHNICAL COORDINATING COMMITTEE: COMMITTEE MEETINGS OF JANUARY 27 & MARCH 16, 1966."

Theodore B. Ford, Chief
Division of Oysters, Water Bottoms & Seafood
Louisiana Wild Life & Fisheries Commission
New Orleans, La.

Chairman Ford called the March 16 meeting to order at 2:00 p.m. He briefly reviewed the discussions which transpired at the New Orleans meeting of the Committee on January 27, 1966, and indicated that there was general approval of plans for a cooperative program entitled "Estuarine Inventory of the Gulf of Mexico." After the introductory comments, Dr. Ford reminded members that four committeemen had been appointed at the earlier meeting to draft standards pertaining to the four phases of the program. These were as follows:

C. R. Chapman	- - Area Description
T. R. Leary	- - Biology
J. E. Sykes	- - Hydrology
J. Y. Christmas	- - Sedimentology

Chairman Ford called upon those named for reports. Chapman distributed a suggested outline to be followed in obtaining and assembling data for Phase I of the estuarine atlas --Area Description. He suggested that official representatives on the Committee study the draft, suggest revisions where they are considered necessary, and return the revised reports to him for the redrafting of a mutually satisfactory plan.

Leary had earlier requested a review of sampling gear from several Committee members and distributed a report which listed gear in use for postlarvae, plankton, juvenile shrimp, subadult shrimp, adult shrimp, and adult fish. A discussion ensued which resulted in the decision that gear standardization would be extremely difficult over the entire range of estuarine systems in the Gulf. Nevertheless, it was suggested that further comments be forwarded to Leary in an effort to reduce the numbers and types of gear and to standardize as much as possible.

Sykes in reporting on Hydrology listed standard factors to be considered in the proposed inventory. These included primary productivity, ultraviolet absoprtion, iron, inorganic phosphate, total phosphate, nitrate, nitrite, oxygen, salinity, ammonia, and pH. He will submit a proposed list of determinations to Committee members, including sampling methods and techniques of analysis. This list also should be reviewed and suggested revisions and additions should be forwarded to him.

(Ford #2)

J. Y. Christmas stated that he had investigated the methods and needs of Sedimentological Studies and had almost reached the point of drafting a proposed design for consideration. This draft, when received by Committee members, should also be reviewed and returned to Christmas. He indicated that analysis of texture and organics was essential and that frequency of sampling should be standardized, preferably on a grid system and in consideration of depth and contour.

After these reports, additional comments were offered; it was suggested that members might consider the possibility of establishing a sediment laboratory through which all samples could be analyzed on a standard basis. Resulting data would be provided the collecting agency.

Another suggestion (Sykes) concerned the possibility of the National Oceanographic Data Center (NODC) aiding in the systematic arrangement and design work required for developing a coding manual, an ADP format for the Inventory. Personal contact and correspondence with NODC indicate that it is interested in development of the program and will be willing to work closely with us if desired. Should the group be interested in coding and assemblage of data by a central agency, NODC will be pleased to send a representative to the area for consultation.

At a later meeting of the Committee, a resolution was proposed to the Gulf States Marine Fisheries Commission regarding the need and acceptability of a Gulf Estuarine Inventory. A report of the Committee Chairman was accepted by the Commission on the following day.

A discussion was also held regarding the feasibility of planning an estuarine film cooperatively between the Gulf States and the Bureau of Commercial Fisheries. By termination of the Commission meeting, indications were that the idea was generally acceptable.

Committee members in attendance:

T. B. Ford, Chairman, Louisiana Wild Life and Fisheries Commission
Terrance R. Leary, Texas Parks and Wildlife Department
George W. Allen, Alabama Department of Conservation
J. Y. Christmas, Gulf Coast Research Laboratory (representing Dr. Gunter)
James E.Sykes, Bureau of Commercial Fisheries, St. Petersburg Beach, Florida
Charles R. Chapman, Bureau of Commercial Fisheries, Galveston, Texas
Lyle S. St. Amant, Louisiana Wild Life and Fisheries Commission

Other participants:

W. D. Gunn, Gulf States Marine Fisheries Commission
Walter R. Nelson, Alabama Marine Laboratory
Richard J.Hammerstrom, Public Health Service,Dauphin Island,Ala.
Jack L.Gaines,Public Health Service, Dauphin Island, Alabama
I.B.Byrd, Bureau of Commercial Fisheries, St. Petersburg Beach, Fla.

(Ford #3)

Other participants (continued):

J. G. Broom, Louisiana Wild Life and Fisheries Commission
Russell T. Norris, Bureau of Commercial Fisheries,
Washington, D. C.
Richard T. Whiteleather, Bureau of Commercial Fisheries,
St. Petersburg Beach, Florida

Several participants indicated a desire to hold another meeting of Estuarine Technical Coordinating Committee members in two to three months.

The meeting was adjourned by the Chairman.

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GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"DEPURATION STUDIES: EXPERIMENTAL SYSTEMS"

William F. Hill, Jr., Ph.D.
Deputy Director for Research
Gulf Coast Shellfish Sanitation Research Center
Dauphin Island, Alabama

The concept of depuration as applied to the controlled purification of shellfish, and in particular oysters, is a subject well understood by some of you. It is not my intention to summarize our total research effort since a subject of such scope far exceeds this presentation. My comments will be limited to reviewing some of our research facilities and test systems and discussing, in general terms, some of our findings and thus provide you with some insight into the activities of our research arena. At any rate, keep in mind that our research, obviously, has public health overtones. Headlines suggesting that our problems, unsolved, equate to a game of Russian roulette on the half-shell may help to sell newspapers but certainly serve no useful public service--and--indeed, exaggerate the urgency of the problem. However, purification of shellfish is a real public health problem and ideally should be accomplished where controlled environments will permit a consistent prediction of satisfactory levels of purity. If we consider depuration as a process for product improvement, we have made a step forward. If we consider depuration as a process for decreasing the margin of risk associated with oyster consumption, we have made an additional step forward. If we consider that 24 hour depuration or daily availability of depurated oysters may involve 3 to 5 days of processing in a continuous operation, we have made another step forward.

Much of the effort at our Center has been oriented toward the depuration of microbiological pollutants from oysters; emphasis being given to viruses. This is not to say that the entire area of chemical pollutants has been forgotten, for chemical contamination of shellfish is no less important and may well prove to be more difficult to deal with.

Let's take a look at the wet laboratory facilities where we conduct our depuration experiments. May we have the first slide please.

Slide No. 1: Slide showing the Research Center at Dauphin Island. The Laboratory consists of approximately 10,000 square feet of floor-space,including the experimental Wet Laboratory for applied shellfish research.

Slide No. 2: Slide showing the overhead seawater storage tank. The tank has a capacity of approximately 1000 gallons. The tank provides a positive pressure head to satisfy the seawater flow requirements of the wet laboratory.

Slide No. 3: Slide showing gate valves for directing and controlling the flow of seawater in the wet laboratory.

(Hill #2)

Slide No. 4: Slide showing the large capacity paired heat exchangers. The heat exchangers provide temperature control for our depuration studies. The design functional capacity of the heat exchangers is 25 gallons per minute with a 20 degree range of temperature.

Slide No. 5: Slide showing the interior of the Purdy ultraviolet seawater treatment unit. The unit consists of thirteen 30-watt UV lamps, each 36 inches long. The functional capacity of the unit ranges up to 150 liters (39.6 gallons) per minute with complete destruction of coliform organisms.

Slide No. 6: Slide showing a large horizontal flow-through depuration tank approximately 8 feet long, 4 feet wide, and 2 feet high. Also shown are oyster-holding baskets which hold roughly a half-bushel or 100 oysters.

Slide No. 7: Slide showing an empty horizontal depuration tank. The "V" bottom design facilitates clean-up. The tank also slopes toward the drain.

Slide No. 8: Slide showing the Purdy UV seawater treatment unit and the large horizontal depuration tank with twelve half-bushels of oysters preparatory to experimentation.

Slide No. 9: Slide showing a scaled-down UV seawater treatment unit consisting of two 30-watt UV lamps. This unit is used for experimental purposes only.

Slide No.10: Slide showing an experimental vertical depuration tank containing oyster-holding baskets. The smaller depuration equipment permits studies to be undertaken for evaluating flow-through versus recirculating seawater systems.

Slide No.11: Slide showing a scaled-down UV lamp seawater treatment unit and the vertical depuration tank as used in experimentation.

Slide No.12: Slide showing two vertical depuration tanks in operation.

Slide No.13: Slide showing the hookup of seawater temperature controlling equipment used with the vertical depuration tank systems.

Slide No.14: Slide showing two scaled down UV seawater treatment units and two small horizontal depuration tanks in operation. These may be set up as either a flow-through or a recirculating seawater system.

To generalize, we are well aware that the success of depuration will ultimately be reflected in those environmental conditions that influence oyster activity. Now--by oyster activity--we mean activity as measured by bacterial elimination rates. In our research studies, we use E. coli, more commonly referred to as the fecal coliform group, as our test organism. We, therefore, evaluate depuration efficiency in terms of bacterial elimination. Our studies have provided us with guidelines for establishing favorable environmental conditions for oyster activity. We have studied factors such as: (1) salinity; (2) temperature; (3) turbidity; and (4) depuration tank flow rates.

In terms of effective depuration of Gulf Coast oysters, we have demonstrated that salinity should range between 15 to 28 parts per thousand. We have demonstrated that temperature should range between 15 and 30 degrees centigrade. We have demonstrated that turbidity may range from zero to 70 parts per million. We have demonstrated that seawater flow rates through the depuration tank may range from 0.5 to 5 liters per oyster per hour. Under these conditions, the elimination of the fecal coliform group follows a predictable course.

Our virus research is applied, quantitative virology and our test model virus is Poliovirus, Type 1 (vaccine strain). Experiments designed to study oyster accumulation and elimination of this model virus have been undertaken under conditions considered to favor good oyster activity. Although the depth of our inquiry has just begun, pilot studies have indicated that poliovirus, like bacteria, is indeed accumulated and eliminated by oysters. Under certain experimental conditions--within the sensitivity of our enumerative methods--our studies have shown that poliovirus is eliminated below detectable levels within 24 to 48 hours.

The entire area of virus research, of course, represents a different order of magnitude. Here we are working with particles that: (1) are measured in millimicrons rather than microns; (2) are enumerated via a parasite host cell system; (3) are readily adsorbed to particulate matter in seawater; and (4) are found as aggregates as well as singles. There are certain features of quantitative virology, however, that facilitate enumeration. For example, we know that when viruses are counted by the plaque technique, then the counts follow a Poisson distribution. Such a statutory distribution of numbers dictates the analytical handling and thus raw data can be translated into meaningful and reliable information.

Where do we go from here? We are presently directing our research toward determining more precisely the combination of environmental conditions needed to consistently produce predictable endpoint depuration--that is, the time required for oysters to eliminate their microbiological contaminants below detectable levels.

As we continue the depuration studies, we are extending our effort to investigate and demonstrate the commercial feasibility of the depuration process. This includes further studies of the design of depuration tanks and ancillary equipment and of such factors as loading and mechanical handling of shellfish. In some of the slides, you saw our present experimental and pilot depuration facilities in the wet laboratory. We are now installing a larger pilot or prototype depuration system which will include a 24 bushel depuration tank. Beyond this larger pilot system, we hopefully look forward to the opportunity of constructing a commercial size depuration facility for experimental study and operation. We would also welcome the opportunity to conduct, in cooperation with the States and industry, pilot studies in commercial plants that may be established in the Gulf Coast area.

Many specific areas of research remain to be accomplished before the depuration concept is fulfilled. However, in closing, I might add--that successful depuration of oysters can no longer be considered a fantasy but rather a foreseeable reality.

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GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"BRIEF SUMMARY: PL 88-309 GULF STATES PROJECTS TO DATE"

I. B. Byrd, Federal Aid Coordinator
Bureau of Commercial Fisheries, Region 2
St. Petersburg Beach, Florida

The States of Alabama, Florida, Louisiana, Mississippi and Texas were allocated a total of $1,007,400 under the Commercial Fisheries Research and Development Act (PL 88-309) for fiscal year 1966. Similar allocations are expected for each of the next three years. The Gulf States have been most cooperative and enthusiastic in responding to the program made possible by PL 88-309. They have demonstrated their need for the program by submitting a total of 19 proposals for commercial fisheries research and development projects requiring a total expenditure of $2,957,127 consisting of $825,023 in state funds and $2,132,104 in Federal funds during the next three years. Several additional project proposals are presently being prepared or considered. Therefore, it is now apparent that the Gulf States will be able to obligate most of their 1966 Federal allocations before June 30, 1966. In addition, it is expected that most of the future Federal allocations to these states under PL 88-309 will be obligated almost as quickly as they are received. This kind of response to a program designed to assist the states in the development of their commercial fisheries must be attributed to the fine leadership of the state officials and the competence of their technical staffs.

The 19 project proposals submitted by the Gulf States to the Bureau of Commercial Fisheries to date are listed as follows:

ALABAMA:

1. Oyster raft production
2. Shell planting for oyster cultch
3. Construction of public docks for commercial fishermen
4. Construction of oyster rearing pond

FLORIDA:

1. Marketing of southern seafoods
2. Survey of clam populations of Florida
3. Study to determine commercial potential of family Scyllaridae
4. Study of reproduction of commercially valuable fishes of the west coast of Florida

(Byrd #2)

LOUISIANA:

1. Coordination
2. Coastwide study of penaeid shrimp
3. Ecology of Louisiana's estuarine waters
4. Oyster lease control monuments
5. Shell planting for oyster cultch
6. Section 4 (b) Rehabilitation and restoration of oyster seed grounds

MISSISSIPPI:

1. Cooperative Gulf estuarine study and inventory
2. A study of coliform bacteria and E. Coli on polluted and unpolluted oyster bottoms of Mississippi and a study of depuration by rebedding

TEXAS:

1. An evaluation of estuarine engineering projects
2. Construction of a Gulf research vessel
3. Construction of a coastal fisheries experimental station

Work has been initiated on seven of these projects to date and it is expected that work can be initiated under most of the other 12 projects by May 1,1966. Work may also be started by May on additional projects presently being prepared by the states.

Of the 19 project proposals submitted to date, nine have been for research, five for development, four for construction and one for coordination.

Twelve project proposals have been approved for the 75 per cent level of Federal funding, six for the 50 per cent level and one for the 100 per cent level. The project for the 100 per cent level of Federal funding was approved for Louisiana under the Disaster Section (Section 4 (b)) of PL 88-309 which did not require state matching. A total of $100,000 was approved under the project for the rehabilitation and restoration of oyster seed grounds that were damaged by Hurricane Betsy.

Thank you very much for allowing me the privilege of reviewing the progress of your PL 88-309 programs with you.

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(COPY)

GULF STATES MARINE FISHERIES COMMISSION
Biloxi, Mississippi
The Broadwater Beach Hotel
March 17-18, 1966

"THE OCEANOGRAPHIC RESEARCH PROGRAM AT GULF COAST RESEARCH LABORATORY"

Kirby L. Drennan, Oceanographer
Gulf Coast Research Laboratory
Ocean Springs, Miss.

First I will discuss oceanography in general, the importance of oceanographic research, and then more specifically discuss the oceanographic program at Gulf Coast Research Laboratory, and in order to do this I will use a series of slides.

SLIDES Oceanography can be defined very generally as the geography of the oceans and the study of all its phenomena.

SHOW SLIDES #12, 13, 14, 15, 16, 17, 25, 26, 27, 28,36, 37, 38, 40, 43, 44, 45, 46, 47
and in this area I feel that we at the Gulf Coast Research Laboratory are contributing to national oceanographic effort through a program of hydrographic investigations over the continental shelf of the northern Gulf of Mexico and aerial investigations in the central and southern Gulf. Support for this program is provided by the Office of Naval Research and the State.

The oceanographic research conducted during the past three years has consisted primarily of studies of the physical parameters over the continental shelf, that is, temperature and salinity, the seasonal variation of these parameters, their horizontal and vertical distribution, and the circulation, based on their distribution. The complexity of the circulation over the continental shelf is indicated from these horizontal plots of surface salinity for January and June. LANTERN SLIDES #1 and 2

These data were obtained from cooperative cruises conducted by Gulf Coast and the Texas A & M Environmental Research Facility at Panama City, Florida.

During January the fresh water discharge from the eastern passes appears to exert little influence on the surface salinity distribution in the northeast Gulf. Oceanic salinities of 35 and 36‰ are found within a distance of 25 miles east of the passes. The total river discharge was approximately 200,000 C.F.S. at this time.

These limited data suggest a westward flow in the area southwest of Panama City, Florida and a general cyclonic circulation system over the area.

The surface salinity pattern had changed considerably by late June, as we see from this slide (#2). At this time a tongue of lower salinity water extended

across the area with salinities of 30‰ shown southwest of Apalachicola, Florida. This is believed to be due in part to the drag exerted by a stronger eastward flowing current in the offshore regions. There is also what appears to be a well-defined westward drift along the Coast. The total river discharge at this time was in excess of 1,000,000 C.F.S.

The dominant factors controlling the circulation over the shelf are local winds, Mississippi River discharge, the quasi-permanent off-shore currents, and density variations result from ambient air temperature variations.

Infrared measurements of sea surface temperature have also been made at regular intervals over large sections of the Gulf of Mexico. An infrared radiation thermometer mounted in Coast Guard and Navy aircraft was flown along the track shown in the following slide in 1964 and 1965. SLIDE OF TRACK #3.

The radiometer measures the infrared emitted from the sea surface in the 8 to 13 micron band and converts this radiation to a measure of sea surface temperature. The infrared temperature is, in most instances, approximately 1°C cooler than the conventional bucket temperature measurement, which is representative of the temperature at a depth of 1 to 3 feet below the surface. SLIDE #4

This sea surface temperature field is depicted here by a series of isotherms (lines that connect points of equal temperature) which show the gradient from the near-shore to the offshore regions, and also defines the major surface circulation features. Here we can see the colder water from the various passes of the Mississippi River, a tongue of warmer water flowing up near the river, which is deflected by the outflow from the river, and the bottom topography to the northeast. The temperature ranges from a minimum of 56 in the near-shore regions to a maximum of 72 in the area south of the river.

In May of 1965, aerial investigations of the meteorological and oceanographic phenomena over the central and southern Gulf of Mexico were initiated by the Gulf Coast Research Laboratory in cooperation with the U.S. Coast Guard Air Station here in Biloxi. Monthly flights are conducted along this track over the central and southern Gulf. SLIDE 35 mm

We have aboard the aircraft, in addition to the infrared radiometer, a dew point hygrometer system and a vortex thermometer for continuous measurements of dew point and free air temperature respectively. SLIDE OF AIRCRAFT & INSIDE OF AIRCRAFT.

The objective of this program is to define the major surface features of the Yucatan current in the Gulf of Mexico. More specifically, the extent of this current into the Gulf and its spatial and temporal variations. In addition, measurements are made of the meteorological parameters associated with this major current.

(Drennan #3)

The use of aircraft as oceanographic platforms is relatively new to the field of oceanography, and we believe it offers great potential for oceanographic and meteorological research. We hope to install additional sensors aboard the aircraft and obtain an automatic data acquisition system to record the output of each of the sensors in digital form on magnetic tape, which in turn would allow us to reduce the data with presently available computer facilities.

The data obtained from these investigations will provide information on the interaction between the sea and the atmosphere, which is essential for an understanding of the small as well as the large scale meteorological phenomena such as hurricanes. It has been suggested by previous investigators, and evidence presented to indicate that a relationship exists between the direction of movement of hurricanes and the sea surface temperature field. That is, hurricanes tend to follow warm-water tongues or warm ocean currents in many instances, and they derive a major portion of their energy from the sea surface. One investigation, conducted by the Navy, showed a very distinct relationship between the intensity of a hurricane and the sea surface temperature field. As the sea temperature increased along its track, the pressure inside the eye of the hurricane decreased, resulting in increased wind velocity.

Another possible application of the data is in predicting areas that are potential hurricane breeding grounds. These are but a few of the many needs and applications for an increased knowledge of the oceans.

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