

## PROGRAM

(Commission Chairman Will G. Caffey, Jr., Presiding)

9:00 AM

### REGISTRATION

Courtesy The Broadwater Beach Hotel

9:30 AM

### CALL TO ORDER

### INVOCATION

Reverend L. C. Hoff, Pastor  
East Howard Baptist Church  
Biloxi, Mississippi

### ROLL CALL

### WELCOME ADDRESS

Hon. Jerry J. O'Keefe, Representative  
State of Mississippi  
Biloxi

### ADDRESS

*Self-Membrable Research - R. J. Whiteheart*  
George E. Steele, Jr.  
Director of Public Affairs  
Van Camp Sea Food Company

### ADDRESS

Jerome F. Anderson  
Field Director  
U. S. Bureau of Outdoor Recreation

### ANNUAL REPORT

Commission Chairman Will G. Caffey, Jr.

### RECESS

*Fifteen Minutes*

11:15 AM

### OBSERVATIONS ON DEPURATION OF SHELL-FISH

Cornelius B. Kelly, Director  
Northeast Shellfish Sanitation Center  
U. S. Public Health Service

### THE MISSISSIPPI OYSTER PROGRAM

Gordon Gunter, Director  
Gulf Coast Research Laboratory

12:15 PM

### ADJOURNMENT *Luncheon*

1:30 PM

### ENACTMENTS OF THE 1963 LEGISLATURES— PANEL

Commissioners:  
Richard H. Cory—Texas  
W. Randolph Hodges—Florida  
Claude D. Kelley—Alabama

2:00 PM

### COMMERCIAL SHRIMP OR FISH CULTURE— PANEL

Laboratory Work—  
David V. Aldrich  
Bureau of Commercial Fisheries  
Field Work—  
Lyle S. St. Amant  
Louisiana Wild Life & Fisheries Commission  
Legal Aspects—  
Joseph C. Jacobs  
Assistant Attorney General—Florida

2:40 PM

### REPORT—GSMFC SHRIMP BIOLOGICAL RE- SEARCH COMMITTEE SESSION, 10/16/63

Robert M. Ingle (Chairman)  
Florida State Board of Conservation

### RECESS

*Ten Minutes*

3:00 PM

### PROGRESS REPORTS AND DISCUSSION: GSMFC ESTUARINE TECHNICAL COORDI- NATING COMMITTEE SESSION

Presiding:  
Committee Chairman Theodore B. Ford  
Louisiana Wild Life & Fisheries Commission

Panel:  
Charles R. Chapman, Bureau of Commercial  
Fisheries

~~James E. Sykes, Bureau of Commercial  
Fisheries~~

Spencer H. Smith, Bureau of Sport Fisheries &  
Wildlife

4:30 PM

### ADJOURNMENT

5:00 PM

### MEETING OF RESOLUTIONS COMMITTEE

6:00 - 6:45 PM

### FILMS—CORONET ROOM

- The Sponge Industry
- Trawl Action At 250 Fathoms  
(Harvey R. Bullis, Bureau of Commercial  
Fisheries—Comments)

**Friday (October 18)**

**7:30 - 9:15 AM**

**COMMISSION EXECUTIVE SESSION BREAK-FAST—VOGUE ROOM**

**9:30 - 11:30 AM**

**EXECUTIVE SESSION—U. S. DEPARTMENT OF STATE—ESQUIRE ROOM**

**9:30 - 11:50 AM**

**SCIENTISTS' SESSION ON GULF OCEANOGRAPHY (From Lobby, 9:00 AM)**

At Gulf Coast Research Laboratory,  
Ocean Springs

Presiding: Gordon Gunter

**12:30 PM**

**LUNCHEON**

Mississippi Marine Conservation Commission—  
Host

Gulf Coast Research Laboratory Cafeteria

**ADJOURNMENT**

Followed by Visits to the Laboratory and the  
Recently Commissioned GCRL Oceanographic  
Vessel GULF EXPLORER.



**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  
Will G. Caffey, Jr. (Vice-Chairman)  
Max K. Lawrence, Sr. *L. W. Brannon Jr.*

**Florida**

W. Randolph Hodges  
Bruce J. Scott  
Walter O. Sheppard

**Louisiana**

L. D. Young, Jr.  
Alvin Dyson  
Feltus Daigle

**Mississippi**

George A. Brumfield  
Stanford E. Morse, Jr.  
Hermes Gautier

**Texas**

J. Weldon Watson  
Richard H. Cory (Vice-Chairman)  
Virgil Versaggi



W. Dudley Gunn  
Director

**GULF STATES MARINE FISHERIES COMMISSION**



**Fourteenth Annual Meeting**

**Biloxi, Mississippi**

The Broadwater Beach Hotel

Coronet Room

**October 17 (Thursday) - 18 (Friday), 1963**

Pre-meeting Session GSMFC Gulf Shrimp  
Biological Research Committee, 1:30 p.m.,  
October 16 (Wednesday)—Esquire Room

Ladies Garden Tour, 10:30 a.m.  
October 17 (Thursday)—From Lobby.  
Bill Baker, Horticulturist  
The Broadwater Beach Hotel



THE CAPITOL  
STATE OF MISSISSIPPI  
JACKSON

*No. 22-1117-10-10-1963*

# Gulf States Marine Fisheries Commission

**CHAIRMAN**  
RICHARD H. CORY, MEMBER  
HOUSE OF REPRESENTATIVES  
STATE OF TEXAS  
VICTORIA, TEXAS

**VICE-CHAIRMAN**  
GEORGE A. BRUMFIELD, CHAIRMAN  
MISSISSIPPI MARINE CONSERVATION  
COMMISSION  
BILOXI, MISSISSIPPI



**DIRECTOR**  
W. DUDLEY GUNN

**OFFICE SECRETARY**  
MRS. ELLEN S. HOOVER

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

## M I N U T E S

**REGULAR MEETING**

**THE BROADWATER BEACH HOTEL**

**BILOXI, MISSISSIPPI**

**OCTOBER 17-18, 1963**

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

M I N U T E S

REGULAR MEETING, OCTOBER 17-18, 1963  
THE BROADWATER BEACH HOTEL  
Biloxi, Mississippi

OFFICIAL ATTENDANCE OF COMMISSIONERS

	<u>PRESENT</u>	<u>ABSENT</u>
<u>ALABAMA</u>	L.W.Brannan, Jr. Will G.Caffey, Jr.	Claude D.Kelley
<u>FLORIDA</u>	W.Randolph Hodges Bruce J.Scott	Walter O.Sheppard
<u>LOUISIANA</u>	L.D.Young, Jr. Feltus Daigle	Alvin Dyson
<u>MISSISSIPPI</u>	George A.Brumfield Hermes Gautier	Stanford E.Morse, Jr.
<u>TEXAS</u>	J. Weldon Watson Richard H.Cory Virgil Versaggi	
<u>PROXIES</u>	George W.Allen George W.Allen Bruce J.Scott Robert M.Ingle George A.Brumfield	(For Claude D. Kelley) (For L.W.Brannan, Jr. 10/18/63) (For Walter O. Sheppard) (For W.Randolph Hodges, 10/18/63) (For Hermes Gautier, 10/18/63)
<u>STAFF</u>	W. Dudley Gunn Mrs.Ellen S.Hoover	

OTHER STATE GOVERNMENT REPRESENTATIVES PRESENT

George Williams, James N.McConnell, Lyle S.St.Amant, Theodore B. Ford, Jean Williams, Terrance R.Leary, Edwin A.Joyce, Jr., William J.Demorán, George A. Rounsefell, James G.Broom, Randall Pierce, Charles J.White, Joseph A. D'Alfonso, George H.Williams, Whitney C.Martinez, Walter R. Nelson, R. M. McPhearson, David Zoellner, T.H.Walker, Jack C. Mallory, Jerry J.O'Keefe.

UNIVERSITY LABORATORY REPRESENTATIVES PRESENT

Gordon Gunter, Patricia Bengirt, Thelma Rattisau, J.Y.Christmas, Wayne Watkins, Clarence P.Idyll, Charles J.Guide, Joseph A.Riehl, Lewis T.Graham, Donald J.Burney, G.Robert Lunz.

FORMER COMMISSIONERS PRESENT

Charles W. Bevis, Joseph V.Colson, Ernest C.Mitts, James H.Summersgill.

FEDERAL GOVERNMENT REPRESENTATIVES PRESENT

U.S. BUREAU OF SPORT FISHERIES AND WILDLIFE: Spencer H. Smith

U.S. BUREAU OF OUTDOOR RECREATION: Jerome F. Anderson

U.S. BUREAU OF COMMERCIAL FISHERIES: Charles H.Lyles, Travis D.Love, George W. Snow, R.T. Whiteleather, Milton J.Lindner, D.V. Aldrich, J. Bruce Kimsey, Harvey R. Bullis, Jr., James E. Sykes, C.R. Chapman, Richard A. Waller, E. Moret Smith.

U.S. PUBLIC HEALTH SERVICE: Lester E. Blaschke, R. J. Hammerstrom, C.B. Kelly, Frank J. Silva.

U.S. DEPARTMENT OF STATE: William C. Herrington

REPRESENTATIVES OF INDUSTRY PRESENT

John R.Nelson, John C.Ferguson, John Mehos, Lawrence W.Strasburger, Paul Kalman, Harry I.McGinnis, James L.McConnell, Ben Humphreys, James McPhillips, F.E. Haas, William A. Lasero, Ray Ladendorff, John W. Lewis, John B.Lincecum, Buddy Gillis, Nick Marvar, Theodore S. Shepard, Will L.Hardee, Ernest H. Powell,Jr., Emile Lapeyre,Jr.

REPRESENTATIVES OF COMMERCIAL AND SPORT FISHERY ASSOCIATIONS PRESENT

Joseph S.Ramos, O.M.Longnecker,Jr., W.V.Robertson, Bernard Lorino, William R.Neblett, Ronald W.DeLucien, Earl M.Rome, Pete Farrar, R.W. Myers, Vernon K.Shriner, Antoine Alario.

CLERGY.....TRADE JOURNAL REPRESENTATIVES PRESENT

Reverend L. C. Hoff

William Corbino, Winston Leonard

GENERAL SESSION, OCTOBER 17, 1963

Commission Chairman Caffey called the meeting to order at 9:45 a.m. Reverend L. C. Hoff, Pastor, East Howard Baptist Church of Biloxi, rendered the invocation.

Preceding the calling of the roll of Commissioners, the Chairman introduced Commissioner L. W. Brannan, Jr., of Alabama and Commissioners J. Weldon Watson and Virgil Versaggi of Texas; each having been appointed to the Commission since its last meeting.

Mississippi State Representative Jerry J. O'Keefe was introduced for the purpose of welcoming the group. In addition to extending a hearty welcome, Mr. O'Keefe spoke of the economic value of the Mississippi fisheries and of the importance to the fishery resource of interstate cooperation.

Mr. Richard T. Whiteleather, Assistant Director, Bureau of Commercial Fisheries, Region 2, was next introduced to apprise the group of a recently implemented menhaden research project. Copy of the presentation by Mr. Whiteleather is first attached to these Minutes.

The Chairman complimented the Bureau on the developing of such a comprehensive program of research and exploration for the important menhaden fishery, then presented Mr. Jerome Anderson, Field Director, U. S. Bureau of Outdoor Recreation, Region 5. Mr. Anderson's excellent coverage of the functions prescribed for the comparatively new Bureau was praised by the Chairman. Copy of the paper is second attached to these Minutes.

Before presenting the annual report of the Commission, Chairman Caffey reminded the delegates that copies of the 1962-63 consolidation of Gulf States' activities and those of the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife, were available on the literature table. Copy of the annual report is third attached to these Minutes.

A fifteen minute coffee break was taken and upon resumption of the morning session, Mr. Cornelius B. Kelly, Director, Northeast Shellfish Sanitation Center, U.S. Public Health Service, was introduced. His presentation was highlighted through the showing of films taken in various parts of the world where depuration of shellfish has made considerable progress. Copy of the address is fourth attached to these Minutes.

Dr. Gordon Gunter, Director, Gulf Coast Research Laboratory, was next introduced to speak about the Mississippi Oyster Program. A resume of his completely extemporaneous speech follows: Dr. Gunter pointed out that the former Seafood Commission did not look after the oyster industry very closely, but that the situation had changed completely when the Marine Conservation Commission was founded. The biologist for the Commission is a member of the Gulf Coast Research Laboratory staff, and he spends his full time working on shrimp and oysters. In the five years previous to the establishment of

this Commission the production of oysters was 85,000 barrels, and last year it was 260,000 barrels. By the planting of shells and seed oysters the Commission has established 5,000 acres of fine oyster bottom, where 3,220 existed before. The biologist carries 6 votes on the 10 man Commission with regard to biological matters. He and the chief inspector have worked together to manage the oyster reefs and to bring about observation of the laws in such a way that the industry and the Commission are working together better than at any time in history for the management of the Mississippi oyster reefs.

The Chairman recognized Mr. Charles H. Lyles, Bureau of Commercial Fisheries, Washington, D.C., who lauded the Commission for its early recognition of the importance of fishery landings records and its continued effort toward refinement of such data. He presented the Commission with two bound volumes; one containing Texas Landings (1949-60) and the other Alabama Landings (1950-51 & 1954-60); Mississippi Landings (1951-60); and Louisiana Landings; (1957-60).

Commissioner Young requested a moment prior to adjournment of the morning session and upon being recognized took the opportunity to express to Chairman Caffey the gratitude of the Commission for his endeavors during the year and as a further expression of appreciation presented the Chairman with an engraved plaque.

The session was adjourned for luncheon at 12:30 p.m.

At 2:00 p.m. Chairman Caffey called the afternoon session to order and introduced a panel composed of Commissioner W. Randolph Hodges of Florida, Vice-Chairman Richard H. Cory of Texas and Mr. George W. Allen (substituting for Alabama Commissioner Claude D. Kelley) of Alabama. The panel proceeded to inform the delegates of the enactments of their respective 1963 legislatures with regard to the marine fisheries. Copy of the above panel presentation is fifth attached to these Minutes.

The next subject presented concerned Commercial Shrimp Culture. Included on the panel were Messrs: Lyle S. St. Amant, Louisiana Wild Life and Fisheries Commission; Robert M. Ingle, Florida State Board of Conservation; G. Robert Lunz, South Carolina Wildlife Resources Department; David V. Aldrich, Bureau of Commercial Fisheries. Copy of these informative presentations is sixth attached to these Minutes.

Mr. Robert M. Ingle, Chairman of the Commission's Shrimp Research Committee was called upon for a report of the Committee's meeting of October 16. Mr. Ingle stated that the standardization of definitions of shrimp life history stages, that is, larva, postlarva, juvenile, etcetera; was discussed at length. It was decided, he said, that the Committee should go back and take all of the most important species and work out standards in terminology for the species in each individual case. He added, that a list would be prepared for further consideration at the March Commission meeting in New Orleans.

Mr. Ingle also stated that the group discussed the old problem of the best size shrimp to fish, mortality rate and related items. He concluded by saying that a reevaluation of research material already gathered was being made.

A ten minute recess was called at his juncture.

Upon resumption of the afternoon session, the Chairman recognized Dr. Theodore B. Ford, Chairman of the Commission's Estuarine Committee. Dr. Ford proceeded to review the history of the establishment of the Estuarine Technical Coordinating Committee by pointing out that the matter pertaining to the closure of Vermilion Bay for the purpose of creating a fresh water reservoir largely for agricultural purposes would have dealt a death blow to that important estuarine nursery grounds and shrimping areas as well as the high quality adjacent water fowl and fur-bearing marshes. The Commission was alert, he said, to the extent of the probable changes and their influence on the fisheries of this Gulf coastal area and the competition that other such Gulf coastal areas might be confronted with in the future. The Commission adopted a very appropriate resolution, he added, which was widely circulated to the various state and federal officials and agencies, and various private individuals and groups; the resolution commanding immediately considerable interest among the various groups concerned with estuarine fisheries and wildlife. Subsequently, with the advent of the Mississippi River-Gulf Outlet Navigation Project which would affect a tremendous area of the Louisiana marshes and Lake Pontchartrain on the east side of the river in the vicinity of New Orleans, the Commission recognized, stated Dr. Ford, the need for having its various scientific advisors to study the prospective influences of such projects on the several highly important estuarine areas located in the five member Gulf States, and created the prominent Estuarine Technical Coordinating Committee in 1958.

Following the establishment of this Committee, it has functioned on several occasions from which recommendations were offered to the Commission for the adoption of resolutions pertaining to either the conservation of or scientific research on estuarine areas. In our opinion, said Dr. Ford, this has stimulated substantial interest in ensuing work on estuarine problems.

In view of the various programs in effect by the states and the Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife of the Fish and Wildlife Service, it seems timely, Dr. Ford stated, that the two Bureaus be called on for a general summary and discussion of their efforts during the past two years. For instance: at our last meeting Mr. Spencer Smith, Regional Supervisor, Branch of River Basin Studies, Bureau of Sport Fisheries and Wildlife, made a very interesting presentation on the estuarine studies associated with the pre and constructional phases of the Mississippi River-Gulf Outlet project, Louisiana. We had proposed, continued Dr. Ford, to ask him to discuss other estuarine aspects of their program today. Unfortunately, his charts and graphs were lost while enroute to the meeting. Therefore, Dr. Ford requested that his part of the program be deferred until the Commission's next meeting in March 1964 in New Orleans.



We are fortunate, indeed, Dr. Ford stated, to have Mr. Charles Chapman of the Bureau of Commercial Fisheries, Galveston Laboratory, who is in charge of the Estuarine program emanating from that facility, to present aspects of their work as well as those under the supervision of Mr. Jim Sykes of the Bureau of Commercial Fisheries, St. Petersburg Beach Laboratory. Dr. Ford stated that Mr. Chapman was eminently well qualified to discuss this with us and that he was pleased to present him. Copy of Mr. Chapman's comprehensive report is seventh attached to these Minutes.

After Mr. Chapman's presentation Dr. Ford stated that in addition to looking forward to the presentation by the Bureau of Sport Fisheries and Wildlife at the March meeting, we hope to look forward to having general summaries presented by the technical representatives of the member states.

Chairman Caffey not receiving any response on call for further matters for consideration, expressed the appreciation of the Commissioners for the interesting and enlightening presentations of the day and the very fine attendance.

The session was adjourned at 4:30 p.m.

Meeting at 5:00 p.m. was the Resolutions Committee appointed earlier by the Chairman. Serving on the Committee were Commissioners Young, Brunfield and Versaggi. Messrs. George Allen (proxy for Commissioner Kelley) and Robert Ingle (proxy for Commissioner Hodges) also served on the Committee. The Commission's officers attended the session.

From 6:00 - 6:45 p.m. in the Coronet Room two very interesting and informative films were shown - the Sponge Industry and Trawl Action at 210 Fathoms. Some sixty-odd delegates attended and much interest was shown in each presentation. Mr. Bevis answered many questions concerning the Florida Sponge industry and Mr. Harvey Bullis' comments prior to the showing of the Trawl Action film are eighth attached to these Minutes.

#### Friday (October 18)

The Commission Executive Session began with the serving of breakfast in the Vogue Room at 7:30 a.m.

The Commissioners were joined at 9:30 a.m. by Mr. William C. Herrington, Department of State, and representatives of industry for a session in the Esquire Room, which meeting terminated at 11:30 a.m.

The scientists and guests gathered at 9:30 a.m. at the Gulf Coast Research Laboratory, Ocean Springs, where various subjects were brought up and discussed during a conducted tour of the facilities by Dr. Gordon Gunter and staff.

At 12:30 p.m. the Commissioners and meeting delegates gathered at the cafeteria on the Gulf Coast Research Laboratory campus where the Mississippi Marine Conservation hosted the group to a delightful seafood luncheon.

With some guests arriving as some were being served and with still others departing, the usual final session was not held. Had the session been held Commissioner Caffey would have passed the gavel to Commissioner Richard H. Cory of Texas, his successor to the Commission's chairmanship for 1963-64, and presented the Commission's newly elected Vice-Chairman for the ensuing year, Commissioner George A. Brumfield of Mississippi. Reading also would have been made of a general interest resolution which was adopted at the Executive Session; copy of which follows:

"BE IT RESOLVED that the Gulf States Marine Fisheries Commission go on record as approving in principle S. 1988 (88th Congress-1st Session), which legislation is designed to prohibit fishing in the territorial waters of the United States and in certain other areas by persons other than nationals or inhabitants of the United States; and

"BE IT RESOLVED that endorsement of the purposes of this proposed legislation is in no way intended to define territorial limits that are presently or may be claimed by any State of the United States; and

"BE IT FURTHER RESOLVED that copies of this resolution be transmitted to the members of the Senate Committee on Commerce, the members of the House Committee on Merchant Marine and Fisheries, and the Congressional Delegations of the States of Alabama, Florida, Louisiana, Mississippi and Texas."

A formal closing session likewise would have permitted announcement of the Commission's future meeting sites and dates which are:

1. Monteleone Hotel, New Orleans, Louisiana, March 26-27, 1964.
2. Brownsville, Texas (tentative) October 15-16, 1964.

Prepared by: W. Dudley Gunn  
Director

## M I N U T E S

### EXECUTIVE SESSION, BILOXI, MISSISSIPPI, OCTOBER 18, 1963

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

Commissioner Young moved that the Minutes of the March 1963 meeting be approved without reading. Commissioner Daigle seconded and upon vote the motion passed.

Copies of a suggested budget (copy herewith first attached) for fiscal year 1963-64 was distributed. The Director reported a true October 15 bank balance of \$15,801.82 on hand in the National American Bank, with all member states having paid current year's membership dues except Mississippi. Commissioner Brumfield reported that the Mississippi Marine Conservation Commission had voted at an early October meeting to increase the Mississippi dues from \$1,000 to \$1,500 per annum. He said that their Commission hoped to contribute up to the \$2,500 figure set as an annual maximum by the 1962 Mississippi Legislature when finances permitted. The Director then stated that with the increase of \$500 from Mississippi the Commission would have a 1963-64 operating fund of \$22,227.50 against an operating expense estimated and suggested budget of \$19,766.25.

Commissioner Young stated that he hoped it would be possible for the annual Louisiana dues to be increased from \$5,000 to \$6,000. Commissioner Young offered a resolution which would increase the salary of the Commission Director from \$9,500 to \$10,000 per year, retroactive to July 1, 1963. Commissioner Daigle seconded and upon vote the resolution, which is second attached, was adopted.

Commissioner Young moved that the budget under consideration be increased to carry salaries for the year of \$14,200. Commissioner Daigle seconded, and upon vote the motion passed.

The Director explained the salary arrangement of the Office Secretary, as had been approved by Chairman Caffey; that is, that the Office Secretary would receive \$300 monthly for work on Tuesday, Wednesday, Thursday and Friday of each week and \$16 per day for any Monday worked. Commissioner Cory moved that the arrangement with the Office Secretary be approved and that the budget be accepted with the estimated operating total being changed to read \$20,266.25. Commissioner Daigle seconded and upon vote the motion passed.

Commissioner Young, who served as Chairman of the Resolutions Committee at its October 17 meeting, proposed the following resolutions:

1. To Commission Chairman Caffey for his meritorious service to the body.

2. To the Mississippi Marine Conservation Commission for its gracious hospitality during the meeting, and with special thanks to Mr. George Williams and the law enforcement staff.
3. To Dr. Gordon Gunter and staff of the Gulf Coast Research Laboratory for the interesting and informative tour of the Laboratory.
4. To The Broadwater Beach Hotel management and staff for fine services rendered, and with added appreciative note for Mr. Bill Baker's conducted tour of the hotel grounds and gardens.

Commissioner Scott seconded the above for adoption and upon vote the resolutions were adopted. The resolutions appear in the order listed above as attachments to these Minutes; third, fourth, fifth and sixth.

With reference to future meetings, it was brought out that the March 26-27, 1964 meeting would be held at the New Orleans Monteleone Hotel. It was stated that the 15th annual meeting would fall on October 15-16, 1964 and that on the rotation plan the meeting would be held in Texas. Commissioner Scott moved that the October 1964 meeting be held in Brownsville. Commissioner Versaggi seconded and upon vote the motion passed.

Senate Bill No. 1988 (88th Congress- 1st Session) was discussed at length. Commissioner Young read a resolution which had been adopted by the Resolutions Committee, including distribution of the same. Commissioner Scott moved for adoption of the resolution. Commissioner Brumfield seconded and upon vote it was adopted. Copy of the resolution is herewith seventh attached.

Rules, regulations and laws affecting the commercial fisheries of the Gulf States was a topic presented for consideration by Mr. George Allen (proxy for Commissioner Kelley). During the discussion it was suggested that it might be well to hold a meeting of one or more persons, which each member state would send, one day prior to the March 26-27, 1964 Commission meeting for the purpose of not only studying the rules, regulations and laws, but to inquire into the licenses and taxes for possible inequities that might exist. Mr. Allen so moved. Commissioner Young seconded and upon vote the motion was passed. The Director was requested to prepare a questionnaire covering the various subjects to be considered. Commissioner Young volunteered to assist in its preparation. The Director was further requested to consolidate the accomplished questionnaires and to distribute them to the States at least one month in advance of the spring meeting.

Commissioner Watson nominated Commissioner Richard H. Cory for the office of Commission Chairman for the year 1963-64. Commissioner Scott seconded. No further nominations were presented and Commissioner Cory was acclaimed Commission Chairman for the coming year.

Commissioner Young nominated Commissioner George A. Brumfield for the office of Commission Vice-Chairman for the year 1963-64. Commissioner Versaggi seconded. No further nominations were presented and Commissioner Brumfield

was acclaimed Commission Vice-Chairman for the coming year.

No further business remained to be transacted and the session was adjourned at 9:30 a.m., whereupon the group was joined by Mr. William C. Herrington, Department of State, and representatives of the commercial fishing industry for a session which was adjourned at 11:30 a.m.

Prepared by: W. Dudley Gunn  
Director

# Gulf States Marine Fisheries Commission

**CHAIRMAN**  
**WILL G. CAFFEY, JR., MEMBER**  
**SENATE, STATE OF ALABAMA**  
**MOBILE, ALABAMA**

**VICE-CHAIRMAN**  
**RICHARD H. CORY, MEMBER**  
**HOUSE OF REPRESENTATIVES**  
**STATE OF TEXAS**  
**VICTORIA, TEXAS**



**DIRECTOR**  
**W. DUDLEY GUNN**  
**OFFICE SECRETARY**  
**EMILY C. CARR**  
**HEADQUARTERS OFFICE**  
**312 AUDUBON BUILDING**  
**NEW ORLEANS 16**  
**LOUISIANA**  
**TELEPHONE: 524-1765**

## SUGGESTED BUDGET FOR FISCAL YEAR 1963-64

### Estimated Income F/Y 1963-64

Alabama	\$3,500.00	
Florida	4,500.00	
Louisiana	5,000.00	
Mississippi	1,000.00	
Texas	<u>6,000.00</u>	\$20,000.00

### Estimated Funds Available

Cash on hand close F/Y 1962-63		
\$6,727.50 - \$5,000.00 Louisiana contribution paid in advance)	<u>1,727.50</u>	<u>\$ 21,727.50</u>

### EXPENSES

	<u>Per Audit</u> <u>1962-63</u>	<u>Suggested</u> <u>1963-64</u>
Salaries	\$ 13,700.00	\$ 13,700.00
Traveling	1,430.46	1,700.00
Office rent	1,080.00	1,080.00
Stationery, printing & supplies	440.65	475.00
Telephone & telegraph	539.49	525.00
Postage	184.21	250.00
Electricity	57.89	60.00
Equipment maintenance	69.28	75.00
Accounting	250.00	250.00
Insurance	247.92	250.00
Meeting expense	287.70	300.00
Publication expense	654.48	675.00
Payroll taxes	323.31	326.25
Depreciation	61.30	60.00
Sundry	<u>39.70</u>	<u>40.00</u>
	<u>\$19,366.39</u>	<u>\$19,766.25</u>

RESOLUTION

BE IT RESOLVED by the Gulf States Marine Fisheries Commission that the salary of its Director be increased from \$9,500.00 to \$10,000.00 per annum, effective at the beginning of the current fiscal year.

\* \* \* \* \*

The foregoing resolution was adopted by the Gulf States Marine Fisheries Commission, October 18, 1963, at a regular Commission meeting held at the Broadwater Beach Hotel, Biloxi, Mississippi.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission

RESOLUTION

WHEREAS, Will G. Caffey, Jr., appointee of the Governor of Alabama on the Gulf States Marine Fisheries Commission, has served as Chairman of the Commission for the year 1962-63; and

WHEREAS, he has served in a most distinguished manner, having not only discharged in a highly commendable fashion the duties of such office as set out in the Commission directives, but having additionally served the member Gulf States through his attendance and participation at meetings, conferences and hearings concerned with the marine fisheries resource.

NOW, THEREFORE, BE IT RESOLVED that the Gulf States Marine Fisheries Commission express to Will G. Caffey, Jr., its most sincere appreciation for the fine leadership he most generously provided the Commission during his term of office and during which period the objectives of the Compact so admirably advanced.

\* \* \* \* \*

The foregoing resolution was adopted by the Gulf States Marine Fisheries Commission, October 18, 1963, at a regular Commission meeting held at the Broadwater Beach Hotel, Biloxi, Mississippi.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission



RESOLUTION

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 October 18th 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.

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine Fisheries Commission, October 18, 1963, at a regular Commission meeting held at the Broadwater Beach Hotel, Biloxi, Mississippi.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission

RESOLUTION

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 October 17-18 meeting of this Commission at Biloxi, Mississippi.

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 of Mexico.

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine Fisheries Commission, October 18, 1963, at a regular Commission meeting held at the Broadwater Beach Hotel, Biloxi, Mississippi.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission


RESOLUTION

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express its sincere appreciation to the management and staff of the Broadwater Beach Hotel for the cordial hospitality and splendid food and services enjoyed by the group on the occasion of the October 17-18, 1963 meeting of this Commission at Biloxi, Mississippi.

BE IT FURTHER RESOLVED that this Commission extend its many thanks to Mr. Bill Baker for the interesting tour by the lady folk of the botanical gardens of the hotel.

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine Fisheries Commission, October 18, 1963, at a regular Commission meeting held at the Broadwater Beach Hotel, Biloxi, Mississippi.

  
W. D. Gunn, Director  
Gulf States Marine Fisheries Commission

RESOLUTION

BE IT RESOLVED that the Gulf States Marine Fisheries Commission go on record as approving in principle S. 1988 (88th Congress-1st Session), which legislation is designed to prohibit fishing in the territorial waters of the United States and in certain other areas by persons other than nationals or inhabitants of the United States; and

BE IT RESOLVED that endorsement of the purposes of this proposed legislation is in no way intended to define territorial limits that are presently or may be claimed by any State of the United States; and

BE IT FURTHER RESOLVED that copies of this resolution be transmitted to the members of the Senate Committee on Commerce, the members of the House Committee on Merchant Marine and Fisheries, and the Congressional Delegations of the States of Alabama, Florida, Louisiana, Mississippi and Texas,

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine Fisheries Commission, October 18, 1963, at a regular Commission meeting held at the Broadwater Beach Hotel, Biloxi, Mississippi.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission

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GULF STATES MARINE FISHERIES COMMISSION

Biloxi, Mississippi  
The Broadwater Beach Hotel  
October 17-18, 1963

"GULF MENHADEN RESEARCH PROGRAM"

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

1. Appropriation of this research program was made in August 1963 by the Congress in the amount of \$125,000.
2. The program financing was strongly endorsed by the menhaden industry, and as a result of favorable congressional action the Bureau is gratified that it is now possible to begin this long needed research.
3. There were earlier resolutions by the Gulf States Marine Fisheries Commission for Gulf menhaden research in years gone by. In fact, as early as 1950 the program was recommended. Also, in 1955 the Commission adopted a resolution that the Atlantic menhaden research program be extended into the Gulf and that funds for such studies be allocated on a contract basis through universities in the Gulf States. Some S-K funds were then allocated for this purpose; specifically, a contract was given the Gulf Coast Research Laboratory at Ocean Springs, Mississippi, which completed in 1960 a 3-year menhaden study to identify population units. The same funds supported a 1-year study at Tulane University in 1958 to describe and illustrate the larval stages of Gulf menhaden. In addition, the Bureau did some routine sampling of commercial catches from 1956 to 1959. Also, an analysis of the records of the exploratory fishing operations over a decade or more yields some information on the occurrence of menhaden in the Gulf. All of this work has provided a useful foundation for the Gulf menhaden program, but the present appropriation is the first regular financing for a full-scale program.
4. Some statistics on the Gulf fishery give us a good picture of the need for a research program. The menhaden resource in the Gulf of Mexico is composed of several species which are poorly known. At present, they support the largest fishery in North America. Prior to 1940, the annual purse seine catch was less than 15,000 tons. During the following decade, the industry began expanding, and by 1957 reached substantial magnitude. From 1949 to 1958, the annual catch fluctuated between 138,000 and 280,000 tons and averaged approximately 200,000 tons. Beginning in 1959, the catch increased each year and in 1962 amounted to 530,000 tons. The catch in 1963, for the first time, will exceed that in the Atlantic. In 1948, there were 34 vessels engaged in the Gulf menhaden fishery and 6 reduction plants, located in Mississippi, Louisiana, and Texas, processed the catch into fish meal, oil, and condensed solubles.

(Whiteleather #2)

In 1963, the number of vessels had increased to 69 and the number of reduction plants to 12. In fact, the recent rapid growth of the Gulf menhaden industry has been phenomenal.

5. The present program planning contemplates headquarters of the menhaden program in the Bureau's biological laboratory at Beaufort, North Carolina. This is where the current Atlantic menhaden program, which was initiated in 1955, is headquartered, and it seems judicious to place the menhaden biological research under a single headquarters staff since the resource being studied extends all the way from New England to Mexico. As the phases of the Gulf program are implemented, however, some substations or field stations will be established in the Gulf area. Facilities and personnel at the exploratory fishing and gear research base at Pascagoula, of course, will be called upon for those parts of the program related to their specialties.

6. The program has been planned to meet the requests of the menhaden industry for research to (1) investigate the causes of seasonal and annual fluctuations in the catch, (2) determine if the populations can withstand increased fishing on a sustained basis, and (3) conduct explorations to determine offseason distribution of adult fish. Since the landings at present are composed principally of one- and two-year old fish, a failure of the one- or two-year classes could cause a sharp decline in the commercial production. Knowledge of Gulf menhaden, including the existence and availability of the older segment of the menhaden population, could possibly soften the blow of any year-class failure, and also might provide the industry with some advance notice of adverse conditions. The Bureau program in the Atlantic has reached the point where reasonable predictions have been made from estimates of prevailing conditions.

7. The first year's program in the Gulf basically is made up of five activities:

1. Collection of biostatistics on the fishery, including sampling of the catch, compilation of catch records, and collection of effort data.
2. Adoption of ADP methods for tabulation and analysis of biostatistical data.
3. Evaluation of estuarine nurseries and estimation of juvenile abundance.
4. Biological studies concerning spawning, early life history, and population structure.
5. Exploratory studies to determine offseason distribution of adult fish.

All of this work will be done within the \$125,000 appropriation currently available.

(Whiteleather #3)

8. Extension of the work into the second year would require a total of \$200,000 if the program plan is to be followed implicitly. The \$75,000 additional would be required for a tagging study which would furnish information on the population structures and features of life history and migration. In fact, the first five years of the program are planned to obtain knowledge on all aspects of the resource. Since so little is known of the biology of the Gulf species, initial efforts must be directed toward understanding basic features, their life history, and behavior. As said before, several species occur in the Gulf of Mexico, and we must know which are important to the fishery at present (i.e., the catch by species). We must know which offer potential for future development. We must know their distribution and movements and changes that occur seasonally and over longer periods. We must know whether there is a mixing of the various stocks of fish. We must know the extent to which variations in the catch are due to variations in year-class survival rates of recruitment and mortality. We also must know as soon as possible about the offseason distribution of the adult fish of the species now taken mainly and the potentials in areas not now commercially fished. The program has been planned to accomplish these objectives in the shortest time possible, consistent with good research practices. It will not be possible to implement research on all of the above mentioned lines of inquiry at once. Initial studies will be performed by the Bureau. As the program develops and additional funds become available, contract work with other governmental agencies and academic institutions may be awarded when necessary and expedient to get the job done.

9. With the experience already at hand from about eight years of menhaden research in the Atlantic, we believe that the Gulf program can be launched with better than average expectations.

(COPY)

GULF STATES MARINE FISHERIES COMMISSION  
Biloxi, Mississippi  
The Broadwater Beach Hotel  
October 17-18, 1963

"BUREAU OF OUTDOOR RECREATION"

Jerome F. Anderson  
Regional Director, Southeast Region  
Bureau of Outdoor Recreation  
Atlanta, Ga.

Participation in the Gulf Marine Fisheries annual meeting is of special interest to me. I did participate in your annual meeting some three years ago and so my repeat performance here today has some connotation of a compliment. At least I can rationalize that my earlier appearance was not so bad that I was not invited back. At the earlier meeting I was associated with the U. S. Study Commission, Southeast River Basins and spoke on that subject at that time. I now hasten to add that this is not truly a repeat performance. This time I am here and intend to talk to you on the basis of recreation and the Bureau of Outdoor Recreation which has been established since I last met with you.

I look forward to the little "gems" of information that I will be exposed to as I listen and participate in your meeting. I recall one little "gem" of information that was passed on to me the last time I met with you in Mobile when I learned that some 10 million cats in the United States are fed at least one meal each day of commercially prepared cat food, most of which has a fish base. Most certainly this means the cats are big business to the fishing industry. I classify this as a little "gem" of information because I assure you that in the last three years, on many occasions when conversation has been dragging, I have dropped the comment about 10 million cats being fed one meal a day and always it seems to stimulate further conversation. I am certainly wondering what little "gems" I will pick up this time.

Let me turn from the business of "cats" to the subject of outdoor recreation.

Your business of fishing is closely related to sport fishing in our coastal waters. Outdoor recreation, in its broad sense, encompasses sport fishing as well as hunting and a broad spectrum of other recreation activities.

Mushrooming cities, sprawling urban areas, spiraling population gains, and increasing demands for land by industry and commerce all serve to remind us we have relatively little time in which to take effective action to dedicate additional out-of-door areas, particularly adjacent to metropolitan areas, and to provide improved access and, in many instances, improved management methods which will meet America's growing outdoor recreation needs.



(Anderson #2)

A report submitted to Congress in 1962 by the Outdoor Recreation Resources Review Commission noted that outdoor recreation resources are not nearly adequate to meet public needs now and for the future. More than ninety percent of all Americans now participate in outdoor recreation activities. These activities range from driving for pleasure to camping, hunting, fishing, boating, picnicking, swimming, and a multitude of other activities. The ORRRC Report also noted that the Federal efforts and activities in the recreation field were spread through some twenty or more agencies and were without a single effective focal point in the Federal Government. ORRRC recommended creation of a Bureau of Outdoor Recreation as a focal point.

Shortly after the release of the ORRRC Report, Secretary of the Interior, Stewart L. Udall, at the direction of the President, acted to establish the Bureau of Outdoor Recreation within the Department of the Interior. This was done on April 2, 1962. Thus the Bureau of Outdoor Recreation passed its first birthday on April 2 of this year. A little over a month later, May 28, 1963 to be exact, Public Law 88-29, the so-called Organic Act of the Bureau was signed into law by President Kennedy.

This Act defines in law the Bureau's specific responsibilities through the Secretary of the Interior for the promotion and coordination and development of effective programs relating to outdoor recreation. The Congress declared it to be desirable that all American people of present and future generations be assured adequate outdoor recreation resources. The Congress further said that it is desirable for all levels of Government and private interests to take prompt and coordinated action to the extent practicable to conserve, develop, and utilize such resources for the benefit and enjoyment of all the American people.

#### FUNCTIONS OF BUREAU OF OUTDOOR RECREATION

There are some seven major functions and activities in which the Bureau of Outdoor Recreation is active.

##### INVENTORY

Prepare and maintain a continuing inventory and evaluation of outdoor recreation needs and resources of the United States.

##### CLASSIFICATION

Prepare a system for classification of outdoor recreation resources to assist in the effective and beneficial use and management of such resources.

##### NATIONWIDE PLAN

Formulate and maintain a comprehensive nationwide outdoor recreation plan, taking into consideration the plans of the various Federal agencies, States, and their political subdivisions. The plan shall set forth the needs and

(Anderson #3)

demands of the public for outdoor recreation and the current and foreseeable availability in the future of outdoor recreation resources to meet those needs. The plan shall identify critical outdoor recreation problems, recommend solutions, and recommend desirable actions to be taken at each level of government and by private interests. The Secretary shall transmit the initial plan, which shall be prepared as soon as practicable within five years, to the President for transmittal to the Congress. Future revisions of the plan shall be similarly transmitted at succeeding five-year intervals. When a plan or revision is transmitted to the Congress, the Secretary shall transmit copies to the Governors of the several States.

#### TECHNICAL ASSISTANCE

Provide technical assistance and advice to and cooperate with States, political subdivisions, and private interests, including nonprofit organizations, with respect to outdoor recreation.

#### REGIONAL COOPERATION

Encourage interstate and regional cooperation in the planning, acquisition, and development of outdoor recreation resources.

#### RESEARCH AND EDUCATION

(1) Sponsor, engage in, and assist in research relating to outdoor recreation, directly or by contract or cooperative agreements; (2) undertake studies and assemble information concerning outdoor recreation, directly or by contract or cooperative agreement, and disseminate such information; and (3) cooperate with educational institutions and others in order to assist in establishing education programs and activities and to encourage public use and benefits from outdoor recreation.

#### INTERDEPARTMENTAL COOPERATION

(1) Cooperate with and provide technical assistance to Federal departments and agencies and obtain from them information, data, reports, advice, and assistance that are needed and can reasonably be furnished; and (2) promote coordination of Federal plans and activities generally relating to outdoor recreation.

These seven fields of activity that I have just gone over comprise the major functions of the Bureau of Outdoor Recreation; but of more immediate concern and interest to you, however, is how is the Bureau doing.

Basically, the first year of the Bureau was devoted primarily to examining the direction the Bureau's action should take and gathering together the key Washington staff members to carry out the task. Actually in the year and one-half or so of the Bureau's existence, there has been activity in all seven of the functions that I outlined to you. But with the first year basically being devoted to staffing up and establishing policies for the

(Anderson #4)

national level, the second year inaugurated the phase of gathering together qualified staff people for carrying the policies out in the field.

In a way I can be regarded as symbolic of the second phase of activity, that of gathering a field group together to carry out the work of the Bureau. I joined the Bureau of Outdoor Recreation as the Regional Director for the Southeast Region, which incidentally was the first Region established and I am the first Regional Director appointed. My timing was one day before the first birthday and since that time the Bureau has established six Regions covering the whole of the United States and six of the Regional Directors have already been appointed with the last one taking office the first of this month.

Turning again to the ORRRC Report, it was pointed out that the Federal agencies should not assume a role of domination but rather "the States should play a pivotal role."

Now let me turn to some of the complexities of State organizations in the recreation field. Most State outdoor recreation activity is found either in the parks, fish and game, or forestry agencies of the State; however, other State organizations such as the State highway or road departments are involved in recreation, to some degree, in one way or another. Altogether the States have some 500 offices concerned with outdoor recreation. This is an average of 10 per State and the range is from 4 to 26 agencies within a State. This wide variety of State arrangements for the planning and administration of outdoor recreation may be explained by differences in conditions between the States. I strongly suspect, however, that such explanation would be a little bit more rationalization than the full truth. Regardless of the reasons why, the facts exist. These facts compound greatly the difficulty of dealing with the States and the States one with another on outdoor recreation matters.

I do not mean to infer that all states should adopt a single organizational arrangement nor that recreation should be the controlling force in the administration of natural resources by the States. Recreation, however, should be a much larger factor in State organizational plans than it has been in the past years. It is my understanding that many of the States have recognized this very fact and I know here in the Southeast several have, within recent months, actually taken specific actions to make the State organizational structure more cognizant of outdoor recreation.

Money is an essential element whether it is for personal activities or for Government activities, either State or Federal. Accordingly, I would be remiss if I did not emphasize the Land and Water Conservation Fund Bill and its significance to the Bureau of Outdoor Recreation and outdoor recreation in general. A Fund Bill, regarded as a keystone for effective State and Federal action in the field of outdoor recreation, was recommended by President Kennedy, introduced in both Houses of the 88th Congress in February 1963 and was the subject of hearings by the Senate and House

(Anderson #5)

Interior and Insular Affairs Committees. The measure reflects closely recommendations of the Outdoor Recreation Resources Review Commission. Because the States play the key role in outdoor recreation, the bill places a special emphasis on assisting States in planning for outdoor recreation and in acquiring and developing recreation areas. Enactment of a Land and Water Conservation Fund Bill would provide significant and far reaching assistance to assure sufficient outdoor recreation resources for both the present and coming generations. Money would be available in significant quantities and would permit States to do twice as much in the recreation field.

In closing, let me say that it is indeed a pleasure to participate in the Gulf Marine Fisheries annual meeting and my ears are tuned to hear new "gems" of information.

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GULF STATES MARINE FISHERIES COMMISSION  
Biloxi, Mississippi  
The Broadwater Beach Hotel  
October 17-18, 1963

"COMMISSION ANNUAL REPORT 1962-63"

Will G. Caffey, Jr., Chairman  
Gulf States Marine Fisheries Commission

Reviewing the activities of this commission for the year and the related research and production of the Marine Fisheries in our member states it gives me great pleasure to report that it has been a good year.

A review of the resume compiled by the commission of State and Federal Research and Exploratory Activities for the past year shows that a great deal of effort has been expended by the several agencies for the good of the fishery resources of the Gulf and the industries sustained by them.

The beneficial results of scientific research is now paying off and increased production demands that research programing continue, perhaps on an even accelerated pace, and on a broader front, as commercial and recreational fishing pressure increases at an ever accelerating pace.

The marine fisheries with which we are concerned is indeed big business and numerous records - both in pounds landed and in value of the catches - have been set during the past year.

In total landings at Gulf ports we had a record of 1.4 billion pounds and the value reached \$94.5 million dollars.

Menhaden landings rose to approximately 1 billion, fifty-seven million pounds, which was a record high and the value rose to \$12 million dollars. As to shrimp the landings rose from 133.8 million in the previous year to 141.7 million pounds of heads-on shrimp and the value increased to a record high of 60.5 million as against 43.7 million dollars in the previous year. And the oyster fishery accounted for 18.8 million pounds with the value up three-quarters of a million dollars. Another record fell when industrial fish landings rose to approximately 97 million pounds. I could go on with other figures to indicate that this was indeed a record breaking year but I know that statistics are boring and that most of you are already intimately familiar with these figures.

The picture in the blue crab fishery is not as favorable. Production in round weight dropped to about 27 million pounds as compared with approximately 36 million pounds for each of the two previous years; and although production increased slightly during the first seven months of this year, it is too early to tell yet whether the decline which we have experienced is

(Caffey #2)

merely cyclic or whether a depletionary trend is being experienced. This is one area in which we certainly need a great deal of further knowledge based on scientific research.

Unfortunately, we do not yet have combined production figures on annual landings of such commercial and sports fishes as the trouts, drums, or flounders; the principals of the so-called inshore species. The commercial pressure on this group appears to have remained fairly constant for the past several years, according to official tabulations. While we do not have landing records for these fishes caught by the sportsmen, we are aware that recreational fishing pressure has and will continue to increase as the population, both resident and out-of-state, grows, as more leisure hours become available for this activity, and as a greater amount of the family income is being spent for the purchase of boats and fishing gear. That landing statistics on the increasing sports catch are needed seems evident.

It is good to note that the Bureau of Commercial Fisheries shrimp research program was further implemented during the year when the collection of data on spawning activity and larval abundance was expanded east of the Mississippi River Delta. I wish also to point out that, having proven their worth, the construction of artificial reefs continues to increase. The difficulty experienced by party boat and private boat operators in locating reefs is rapidly being corrected by the installation of bell and lighted buoys, and other navigational aids.

At its inception this commission realized that biological and allied research programs were fundamental to the accomplishment of its objectives. Therefore, this agency has always strongly supported the providing of adequate laboratory facilities. We were pleased during the past year to welcome three new laboratories to the Gulf area: The Bureau of Commercial Fisheries Gear Research Laboratory at Panama City, The Public Health Service Gulf Coast Shellfish Sanitation Research Center at Dauphin Island, and the Alabama Marine Resources Laboratory, also at Dauphin Island.

At the time of the formation of this commission, the U. S. Fish and Wildlife Service was operating a shellfish laboratory at Pensacola, with a temporary laboratory at Sarasota to study the Red Tide outbreak of 1947. In effect, we had one permanent Federal biological laboratory for the entire continental seaboard of the Gulf. At the present time the service, through the Bureau of Commercial Fisheries, maintains biological laboratories at Pensacola, Galveston and St. Petersburg Beach. In addition, the Bureau maintains a Pascagoula facility for exploratory fishing and gear development and, of course, the comparatively new Panama City installation now concentrating on shrimp trawl development, and action, as televised underwater. The Bureau's technological laboratory completed in 1957 resulted from an early request of this Commission. Turning to the States, fourteen years ago only one of the Gulf States' Marine Fishery Administrations maintained a coastal marine biological laboratory; namely Texas. For some years now Alabama, Florida, Louisiana and Mississippi have had laboratories in operation.

(Caffey #3)

Alabama's was replaced during the year, as has been stated, while others have been enlarged or have expansion authorizations in hand. During the year also new university or college laboratories have been established and the facilities of those already in existence have been expanded. We feel now that the research facilities on the Gulf are of an order that the gap of knowledge of our fisheries as against the rapid expansion of the numerous categories of the resource can be steadily closed.

Funding at State and Federal levels continues to improve as our legislative arms of government reassess from year to year the increasing importance of the fisheries. Another interesting observation is that the additional research facilities, and an accompanying expansion of programs, are providing a greater impetus for students in our State institutions to pursue studies in the marine sciences and to locate here on the Gulf.

In furtherance of the resolution adopted by this commission at the March meeting in Clearwater, Florida your Chairman and other representatives of the commission appeared and testified at the Senate committee hearings on the Bartlett Bill (Senate 627). This legislation, designed to promote State commercial fishery research and development projects and for related purposes, would make approximately \$1,000,000 of Federal funds available annually for five years to the Gulf States with a 25 per cent matching of State funds. The bill as amended to add additional moneys for hardships caused by production failures, passed the Senate with only minor opposition, but as of this date its House counterpart has not been scheduled for hearing. The passage of this legislation could be a real assist to fisheries programing in our area.

As to other commission activities: A meeting was held in the latter part of May at the request of the commission, to discuss oyster containers. State Marine Conservation representatives and State Health Agency representatives together with Public Health Service and Bureau of Commercial Fishery representatives participated in this discussion.

Also in May the Conference of Interstate Agencies established itself as a permanent body at a meeting attended by commission representatives in Chicago. The next meeting of this group will be held May 10-12 at the Hotel Roosevelt in New York City and all commissioners are cordially invited to attend according to our Commissioner Walter Sheppard, who was elected a Vice-Chairman of the Conference of Interstate Agencies.

Earlier this month technical representatives from the Gulf area attended hearings at Washington which had the purpose of reviewing on a national scale the problems of the oyster industry, both biologically and economically.

And speaking of future meetings, the Commissioners extend to all of you an invitation to join them for the spring session to be held at the New Orleans Monteleone Hotel on March 26th and 27th, 1964.

(Caffey #4)

As the end of my Chairmanship of the Commission is rapidly drawing to a conclusion, please permit me to express my appreciation to the Commissioners and to the many co-workers for their assistance throughout the year. \* all striving for the betterment of the Gulf fisheries and the industries which are sustained by these resources. This continued cooperative effort will mean much to the present and future welfare of our entire society. I also feel that I would certainly be remiss if I did not at this time recognize the outstanding contribution made by our Director, Dudley Gunn. Until you have had the pleasure of serving this commission as Chairman you cannot realize the considerable amount of work which Dud does day in and day out for this commission and the tremendous job which he is doing as our Director. To him I wish to extend my special thanks.



"OBSERVATIONS ON DEPURATION OF SHELLFISH"

Cornelius B. Kelly, Director  
Northeast Shellfish Sanitation Center  
U. S. Public Health Service

IT IS EXPECTED MR. KELLY'S PAPER WILL BE ATTACHED  
TO THE MINUTES OF THE NEXT REGULAR COMMISSION MEETING.

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GULF STATES MARINE FISHERIES COMMISSION  
Biloxi, Mississippi  
The Broadwater Beach Hotel  
October 17-18, 1963

"ENACTMENTS OF THE 1963 LEGISLATURES - PANEL (FLORIDA, TEXAS, ALABAMA)"

W. Randolph Hodges, Director  
Florida Board of Conservation  
Tallahassee, Florida

Chairman Caffey, Director Gunn, fellow members of the Gulf States Marine Fisheries and distinguished guests:

One of the more pleasant aspects of my job is the opportunity to attend these meetings of the Gulf States Marine Fisheries Commission. I say with complete sincerity that the State of Florida and those of us from Florida who are privileged to participate derive great benefit from these meetings and from our State's membership in this organization.

The fisheries problems of the Gulf States are quite similar. These discussions and the knowledge we take home of what our sister states are doing are most helpful in guiding us toward solutions of our individual problems.

I am flattered to have been invited to share the platform this afternoon with the distinguished Commissioners from Texas and Alabama, Mr. Cory and Mr. Kelley, and to bring you up to date on the laws governing the Florida fisheries enacted by our legislature this spring.

We were most fortunate this year. Our legislature was conservation-minded. Significant advances were made in all fields under the jurisdiction of the Board of Conservation. The salt water fisheries is only one aspect, although a singularly important one, of the responsibilities of the Florida Conservation Department. We also have responsibility for water resources, including flood control, waterways development, geology and beach erosion control.

But here we are concerned with the salt water fisheries division. Several significant pieces of fisheries legislation cleared the legislature. But, of course, we had our disappointments, too. We are dangerously thin in manpower in our law enforcement personnel --fewer than 90 men to patrol a coastline that stretches nearly 900 highway miles from the Alabama line to Key West and up the Atlantic for another 500 highway miles. I had hoped to obtain funds to add 30 uniformed officers to our conservation patrol. The legislature gave us but eight.

I am not pointing the finger of blame at our legislators. Our growth problem in Florida remains tremendous and our legislature faced a difficult problem in finding the money to provide all the services which are essential. Under

(Hodges #2)

the trying fiscal circumstances in which our state found itself, I admit that our agency was treated most fairly in the matter of appropriations. But it will press us to do the law enforcement job with the men we have. However, we will do it.

Perhaps the most significant legislation enacted by our legislature was the appropriation of \$250,000 for a crash research program aimed at finding a feasible method of controlling the red tide. I do not mean Bear Bryant's Red Tide over at Tuscaloosa which needs controlling too. I know I don't need to explain to you what the Florida red tide is. But I don't know if you realize what a problem it has become to us in Florida.

The periodic, massive fish kills by the red tide certainly have hurt our fisheries. That in itself would justify the crash program to control it. In addition, the red tide seriously is affecting tourism, which is so important a prop for our general economy. Although we have been wrestling with the red tide for many years, it only recently has become a topic of interest to the press. Unsightly pictures of dead fish littering our beaches and stories of the noxious odors that accompany red tide outbreaks flooded the nation's newspapers and news magazines this spring and even were published as far away as London. As you can imagine, this did not help our efforts to encourage vacationers to come and spend their time and money along Florida's lower Gulf Coast.

This special red tide study is being carried out under the direction of our Director of Research, Robert M. Ingle. Bob has developed a program in which I have great confidence. He already has started gathering together the highly-skilled technicians needed in the program.

Checks will be made on the principal elements of selected stations in the rivers, bays, estuaries and coastal waters from Clearwater to Naples. Muds will be analyzed similarly.

Samples will be taken and checked for the type and quantity of phytoplankton available over the entire range of red tide occurrences. We will seek to identify and ascertain the source of organic material in the red tide coastal areas which are vital to the growth of Jim Brevos.

We will continue and accelerate the laboratory work we have been doing in red tide research, cultivating phytoplankton and investigating particularly the role of H-2-S in the conditioning of sea water and we will increase our studies of the role of vitamin B-12 in the cultivation of the red tide organism.

Because of the physical nature of Florida, which makes for widely differing conditions along our coastline, much of our salt water fisheries legislation takes the form of local laws, applicable only to a single county.

(Hodges #3)

Most of these 1963 local laws continued the legislative trend of recent years to impose restrictions on the commercial fishermen by sealing off additional areas of inshore waters to netters or regulate the gear permitted for inshore commercial fishing. This trend is a natural follow-up to Florida's population explosion and the steady increase in tourism with the resultant increase of salt water sports fishermen.

Even though all the statistical information we have at hand in the Conservation Department has convinced us that commercial net fishing does not work to the disadvantage of the sports fishermen, we unfortunately cannot convince many of the sports fishermen or the operators of tourist businesses.

Several of our counties obtained local laws placing tight regulations on bait shrimping. For example, the legislative delegations of Escambia, Santa Rosa and Okaloosa counties joined to enact a law setting up a permit system for bait shrimping in Santa Rosa Sound and spelling out the gear that may be used and the quantity of bait shrimp that may be taken.

In the field of Fisheries General Law, the 1963 Florida legislature shortened the closed season on stone crabs. Formerly, it was illegal to take stone crabs between April 15 and October 15. Under the new law, the closed season on stone crabs runs from June 1 to October 15. This, of course, extended the lawful period for the taking of stone crabs 45 days. The Conservation Department endorsed the extension because our studies had shown there was no sound reason for continuing to close the season as early as April 15.

Our legislature also prohibited the taking of egg-bearing blue crabs, or as we know them more commonly, sponge crabs, in the entire area east of the Aucilla River. There remains no restriction on the taking of blue crabs in the Gulf west of the Aucilla River, the stretch we know as the Florida panhandle.

The striped bass was declared a game fish, taking it completely out of the commercial market. The legislature imposed a daily possession limit of six striped bass. This fish, of course, never has been important commercially in our state. It is not found in abundance in our waters, the principal areas being Nassau and Brevard counties. The Conservation Department supported this legislation. We feel that with the protective covering of this law the striped bass may become in future years an important sports fish.

One of the more significant legislative acts, in my opinion, permits the Conservation Department to use revenue received by the state from the sale of dead oyster shell for marketing research, transportation studies and promotion, as well as biological research. Formerly, the dead shell money was earmarked exclusively for biological research and was the principal support of our fisheries research program.

The vital biological research will not suffer because of the law permitting use of dead shell revenue for other purposes. Up until last year, we had

(Hodges #4)

been receiving about \$80,000 a year from sale of dead shell.

Shortly after I became Conservation Director July 1, 1961, I discovered that the state still was granting dead shell leases at fees that had prevailed during World War II, despite the inflation that had doubled or trebled prices of all other commodities.

I set out to renegotiate the dead shell leases, and found little resistance among the lease holders. As a result, revenue from dead shell sales has increased from an average of 10 cents per cubic yard to up to 26 cents per cubic yard, and the revenue has been increased to around \$200,000 a year.

I have long felt that marketing and promotion are the most pressing problems of our salt water fisheries. Increased productivity means little if there is no market for the fish landed. It is our plan to set up within the Department a marketing and promotion research section to study all aspects of the marketing program and develop suggested programs for increasing the sale of our fisheries products. By creating more demand we should lift the prices paid to the fishermen at the piers.

You will recall that at the meeting of this Commission at Clearwater last spring, it was suggested by representatives of the Federal Government that our states enact laws to restrict the activities of foreign fishing vessels in our waters, particularly those from the Soviet Union, Castro's Cuba and other Communist-dominated nations.

Representative Bruce Scott of Ft. Myers, who is the Florida Legislature's Representative on the Gulf States Marine Fisheries, introduced and secured enactment of a law which prohibits the licensing for fishing in Florida's territorial waters of any vessel owned in whole or in part by any alien power which subscribes to the doctrine of International Communism. This law also makes it unlawful for an unlicensed alien vessel to take, attempt to take, or have in possession any natural resources of Florida's territorial waters.

Lying as close to Cuba as Florida does, the problem of Castro's fishermen has worried us for some time. And we know that the Soviet Union has a substantial fleet of commercial fishing vessels operating out of a Cuban refuge.

We have had no trouble with Russian vessels. Occasionally we sight a Soviet flag trawler off our coast, but they merely have been in transit and apparently have scrupulously followed the restrictions under international law which permit vessels to take the most satisfactory route in moving from one place to another.

We do know, however, that Castro's Communist fishing boats covet the riches of Florida waters. With food supplies short in Cuba, particularly since the destruction of crops by hurricane Flora, we can expect Castro's boats

(Hodges #5) & (Cory)

to become more and more of a problem.

In closing, I want to call to your attention that Florida and Mississippi only recently have concluded a reciprocal agreement which will permit licensed Mississippi shrimpers to fish Florida waters without obtaining Florida licenses and grant Florida shrimpers the same courtesy in Mississippi waters. The agreement with Mississippi is similar to those previously effected with Georgia, Alabama and Texas, and I am sure will prove most valuable to the shrimpers of both Florida and Mississippi.

Thank you.

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PANEL CONTINUED - "ENACTMENTS OF THE 1963 LEGISLATURES"

Richard H. Cory, Member  
House of Representatives  
State of Texas  
Victoria, Texas

Shrimp (Chapters 339 and 340).

The Texas Shrimp Conservation Act was extensively revised to plug loopholes in the previous Act by providing more clear definitions of terms and providing better separation of bait and table shrimping. The amended law does not apply to Orange and Jefferson Counties which form the eastern extremity of the Texas coast and which have problems peculiar to themselves. It was provided that shrimping in those two counties would be left strictly to regulation by the Parks and Wildlife Commission.

Merger (Chapter 58)

A new agency, the Parks and Wildlife Department, was created out of the former Game and Fish Commission and the Texas State Parks Board. The new agency is under the policy direction of a three-man Commission. The Department succeeds to the functions of both former agencies.

Padre Island Seashore Area (Chapter 38)

The long, low-lying sandbar-type island lying off the lower 120 miles of the Texas coast experienced a milestone when enabling legislation was passed by the Texas Legislature permitting the designation of 80 miles of the island as a National Seashore. It is anticipated that the designation will increase the tourism attracted to the lower Texas coast as well as aid in the conservation of important fisheries found both inboard and outboard from the island.

(Cory #6- Panel continued)

Oyster Shell Dredging (Chapter 248)

The procedure by which permits for dredging of sand shell and gravel are granted was formalized and additional legislative guidelines were placed in the statute by this amendment. Full fact findings in relation to the criteria upon which granting or denial of permits is based are now required. To conservation criteria is added, "the requirement of industry for such... shells..." as one of the matters to be considered by the Commission.

Confiscated Equipment (Chapter 373)

Formerly, when contraband fishing equipment has been found, it has been public policy in Texas to cause the same to be destroyed. This statute permits contraband equipment to be used for research purposes by the University of Texas or Texas A & M University.

Netting of Predatory Fish (Chapters 5 and 287)

Controlled netting of black drum fish during winter months has been expanded in two counties by these Acts. The netting of these fish allows the utilization of an otherwise wasted fish resource and reduces the predation accomplished by black drum fish on game species.

Regulatory Responsibility of Parks and Wildlife Commission (Chapters 287 and 409).

Two additional Counties have been placed under regulatory responsibility of the Parks and Wildlife Commission, with respect to regulating the taking of marine species. The new counties, Aransas and Cameron, bring to 4 (out of 18) the number of coastal counties so situated.

Such regulation in Texas means that open seasons, bag and possession limits, and lawful methods of taking are prescribed by the Commission upon recommendations of staff biologists and after thorough airings at local public meetings.

The addition of these two counties, along with several inland counties, brings to 150 (out of 254) the number of counties over which some form of regulatory responsibility has been placed in the Parks and Wildlife Commission.

Sea Turtles (Chapter 390)

In aid of a movement to reestablish the sea turtle along the Texas coast, where they were once abundant, this statute was passed making it unlawful to kill or disturb sea turtles or their nests.

(COPY)

PANEL CONTINUED - "ENACTMENTS OF THE 1963 LEGISLATURES" (#7)

George W. Allen, Chief  
Seafoods Division  
Alabama Dept. of Conservation  
Dauphin Island, Alabama

OYSTERS: Section 131 of Title 8, Code of Alabama, as amended, is amended further to read as follows:

"Section 131. All oysters taken from the public reefs of this state shall be culled upon their natural reefs or beds as taken and all oysters which measure less than 3 inches in length and all dead shells shall be immediately replaced and scattered and broadcast upon the natural reefs or beds from which they have been taken, and it shall be unlawful for any captain or person in charge of any vessel or any canner, packer, commission man, dealer, or other person to purchase, sell or have in his possession or under his control any oysters off the public reefs or bedding grounds not culled according to the provisions of this title, or any oysters from such reefs or bedding grounds under the legal size aforesaid. Any excess of over five per cent of dead shells and oysters under the size prescribed herein shall be considered a violation of this section, and in order that the inspector may arrive at the percentage of uncultured oysters he shall cause to be culled according to law all or any part of cargo or stock on hand, and if the cargo or stock on hand is found to contain more than five per cent of dead shells and oysters under 3 inches in length, the inspector shall condemn said cargo and stock on hand and cause the same to be reculled and cause the shells and young oysters to be taken to some place designated by an agent of the division of seafoods; Provided, however, that the director of conservation shall have the authority by duly promulgated regulations to reduce the legal measure of oysters to be culled to a length of not less than two and five-eighths inches, with an allowance of not more than five per cent for under-sized oysters, and not more than five per cent for dead shells, when the said director so deems the said reductions expedient or necessary; and provided further, the director may in his discretion designate certain public reefs as to which an allowance of not more than twenty-five per cent for under-sized oysters may be provided from January 1 through May 31 in each year. Any person who violates any of the provisions of this section shall be guilty of a misdemeanor and upon conviction for his first offense shall be punished by a fine of not less than fifty dollars nor more than one hundred dollars; and upon his second conviction thereof he shall be punished by a fine of not less than one hundred dollars nor more than one hundred fifty dollars; and upon conviction of a third offense thereof shall be punished by a fine of not less than one hundred dollars nor more than two hundred dollars and the revocation of his license."

Approved April 12, 1963



(Allen #8)

ACT 254: Distribution of Excise Tax on Gasoline.

Section 1. That Section 647, as amended, of Title 51, Code of Alabama 1940, be and the same is hereby amended to read as follows:

"Section 647. (a) Every distributor, refiner, retail dealer, storer, or user of gasoline shall collect and pay over to the state department of revenue an excise tax of seven cents per gallon upon the selling, use or consumption, distributing, storing or withdrawing from storage in this state for any use, gasoline as defined or otherwise referred to in article 5 of Title 51, Code of Alabama 1940, and as amended; provided, that where the excise tax of seven cents per gallon upon the sale, use or consumption, distribution, storage, withdrawal from storage in this state of such gasoline shall have been paid to the state by a distributor, refiner, or by any retail dealer, storer, or user, such payments shall be sufficient, the intent being that the tax shall be paid to the state but once.

"(b) The state department of revenue is hereby authorized to issue to the United States certificates of exemption, upon forms prescribed by the department for use by the United States in purchasing gasoline within the state of Alabama and which is paid for by the United States. Any person in reporting and paying the tax to the department may deduct the number of gallons of gasoline sold to the United States, as shown by such certificate of exemption duly executed by the United States and filed with such report; and the department is authorized to adopt rules and regulations with respect to the issuance and use of such certificates.

"(c) The revenue, less the cost of collection, obtained from the taxes on gasoline, naphtha, and other liquid motor fuels, or any device or substitute therefor, commonly used in internal combustion engines, as is provided for in this section, shall not be used for any purposes other than the following, namely:

"(1) The revenue arising from the sale of gasoline, as herein defined for aviation fuel, shall be used exclusively for the purpose of paying the cost of acquiring, engineering, construction, improvement and maintenance of existing or proposed airports and other air navigation facilities within the state, for the payment of the salary of the state director of aeronautics, the salaries of other employees of the Alabama department of aeronautics, and for the payment of other administrative and aeronautical expenses of the Alabama department of aeronautics and for the further purpose of creating a sinking fund for the payment of the interest and retirement of the principal of all bonds which may be hereafter lawfully issued, sold and delivered for funds to be used exclusively for the enumerated purposes. All gasoline or any substitute therefor, sold or delivered to any airport within the state for use as fuel to propel airplanes, is hereby classified as aviation fuel.

"(2) The Legislature hereby finds as a fact that of all the gasoline sold in this State not less than thirty five one hundredths of one per cent thereof is used for marine purposes to propel vessels on inland and coastal waterways of this State. The Legislature hereby declares that it is the policy of this State to use the funds derived from the sale of marine gasoline to improve boating and boating facilities, seafoods and salt water sports fishing in this State. Effective on the first day of the month following the passage

(Allen #9)

and approval of this Act thirty five one hundredths of one per cent of all State imposed taxes collected on the sale of gasoline (except gasoline consumed in airplanes) shall be credited as follows: sixty per cent to the State Water Safety Fund of the Water Safety Division and forty per cent to the Seafood Fund of the Seafood Division.

"(3) The revenue arising from the sale of gasoline, as herein defined, for all other purposes shall not be used for any purpose other than for the construction, improvement, maintenance and supervision of highways, bridges and streets, including the retirement of bonds for the payment of which such revenues have been or may hereafter be pledged. The payment of the per diem and mileage of members of county governing bodies when engaged in supervising the construction, improvement and maintenance of highways, bridges and streets, shall be construed as used in supervision. However, the governing body of each county is authorized to expend an amount not to exceed one-third of the total amount of such revenue that may be received by such county in the payment of any debt that may have been incurred by such county for the construction or maintenance of roads or bridges. This fund shall be allocated in the manner now provided by law.

"On the 20th day of each month following that quarter of any fiscal year, all revenue derived from the sale of gasoline to be consumed in the motor of a boat or vessel as defined in (2.) above shall be allocated to the 'State Water Safety Fund' and 'Seafoods Fund'. On the 20th day of each month following that quarter of any fiscal year, all revenue derived from the sale of gasoline purchased and used for aviation fuel, less the cost of collection, shall be allocated to the state department of aeronautics, or to the Alabama aviation commission, as the case may be, and the counties and municipalities which own or operate public airports where aviation gasoline is sold or delivered in the following manner, namely:

"Of the first twelve thousand five hundred dollars (\$12,500) of such tax collected in any county in the quarter-fiscal year, the county and municipalities therein owning or operating public airports, or public airports where aviation gasoline is sold or delivered, shall receive twenty-five per centum (25%) thereof to be allocated to each unit of government owning or operating any such airport, whether it be the sole or joint owner thereof, in the proportion that the number of gallons of aviation gasoline sold or delivered at each of such airports bears to the number of gallons of aviation gasoline sold or delivered in the county; of the second twelve thousand five hundred dollars (\$12,500) of such tax collected in any county in the quarter-fiscal year, the county and the municipalities therein owning or operating a public airport, or public airports, where aviation gasoline is sold or delivered, shall receive fifteen per centum (15%) thereof to be allocated to each unit of government owning or operating any such public airport whether it be the sole or joint owner thereof, in the proportion that the number of gallons of aviation gasoline sold or delivered at each of such airports bears to the number of gallons of aviation gasoline sold or delivered in the county; of the third twelve thousand five hundred dollars (\$12,500) or over of such tax collected

(Allen #10)

in any county in the quarter-fiscal year, the county and the municipalities therein owning or operating a public airport, or public airports, where aviation gasoline is sold or delivered, shall receive five per centum (5%) thereof to be allocated to each unit of government owning or operating any such public airport, whether it be the sole or joint owner thereof, in the proportion that the number of gallons of aviation gasoline sold or delivered at each of such airports bears to the number of gallons of aviation gasoline sold or delivered in the county. Provided, however, if any public airport or airports is owned or operated by any unit or units of government outside of any county where such public airport or airports may be situated, such unit or units of government shall receive its pro rata share of the funds allocated in the proportion hereinabove stated. The remainder shall be paid to the state department of aeronautics, or to the Alabama aviation commission as the case may be.

"(d) Every distributor, refiner, retail dealer, or storer of gasoline shall add the amount of the excise tax levied and assessed herein to the price of the gasoline, it being the purpose and intent of this provision that the tax levied is in fact a levy on the consumer or user with distributor, refiner, retail dealer, or storer, or in the case of a licensed user, acting merely as an agent of the state for the collection and payment of the tax to the state."

Section 2. That Section 649, as amended, of Title 51, Code of Alabama 1940, be and the same is hereby amended to read as follows:

"Section 649. On or before the 20th day of each month, every distributor, refiner, retail dealer, or storer of gasoline, shall render to the department of revenue, on forms prescribed by the department, a true and correct statement of all sales and withdrawals of gasoline, as defined in this article, namely:

"(a) All gasoline sold or delivered to an airport for use as aircraft fuel during the preceding month, and

"(b) All other gasoline sold or delivered for any other use during the same period of time, and shall furnish said department such other reasonable information as it may demand and require, upon blanks to be formulated and furnished by the department, and at the time of making such report shall pay over to such department an amount of money equal to the excise tax levied under the provisions of this article."

"Section 3. All laws or parts of laws in conflict with the provisions of this Act are hereby expressly repealed.

(Allen #11)

" Section 4. This Act shall become effective immediately upon its passage and approval by the Governor or by its otherwise becoming a law.

" Approved August 16, 1963.  
Time: 1:34 P.M.

" I hereby certify that the foregoing copy of an Act of the Legislature of Alabama has been compared with the enrolled Act and it is a true and correct copy thereof.

" Given under my hand this 19 day of August, 1963."

JOHN W. PEMBERTON,  
Clerk of the House.

(COPY)

GULF STATES MARINE FISHERIES COMMISSION  
Biloxi, Mississippi  
The Broadwater Beach Hotel  
October 17-18, 1963

"COMMERCIAL SHRIMP OR FISH CULTURE- PANEL"

Lyle S. St. Amant, Chief  
Division of Oysters, Water Bottoms & Seafood  
Louisiana Wild Life & Fisheries Commission  
New Orleans, La.

During 1962 and 1963 four experiments have been carried out in which shrimp were raised in a quarter-acre pond. The pond was constructed above sea level by the establishment of a ring levee and is fitted for complete drainage. The bottom of the pond is essentially hard sand which did develop an inch or two of soft muck after extensive usage. The ponds were filled with sea water to depths ranging from two feet to eight inches. All water was screened and filtered to keep out the larger animals and predators that might survive the pump. Water was not circulated in the pond but additional water was added to account for evaporation loss.

Of the four experiments conducted two were carried out during the spring and early summer involving brown shrimp, and two were carried out during the late summer and early fall of each year involving white shrimp. In the fall experiment, in 1963, postlarva were used in stocking the pond and at the conclusion of the experiment it was determined that 86 percent of the shrimp were actually brown shrimp as compared to only 14 percent white. No feeding or fertilization was used to increase poundage. In one instance, in the spring of 1963, attempts were made to poison out predators with limited success. In all other experiments no poison was used and certain predators existed in the ponded area. The detailed results of the four experiments are shown in the following table:

	1962		1963	
	Spring	Fall	Spring	Fall
	Stocked with juveniles		Stocked with Postlarvae	
Starting Date	4-6	8-22	3-22	8-6
Duration	60 da.	63 da.	75 da.	62 da.
Ending date	6-5	10-24	6-5	10-7
Stocking rate/acre	18,000	12,000	20,000	12,000
Recovery/acre	13,216	10,352	8,992	7,960
Stocking wt. (lb.)/acre	19.23	29.61	Postlarvae	Postlarvae
Recovery(lb.heads on)/acre	79.88	201.48	145	76.80
Mortality rate	26.24%	13.73%	55.04%*	37.81%
Gain (lbs/acre/day)	1.01	2.73	1.93	1.24
Salinity range -0/00	23-26	26-35	32-35	23-35
Temp.range (degrees F.)	73-90	93-56	59-89	96-80
Count/lb.	166	50	62	B-122** W-55

\* Poison used to control predation. Distress noted among shrimp

\*\* Postlarvae mixed-Brown shrimp predominate although it was thought that all postlarvae were white shrimp.

Note: Some predators were in all ponds,

(St. Amant #2)

Several interesting facts may be determined from examination of the results tabulated above. Best production occurred when using white shrimp during the summer and fall months. It is also evident that the stocking rate is an important factor and over-stocking conceivably will reduce the poundage rather than increase it. Mortality rates in all cases are rather low and considered acceptable for pond culture. In all cases these mortality rates appeared to be lower than those reported for shrimp in open waters. The highest mortality rate at 55 percent occurred in the pond when poison was used to control predators and where some distress was noted among the shrimp. It is believed that additional experiments with proper stocking rates and either supplemental feeding or fertilization should produce poundages acceptable for pond culture on economical basis.

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PANEL CONTINUED - "COMMERCIAL SHRIMP OR FISH CULTURE"

Robert M. Ingle  
Director of Research & Asst. Director  
Florida State Board of Conservation  
Tallahassee, Florida

We find in Florida that there is no legal impediment to pond culture.

A party from Connecticut investigated pond culture possibilities from an investment standpoint in our state last year and seemed to think there were some laws which would impede such a development.

The cost of water frontage in Florida is quoted at figures sufficiently high as to rule out the economic feasibility of commercial pond culture at this time. It would appear that such land values will increase rather than decline in the future.

\* \* \* \* \*

PANEL CONTINUED (#3)  
"COMMERCIAL SHRIMP OR FISH CULTURE"

G. Robert Lunz, Director  
Bears Bluff Laboratories  
Wadmalaw Island, S. C.

There is a lot of marsh in South Carolina and there are some legal problems, particularly with state land. All of the coastal marshland of the state belongs to the state with the exception of that which was granted to individuals by King George III. There presently is no provision in the state laws to lease land for shrimp culture; this must be obtained through the General Assembly. It is not believed that this would be a major difficulty.

In South Carolina we have several ponds devoted to shrimp culture. One of these covers 50 acres and cost less than \$3,000 to build. This pond has high ground around three sides so that only one side required a dike. A 100 acre pond across the river from the Bears Bluff Laboratory cost even less to build.

Unlike Dr. St. Amant's ponds in Louisiana, the South Carolina ponds rely upon tides for the bringing of water and nutrients into the pond and the subsequent releasing of water from the pond. The tide at Bears Bluff is about 6 feet and the tides range from 4.6 to 8 feet in South Carolina. The Bears Bluff Laboratory has 6 ponds ranging in size from 1/10 of an acre to 2 1/2 acres. Temperatures in the ponds run as high as 95°F in August. The shrimp appear to thrive at the higher temperatures but white shrimp cannot stand temperatures at 41° to 42°. Salinity of the ponds varies from 8 parts per thousand shortly after storms to a high of 26 parts per thousand which is the normal status.

Production of shrimp at the Bears Bluff ponds has ranged to 250 pounds per one-acre pond of white shrimp after being grown for 90 days. These shrimp were of 40 count, heads on. Both natural stocking and a combination of natural stocking plus introduction of juvenile shrimp into ponds were used. Detritus and copepods come to the shrimp pond with the movement of the water with the tide. This is a food for the postlarval shrimp. Once the shrimp have reached the juvenile stage they are usually fed at the Bears Bluff Laboratories but to date never enough food has been fed. About 100 pounds per acre per month is fed. The amount of food necessary is quite a problem. A scientist from Ceylon visited the Bears Bluff Laboratories and suggested the use of chopped trash fish. The fish that is fed to the shrimp at the laboratories is frozen, then ground up in a coarse hamburger grinder to pieces the size of a pencil eraser. The shrimp love this food.

Predators are a problem in shrimp ponds. The 50 acre pond mentioned previously produced 480 pounds of shrimp one year together with 5,000 pounds of fish. That pond had not been treated with rotenone. Experiments have been made using tea-seed cake. These experiments were quite successful but extreme difficulty was experienced in obtaining tea-seed cake. Eventually

(Lunz #4)  
PANEL CONTINUED

enough of the cake was accumulated from diplomatic pouches sent from the far east to treat a one-acre pond. Rotenone is a reliable standard for treating ponds to kill fish. Usually about 3 pounds of 5% rotenone are used per acre foot of water. No bad effects on the shrimp have been experienced using this concentration. This is about 6/100 parts per million rotenone. The rotenone must be distributed very carefully. Two treatments are given during each season.

Ponds are stocked by draining about 2 feet of water from the pond on the ebb tide then permitting the incoming tide to refill the pond with water and the postlarval shrimp contained in the water. For some experiments juvenile shrimp are also netted and placed in the pond.

I strongly emphasize the need for work such as that done by David Aldrich and also that done by Bonnie Eldred, who works with Robert Ingle. It is my feeling that eventually we will be able to order so many postlarval shrimp for delivery on a certain date and these shrimp will then be used to stock the ponds; however, I do not believe this will be done for a number of years.

\* \* \*



(COPY)

GULF STATES MARINE FISHERIES COMMISSION  
Biloxi, Mississippi  
The Broadwater Beach Hotel  
October 17-18, 1963

"THE BUREAU OF COMMERCIAL FISHERIES  
GULF ESTUARINE RESEARCH PROGRAM"

Charles R. Chapman  
Bureau of Commercial Fisheries  
Galveston, Texas

Biological research in Gulf coast estuaries has been conducted by the Bureau of Commercial Fisheries and its predecessor agencies for many years.

For the most part, early studies treated individual species such as shrimp and oysters, were designed to solve specific but limited problems, or were of "survey" scope. While this type of investigation is still being conducted and represents the larger share of our research effort, a more recent innovation has been the initiation of specific programs to study the estuarine environment on a much larger and broader scale than had heretofore been attempted.

This broadening of our program's scope has resulted from the realization that estuarine complexes of the Gulf coast contribute more than 98 percent of the harvest of commercial fisheries in the Gulf area, and that estuaries are undergoing very rapid change (and in many cases, destruction) due to commercial, industrial, residential, and agricultural development. The value of the estuaries may be conservatively appreciated when we consider that more than 1,100,000,000 pounds of estuarine-dependent species were harvested from the Gulf area in 1960 alone. This figure does not include the harvest of an extremely large sport fishery which is supported by many of these same species.

In discussing any program of estuarine research, we must therefore acknowledge that a very large share of the research currently being conducted by the Bureau of Commercial Fisheries does, in fact, contribute either directly or indirectly to our knowledge of the estuarine environment and its biota. This contribution may be better understood if we provide a definition for the word "estuary."

Although there are many definitions, the following was adopted at a recent Bureau conference: "Estuaries are those shallow waters with fluctuating salinities that differ from those of the adjacent sea. Usually, but not always, they are semi-enclosed bodies of water. Physical factors resulting from the mixing of fresh and salt waters, and the resulting nutrient enrichment and high productivity of these waters, constitute the unique features of estuaries."

(Chapman #2)

Current research that provides for enhancing our knowledge of the estuaries may be considered for convenience of discussion to include at least three separate types, all of which are interrelated in various degrees. They are (1) supporting research, (2) cooperative research, and (3) specific estuarine research.

I shall first briefly discuss supporting research and cooperative research, and then review the Bureau's specific estuarine research programs in some detail. In so doing, I shall also locate the areas around the Gulf that are being studied.

1) Supporting research can be considered as research involving the study of a single species or a limited group of animals which are estuarine-dependent during all or part of their lives. Such studies may be conducted entirely or only partly in the estuaries. Frequently, contract research would fall into this category. Investigation of the shrimp resource is a good example of supporting research.

Supporting research is underway at all Bureau of Commercial Fisheries Laboratories and Field Stations on the Gulf coast, while Bureau-sponsored contract research is now being conducted at several points on the Gulf coast.

At the Bureau's Galveston laboratory, the Shrimp Fishery and Industrial Fishery Programs are working on coastal fishery resources from Texas to Florida. Our Physiology and Behavior Program is studying, by means of laboratory experiments, the physiological requirements of, and the effects of simulated hydrological changes upon, estuarine-dependent species found throughout the Gulf. In addition: the Bureau's Gulf-wide fishery statistics program inventories the catch of estuarine-dependent species; its Technological Laboratory at Pascagoula works with estuarine-dependent species; its various gear research programs assist in developing new and better methods for harvesting estuarine-dependent species; and its exploratory fishing program locates new harvest areas and stocks which frequently consist of estuarine-dependent species. The Bureau's laboratory at Gulf Breeze is working on problems now inherent in most estuaries, namely, the effects (role) of pesticides as well as general problems of the shellfish industry.

Thus, much of the Bureau's research effort on the Gulf coast does, in effect, contribute toward our knowledge of the estuaries and lends considerable support to specific estuarine research programs.

Also worthy of mention is Bureau-sponsored contract research on shrimp which is being conducted by the University of Texas in the Aransas Pass area, by Southwestern Louisiana University in Vermilion Bay, by the Gulf Coast Research Laboratory in Mississippi Sound, and by the University of Miami in Everglades National Park and the Florida Bay area of Florida.

(Chapman #3)

2) Cooperative research includes joint studies by more than one organization for mutual benefit, in which distinct functions or perhaps limited objectives are involved. Individual efforts, of course, would frequently be considered supporting research. Bureau of Commercial Fisheries research programs are cooperating with numerous other Federal, State and private organizations. For example, the estuarine program at the Galveston Laboratory has cooperative field studies underway with the Corps of Engineers and Texas Water Pollution Control Board. We also exchange data with our own laboratory programs, and hydrological data with the Southwest Research Institute (for NASA). We also give technical assistance and certain data to the Branch of River Basin Studies in two regions, and just recently to the Louisiana Wild Life and Fisheries Commission. Similar cooperative efforts are being conducted by other laboratory research programs. Cooperative research usually pays big dividends. Since research is expensive, this is an excellent way to stretch our budgets.

3) Specific estuarine research can be considered as investigative activity that is separately funded and is usually devoted entirely to an approved estuarine study. Such research frequently consists of ecological or environmental studies conducted over an entire estuarine system. Of necessity, these studies are often divided into several parts for administrative purposes. Specific estuarine research is presently being conducted in the Galveston Bay area by the Bureau's Galveston laboratory, and in the Tampa Bay area by its St. Petersburg Field Station. Estuarine research, as a separate project, is also being conducted in the Pensacola area by our laboratory at Gulf Breeze.

The estuarine programs of the Bureau of Commercial Fisheries have as their ultimate objective a single goal, namely, to assure that fishery resources receive adequate consideration in multiple-use planning for and development of water resources and estuarine basins, and insofar as possible, to secure from them maximum sustained harvests.

In working toward this goal, several different approaches are used, not only by different laboratories but by the same specific estuarine research programs.

Thus, the St. Petersburg Field Station has undertaken study of the estuarine areas along these lines:

1. Bottom study - to provide an index of estuarine condition. Study results should be useful in estimating the effects of environmental change.

2. Faunal studies - to determine the dependency of immature forms upon the estuary, and to attempt to relate seasonal and areal occurrence of animals in the estuary to measurable hydrological and hydrographical factors.

(Chapman #4)

3. Hydrological and plankton studies - to determine the extent and composition of phytoplankton and zooplankton since they are basic elements in the "food chain." Such studies would also define the hydrological character of an estuarine system.

4. Water chemistry and primary productivity studies- to better understand the role of the chemical environment in the ecology of estuaries. It is hoped that a knowledge of the primary productive capacity of estuarine areas will provide a measure of their value.

The St. Petersburg Field Station also plans to study circulation, flushing, and transport characteristics of a large estuarine system.

The Gulf Breeze Laboratory, previously mentioned as carrying out supporting research, also conducts specific estuarine research. Its personnel are studying low-, intermediate-, and high-salinity areas within an estuarine system. Seasonal distribution and abundance of estuarine animals, including both benthic and pelagic forms, are recorded for each area. Standing crops of phytoplankton and rates of photosynthesis have been measured to determine primary productivity. Clams have been used as bioassay animals and it is expected that monthly checks of their growth rates will prove useful in monitoring changes in the estuarine habitat.

The Bureau's specific estuarine research program at Galveston was initiated in 1959. Early work was devoted to determining the types and scope of research necessary. During this period, our program was divided into three separate projects: (1) "Ecology of Western Gulf Estuaries." (2) "Effects of Engineering Projects," and (3) "Evaluation of Estuarine Data."

The first project, Ecology of Western Gulf Estuaries, was initiated as a small effort, to study species composition and relative abundance in two small but different types of estuarine areas--one of high salinity and the other of low salinity. The low-salinity area has since been found to be the more valuable nursery area. Although much valuable data were obtained from these earlier studies, it became increasingly evident that the study's scope should be greatly increased to fulfill stated objectives, and broadened to include study of the Galveston Bay estuarine system as a whole. This change was effected on January 1, 1963. In keeping with our expanded approach, specific project objectives were delineated as follows:

- 1) To determine the composition and size of fish and shellfish populations inhabiting selected Gulf coast estuaries and coastal marshes;

- 2) To describe and monitor the hydrological environment of these estuaries;

(Chapman #5)

3) To determine the long-term functional relationships between estuarine populations and measurable characteristics of the environment, including that of coastal marshes;

4) To determine ecological differences and similarities between several estuarine systems;

5) To develop a level of value for estuarine areas and their component habitat types.

Under our revised project, we have subdivided the Galveston area into seven subareas for study. Each subarea incorporates two to five distinct habitat types, namely, channels, open water, shoreline or surf zone, connecting bayous or tertiary bays, and special situations such as oyster reefs. Adjacent marshes as a habitat type will be added to the study next January. We now sample at 65 stations twice monthly. Stations are distributed so that the survey includes locations in each habitat type within each subarea. Hydrological data and biological material are obtained at each station. Populations of various fishes, crustaceans, and mollusks are sampled for density measurements and life history data. A study of the relationship between bottom sediments and benthic animals is also underway. Much detailed hydrological data is provided by the Corps of Engineers which is collecting such data for use in a model study of this area to be undertaken at its Experiment Station in Vicksburg. In addition, the Texas Water Pollution Control Board has initiated a rather large pollution survey of the area and presently samples at 165 stations, of which 33 duplicate ours. They furnish us with a detailed water-quality analysis from each station. We, in turn, make available our hydrological data to both of these organizations. All hydrological and biological data are being entered on ADP cards and then tabulated and analyzed on an IBM 1620 computer.

Future plans for the ecology project include: (1) a study of primary productivity in which we will attempt to develop a method of measuring and determining the value per unit area of estuarine habitat; (2) the development of better estuarine biological sampling gear; (3) a study of the contribution and value of marshes adjacent to estuarine water areas; (4) the contribution of tributary inflow; and (5) the effect of changing water quality. Incidentally, the primary productivity study will start next January. Similar studies will be conducted simultaneously by several Bureau laboratories on the South Atlantic and Gulf coasts. Results of this work will reflect our participation in the forthcoming "Biological Year."

Since 1960, our biologists have also been working directly with the Branch of River Basin Studies field personnel from Region 2, assisting them in evaluating all engineering construction projects on the Texas Coast. We review drafts of BRBS reports for Coastal Louisiana (Region 4) and provide data and consultant services on the fishery aspects of many major projects. In addition, we have undertaken a thorough review of literature pertaining to past research in Gulf coast estuaries and are compiling

Chairman #6)

information and data on the relationship between water development projects and estuarine resources, the resultant problems, and possible solutions.

My remarks about the Bureau of Commercial Fisheries programs of estuarine research cannot begin to cover the multitude of details or the amount of work being done. To those of us who bear part of the responsibility for this research effort, as well as the application of its findings, it is obvious that we have come a long way, but have much farther to go. It seems that we no sooner solve one problem than a dozen more arise and demand solution.

Most of you are aware of the work that has been accomplished and that still continues on the Mississippi River-Gulf Outlet Project in Louisiana. Potentially, this project concerns most of us. However, we are now facing a project that makes the Gulf Outlet look small in comparison. I am referring to the Texas Basins Project in Texas. This joint effort by the State of Texas, Corps of Engineers, and Bureau of Reclamation could detrimentally affect the entire commercial fishery of the Gulf coast by virtually eliminating large segments of the industry in Texas.

This project, plus others that are planned, would capture most of the tributary inflow to the Texas Coast, particularly in east Texas, and divert it by means of a large inland canal to southwest Texas for irrigation, municipal, and industrial uses. More than 60 reservoirs would be built on the major streams of Texas. Most of these would eventually be built even if this project is never authorized, but the significant factor here is that much of the water released from these reservoirs would not be permitted to flow to the coast. The Bureau of Reclamation has estimated that by the year 2010, an average of almost 55 percent of the water now flowing to the coast would be diverted for other use, and that during dry years, almost 90 percent would be diverted. Thus, during dry years, tributary discharge to Sabine Lake would be reduced 89 percent, to Galveston Bay, 93.5 percent, to San Antonio Bay, 99.7 percent, and to Corpus Christi Bay, 100 percent. A single feature of the Texas Basins project, the "trans-Texas" canal, would be responsible for 30 to 40 percent of this reduction in tributary flow, this figure being subject to considerable variation from area to area and from year to year.

The Bureau is gravely concerned over the future prospects of the commercial fishing industry in Texas. If we but realize that more than 98 percent of the commercial harvest from the Gulf Coast is composed of estuarine-dependent species, the future does not look bright unless some solution can be found now before material damage is done.

We have been working with the Branch of River Basin Studies on this problem but our preliminary analyses of the project's potential effects have indicated that much greater effort must be expended. For instance, the volume and value of the commercial industry in Texas for each estuarine system

(Chapman #7)

must be established. This is being done by using the most recent harvest figures available from our Branch of Statistics. The Bureau of Reclamation is providing us with data on tributary discharge by months from 1941-1962 for each estuarine system in Texas. We will attempt to establish the relationship between tributary discharge and commercial harvest and use this relationship to set minimum requirements of tributary discharge to maintain the fishery. Remember that in this situation, we will be competing with industrial, residential, and agricultural demands for the water involved--the only three uses recognized under Texas law. We must also project the fishery values both with and without the project for the entire Texas coast for a period of 100 years. This alone is a major undertaking and time is short as it so often is with projects of this nature. The Bureau of Commercial Fisheries recognizes the impact that this project could very well have on the future of the fishing industry. We will need all the support we can get to develop ways and means of offsetting expected damage.

I want to thank you all for the opportunity to review our research programs and discuss some of the problems we face. If any of you have questions, I will do my best to answer them.

\* \* \* \*

(COPY)

GULF STATES MARINE FISHERIES COMMISSION  
Biloxi, Mississippi  
The Broadwater Beach Hotel  
October 17-18, 1963

"INTRODUCTORY COMMENTS FOR THE DEEP-WATER SHRIMP MOVIES AT GSMFC"

Harvey R. Bullis, Jr.  
Base Director  
Bureau of Commercial Fisheries  
Pascagoula, Mississippi

The number one question in every shrimp fisherman's mind is; how efficient is their trawling gear? Does the trawl catch every shrimp in the towing path? If not, how do the shrimp escape? What percent escape? It must be added that these same questions have to be answered for the scientists and the gear experts before solid steps can be taken toward improved gear design.

The short motion picture I am going to show to you this evening is a progress report of sorts on one aspect of the Bureau of Commercial Fisheries study of shrimp fishing gear. The footage was taken with a Bureau designed automatic motion picture camera mounted on the headrope of a 40-foot shrimp trawl that was operating in the royal red shrimp grounds off the Mississippi Delta at a depth of 210 fathoms (or just slightly over one-quarter of a mile deep).

In 1961, a special shrimp gear research project was funded to conduct a more intensified study of shrimp trawling gear to determine if fishing efficiency could be increased. This project was to compliment the work that was then in progress on the study of the mechanics of shrimp trawl operation. That work has resulted in two motion pictures that have been shown to the Gulf States Marine Fisheries Commission at earlier meetings.

To the best of our knowledge these films represent the first successful attempt to take direct deep water motion pictures. The equipment used (cameras and lights) is still considered experimental and is being improved with every test. I say this to warn you not to expect results in Technicolor and Cinemascope. Slow motion analysis of this footage has answered many questions already and, as a library of footage is accumulated, analysis will reveal previously unknown information on:

1. How many shrimp escape the trawl and how they do it.
2. Density patterns, or how the shrimp are distributed over the bottom.
3. Many other behavioral patterns including the relation of burrowing to trawl capture.

The four sequences to be shown were taken on a single 45-minute trawl drag. Each sequence covers a shooting period of from 1 1/2 to 3 minutes during which the trawl covered distances of from about 450 to 850 feet. The field



(Bullis #2)

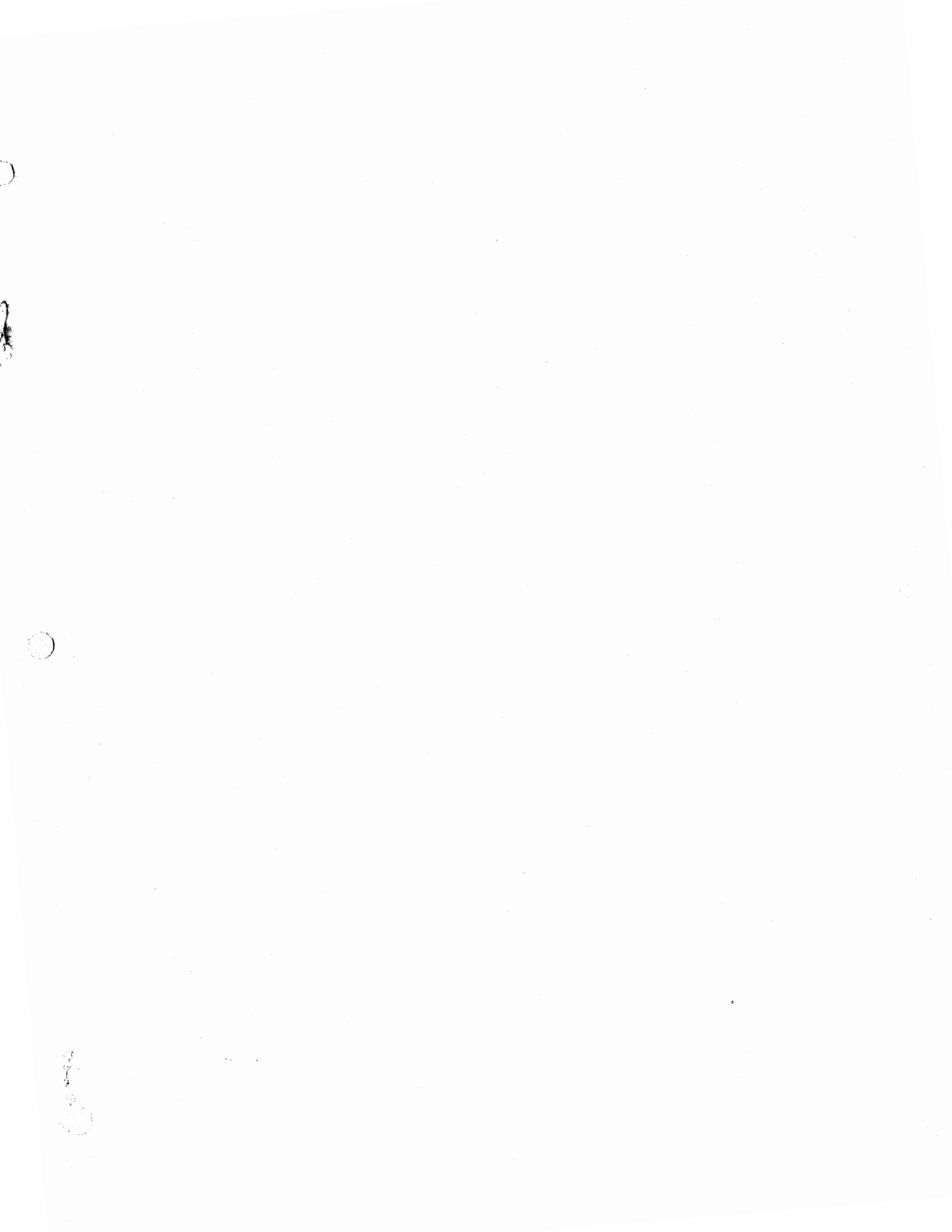
of illumination covers a path some 4 feet wide immediately in front of the middle of the footrope.

Pictures taken subsequent to these are in much better focus; however, these pictures show the largest number of shrimp seen to date. Due to poor focus, it is not possible to identify many of the shrimp that do not move or respond to the trawl. Repeated evaluation of these films shows some 56 individual royal red shrimp swimming or jumping in response to the trawl. Of these, we can count 14 individual shrimp that are lost to the catch by passing under the footrope. This indicates escapement below the footrope of at least 25% of the shrimp in the path of the trawl. We can assume that the figure is considerably greater than 25% since this is a measure of only those shrimp actually showing active response.

Four short sections of bottom are photographed over a distance of some 2 1/2 miles. The bottom shows surprising smoothness and uniformity and the water is surprisingly clear. Density patterns of royal red shrimp show little uniformity though. Density varies from a high of 1 per 114 ft<sup>2</sup> of bottom to a low of 1 per 380 ft.<sup>2</sup>

Most surprising of all was the poor relationship between these observed densities and the actual numbers caught in the trawl while the pictures were being taken. Preliminary calculations would indicate that the trawl being fished is catching perhaps less than 25% of the shrimp in the trawling path. If this is generally true for most trawls and species, then we can look forward to some significant developments in increasing trawling efficiency in the coming few years. We believe observations such as these will show us the way.

\* \* \* \*



## PROGRAM

(Commission Chairman, Will G. Gaffey, Jr., Presiding)

9:00 AM

### REGISTRATION

Courtesy Clearwater Chamber of Commerce

9:30 AM

### CALL TO ORDER

### INVOCATION

Reverend D. P. McGeachy, Minister  
Peace Memorial Presbyterian Church  
Clearwater, Florida

### ROLL CALL

### WELCOME ADDRESS

John C. Ferguson  
Chairman of the Board  
National Shrimp Congress

### ADDRESS

Thomas D. Rice  
Special Assistant to the Commissioner  
U. S. Fish and Wildlife Service

### ADDRESS

Charles E. Jackson  
Consultant on Legislation and Government  
Relations  
Washington, D. C.

### ACTIVITIES OF THE ATLANTIC STATES MARINE FISHERIES COMMISSION

Ernest C. Mitts  
Executive Director  
Atlantic States Marine Fisheries Commission

### RECESS

*Fifteen Minutes*

11:15 AM

### REPORT ON EQUALANT I

J. Laurence McHugh  
Chief, Division of Biological Research  
U. S. Bureau of Commercial Fisheries

### ACTIVITIES OF THE SOUTHEASTERN FISHERIES ASSOCIATION

Charles W. Bevis  
Executive Secretary  
Southeastern Fisheries Association

### INDUSTRY'S APPRAISAL OF NEEDED GULF MENHADEN RESEARCH

Harry I. McGinnis  
Virginia Fishermen's Association—Menhaden  
Division

### ADJOURNMENT *Luncheon*

1:30 PM

### SERIES OF PROGRESS REPORTS, TORTUGAS SHRIMP FISHERY (WITH SLIDES) RESEARCHERS OF THE MARINE LABORATORY, UNIVERSITY OF MIAMI

Does Temperature Affect The Abundance of  
Pink Shrimp Larvae? A. C. Jones

Measures Of The Abundance Of Juvenile Pink  
Shrimp in the Everglades Estuary.

C. P. Idyll and E. S. Iversen

Raising Of Pink Shrimp From Egg to Adult.  
Jay Ewald

### STATE-FEDERAL COOPERATIVE CANNING STUDIES

Travis D. Love  
Director, Pascagoula Technological Laboratory  
U. S. Bureau of Commercial Fisheries, Region 2

3:00 PM

### FIELD TRIP *To St. Petersburg*

Florida State Board of Conservation Laboratory

6:00 PM

### MEETING OF RESOLUTIONS COMMITTEE

**Friday (March 22)**

7:30 AM - 9:15 AM

### COMMISSION EXECUTIVE SESSION BREAKFAST

9:30 AM - 12 Noon

### ESTUARINE TECHNICAL COORDINATING COMMITTEE SESSION

Presiding:

Theodore B. Ford of Louisiana (Chairman)  
George W. Allen of Alabama (Secretary)

### REPORT ON THE MISSISSIPPI RIVER-GULF OUTLET PROJECT, LOUISIANA (WITH SLIDES)

Spencer H. Smith  
Regional Supervisor, Branch of River Basin  
Studies

U. S. Bureau of Sport Fisheries and Wildlife,  
Region 4

### PROGRESS REPORT BCF PESTICIDE PROGRAM

Philip A. Butler  
Director, Gulf Breeze Biological Laboratory  
U. S. Bureau of Commercial Fisheries, Region 2

### OTHER CONSIDERATIONS

### SHRIMP BIOLOGICAL RESEARCH COMMITTEE SESSION—PANEL

Presiding:

Robert M. Ingle (Chairman)  
Florida State Board of Conservation

Panel:

William J. Demoran  
Mississippi Marine Conservation Commission

*March 21-22 - 1963 - Clearwater Fla*

Joseph H. Kutkuhn  
U. S. Bureau of Commercial Fisheries  
Terrance R. Leary  
Texas Game and Fish Commission  
Jack Mallory  
Alabama Department of Conservation  
Lyle S. St. Amant (Secretary)  
Louisiana Wild Life and Fisheries Commission

**THE SPONGE INDUSTRY—FILM  
COMMENTS ON THE FLORIDA FISHERY**

Mr. Ingle

**ADJOURNMENT**

**FIELD TRIP**

**12:15 PM**

To Tarpon Springs. Luncheon at Papa's  
Restaurant—1:15 PM, then tour of Industry

Luncheon Speaker:

George Th. Frantzis

President, Tarpon Springs Sponge Association

Secretary, Tarpon Springs Sponge Exchange

**4:30 PM**

**RETURN TO CLEARWATER**

★

**Gulf States Marine Fisheries Commission  
312 Audubon Building  
New Orleans 16, Louisiana**

**Commissioners**

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

**Alabama**

Claude D. Kelley

Will G. Caffey, Jr. (Chairman)

Max Lawrenz, Sr.

**Florida**

W. Randolph Hodges

Bruce J. Scott

Walter O. Sheppard

**Louisiana**

L. D. Young, Jr.

Alvin Dyson

Feltus Daigle

**Mississippi**

Joseph V. Colson

Stanford E. Morse, Jr.

Hermes Gautier

**Texas**

Howard D. Dodgen

Richard H. Gory (Vice-Chairman)

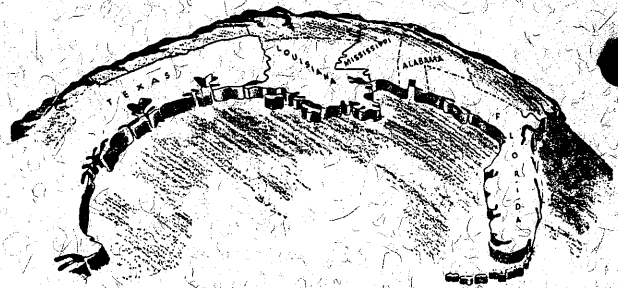
Weldon Cabaniss

★

W. Dudley Gunn

Director

**GULF STATES MARINE FISHERIES COMMISSION**



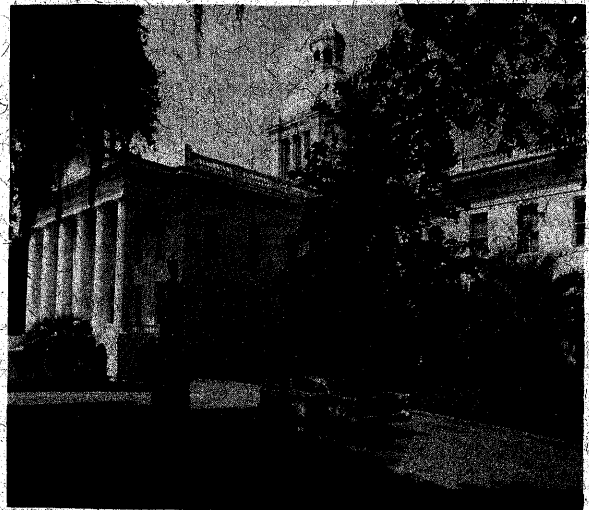
**Clearwater, Florida**

Jack Tar-Fort Harrison Hotel

Crystal Ballroom

**March 21 (Thursday) - 22 (Friday), 1963**

A cordial invitation is extended to all interested in the proper utilization of the marine fishery resources of the Gulf of Mexico. (Convention rates: \$10 and \$11 single, \$13 and \$15 double.)



**THE CAPITOL  
STATE OF FLORIDA  
TALLAHASSEE**

# Gulf States Marine Fisheries Commission

## CHAIRMAN

WILL G. CAFFEY, JR., MEMBER  
SENATE, STATE OF ALABAMA  
MOBILE, ALABAMA

## VICE-CHAIRMAN

RICHARD H. CORY, MEMBER  
HOUSE OF REPRESENTATIVES  
STATE OF TEXAS  
VICTORIA, TEXAS



## DIRECTOR

W. DUDLEY GUNN

## OFFICE SECRETARY

EMILY C. CARR

## HEADQUARTERS OFFICE

312 AUDUBON BUILDING  
NEW ORLEANS 16  
LOUISIANA

TELEPHONE: 524-1765

## M I N U T E S

### REGULAR MEETING

JACK TAR-FORT HARRISON HOTEL

CLEARWATER, FLORIDA

MARCH 21-22, 1963

GULF STATES MARINE FISHERIES COMMISSION  
312 Audubon Building  
New Orleans 16, Louisiana

M I N U T E S

REGULAR MEETING, MARCH 21-22, 1963  
JACK TAR-FORT HARRISON HOTEL  
Clearwater, Florida

OFFICIAL ATTENDANCE OF COMMISSIONERS

	<u>PRESENT</u>	<u>ABSENT</u>
<u>ALABAMA</u>	Will G. Caffey, Jr. Max K. Lawrenz, Sr.	Claude D. Kelley
<u>FLORIDA</u>	W. Randolph Hodges Bruce J. Scott Walter O. Sheppard	
<u>LOUISIANA</u>	Alvin Dyson	L. D. Young, Jr. Feltus Daigle
<u>MISSISSIPPI</u>	Joseph V. Colson	Stanford E. Morse, Jr. Hermes Gautier
<u>TEXAS</u>	Richard H. Cory Weldon Cabaniss	Howard D. Dodgen
<u>PROXIES</u>	Richard T. Turner Lyle S. St. Amant Joseph V. Colson Joseph V. Colson Eugene A. Walker	(For Claude D. Kelley) (For L. D. Young, Jr.) (For Stanford E. Morse, Jr.) (For Hermes Gautier) (For Howard D. Dodgen)
<u>STAFF</u>	W. Dudley Gunn	

OTHER STATE GOVERNMENT REPRESENTATIVES PRESENT

Lee Brevos (Florida), Bonnie Eldred (Florida), Ted B. Ford (Louisiana),  
H. V. Gibson (Florida), Larry Gillespie (Florida), Robert M. Ingle (Florida),  
Edwin A. Joyce, Jr. (Florida), Terrance R. Leary (Texas), James N. McConnell  
(Louisiana), Harold Parr (Florida), Lyle S. St. Amant (Louisiana), Harold Sims  
(Florida), George Williams (Mississippi), Jean Williams (Florida), Ken Woodburn  
(Florida).

FORMER COMMISSIONERS PRESENT

Charles W. Bevis, Ernest C. Mitts, James H. Summersgill

FEDERAL GOVERNMENT REPRESENTATIVES PRESENT

U. S. BUREAU OF COMMERCIAL FISHERIES: Philip A. Butler, Francis J. Captiva, Charles R. Chapman, Thomas J. Costello, John H. Finucane, Billy F. Greer, George B. Gross, J. Bruce Kinsey, Joseph H. Kutkuhn, Charles F. Lee, Milton J. Lindner, J. Laurence McHugh, George H. Rees, Thomas D. Rice, James E. Sykes, Seton H. Thompson, Melvin E. Waters, Richard T. Whiteleather.

U. S. BUREAU OF SPORT FISHERIES AND WILDLIFE: Spencer H. Smith

U. S. PUBLIC HEALTH SERVICE: R. J. Hammerstrom, F. J. Silva.

REPRESENTATIVES OF INDUSTRY PRESENT

William Bennett, Steele Culbertson, D. L. Fendler, John C. Ferguson, Charles E. Jackson, Harry I. McGinnis, James McPhillips, Ted Reinke, Francis W. Taylor.

UNIVERSITY LABORATORY REPRESENTATIVES PRESENT

J. Y. Christmas, R. C. Delcambre, Joseph J. Ewald, Lewis T. Graham, Gordon Gunter, C. P. Idyll, Edwin S. Iversen.

OTHERS PRESENT

CLERGY: D. P. McGeachy

CLEARWATER CHAMBER OF COMMERCE: R. I. Hendershott

\* \* \* \* \*

GENERAL SESSION, MARCH 21, 1963

Commission Chairman Caffey called the meeting to order at 9:30 a.m. Reverend McGeachy, Minister, Peace Memorial Presbyterian Church of Clearwater rendered the invocation.

The Chairman expressed appreciation for the assist in registration by the Clearwater Chamber of Commerce and called upon Mr. R. L. Hendershott of that organization for remarks.

The roll of Commissioners was next called by Commission Director Gunn.

Mr. John C. Ferguson, Chairman of the Board of the National Shrimp Congress was praised for his contributions as an official of various fishery associations and was introduced for the purpose of welcoming the group to the State of Florida. In addition to extending a hearty welcome, Mr. Ferguson spoke of the great progress which had been made by the shrimp industry over the years, and of the advances that had been made possible through coordinated research by the states and the federal government.

Chairman Caffey next introduced Mr. Thomas D. Rice, Special Assistant to the Commissioner, U. S. Fish and Wildlife Service, after a brief review of the latter's activities in interest of the fisheries. Copy of Mr. Rice's address is first attached to these Minutes.

Mr. Charles E. Jackson, Consultant on Legislation and Government Relations, was praised by the Chairman for his accomplishments as General Manager of the National Fisheries Institute prior to retirement in 1962, and was introduced. Copy of the presentation by Mr. Jackson is second attached to these Minutes.

In presenting the next speaker, Chairman Caffey referred to his services as a member of the Gulf Commission and more recently as Executive Director of the Atlantic States Marine Fisheries Commission. Copy of Mr. Ernest C. Mitt's paper is third attached to these Minutes.

A fifteen minute coffee break was enjoyed at this juncture.

Upon resumption of the session, Dr. J. Laurence McHugh was introduced and welcomed back for another presentation to the Commission. As Chief, Division of Biological Research, U. S. Bureau of Commercial Fisheries, Dr. McHugh apprised the group of the purpose of the Tropical Atlantic Oceanographic project. Copy of the report is fourth attached to these Minutes.

His many years of endeavor toward the advancement of the Gulf fisheries was cited as Mr. Charlie Bevis, Executive Secretary of the Southeastern Fisheries Association was introduced. Copy of Mr. Bevis' paper is herewith attached in order.

The Chairman reminded the delegates of the next speaker's excellent coverage of the economics of the Gulf menhaden industry at the March 1960 Mobile meeting of the Commission, and then introduced Mr. Harry I. McGinnis. Copy



of his paper reflecting the views of industry regarding needed Gulf menhaden research if fifth attached to these Minutes.

The session was adjourned for luncheon at 12:15 p.m.

At 1:45 p.m., Chairman Caffey called the afternoon session to order and introduced Dr. Clarence P. Idyll, The Marine Laboratory, University of Miami, to preside for a series of reports by staff members of the Laboratory and relative to the pink shrimp fishery. Copies of the three papers heard are sixth, seventh and eighth attached to these Minutes in the following order:

- 6th. "Does temperature affect the abundance of Pink Shrimp Larvae?" (by Albert C. Jones)
- 7th. "Progress report on a study of the Juvenile Phases of the Pink Shrimp in South Florida." (by C.P. Idyll and E.S. Iversen)
- 8th. "Raising of Pink Shrimp from Egg to Adult." (by Joseph J. Ewald)

The Chairman referred to the splendid accomplishments of the Pascagoula Technological Laboratory since its work program was begun in 1958 and introduced Mr. Melvin E. Waters of that Laboratory for a report on "The Mullet (Liza) Utilization Program." Copy of Mr. Waters' paper is ninth attached to these Minutes.

The formal phase of the afternoon session was adjourned at 2:45 p.m. and the delegates were invited to participate in a taste panel of Liza, which sampling was enjoyed by the entire group.

At 3:15 p.m. the delegates were met and taken to the St. Petersburg Laboratory of the Florida State Board of Conservation in cars provided by the Board's Division of Law Enforcement. The group was divided into parties following a briefing by Mr. Robert M. Ingle, Director of Research, Board of Conservation, and each party was conducted by a laboratory staff member on an interesting and informative tour of the facilities.

The motorcade returned to Clearwater at 6:00 p.m.

Meeting at 7:00 p.m. was the Resolutions Committee appointed by Chairman Caffey and composed of Commissioners Lawrenz, Sheppard, Dyson, Colson and Mr. Eugene A. Walker (Proxy for Commissioner Dodgen).

#### Friday (March 22)

The Commissioners met in executive session with the serving of breakfast at 7:30 a.m. The session was adjourned at 9:15 a.m. for the final general session which was scheduled to begin at 9:30 a.m.

The session was advised by the Chairman of three resolutions of general interest which were adopted at the Executive Session: (1) Approval of S. 627 and H. R. 3738 (88th Congress - 1st Session). (2) Request for member state conservation and board of health agencies to meet for discussing and studying oyster shipping containers, (3) Suggested a meeting of the three marine interstate fishery agencies in 1964 on the Gulf coast.

Chairman Caffey called upon Dr. Ted B. Ford, Louisiana Wild Life and Fisheries Commission, and Chairman of the Gulf Commission's Estuarine Technical Coordinating Committee, to preside at the scheduled meeting of the Committee. Dr. Ford stated that the Committee consensus concerning the sponsoring of a symposium, at which estuarine technical papers would be presented, was to again consider the matter following a similar symposium which had been scheduled to convene on the Georgia coast during the coming summer.

Preliminary to introducing the next speaker, the presiding officer referred to the interest of the Commission in requesting research in connection with the dredging of the Mississippi River-Gulf Outlet and its continued interest since such research was initiated. Mr. Spencer H. Smith, Regional Supervisor, Branch of River Basins, U. S. Bureau of Sport Fisheries and Wildlife, Region 4, was introduced for a current report on accomplishments of the subject research, which presentation was highlighted by views of the project in various stages of progress. Copy of the report is tenth attached to these Minutes.

The use of pesticides was cited by Dr. Ford as being of much concern to the Estuarine Committee because of their possible infiltration of the marine fisheries nursery grounds. For a progress report on the Bureau of Commercial Fisheries Pesticide Program, Dr. Philip A. Butler, Director, Gulf Breeze Biological Laboratory, was introduced. With the use of slides, the delegates were able to study the effect of various pesticides on certain of the commercial fishes. A copy of the referred to report is eleventh attached to these Minutes.

With no further estuarine matters to be considered, the chair was returned to Chairman Caffey, who introduced Mr. Robert Ingle, Chairman of the Commission's Shrimp Biological Research Committee, to preside over a session of that Committee.

Following a brief statement as to the purposes of the Committee, Mr. Ingle called upon Mr. Edwin A. Joyce, Jr., Florida State Board of Conservation Laboratory, St. Petersburg, who reported on "Penaeid Shrimp Studies of Florida's Northeast Coast". The extract follows:

"Forty-five shrimp sampling stations were established in July, 1962, along the northeast coast. Fifteen offshore stations extend from St. Mary's Inlet south to Cocoa Beach. The remaining thirty are located in the Intracoastal waterway and the St. John's River. Day and night samplings are made at each station monthly.

"Eight penaeid species are being collected, but the predominant ones are the commercially important white, brown, and pink shrimps. Although samplings have been limited to the past eight months, some apparent trends in abundance, growth, and migrations have been noted.

"It appears that the larger white shrimp, populating the St. John's River, begin their migration to the sea shortly before September, since by October, only small shrimp were collected at the southern end of the river. Findings from offshore stations suggest that the shrimp range from 111 mm. to 127 mm. (total length) when they leave the nursery areas.

"Only one white shrimp was obtained from the area south of the Ponce de Leon Inlet, whereas, north of this Inlet, this is the major species.

"Further sampling and hydrographic data gathered from this part of Florida's coast should bring to light a better knowledge of the life histories of the shrimps of this area."

Mrs. Bonnie Eldred, also of the Board's St. Petersburg Laboratory, next presented a report on "Monthly Abundance and Distribution of Penaeid Larvae and Post Larvae in the Tampa Bay Area." An extract of Mrs. Eldred's remarks follows:

"Examinations of plankton samples, picking out the tiny larval shrimps and identifying them to species and stages, is a slow, tedious process. Therefore, workers in this field are sometimes reporting on samplings made several months ago. At this time, we have just finished analyzing our data of January through July, 1962.

"Evidence to date shows that pink shrimp (Penaeus duorarum) spawning commenced offshore in April. Although seven postlarvae were found at our inshore stations during January through April, the number increased to 58 postlarvae in May, and to 368 in July.

"The presence of early naupliar forms of P. duorarum, at stations 20 to 40 miles offshore and at depths of 40 to 120 feet, suggest that spawning is possibly confined to this area.

"The relationship of water temperatures and spawning of P. duorarum have been carefully noted. In April, the temperature at offshore stations rose above 20.0°C., and at inshore stations readings were above 25.0°C.

"From January through June, minor penaeid larvae were more abundant than larvae of P. duorarum. Protozoan and mysis stages are as follows: P. duorarum, 15.6 per cent; Trachypeneus, 37.0 per cent, Sicyonia, 21.3 per cent; Solenocera, 17.3; and Parapenaeus, 8.6 per cent. Also, trynet samplings at offshore stations, for adult populations of P. duorarum through 1962, indicate that this species was rather scarce in this area during that year."

Dr. Joseph H. Kutkuhn, Assistant Director, Galveston Biological Laboratory, Bureau of Commercial Fisheries, was next introduced. Copy of his report, "Federal Research on Commercial Shrimps of the Gulf of Mexico", is twelfth attached to these Minutes. Large and excellently prepared charts were employed during the course of Dr. Kutkuhn's presentation.

Since the noon hour had been reached and a field trip to Tarpon Springs was scheduled for departure at 12:15 p.m., Chairman Caffey returned to the chair and with apologies to those scheduled participants who were not to be heard, suggested that the shrimp March report for Alabama, Mississippi, Louisiana and Texas to the Commission be incorporated in these Minutes. The March shrimp reports follow:

Alabama (From Mr. George W. Allen). Shrimp landings in Alabama remained about normal, the majority of shrimp being brought from offshore Louisiana waters. A short run of brown shrimp running from 20 to 30 count was experienced for two weeks off the beaches of Gulf Shores and Dauphin Island.

Mississippi (From Gordon Gunter) Young brown shrimp reached the nursery grounds along the Mississippi coast in March. In 62 standard hauls at 16 stations 1,348 post larvae were collected. Numbers taken per haul increased rapidly during the month at some stations. In general, stations along the barrier islands produced very few specimens.

Water temperatures increased during the month and station temperatures in the last week of the month were practically all above 64°F and exceeded 70°F on several occasions. Salinities fluctuated considerably at some stations and averages were higher in some cases than those for February.

Louisiana (From Lyle S. St. Amant) The Louisiana research program has been carried on with increased activities throughout the month of March. Post larval sampling has been extended to the Texas line and to the Mississippi Sound. All data to date indicates that post larval densities are equivalent to or better than in 1962. Some evidence indicates that there is a better or more even distribution of larva. Juvenile shrimp made their appearance in late 1962.

It is yet too early to determine accurate densities, counts and growth rates. However, it should be noted that the distribution is more widespread and even than in 1962. This would lead us to make cautious prediction that conditions thus far in 1963 are equivalent to or better than they were in 1962. It is proposed that by April 18 all data will be summarized to the extent that some prediction can be made and that the opening date of the season can be set.

Texas (From Terrance R. Leary) Sampling of post larval shrimp in the Aransas Pass near Port Aransas showed a peak of post larvae on March 27 when water temperature was about 20°C.

The peak number of post larvae at Brazos Santiago Pass near Port Isabel was taken on March 19 about one week earlier.

With apologies to Mr. Ingle, the Chairman suggested that the film, "The Sponge Industry", be shown at a future meeting of the Commission.

The closing General Session was then adjourned following no response on call for other business.

The delegates proceeded to Tarpon Springs and upon assembling at Papa's Restaurant were greeted by their host for luncheon, Sponge Fisherman's, Incorporated. Following a delectable seafood luncheon, the group was greeted by Honorable Thomas Craig, Mayor of Tarpon Springs, following his introduction by Mr. Manuel Johnson, Honorary President of the Association. Other Tarpon Springs individuals who made brief talks following the luncheon included:

Messrs: Lewis Alderman, Vice-Pres, Chamber of Commerce  
Manuel Kouremetis, Pres, Greek Community  
Teddy Cantonis, Vice-Pres. Sponge Exchange  
George C. Tsourakis, City Commissioner  
Steve Lelekis, City Commissioner (Retired)  
George N. Arfaras, Sponge Producer  
Angelo Angelis, Pres, Sponge Fisherman's, Inc.  
John Theodore, Vice-Pres. Sponge Fisherman's Inc.

Mr. Charlie Bevis was recognized and called upon Messrs. Bruce Scott, Robert Ingle, Will Caffey and Dudley Gunn for a few words.

Chairman Caffey expressed the deep appreciation of the Commissioners and delegates for the very fine climax to the Clearwater meeting and wished the sponge industry every success in its future endeavors.

Prepared by: W. Dudley Gunn  
Director

## M I N U T E S

Executive Session, Clearwater, Florida, March 22, 1963

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

Vice-Chairman Cory made a record of proceedings as the Bartlett Bill, S. 627, and the similar Rivers' Bill, H.R. 3738, were discussed at some length. Commissioner Sheppard moved for the adoption of a resolution approving both bills which would make Federal funds available to the States for fishery research and related purposes. Commissioner Colson seconded. Upon vote, the resolution was adopted with Texas voting no and the other States yes. Dr. St. Amant, proxy for Commissioner Young, suggested that the Commission Director be instructed to gather material from the States as to projects that might be initiated should the legislation be acted upon favorably by the Congress and to consolidate same for publishing as Commission Research Prospectus No. 2. The consensus was that this be done. The Director was also instructed to keep the States informed so that they may act as each saw fit with regard to hearings on S. 627, which bill Senator Bartlett was quoted as saying would probably come up for hearing in latter May or early June. Copy of resolution is herewith first attached.

Commissioner Colson stated that from information reaching the Mississippi Marine Conservation Commission there was a real need for the developing of a standard tamper-proof oyster shipping container. He suggested that a representative of the conservation agency of each member State together with a representative of the board of health of each member State meet together for discussing and studying the matter. The consensus from consideration of the subject was that such a meeting would be desirable. Commissioner Colson put his suggestion in the form of a resolution. Commissioner Sheppard seconded. Upon vote the resolution was adopted, copy of which is herewith second attached.

Commissioner Hodges presented a resolution inviting the Atlantic and Pacific interstate marine fisheries agencies to meet on the Gulf jointly with the Gulf Commission in 1964. Commissioner Scott seconded. Upon vote the resolution was adopted. Copy of the resolution is herewith third attached. The Director was asked to discuss this matter with the concerned compact agencies at the May 6-7 meeting at Chicago of the Council of State Governments Interstate Agency meeting.

The Director was recognized by Chairman Caffey. The former stated that the balance as of February 28, 1963 in the Commission's National American Bank account was \$8,499.25 and that expenditures for the current fiscal year were in accord with the approved budget for operating expenses.

Commissioner Scott moved that the Minutes of the October 1962 Commission meeting be accepted without reading since all Commissioners had been supplied

a copy through the December 3 mailing. Commissioner Dyson seconded and upon vote the motion carried.

The Director reported that all arrangements had been completed for the October 17-18, 1963 meeting with the Management of the Broadwater Beach Hotel, Biloxi.

Upon inquiry of the Louisiana Delegation as to its preference for the March 19-20, 1964 meeting, New Orleans and the Monteleone Hotel of that city was designated.

The Director was instructed to prepare the following resolutions of appreciation in connection with the Clearwater meeting:

1. Florida State Board of Conservation (copy herewith fourth attached)
2. Sponge Fisherman's, Inc. (Copy herewith fifth attached)
3. Jack Tar-Ft. Harrison Hotel (Copy herewith sixth attached)
4. Clearwater Chamber of Commerce (Copy herewith seventh attached)

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

Prepared by: W. Dudley Gunn  
Director

RESOLUTION

BE IT RESOLVED that the Gulf States Marine Fisheries  
Commission go on record as approving S. 627 and H. R. 3738  
(88th Congress - 1st Session) each of which bills is designed  
to promote State commercial fishery research and development  
projects, and for other purposes.

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine  
Fisheries Commission, March 22, 1963, at a regular Commission  
meeting held at the Jack Tar - Fort Harrison Hotel, Clearwater,  
Florida.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission



RESOLUTION

BE IT RESOLVED by the Gulf States Marine Fisheries Commission that it extend a most cordial invitation to the Atlantic States Marine Fisheries Commission and to the Pacific Marine Fisheries Commission for a Tri-Commission meeting on the Gulf at a site and on dates in 1964 to be determined mutually agreeable.

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine Fisheries Commission, March 22, 1963, at a regular Commission meeting held at the Jack Tar - Fort Harrison Hotel, Clearwater, Florida.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission

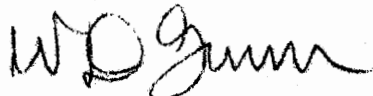
RESOLUTION

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express its most sincere appreciation to the Florida State Board of Conservation for the very cordial hospitality extended upon the occasion of the March 21-22, 1963 meeting of the body at Clearwater, Florida.

BE IT FURTHER RESOLVED that this Commission particularly express its gratitude for the interestingly conducted tour of the St. Petersburg Biological Laboratory of the Board by its competent staff and for the excellent transportation supplied by the Division of Law Enforcement during the course of the meeting.

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine Fisheries Commission, March 22, 1963, at a regular Commission meeting held at the Jack Tar - Fort Harrison Hotel, Clearwater, Florida.



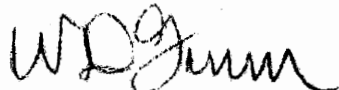
W. D. Gunn, Director  
Gulf States Marine Fisheries Commission

RESOLUTION

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express to the Tarpon Springs Sponge Fishermen's Association its sincere appreciation for the very fine luncheon tendered on March 22, 1963; for having arranged the informative and interesting panel of speakers; for the dockside demonstration of sponge harvesting techniques; and for the conducted tour of the Sponge Exchange and the sponge processing plants.

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine Fisheries Commission, March 22, 1963, at a regular Commission meeting held at the Jack Tar - Fort Harrison Hotel, Clearwater, Florida.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission

RESOLUTION

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express its sincere appreciation to the management and staff of the Jack Tar - Fort Harrison Hotel for the cordial hospitality and splendid food and service enjoyed by the group on the occasion of the March 21-22, 1963 meeting of this Commission at Clearwater, Florida.

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine Fisheries Commission, March 22, 1963, at a regular Commission meeting held at the Jack Tar - Fort Harrison Hotel, Clearwater, Florida.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission

RESOLUTION

BE IT RESOLVED that the Gulf States Marine Fisheries Commission express its sincere appreciation to the Clearwater Chamber of Commerce for the registering of delegates at the March 21-22, 1963 meeting of the body at Clearwater, and for the hearty welcome to the city which was extended at the opening session of the conference.

\* \* \* \* \*

The foregoing Resolution was adopted by the Gulf States Marine Fisheries Commission, March 22, 1963, at a regular Commission meeting held at the Jack Tar - Fort Harrison Hotel, Clearwater, Florida.



W. D. Gunn, Director  
Gulf States Marine Fisheries Commission

(COPY)

GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
Jack Tar-Fort Harrison Hotel  
March 21-22, 1963

Thomas D. Rice  
Special Assistant to the Commissioner  
Fish & Wildlife Service  
Washington, D. C.

This is the first opportunity I have had to meet with members of the Gulf States Marine Fisheries Commission since I left the ranks of industry and joined the force of bureaucrats in Washington. It is a pleasure to renew acquaintances that were made a number of years ago when you in the Gulf were experiencing some of the same problems that we were having in New England and we joined forces to try to solve them.

When I knew I was going to have the privilege of attending this meeting, I looked back over the records of some of your past sessions and found that Seton Thompson and Dick Whiteleather have kept you well informed concerning the Bureau of Commercial Fisheries Activities and that Walter Gresh and Paul Thompson, Bureau of Sport Fisheries and Wildlife, have kept you abreast with marine and sport fishing activities. They have been loud in their praise of the commercial and marine sport fishery resources of the Gulf and I have found it to be fully justified by the facts.

One of the recent statistical bulletins reports that the 300 mile stretch of coastline between Pascagoula, Mississippi, and Port Arthur, Texas, is the most productive in the United States. Fully one fourth of the total United States catch was made in this very rich area, and it is well known that you have other resources still untouched.

In spite of the bounty of your fishery resources, you are not entirely secure from problems that may have disastrous consequences. The unexpected decline in abundance of shrimp in the Gulf in 1961 is one example. As you know, steps are being taken by the Service and by the state conservation agencies to ease severe blows of this kind through research that will lead to a method of predicting or forecasting some months in advance the size of the harvestable crop.

Exploratory fishing to open up new resources and new fishing grounds so that existing industry can diversify its operations also should provide some relief. Better, more efficient gear is the subject of continuing study and also should minimize the adverse effects of fluctuating supplies on the fishing grounds.

Up to this time the only competition for fishery products on the Gulf grounds has been from our own fishing vessels. This picture is changing rapidly. Whereas, a few years ago the United States was in second place as a world producer of fishery products, we are now in fifth place. Japan,

(Rice #2)

traditionally, has been in first place. Peru, Russia and Red China follow Japan in that order. Japan has undisputed leadership as a fishing nation with ocean-going vessels from the Japanese Islands in Bering Sea, on the Grand Banks, off South and Central America and off the African Coast. The USSR also has an ocean-going fleet of fishing vessels.

During 1962 there were substantial fishing operations by Russia in Bering Sea and off the African Coast, and at one time last summer 200 large Russian vessels were on the Grand Banks off the New England coast. Russian vessels, particularly, are seeking volume production to meet the animal protein shortage in that country. Not only are there a large number of Russian vessels operating, but unlike our fishermen, they do not fish selectively; they take everything they can catch.

You can be sure these major foreign interests are not blind to the opportunities that exist in Gulf waters. I rather expect that they are as well or better informed concerning the potential of our resources than we are.

Two large Russian trawlers were contacted off the North Carolina coast last fall where they admitted to fishing experimentally for menhaden. A small fleet, presumably from those operating on the Grand Banks, was reported by the Coast Guard not long ago to be moving south along the South Atlantic Seaboard. They were presumed to be headed for the new base which Fidel Castro has announced he is building in Cuba for fishing vessels from the USSR. One Japanese vessel is scheduled to operate off the New England Coast in the summer, and move south to fish for shrimp in the Gulf during the winter months.

All this seems to add up to nothing but trouble for the United States fishing industry, and it does appear that the Gulf is soon to see the same invasion we have already experienced in the North Pacific and North Atlantic. This competition on the fishing grounds soon is compounded by competition in our markets.

There is legislation pending in Congress that could provide some relief from the numerous troubles overshadowing the industry. First, probably, is the Bartlett Bill, S. 627, co-sponsored by Senators Magnuson, Jackson, Gruening, Kennedy, and Williams of New York. Companion bills have been filed in the House by Congressmen Multer (New York), Rivers (Alaska) and Tupper of Maine. S. 627 would provide federal aid to commercial fishery states on a 75 percent federal, 25 percent state matching basis to promote commercial fishery resource and development projects. This is patterned somewhat along the line of the Gruening bill of the last Congress. If passed, it would accelerate substantially the research on Gulf fishery projects, and lead ultimately to better utilization practices. This bill has been rewritten to overcome the objections to the Gruening Bill. The chairman of the Atlantic States Marine Fisheries Commission has spearheaded the drive to get approval of this legislation, and has done an excellent job. I know he has had support from you also. The chief deterrent to enactment, if there is one, will be the 5 million dollar appropriation to implement the legislation.

(Rice #3)

Another bill pending in Congress is the Kilgore Bill, H. R. 2603, which would provide low interest, long-term loans to fishing vessel owners and operators adversely affected by the failure of a fishery resource or other national disaster. This bill, like its predecessor in the last Congress, would require a transfer of operating funds from the Department of Agriculture revolving fund to the Department of the Interior. Similar legislation relating specifically to the oyster industry passed at the last session. We recognize the need for this kind of authority to meet emergency situations in the fishing industry. Such assistance is now furnished to the nation's farmers.

Still another bill is the fishing vessel construction differential subsidy bill, H. R. 1026, introduced by Congressman Bates of Massachusetts, and companion bills introduced by Congressmen Glenn of New Jersey, Tollefson of Washington, an old friend of the commercial fishing industry, Tupper of Maine and Burke of Massachusetts. These are now known as the United States Fishing Fleet Improvement Act of 1963, and one of the provisions of the Act is designed to extend until 1972 the present fishing vessel subsidy program in an amended form. It would increase the subsidy from  $1/3$  to  $1/2$  of the cost of constructing the vessel in the United States, and extend the program to more fisheries than under the present law. This could be extremely important legislation to up-date the United States fishing fleet and make it competitive with the large vessels from other countries now frequenting our offshore waters.

And now I should like to dwell for a few minutes on some matters that have bothered me somewhat over the past several years. I have been impressed with the fact that something is missing in our concern with fishery development and conservation. What is missing is an appropriate balance within the Department of the Interior, the Coastal State Agencies, and the Interstate Marine Fishery Commissions as between the Commercial and Recreational Fisheries.

The lack of balance is reflected in great and reasonable concern with commercial fishery statistics and little or none with sport fish catches. It is reflected in the agendas of such meetings as this, where the vastly important shrimp resource is king and the vastly important sport fish resource is all but ignored. It is reflected in great and good research efforts for a few of the major commercial fishes and little or no effort for the major game fishes.

What has brought this imbalance most sharply to my attention are the statistics of growth in numbers of salt water anglers and in the quantities and poundage of their catches all around the coasts. Most of this growth is recent and rapid. It has been reported in publications of the Outdoor Recreation Resources Review Commission and the Fish and Wildlife Service, but it hasn't quite gotten through to us all that we're riding a wave of the future. We had better take account of it. We had better follow what's happening. We had better try to see clearly how we can take advantage of it to keep all our fisheries strong and growing in the face of threats from pollution, river and shore and marsh development and destruction.



(Rice #4 )

The Fish and Wildlife Service and the Interstate Commissions are the custodians of valuable and imperiled resources for all Americans. What can we all do together to achieve the most productive, best balanced effort on behalf of these resources?

Have you as state organizations exhausted all possibilities to increase your income through sale of marine sport fishing licenses? To your credit, you have done better on the Gulf Coast than other areas have, but more might be accomplished.

Have you been able to devote as much time to your regulation of salt water sport fishery catches as to the regulation of fresh-water fish catches? Do we have a balance between sport fishery regulations and commercial regulations? Have we worked together to get the facts necessary for the making of good rules for fishing?

Have we worked as hard or as soon as we should have on the many proposals to dredge channels through fish spawning grounds and oyster beds and to change bayou outlets? We realize now that we began to study the Mississippi-Gulf outlet problem almost too late.

Have we worked well enough together on the complicated studies of water quality which will tell us whether the pesticides sprayed on the land will decimate our young fishes and our shellfish in estuarine areas?

There is need for comprehensive planning to meet these problems whether they arise from domestic or international sources or whether we are interested in sport fish, commercial fish, or any other inhabitants of our coastal waters. A body such as this, representing federal, state, industry and recreational interests, can, and I am sure will, provide a valuable and continuing service in this respect. Thank you!

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GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
Jack Tar-Fort Harrison Hotel  
March 21-22, 1963

Charles E. Jackson  
Consultant on Legislation and Government Relations  
Washington, D. C.

I must confess that while the thoughts expressed are truly mine, yet the speech was compiled with the aid of a ghost writer. Even before I have finished, it is possible that I may join my associate in the spirit world.

In days gone by the Fishing Industry of our state was one of the largest income producers of all our various activities. Yet as time has passed, the returns to the commercial fishing operations has faded far into the background, and in many instances companies who were financial rocks have been undermined by the economic tides and have disappeared beneath the surface.

Now it is my frank opinion that if we will just face the facts and look the situation right squarely in the eye we can again put our industry back in its place in the sun. But the procedure is not going to be easy for, unfortunately, there are far too many of us who do not want to change our ways of thinking.

Now before we start to recommend remedies, let's begin by looking at the picture as to how our eating habits compare with those of a generation or so ago.

In the past, emphasis was placed on fresh fish. The catches were iced and usually shipped in barrels. In spite of the emphasis on fresh fish, I rather doubt that many of us would be satisfied with the quality of the product of those days today.

Now the progressive members of our industry have always tried to improve and give better products to their customers. Unfortunately, some of these folks would often get too far ahead of the procession and get lost. While I could give you many examples, there are two which I would like to tell you about. The first was about some of the work done by the father of one of our members. Briefly, he developed an excellent frozen fish package. The product was outstanding and it was put up in a most attractive package, but the idea flopped and for this reason....just no one had the facilities for taking care of the product after he received it. Such a thing as a frozen food cabinet just didn't exist. Another case which should be mentioned and that was when trawl nets were first applied to the catching of shrimp. In this instance a carload of shrimp was sent to Chicago and the shipper did not get the shipping costs...and why? Because the consumers knew nothing about shrimp and wouldn't buy them.

(Jackson #2)

Now the point that I am trying to make is that conditions have changed from the times when customers went to French Market at some two or three o'clock in the morning so that they got the pick of the freshest fish on sale. Yet such procedure seems foolish to us today when we can go to a market at any time of day and get an attractive package of excellent quality which was frozen in, say, Norway some six months ago.

Now those are just some of the changes which have come about in one generation. During that time our Florida Fishing Industry has slipped from among the leaders to near the bottom of the revenue producers of this state.

Let's next analyze some of the reasons for this change. There are perhaps many, but probably the principal one is that after World War II we sent our best technicians and modern equipment overseas so that our foreign neighbors could produce food to feed themselves, all of which was an excellent idea. However, from our standpoint there was a backfire in that our dear foreign brethren would rather have dollars than food, so the production is being shipped back to this country for dollars. So today more than one-half of the seafood consumed in this country is imported.

Now naturally you would like to know why our U. S. production has not kept pace with foreign production. There are perhaps two or possibly three reasons. The first is confidence in the teachers. Our technicians go to undeveloped countries overseas where the U. S. is considered to be well ahead of the world and instruct in the latest methods that they know. Our foreign brethren absorb the teachings, apply them and produce. Yet those same teachers don't get to first base in trying to teach their own home folks in this country because their ideas are contrary to those used by a generation or more ago and are contrary to the way Daddy did it.

So the first point that I would like to emphasize is that our methods, in most cases, are antiquated.

Now the second thing is equipment. There is a "hue and cry", particularly from the New England area, that there has been no new trawlers in that area for many years back. You know and everyone else knows that has operated fishing vessels that an old vessel with a capable captain will produce much more than the best equipment available operated by a sorry captain.

So when we look at the picture of New England real closely we find that the average age of the average fisherman in that area is well over fifty years of age. So it is obvious as to what is needed is more new faces rather than more new bottoms.

As you may recall, we in Florida were to a great extent responsible for a law which made available funds for teaching the younger generation fishing methods, boat handling, navigation, etc. This program started with a bang but somehow fizzled out. One of the reasons, I understood, was because the teacher had to have certain academic degrees, as well as so many

(Jackson #3)

years of experience and folks so qualified were just not available.

Some years ago a friend of mine was on the Fishery Advisory Board way back when the old Bureau of Fisheries was under the Department of Commerce. In those days the Bureau of Fisheries had only one research vessel and that one operated from Alaska. The said friend insisted that we needed such a vessel in the Gulf of Mexico, but was frankly told that there was not enough seafood in the Gulf to justify such a program.

Fortunately this situation has been corrected, but unfortunately the pendulum has swung too far in the other direction for now the Fish and Wildlife Service has elaborated shore installations, as well as a fleet of large seagoing vessels. Even though the funds appropriated are many times what they were formerly, yet the Fish and Wildlife Service seem of the opinion that these funds are no where near enough.

Now you would think that we had every reason to be very happy with the accomplishments of the Fish and Wildlife Service, yet on the contrary our thoughts are quite the reverse. For example, it's good news to know that there are tuna in the Gulf. So what? The Fish and Wildlife Service say that if and when the shrimp supply becomes unprofitable, that the shrimpers can go tuna fishing. All of which sounds logical if you didn't know that only the very largest of the shrimpers can carry even a moderate catch of tuna. Then, too, we don't know any of the habits of the tuna, we only know that at times tuna can be caught in the Gulf.

Now I ask you if it wouldn't be a practical solution to finish this problem for the government to charter or subsidize a number of shrimpers so that we could determine whether there is a sufficient supply of tuna to justify a fishery, when and where the fish can be caught, etc.

I can go on with examples, and one more before I leave the subject.

It has always been assumed that Red Snapper could not be caught with nets. Well, the Fish and Wildlife Service proved it could be done. However, to date, I have not seen an opinion from them to the effect that they believe it can be done economically commercially.

Now understand that I think that the Fish and Wildlife Service have done some commendable work, but I do believe there is a big chunk of the road missing between here and there. Or to put it another way, the greatest thing in the world is the postage stamp because it sticks to one thing till it gets there.

The last and perhaps the most discouraging detriment in the development of the fisheries of our state should be titled "Fishermen versus Progress." As I said previously, one of the rapid developments of foreign fisheries is the fact that the fishermen of the undeveloped countries accept our teachings. Many of our fishing methods were out of date generations ago and politics block any change. For example, our Conservation Department has told the world how a handsome profit could be made by raising

(Jackson #4)

oysters, and at the same time they insist that the only way you can harvest your crop on your leased ground is by the laborious and costly method of using hand tongs.

Then, of course, you all know how ridiculous the purse seine law is, which states that no food fish caught in a purse seine can be brought into the State of Florida. So as a result a slow and insufficient gill net is still used, from which each fish is removed from the net by hand. If there is a large catch, the net with the fish in it are piled on the stern of the skiff and taken to the fishermen's dock where the net is wound on its reel at the time the fish are being removed from the net. By this time the fish have not only been mashed, but also begin to heat and spoil. But regardless of the fact that a purse seine can produce many times the poundage with far less labor in less time, we still have the purse seine law.

To summarize ....I still believe that we can again put the Fishing Industry of Florida among our outstanding enterprises if we can get the younger generation interested in commercial fishing and teach them modern fishing methods.

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GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
Jack Tar-Fort Harrison Hotel  
March 21-22, 1963

Ernest C. Mitts  
Executive Director  
Atlantic States Marine Fisheries Commission  
Tallahassee, Florida

Mr. Chairman, Members of the Commission and guests, it is certainly a pleasure to be back home here again. The several years that I served on this Commission were indeed an enjoyable part of my duties.

I would like to congratulate the Gulf States Marine Fisheries Commission for the leadership and success in obtaining the much-needed funds for the shrimp research along our Gulf Coast. Your Commission labored some five years, and I sincerely believe without their leadership and efforts that this project would have been some ten years in the future.

I would like to comment briefly on some of the remarks that Tom Rice made regarding the necessity for the commercial people and the sports people to coordinate their activities. I feel very deeply about this, as I have seen success come in some of our states. If the commercial people are to assume their leadership, also be able to expand their industry, I feel that it is very necessary that they join hands with the sports people in order to get proper laws enacted which will benefit both groups.

I would like to very briefly discuss S. 627, which was introduced by Senator Bartlett of Alaska. This bill is almost identical to the bill which the Atlantic States Marine Fisheries Commission had drafted. We feel fortunate in having Senator Bartlett to introduce it, as he will be the Chairman of the sub-committee which will hear it in the Senate. After much research and considerable leg work, we feel this bill, in its present form has removed all serious objections. We feel that the industry, all the states all around our great coast line will be able to wholeheartedly support this legislation. Your Executive Director has been very helpful in this matter. I called him from Washington. He was in bed with the flu but he contacted your senators, and many of them are co-introducers. At the present time, we have more than thirty co-introducers to S. 627. We feel that we have an excellent chance of having this much-needed legislation passed in this coming Session of Congress. Hearings will be April 24, and we urge you people in the Gulf to have representatives testify in order to present the need for this type legislation.

In the past many years the biologists have not had the proper funds in order to accomplish the things that are needed, both for industry and for the sports fishing industry.

In this act, the State of Alabama would receive some 40 Thousand Dollars yearly; Florida, 247 Thousand Dollars; Louisiana, 275 Thousand

(Mitts #2)

Dollars; Mississippi, 131 Thousand Dollars; and, Texas, 333 Thousand Dollars. This would be on a matching basis -- 25% state funds, 75% federal funds. As you can see, each one of your Gulf Coast states would have an opportunity to accelerate their research programs tremendously.

I wish to ask your Commission to continue to support and help pass this important legislation.

It has certainly been a pleasure to be here with you again, and I have enjoyed visiting with you and would like to invite all of you to attend our meeting which will be held during the last week in September, and probably somewhere in the New England states. We will notify your Executive Director, and we extend a cordial invitation to all of you to attend our next Annual Meeting.

Thank you.

(COPY)

GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
Jack Tar-Fort Harrison Hotel  
March 21-22, 1963

"TROPICAL ATLANTIC OCEANOGRAPHY"

J. Laurence McHugh  
Chief, Division of Biological Research  
Bureau of Commercial Fisheries  
Washington, D. C.

I have been asked to review the International Cooperative Investigation of the Tropical Atlantic, a new, large-scale study of an important but little-known region of the world ocean. Adjoining, as it does, the productive waters of the Gulf of Mexico, this part of the ocean is of great interest to your Commission and its member States.

Purpose of the Investigation

The tropical Atlantic is a relatively poorly-known area of the ocean, but one which we believe is highly productive of marine life. In general, this region is similar in its circulation to the tropical Pacific, with two westward-flowing equatorial currents north and south of the equator, and an eastward-flowing equatorial counter current between. Recently in the Pacific an important new current has been found, the easterly flowing equatorial undercurrent or Cromwell Current. This carries a volume of water about a thousand times the flow of the Mississippi River. We now know that a similar undercurrent exists in the tropical Atlantic, but we know very little about its characteristics.

These complicated systems of currents in the tropical regions of the ocean create upwelling of relatively cool, nutrient-rich water from below. This "plowing" of ocean waters fertilizes the surface layers, creating extensive zones of rich biological productivity. These are fertile feeding grounds for tuna and other surface-swimming fishes. The equatorial regions of the ocean are by no means the biological deserts the open ocean once was believed to be. This region in the Pacific is rich in marine life and produces commercial quantities of tuna.

The equatorial region of the Atlantic differs from the tropical Pacific in that the equatorial currents flow diagonally across the equator from southeast to northwest. They contribute substantially to the circulation of the Gulf of Mexico and the Gulf Stream. Indeed, much of the water in the Gulf of Mexico comes from the South Atlantic. Oceanographic conditions in the South Atlantic, therefore, can have an important effect upon marine life in the Gulf. North American fishermen thus have, or should have, a deep interest in what happens in the tropical Atlantic.



(McHugh #2)

### Organization of Cruises

The International Cooperative Investigation of the Tropical Atlantic (ICITA) is a joint enterprise of several nations. One or more ships are being provided by Argentina, Brazil, and Venezuela in South America; Congo, Ivory Coast, and Nigeria in Africa; the United States of America, U.S.S.R., and possibly Japan. At least 18 universities, private laboratories, or Government agencies in the United States are participating. Several nations, unable to provide research vessels, are contributing scientific personnel. These include the Institute of Oceanography, Madrid, Spain; the Institute for Fisheries and Hydrobiology in Hamburg, and the Institute of Marine Science at Kiel University, Germany; the National Institute of Oceanography and the Lowestoft Fisheries Laboratory in the United Kingdom. Two international organizations, the World Meteorological Organization and the International Council for the Exploration of the Sea, also are involved. The international coordinator is Mr. Vernon Brock, Director of the Bureau of Commercial Fisheries Biological Laboratory, Washington, D. C.

The first series of cruises, under the code name EQUALANT I, is underway at the present time. A second series, EQUALANT II, is scheduled for the fall of 1963.

### What Will the Investigation Accomplish?

The rapid development of high-seas fisheries by a number of nations, particularly Japan and the U.S.S.R., since the end of World War II is well known to you. The West Coast of Africa, from Dakar to Cape Frio (approximately 15° N. Lat. to 20° S. Lat.) has received particular attention, and catches of tuna and herring-like fishes in this region have risen sharply. There is a real need for detailed information on abundance, movements, and other characteristics of these and other valuable living resources in the region. Such information will be valuable to prevent overfishing of resources presently utilized, and to identify resources now underutilized. This is of particular importance to the developing new nations of Africa, which have not used these resources to any great extent in the past.

Off the northeast coast of South America, from the Caribbean to Recife, lies a continental shelf rich in marine life about which even less is known. These resources are of potential value to the United States and other nations of the Northern Hemisphere, and are being exploited to some extent by several such nations now. They also are of great potential value to South American nations, which need animal proteins to augment the diet of their growing populations. In the equatorial waters of the open ocean, as mentioned already, are tuna and other resources of unknown magnitude, valuable to us and to other nations.

To understand the size of the catch that can be made from these waters, and to ensure that maximum harvests will be made and will continue, we need to know the habits of the living resources and the characteristics of their oceanic environment. From a more selfish point of view, we need to understand the ocean currents that sweep up the West Coast of Africa,

(McHugh #3)

across the equator, flow north and west along the South American coast, make a broad eddy in the Gulf of Mexico, and generate the great Gulf Stream. We need to know how these currents influence the abundance and movements of shrimp, menhaden, and other traditional resources along our shores. These are some of the benefits that this investigation will make possible.

#### Other Benefits

Other advantages will accrue to the United States fishing industry from these broad oceanographic studies. We must recognize that, except in places like the Northwest Pacific where our fishermen enjoy special advantages gained through international agreements, we have no exclusive right to ocean resources beyond our narrow territorial waters. If the United States is to remain a major fishing nation we cannot rely entirely on policies aimed at securing special privileges. Where such privileges are justified, and we can demonstrate our right to enjoy them, your Government will do everything possible to secure and maintain these privileges for you. But many resources off our shores do not qualify for abstention by other nations today and they are being fished with ever-increasing vigor. Oceanographic research in all parts of the world ocean will work to the advantage of our fishing industry. It will provide American fishermen with information which, coupled with their traditional ingenuity and aggressiveness, will allow them to compete successfully with foreign fishermen anywhere in the world.

#### Assisting Our Domestic Industry

In helping our industry to remain competitive on the high seas, we must not neglect our responsibilities at home. Many of our most serious local fishery problems can be corrected by continual revision and coordination of the fishery laws of your individual States. This is one of the principal purposes and functions of interstate fishery commissions like your own. I would suggest that you reexamine your performance and policies to be sure that you are doing everything possible in this direction.

It might be well to give an example of what I mean. I cannot think of a better one than your oyster industry here in the Gulf. One encouraging aspect of the disastrous decline of the oyster industry of the Atlantic coast, from your point of view, is that the Gulf is producing a larger and larger proportion of the country's oyster harvest. I would urge you to take a lesson from the mistakes made by your sister States on the Atlantic coast. Be sure that you are not creating, by unnecessarily restrictive laws enacted in the name of conservation a set of conditions that will prevent free use of accumulated knowledge and will raise the cost of producing oysters beyond the point of reasonable profit. Your State scientists and those of our Bureau are at your service to advise you how to avoid such costly errors.

(COPY)

GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
Jack Tar-Fort Harrison Hotel  
March 21-22, 1963

"ACTIVITIES OF THE SOUTHEASTERN  
FISHERIES ASSOCIATION"

Charles W. Bevis  
Executive Secretary  
Southeastern Fisheries Association  
Tallahassee, Florida

Mr. Chairman, members of the Gulf States Marine Fisheries Commission and guests. It is always a pleasure to appear before this group. The Gulf States Marine Fisheries Commission has been most helpful to our industry and we are deeply grateful to Dudley Gunn and all the Commissioners who have served throughout the years. I sincerely believe that you have done an outstanding job. We are proud to have you meet with us in Florida and always look forward to your visit with us.

Dud assigned me a topic - "The Activities of Southeastern Fisheries Association". I am going to vary somewhat from this topic and discuss with you some of our problems as an association. I think that these same problems may apply to the Gulf States Commission- to the marine biologists - to the members of our 5 State Governments (especially the enforcement agencies and lawmakers) whose duty it is to regulate and control our salt waters - and to the seafood industry itself,

May I steal from our good friend Charlie Jackson, who for so many years served as general manager of National Fisheries Institute, the following:

"Trials of an Association Secretary.

If he talks on the subject -- he is trying to run things.  
If he is silent -- he is dumb or has lost interest.  
If he is usually at the office -- why doesn't he get out.  
If he is out when we call -- why doesn't he stick around more often.  
If he is not at home at night -- he must be out carousing.  
If he is at home -- he is neglecting outside contacts.  
If he doesn't agree with you -- he is ignorant or bullheaded.  
If he does -- that's all he had to do anyway.  
If he can't help you find a better job -- he's a poor contact man.  
If he's more cordial to one member than another -- he's playing politics.  
If he should give someone a short answer -- trim him down to size in the next budget.  
If he tries to explain both pros and cons of something -- he's pussyfooting.  
If he is well dressed -- he thinks he's a big shot.  
If he isn't -- he's not a proper representative of his association.  
If he takes a vacation -- he's been on one all year.

(Bevis #2)

If he's been on the job a short time -- he's too inexperienced.  
If he's been on the job a long time -- we need new ideas and it's time  
for a change.

A trade association executive just can't win."

I am sure that you have all read this but I am not so sure that  
all of you have given deep thought and evaluated the real and deep serious-  
ness and truth as Charlie has so aptly put it.

No - a trade association executive can't win.

No - a commission can't win.

No - a director of conservation can't win.

No - a member of the legislature can't win.

No - a biologist can't win - and might I add "can't complete a project -  
never has enough funds" generally tells the industry what to do  
instead of industry asking for specific help but not assisting in  
getting that help.

No - the industry can't win, because there is no such thing as a united  
front in any problem concerning the fisheries industry and because  
the: Trade executive can't win - the commission can't win - the  
conservation director can't win- the legislator can't win - and so  
goes the revolving circle - most always brings us back to the  
starting point, established years and years ago.

On June 23, 1952 the constitution and by-laws of the Southeastern  
Fisheries Association were adopted and at that time the following "Objects  
and Purposes" of the association were adopted:

1. To promote in every legal manner the development, operation, maintenance,  
and general welfare of the commercial fisheries industries of the Southeastern  
United States, namely, Florida, Alabama, Georgia, South Carolina, North  
Carolina, and other states desiring to affiliate.

2. To conduct studies, engage in research, and in any or all other kindred  
and legitimate activities to aid the commercial fisheries industries of the  
Southeastern United States and Gulf of Mexico.

3. To furnish timely information to its membership in every legal manner  
with respect to any and all matters vital to the maintenance and development  
of the commercial fisheries industry of the Southeastern United States and  
Gulf of Mexico.

4. To collaborate and cooperate in every legal manner with all branches  
and agencies of the state and federal governments having to do with the  
commercial fisheries industry, with trade associations, chambers of commerce,  
boards of trade, and other organizations to the end of protecting the health

(Bevis #3)

and well-being of our citizens by educating them with respect to the high nutritive value of fishery products, and the establishing of a sound and coordinated government policy which will protect and strengthen the fisheries industry.

5. To appear before legislative and congressional committees, and executives or administrative agencies of state and federal governments for the purpose of promoting and sponsoring the enactment of sound laws, rules and regulations pertaining to or affecting the fisheries industry of the Southeastern United States and Gulf of Mexico.
6. To advance in every legal manner the fisheries industry of the Southeastern United States by sponsoring sound laws, foreign treaties and agreements safeguarding the producing, processing, canning and distributing of fishery products.
7. To promote in every legal manner the standardization and simplification of products.
8. To conduct in every legal manner trade promotion activities, including advertising and publicity.
9. To engage in any lawful activities which will enhance the efficient and economic progress of the industry and apprise the public of its scope and character.

Now nearly 11 years later these objectives and purposes are still the same. Problems have increased with growth and expansion of the fishing industry throughout the world. We have had to make progress to survive and I certainly think we have all made a sincere effort to keep abreast of the times. We are proud of the strides made by Southeastern. Our problems and purposes may be the same - but the magnitude and importance of these problems have greatly increased. The progress that has been made is the results of a dedicated effort by all of you to make our industry grow and take its rightful place, its honorable place in world economy.

Before closing I would like to take this opportunity to extend to each of you a cordial invitation to attend the 11th annual Southeastern Fisheries Association Convention in St. Augustine, Florida, on May 18, 19, 20, 1963.

I am not fussy and mad -- just tired.

Thank you.

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GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
Jack Tar-Fort Harrison Hotel  
March 21 22, 1963

"INDUSTRY'S APPRAISAL OF NEEDED  
GULF MENHADEN RESEARCH"

Harry I. McGinnis  
Wallace Menhaden Products, Inc.  
New Orleans, La.

The menhaden fishery in the Gulf of Mexico is the fastest growing fishery in the United States. Production in 1962 reached a record high of 530,000 tons. This amount was approximately one-fifth of the total fish catch in the United States and one-half of the total menhaden production.

Prior to World War II, the catch of menhaden from Gulf waters amounted to less than 15,000 tons annually. Beginning about 1947, the industry began expanding. New plants were built, processing facilities were increased, and new vessels were added to the fleet. By 1950, the catch had risen to over 163,000 tons. From 1950 to 1958, the annual catch varied about an average of 212,000 tons. The catch increased each subsequent year and in the past 2 years has more than doubled.

The entire Gulf menhaden catch is manufactured into fish meal, oil, and condensed solubles. The meal and solubles are used in mixed animal feeds, primarily for poultry. Most of the oil production is exported to Europe, where it is manufactured into margarine. The combined value of these products in 1962 was estimated at \$22 million.

The increased market demand for fish meal in the United States has been closely associated with the production of the menhaden industry. In 1962, menhaden meal accounted for nearly 79 percent of the total U. S. fish meal production. Undoubtedly future domestic production of fish meal will continue to be largely dependent on the menhaden industry.

We recognize that in order for us to maintain our favorable position in the current fish meal market, we must be assured of adequate supplies of raw material. Furthermore, because of the narrow margin between the market price of our products and the combined costs of catching and processing the raw material, we require tremendous quantities of fish.

For these reasons, the phenomenal growth of the Gulf menhaden fishery has been particularly encouraging to us in industry, especially since the Atlantic menhaden fishery in recent years shows signs of leveling off or even declining.

The basic questions which we now face with respect to the resource are these: (1) Can the Gulf menhaden stock support even greater catches than are now being taken, or (2) Is the increased fishing in recent years

(McGinnis #2)

endangering the future supply of fish? Such information can only be furnished by scientific studies such as those being conducted on the Atlantic Menhaden fishery.

The Gulf menhaden fishery at present is carried on along the coasts of Mississippi, Louisiana and eastern Texas. Approximately three-fourths of the catch, however, is taken between Moss Point, Mississippi and Morgan City, Louisiana. Because the fishery is restricted to such a relatively short stretch of Gulf Coast, this suggests the possibility of a much larger annual catch than is now being taken. However, exploratory fishing work must be done to determine whether sizable concentrations of menhaden occur elsewhere in the Gulf. Furthermore, the fish disappear from the northern Gulf sometime in October and are not seen again until the following April or May. If the migration routes and winter locations of the fish could be determined, this information could lead to extension of our fishing season.

Most of the fish in the catches are small, and biologists of the Bureau of Commercial Fisheries tell us that most of these fish are in their second or third year of life. Some offshore catches of larger, older fish have been reported by the Bureau's exploratory fishing vessels, and these sometime appear in our catches during the spring and fall migrations. Since these fish are not being utilized by our industry, this portion of the resource is being wasted. If these older, larger fish could be located and caught, they could appreciably increase the yield and provide a greater economic return than is now being realized.

Furthermore, since the fishery is based on fish in their second and third years of life, the failure of a single year class could cut production by at least 50 percent. The failure of two or more year broods could have catastrophic effects on our industry.

Frequently the catch in one locality differs considerably from that in other localities during the fishing season. Such erratic changes in the supply of fish obviously are of great economic concern to both the fishermen and the plant operators. Fish meal inventories which must be carried until each new season's supply of fish becomes known result in costly storage and handling. The repair and reconditioning of vessels and plant processing machinery in advance of each fishing season are costly and, at present, are made with no knowledge of expected catch. New processing plants and vessels have been constructed with no assurance that our capital investments can be recovered. It would be extremely helpful, therefore, if prediction of catch could be made so that we could plan our fishing operations, marketing practices, and capital investments on an objective basis.

No industry, including the menhaden industry, can operate successfully with so many unknowns. We have invested large sums of money in vessels, plants, and other equipment, and we cannot afford to see this great resource either wasted or unwisely used.

There have been confirmed reports that Russian fishing vessels have been searching for menhaden along the coasts of our Southeastern Atlantic States. Recently we have been reading in the news that the Russians have established

(McGinnis #3)

a fishing base in Cuba. We cannot idly sit by while the nationals of other countries are searching the waters in our backyard for the very fish which support our industry.

We have repeatedly urged that scientific studies be undertaken which will lead to a better understanding of the biology and habits of Gulf menhaden. We believe that biological research, similar to that which the Bureau of Commercial Fisheries is conducting on the Atlantic menhaden fishery, is absolutely essential to the wise utilization of the Gulf menhaden resource and thus will assist the nation's leading fishing industry in the uninterrupted continuation of its operations and in the expansion of the markets for its products.



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GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
Jack Tar-Fort Harrison Hotel  
March 21-22, 1963

"DOES TEMPERATURE AFFECT THE ABUNDANCE  
OF PINK SHRIMP LARVAE?"

Albert C. Jones  
Institute of Marine Science  
University of Miami

Study of the early developmental stages of pink shrimp on the Tortugas fishing grounds of Florida is being carried out by the Institute of Marine Science of the University of Miami with the support of the Bureau of Commercial Fisheries. One objective of this study is to describe the abundance of the larval stages, seasonally and geographically, and to determine the factors which affect the numbers and the survival of the larvae. This information will help in our understanding of the variations that take place in a shrimp population. Along with information on survival at older ages, the study will point the way to discovering why some years are good and some years are bad for shrimping.

Temperature is an important factor in the lives of all marine animals. It is perhaps the most important single factor governing the occurrence and behavior of life. The effect of temperature on reproduction of a species has been described many times. In temperate and higher latitudes reproduction usually is associated with the warm season of the year. What happens in the tropics or at great depths where temperatures are uniform summer and winter may be different and is of great interest. Tropical organisms may breed continuously, as has been suggested by some, or they may have definite breeding rhythms as do temperate organisms.

Our study suggests that temperature is a primary factor which affects the spawning of pink shrimp and the abundance of larvae. The study shows that pink shrimp like many tropical species, have a continuous breeding season but, like temperate and the majority of tropical species have a definite breeding rhythm.

The continuous breeding season has been demonstrated by plankton tows made throughout the year on the Tortugas fishing grounds. In these tows young pink shrimp, less than 3 weeks old, were found each month of the year. In fact, in 3½ years, a cruise was never unsuccessful in collecting larvae. The continuous presence of young larvae in the samples is evidence that spawning is continuous and is not restricted to a certain period of the year. Other evidence that spawning continues throughout the year is from samples taken in inshore areas. Samples from the entrance to the Flamingo estuary in the Everglades National Park showed that postlarvae are present throughout the year. This is surprising, since in temperate waters penaeid shrimp are definitely seasonal in their distribution in estuaries. In North Carolina postlarvae of pink shrimp were observed by Austin Williams only from May to November. In Texas the Bureau of

(Jones #2)

Commercial Fisheries found that penaeid postlarvae were absent at the entrance to Galveston Bay from mid-December to mid-February.

The fact that the breeding season is continuous throughout the year provides some interesting information about the temperatures at which pink shrimp spawn. Most marine animals have restricted temperature ranges for breeding. Presumably pink shrimp do also, but since spawning occurs throughout the year in the Tortugas area these limits are presumably beyond the limits of the temperature range of this environment. The observed temperatures at stations at which spawning occurred, (i.e. at stations at which larvae of less than 2 days in age were collected) ranged from a low of 19.6°C to a high of 30.6°C. These observed temperatures considerably extend the temperature range for spawning of pink shrimp which has been reported in the literature.

Some of the conclusions concerning the spawning season which have been reported in the literature have been based on the appearance of postlarvae at the mouths of estuaries. This is not a good criterion for crustacea, which may have a prolonged larval development. It is possible that even in northern areas pink shrimp may spawn throughout the year but may not enter the estuaries during the cold winter months. Broad found large ready-to-spawn female pink shrimp offshore of North Carolina in November but recruitment of postlarvae of this species has never been noted there in winter. It is possible that the shrimp may have spawned and the larvae remained off shore until spring. The Bureau of Commercial Fisheries found penaeid postlarvae off Galveston throughout the year although, as we just said, the postlarvae did not enter the bay during the winter.

Although pink shrimp have a continuous breeding season in the Tortugas area, they have a definite breeding rhythm which is related to temperature. There is a close relationship between the abundance of larval shrimp, as measured by the catches of plankton tows, and the temperature of the water at the bottom, which is the habitat of the adult shrimp. The figure shows this relation in 1959, 1960, 1961 and the first half of 1962. The temperature pattern consists of an increase in spring from the winter low, high temperatures during summer, a gradual decrease through the early fall and an abrupt drop in the late fall. The winter lows during the three years were between 19.5 and 21.7°C. The summer highs were between 29.1 and 29.8°C.

The seasonal fluctuation in the numbers of larvae follows a similar pattern. The numbers of larvae were low during the winter, increased rapidly in spring along with rising water temperatures, fluctuated around a high level in summer and decreased in autumn. The winter lows during the three years were less than 1 larva per tow. The summer highs were between 60 and 250 larvae per tow.

In 1961 the water temperatures fell off unusually early in the spawning season. The maximum temperature was reached in June and temperatures decreased in July, August, and September. In other years the temperature decline did not begin until September or later. The temperatures

(Jones #3)

in August 1961 were colder than in November of the two previous years. These cold temperatures were associated with sharp thermoclines, with the surface temperatures up to 5.7°C. higher than the bottom. The spawning intensity in 1961 followed this same trend. Maximum spawning occurred from March to June but few larvae were collected in the succeeding summer months of 1961 which had cold water temperatures. An average of 37 larvae in June was followed by averages of 0.2 to 3.4 in July to September.

Temperature, of course, may affect the numbers of larvae in several ways. It may affect the spawning intensity of the adults. Or it may affect the hatching of the egg and survival of the larvae. Finally, the growth and duration of the larval stages may be affected.

It is possible that the fluctuations in numbers of larvae can be explained largely as fluctuations in spawning activity. Some ripe and nearly-ripe shrimp are found on the Tortugas grounds throughout the year but the highest percentages are present in spring and summer, from April to November. Thus, the seasonal trend in numbers of larvae follows the seasonal trend in the percentage of ripe shrimp.

Effects of temperature on hatching of the eggs and survival of the larvae also may be important in affecting the abundance of larvae, but we have less information on these factors. Some of our laboratory experiments which will be discussed in another talk indicate that low temperatures prolong the larval life and may affect survival. The planktonic life of shrimp is full of hazards and a longer larval life which is a result of prolonged development at low temperatures, may markedly reduce survival. This has been suggested in the case of sardine larvae in California waters where a three degree range of temperature may result in a 10 fold variation in survival. Further information on the effects of temperature on these aspects of the life history awaits additional observations and experiments.

There is a general pattern in the seasonal relationship between waters temperature and numbers of larvae. This is shown in the following figure.

The numbers of larvae are plotted on the vertical axis against temperature on the horizontal axis. The months are indicated by the numbers 1 to 12, starting with 9 in September 1959 and ending with 6 in June 1962. The resulting polygons give seasonal pictures of the temperature-larval relationship and makes possible a graphic comparison of the data.

The numbers of larvae increased rapidly when water temperature increased in the spring months. The numbers of larvae also decreased rapidly when water temperatures decreased in the fall months. This pattern was observed in the 4 years in which data were collected. The increase in the numbers of larvae in the spring occurred at lower temperatures than did the decrease in the numbers of larvae in the fall. Apparently, the direction of the temperature change, as well as the absolute value of the temperature, affects the spawning intensity.

(Jones #4)

A slight increase in temperature is sufficient to trigger gonad maturation and spawning in the spring while in the autumn a slight decrease in temperature is sufficient to cause spawning to cease in the majority of the population.

In conclusion, pink shrimp in the Tortugas area of Florida spawn throughout the year but the principal spawning season is from March to October. The shrimp are capable of spawning at temperatures at least between 19 and 30°C, and possibly at more extreme temperatures. The fluctuations in the numbers of larvae are related to the seasonal temperature cycle, probably because of the effect of temperature on the seasonal spawning cycle. The effects of temperature on survival of the egg and larval stages remains to be determined.

GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
Jack Tar-Fort Harrison Hotel  
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"PROGRESS REPORT ON A STUDY OF THE JUVENILE  
PHASES OF THE PINK SHRIMP IN SOUTH FLORIDA"

C. P. Idyll and E. S. Iversen  
Institute of Marine Science  
University of Miami

INTRODUCTION

With the support of the Bureau of Commercial Fisheries the Institute of Marine Science is studying the juvenile phase of the life history of the pink shrimp Penaeus duorarum, in the Everglades National Park nursery grounds. The work was begun on October 1, 1962. The program involves obtaining quantitative information on pink shrimp in an outlet of the nursery grounds. Information on relative abundance, sizes of shrimp, sex ratios of shrimp and movements of shrimp in this canal in response to environmental conditions are being sought.

The area of Flamingo (Buttonwood) Canal where sampling is to be done is about 60 feet in width and about seven feet deep at low low water. At high tide the depth may reach about nine feet. A bridge which carries vehicular traffic between the Everglades National Park entrance and Flamingo passes over the canal at the point of sampling. This area is about half a mile from the exit of the canal into Florida Bay. The heavy concrete pilings which support the bridge are located at each side of the canal about six feet from the edges of the canal. The bottom of the canal is of hard marl and is relatively flat. There is considerable small boat traffic up and down the canal during the day and evenings, especially during week ends. Tidal currents are usually strongest on the ebb tide, but wind conditions often cause variations in strength and duration as well as direction of the water movement.

Considerable effort was spent in searching for and removing logs, rocks, cement rubble and drift wood which would have fouled the sampling net. Because the water is murky, careful underwater searching was required over an area about 60 x 60 feet. Numerous large rocks and logs, some weighing several hundred pounds were removed from the sampling area with block and tackle.

METHODS

Based on preliminary trials with a channel net used by commercial shrimp fishermen in the Everglades Park, and observations made with SCUBA gear, a net was designed and assembled. The first net is constructed of 3/4" stretched mesh nylon webbing throughout and is 13 feet by 76 feet with a cod and 6 feet square at the junction of the wings (upper end), tapering

(Idyll & Iversen #2)

to a 2 foot opening at the lower end. The cod end is about 30 feet in length. Lead lines are swen to both the top and bottom lines of the net to permit it to lie flat on the bottom of the canal when boats are passing through the sampling area. Large brass rings were swen to each end of the net to fasten it to the movable pipe supports.

During the first trials the lead line of the net did not stay on the canal bottom. To overcome this difficulty the cod end opening was enlarged from 6' square to about 13' x 36'. Observations made by a diver showed that the net was lying on the bottom of the canal.

A second net has been built which we expect will avoid small pockets in which debris collected in the first net. The new net is tapered evenly from the mouth to the codend. It is more heavily weighted with the bottom line consisting of a solid row of leads, some 160 pounds. The top line has 40 pounds of leads. The new net will be tested this month. The first net is believed to have caught virtually all animals moving in the canal; the new net should do likewise.

Since the net cannot remain erect during the entire sampling period it was necessary to build and install 500 pound concrete blocks which would hold movable "L" shaped pipes that permit the net to be raised and lowered. Stability of these blocks was accomplished by securing them to the bridge pilings by stainless steel cable and turnbuckles. A system of removable overhead lines and blocks has been assembled which permits rapid raising and lowering of the pipes and net by use of an automobile on the nearby roadway. This can be done at all stages of the tide.

Signs which warn boaters that we are working with a net in the canal have been prepared and installed. These 4 foot square signs are placed on both sides of the net and can be lighted at night and removed when not in use. In addition, red kerosene lanterns high on the bridge provide further warning.

Sampling is done twice each lunar month, for two nights running. The net is set at dusk and is fished over two tides. When the tide reverses direction the net is turned inside out. It fishes equally well on either tide.

The cod end of the net is emptied every half hour. The net continues to fish while the cod end is being raised.

At present, while the sampling program is being shaken down, and while catches of shrimps are relatively small, the whole sample is being kept. Later sub-sampling will be employed.

Small fish are being kept. Big fish are measured, counted and released. Crabs are being sexed and counted and released.

A Gurley current meter, Model No. 622 is used continuously while sampling is underway. The meter provides accurate measurement of water velocity.

(Idyll & Iversen #3)

Temperature and salinity readings are made on each haul. A summary of samples taken is shown in Table I.

### RESULTS

Abundance: A comparison of the numbers of shrimp caught on flood and ebb currents (from current meter readings) is shown in the table #2. There is considerable variation within the several series of comparisons but the numbers of shrimp caught on the flooding current are low in relation to the numbers caught on the ebbing current. This was anticipated; in fact it was expected that the differences would be even greater than those observed. It was supposed that at this spot, close to the edge of the estuary, most shrimp movements would be toward the sea, with very little movement into the estuary. The fact that moderately large numbers of shrimp were caught on the flood tide suggests that many of the shrimp moving towards Florida Bay return "inland" again. Clearly, however, there is a net migration out of the estuary. It will be of interest to see how the comparison of numbers on flood and ebb currents changes seasonally and with varying hydrographic conditions.

It is necessary to differentiate between "flood tide" and "flooding current" since commonly the water falls while the current is flooding. This is probably associated with the character of the terrain, which involves a sizeable basin connected by a narrow inlet from the sea. Delay in emptying and filling this basin produces the anomaly between current direction and falling or rising water level. A further peculiarity of the tides at the sampling area is that their duration does not coincide with tide-table predictions. Commonly the tide will flood much longer than predicted and, the ebb stage will be relatively very short. Sometimes the reverse is true. This phenomenon may be associated with winds, but the pattern is not at all clear.

Perhaps as a consequence of the peculiarities of the tides, the shrimp abundance shows some unexpected patterns. On the basis of preliminary work during an ecological study of the estuary, it appeared that shrimp catches were highest when the velocity of the water was greatest. The new data show that there is a good agreement between catches and current on the ebbing current, but that this is not true on the flooding current. On the other hand, there is a good inverse relationship between the tide height and the numbers of shrimp caught in the net. This is true both on flooding and ebbing currents. It is not clear how the shrimp sense tide height, yet the animals appear to be reacting to it.

Sizes of Shrimp: During the whole period January 3 to February 9 the mean sizes of shrimp caught did not change. The time period is only 6 weeks, yet it is surprising that the mean size is the same, with one exception, for 6 sampling times. The mean size is 14 mm carapace length and the smallest shrimp caught are about 6 mm. There is a considerable difference in size ranges among the samples, but this is due to the variation in sample sizes.

(Idyll & Iversen #4.)

Light: Boat traffic in the canal is heavier in the daytime than during the night. During preliminary trials with the net we have done nearly all sampling at night except when SCUBA diving for inspection of the net was involved. Some day samples were obtained but are not included in the present analysis. Those taken in full daylight contained no shrimp. When sampling was begun during darkness, and extended into daylight hours, the numbers of shrimp diminished greatly. One sampling period which began at dusk and extended into darkness involved an ebb current. The early samples from this trip contained some shrimp during the dusk hours and as darkness increased the numbers caught increased. Later we will conduct sampling over a full 24 hour period.

Temperature: Temperature affected the movement of shrimp when extremes occurred, but the evidence is too sparse yet to make any close comparisons.

A very large shrimp catch was made during the cold spell of January 8-9. At that time the numbers of shrimp caught per half hour of sampling were about 10 times as large as those taken at times when the air temperature was warmer.

General: Many fish and invertebrates other than shrimp are being caught in the net. Large number of blue crabs and smaller numbers of sea catfish, Galeichthys felis are taken. Collections and counts are being made of all species caught incidental to the capture of pink shrimp.

Since we are in the early stages of this work the results fail to show any but the faintest of patterns. It seems clear however, that we have an opportunity to obtain a good deal of valuable information about the biology and behavior of pink shrimp with the technique employed.



(Idyll-Iversen #5)

TABLE I  
SUMMARY OF SAMPLES COLLECTED

DATE	SAMPLING INTERVAL		NO. OF SAMPLES TAKEN	
	START	END	FLOOD CURRENT	EBB CURRENT
January 3	2120 hrs.	2340 hrs.	4	-
January 8-9	2030	0440	10	5
January 22-23	1945	0400	8	5
January 23	1915	2400	4	5
February 5-6	2237	0301	7	-
February 6	1747	2240	-	10
February 19-20	1845	0545	15	6
February 21	0400	0753	-	8
March 5	0200	0702	2	7
March 6	1905	2330	<u>6</u>	<u>2</u>
		TOTAL	56	48

(Idyll & Iversen #6)

TABLE 2

Numbers of shrimp caught per sample

DATE	FLOOD TIDE		EBB TIDE		FLOOD AS % OF EBB
	Average no. per half hr.	Number samples	Average no. per half hr.	Number samples	
Jan. 8	12.9	10	1,006.4	5	1.3
Jan. 22	23.3	11	102.6	5	22.3
Feb. 6	4.4	7	87.3	10	4.6
Feb. 19	24.2	15	226.0	5	10.6

GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
Jack Tar-Fort Harrison Hotel  
March 21-22, 1963

"RAISING OF PINK SHRIMP FROM EGG TO ADULT"

Joseph J. Ewald  
Institute of Marine Science  
University of Miami

Our present knowledge of the early stages of the life cycles of penaeid shrimps has been gained using three methods:

1. By reconstructing a developmental sequence, linking together larval forms found in the plankton which show morphological similarities.
2. By rearing larvae found in the plankton through one or more stages.
3. By rearing larval hatched from eggs of known parentage through one or more stages.

The first two of these methods have obvious drawbacks. The greatest weakness is that despite similarities with other stages, identity cannot be proven. Only by rearing eggs of known parentage under close observation through all phases of their larval development can we be certain of a shrimp's complete larval history. Many attempts have been made to do this, with little success in most cases.

A few outstanding exceptions exist. Dr. Hudenaga (1942) in Japan has had great success at rearing P. japonicus in his laboratory and then in ponds. His paper describing the complete development and natural history of this species is a classic, for this type of work. In 1938 Heldt reared three species of penaeids into post-larval stages. In 1954-1955 Johnson and Fielding reared Penaeus setiferus, the white shrimp, in ponds using mass culture techniques.

Problems encountered in rearing shrimp larval include:

1. That of obtaining fertile eggs.
2. That of having adequate supplies of the right kind of food at the right time.
3. That of the animal becoming entangled in its food or its excrement. (Especially as protozoa)

No one had successfully reared through all stages any species of penaeid shrimp found in the Western Hemisphere prior to the present work at Miami.

(Ewald #2)

Work at Miami on the life history, distribution, and migration of the Tortugas pink shrimp, P. duorarum is supported by the Bureau of Commercial Fisheries. It was necessary to identify and describe the various larval stages of the pink shrimp before the other phases of our work could proceed. This work is greatly complicated by the presence of some 108 kinds of larval penaeid forms which are found in plankton samples.

Dobkin (1961) described the first six stages (5 naupliar, 1 protozoal) from reared material. He was unable to rear larvae any farther, although four attempts were made. He described succeeding stages from the preserved plankton. For the latter 6 stages he compared such characters as exoskeletal spination, relative length of antennae and length and shape of the rostrum with the published descriptions of other shrimp species such as found in Pearson (1939), Gurney (1943), Heldt (1938), and Hudenaga (1942). In August and September of last year we succeeded twice in rearing pink shrimp all the way from egg to post larvae. I can only touch on a few highlights of these successes, and by doing so perhaps indicate some reasons I feel they were possible.

Obtaining fertile eggs: The problem of obtaining fertile eggs in good condition has proven to be difficult for some workers. In the Tortugas fishery, following the work done by Cummings (1961) on maturation and spawning of pink shrimp, by Jones et al. on seasonal distribution of pink shrimp larvae, and by Iverson et al. (1960) on distribution of adults and by Costello and Allen (1962) on the migration of adults, we know when and where to find spawning females.

Thus large ripe females were obtained in short, try-net hauls by a shrimp trawler out of Key West. They were transported to Miami at night in 50 gallon plastic garbage cans, only periodic manual aeration being necessary. Temperature rose 2-3°C during transport.

At the laboratory these were placed individually in aquaria, and if spawning occurred it was within two days. Our experience indicates that if a shrimp does not spawn 2-4 days after it is brought to the laboratory it probably will not spawn.

Most of the eggs are demersal. They collected on the bottom of the tanks in such numbers that they often appeared as a white powder. They could be easily siphoned out.

Rearing technique: Eggs were allowed to hatch and pass through all naupliar stages in large finger bowls containing filtered sea water. During the naupliar stages the larva does not feed. As first protozoa appeared they were placed in individual compartments of clear plastic tackle boxes. It is now the larvae begin to feed.

The tackle box method of rearing, developed at Duke University and used extensively in the Decapod rearing program at our laboratory, has several advantages. One big advantage is that individual records can be kept for a large number of larvae. These boxes can be stacked and stored quite easily. Water and food are changed each day and molting, growth, condition, and behavior can be observed for individuals.

( Ewald #3)

Water: It has been shown that sea water from different areas may have different characteristics which have marked effect on marine life. (Wilson and Armstrong, 1954). I suspected this might be important in rearing pink shrimp larvae because these larvae are rarely found in inshore waters. I tried both Biscayne Bay and Gulf Stream waters of identical pH and salinity. Extremely high mortality occurred with those reared in Bay water and none survived more than a week. Those in open ocean water survived relatively well.

All the water for a given experiment was collected at one time and used throughout the experiment. Larvae were transferred each morning to trays containing "new" water. This helped to keep bacterial populations to a minimum.

Food: Early stage shrimp larvae are known to feed on micro-organisms found in sea water. However, very little else is known on the kind of microorganism a shrimp larva can utilize.

I have maintained pure cultures of several diatoms, dinoflagellates, and other unicellular algae. In the rearing experiments I used a mixed culture consisting of:

Dunaliella tertiolecta = a unicellular algae

Tetraselms - a unicellular algae

Phaeodactylum tricornutum - a diatom

A strain of Chlorella - a unicellular algae

A marine yeast

After the larvae had been transferred to new trays each day, fresh mixtures of these organisms were introduced into each compartment.

Water temperature: Larvae were reared at three different temperatures, 21°, 26°, and 30°C. Very high mortality resulted at 30°C. Although mortality rates for the 21° temperature were higher than at 25° some larvae appeared to do well at this temperature. This slide shows the fastest development times for the two temperatures. As a comparison we note that the time of development for P. japonicus was 9½ - 10½ days (Hudenaga), P. setiferus 10 - 12 days (Johnson and Fielding), and for P. trisulcalus 18 days - (Heldt).

Mortality: Of 1200 first protozoa started only 50 survived to the post larval stages. These deaths included specimens that were preserved for detailed study and those whose mortality was due to experiments with water source, temperature and laboratory-imposed conditions.

Previous workers have encountered great difficulty in rearing larvae through the protozoal stages. These animals possess appendages with many

(Ewald #4)

feathery setae and can become entangled in food and fecal materials, making them ineffective swimmers. When this occurs they usually sink to the bottom to die. However, I have noticed that healthy, active larvae are generally able to contend with this problem. It thus appears to be brought on more by poor physical condition rather than anything else. However, daily changing of the water minimizes the amount of such materials in the water, thus enhances survival.

Once the first mysis stage was attained mortality decreased substantially and the problems of rearing were greatly reduced. Once post larvae are produced, I have had no trouble rearing the animals to mature sizes.

The results of this initial research may have important applications both to the study of the biology of shrimp and to possible commercial rearing of shrimp. Of course, growth stages identified from rearing are necessary in identifying the plankton in spawning, distribution and abundance studies such as are being conducted at Miami and elsewhere. Perfection of techniques to enable mass rearing of shrimp larvae will facilitate further studies on food preference, effects of temperature and light, and various aspects of behavior. These in turn may shed light on the dynamics of natural shrimp populations.

The ability to mass-rear shrimp from the eggs may open the door to the possible artificial culture of shrimp on large scales. In Japan Dr. Hudenaga has successfully reared penaeid shrimp, first in the laboratory, and then in ponds. At the present time his shrimp farm outside Tokyo supplies restaurants with shrimp on a semi-commercial basis. It is expected that shrimp farms in central Japan will eventually produce 2,000 tons of shrimp per year. (Market News Service, Bur. Comm. Fish., Jan. 15, 1962)

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GULF STATES MARINE FISHERIES COMMISSION  
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"THE MULLET (LISA) UTILIZATION PROGRAM"

Melvin E. Waters  
Pascagoula Technological Laboratory  
Bureau of Commercial Fisheries

The Pascagoula Technological Laboratory of the Bureau of Commercial Fisheries has had a utilization program on most of the available under-utilized species of Gulf of Mexico fish since its inception in early 1958. Several products have been studied at the Pascagoula Technological Laboratory which would utilize mullet as a raw material. Smoked mullet, smoked mullet sausage, canned smoked mullet fillets, dry salt mullet, and several forms of canned mullet have been prepared and favorably reported on by our taste panel.

For the present fiscal year we have been engaged in a canning study to develop the best possible canned fish from mullet. The Florida State Conservation Board had suggested that a product could be developed, which, with sufficient advertising, might well enter the institutional markets now held by other area's products. It was estimated that the volume of canned fish used by the Southern State Institutions alone would support a considerable volume of canning. With this in mind, we joined the Florida State Conservation Board in a study to develop both a consumer and institutional canned mullet pack of highest quality. The State proposed to test market the product and publicize the product under the name "Lisa." In our technological study we abandoned the former method of trying to develop the most economical product which would compete with cheaper products. Our primary concern is to develop a product from mullet which the consumer will select from a multiple choice taste test. We were hindered by the fact that most people don't like canned fish directly from the can. We believe that taste panel work should be done directly on the canned fish as opposed to combining the fish in salads, etc.

I would like to digress one moment here to point out that most people untrained in food selection taste panel work will invariably compare a product to some other canned product, rather than to judge it on its own merits. Even in our own Bureau organization this new canned mullet product is often rejected because its color, flavor, texture, or dryness does not compare to Alaska salmon, Pacific Coast tuna, or Norwegian sardines. It is necessary to acknowledge that mullet is a unique fish with its own taste characteristics. Canned mullet should never be compared to any other food. Taste panelists should simply decide if they would buy this fish when offered in regular consumer channels.

Most of you are familiar with former canning attempts of the University of Miami, the major can companies, and our own attempts at Pascagoula. Suf-

(Waters #2)

face it to say none of these products would ever command any of the housewife's dollar. It is true that a few individuals well acquainted with mullet would gladly eat this earlier product but, in general, it met with complete rejection.

We are going to present here today the most recent product of the Pascagoula Technological Laboratory, and cut some other packs for your evaluation. I will explain the method of packing our experimental product. (I have prepared an instructional sheet to distribute for your convenience.) Two to three-pound mullet were scaled and filleted. The fillets were soaked for 1 hour in a 10% salt solution. The fillets were steamed at 212°F. for 5 minutes on wire racks so that the oil and dark juice could drain off in cooking. After chilling to firm the flesh, the white meat is picked out in large pieces and hand packed in a can.

Most of you know that it is necessary to have a certain "Fill of Container" drained weight under U. S. Food and Drug Regulations. As a "rule of thumb," in the absence of a published standard, a canned fish product should have 70% of the can's water capacity in drained flesh. In order to get this 70% in mullet by this method, we must put in 10% over the desired cut-out weight. Thus, we put 80 ounces in the #10 cans; 13 ounces in the #300 cans; fill the can to 1/8 inch headspace with 5% brine; heat to 160°F. and close the can.

Now that we are working with a boneless product which is precooked and preheated, almost to the point of killing all vegetative bacteria, we can cut down on our retort time. To establish correct processing time, we used thermocouples and a potentiometer to determine the heat penetration in both #10 and the No. 300 cans. In this method Bi-metallic probes are placed through the can walls with thermocouple wires leading out under the retort lid to a potentiometer calibrated to read temperature values. With this set-up one can read the continuous temperature in the center of the can as the pressure rises in the retort. Previous studies published have established the fact that if the center of the can is held at 240°F. for 5 minutes, complete sterility will result. Our thermocouple studies showed that the No. 300 can required 40 minutes at 240°F. and the No. 10 can 50 minutes at 240°F. to obtain the required 5 minutes at 240° in the can centers. The cans should be cooled in the retort upon completion of the processing, in order to prevent further cooking which will soften the fish. To further establish the complete sterility of the product at this greatly lower processing time, several cans were incubated 3 weeks at 37°C. and 25°C. No "swells" developed, and the lot can be assumed safe.

The product, as presented here for your examination, is bland enough to suit modern consumer requirements. It could be utilized in salads, casseroles, loaves, and other dishes. The cost at this stage has not been considered; however, it might be noted that our yield is in the nature of 20% on the round fish. In other words, it took 22½ pounds, or 10 large fish, to fill this one No. 10 can by this pre-cook, white-meat-only method of packing.



(Waters #3)

In closing, I will mention one other phase of our mullet utilization studies. Our Ann Arbor Technological Laboratory has been engaged in a study on filleting of Great Lakes fish. They have a filleting machine under contract at Menominee, Michigan, north of Milwaukee. We took 500 pounds of mullet to Menominee last January for a filleting test. Unfortunately, the machine was designed for a flat fish-like herring and our round mullet did not fit the set-up. A considerable amount of rib bones were left in the fillet. These results indicate that to be really practical, a special filleting machine must be engineered for these larger round fish. Machine filleting would lower labor cost in production.

The Bureau invites requests for further information.

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GULF STATES MARINE FISHERIES COMMISSION  
Clearwater, Florida  
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March 21-22, 1963

"REPORT ON MISSISSIPPI RIVER-GULF OUTLET NAVIGATION PROJECT  
AND LAKE PONTCHARTRAIN HURRICANE PROTECTION PROJECT, LOUISIANA"

Spencer H. Smith, Branch of River Basin Studies  
Bureau of Sport Fisheries and Wildlife  
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The Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries are completing jointly conducted investigations on two public works projects within the New Orleans vicinity. Both studies were coordinated with the Louisiana Wildlife and Fisheries Commission and were carried out under authority of the Fish and Wildlife Coordination Act.

The first initiated was the Mississippi River-Gulf Outlet navigation project authorized to be constructed by the Corps of Engineers. The project will be a 36 x 500 foot navigation channel from New Orleans extending 70 miles southeast through a tidal marsh area, Chandeleur Sound, and into the Gulf of Mexico.

The 2100 square-mile tidal marsh area subjected to project-occasioned effects is a highly valuable oyster, shrimp, and fishery area. Saline conditions are maintained here through an intricate circulation pattern of saline flows from Lake Borgne to the north, and Chandeleur Sound to the southeast. Primary effects which could have resulted to fish and wildlife from construction were considered to be: (1) Transection of the circulation pattern by the channel alignment; (2) intrusion of higher saline Gulf of Mexico waters by the channel; and (3) silt dispersion and damage from channel dredging and future maintenance.

Investigations required to consider needs and devise measures to reduce project effects to the resource fell into the following general categories: (1) Hydrological studies to determine net flows and circulation patterns through the marsh; (2) limited biological studies to establish relative value of marsh and sound areas as fishery nursery and harvest zones; and (3) appraisal of utilization by hunters and fishermen including the commercial fishery within the zone of project influence.

Channel construction is currently at one-half width dimension. Spoil dispersion has been effectively controlled by construction of levee-enclosed ponding or lagooning areas into which the hydraulically channel-dredged material is pumped. The lagoons were designed in size to allow for settling of solid dredge effluents within the lagoons with discharge of the dredging fluid through weirs constructed in the levees.

(Smith #2)

It is our opinion the existing water exchange and circulation patterns within the marsh can be generally sustained by maintenance of, and salinity control within, the three major bayou flows crossing the channel alignment from Lake Borgne southward through the marsh. Provision for the cross flows has been accomplished by keeping the bayous intact at point of intersection with the channel. Data to establish specifications for salinity control structures are being collected.

The second Corps of Engineers' project of major significance to fish and wildlife interests is the Lake Pontchartrain hurricane protection study for the city of New Orleans. This study was initiated by the construction agency as a survey-scope investigation to determine a feasible method to reduce hurricane tide surges within Lake Pontchartrain.

The lake is a 640-square mile, shallow, saucer-shaped area connected to Lake Borgne by two passes. Accordingly, it is subject to tidal influence with its lower half having a marine environment. The concept of hurricane control was based on closure of the two passes in combination with a partial lakeshore levee system.

A high-value sport fishery for both marine and fresh water fishes is supported by the lake. Also, a significant commercial bait-shrimp and crab fishery exists.

Fish and wildlife investigations were designed primarily around a model study conducted by the Corps of Engineers. Major concern for the resource was based on project-occasioned alteration to salinity conditions within the lake. Model studies reveal that permanent closure of 75 percent of the cross-section of the two passes would not significantly alter present salinities, provided the vertical cross-section of the remaining 25 percent was maintained. Net exchange of water would be sustained by a differential in head and resulting increased velocity occasioned by the partial closure.

One complicating factor of importance was found during the model study operation. Mississippi River-Gulf Outlet channel will be connected to Lake Pontchartrain through the existing Industrial Canal. A deep-water area in the vicinity of the lake juncture with the canal will cause head-developed increased-velocity inflow of the heavier saline waters from the Gulf Outlet channel. In consequence, a structure must be designed to control the exchange of fresh and salt water at this juncture. The Division Engineer, LMVD, has recommended the hurricane control project with the Industrial Canal structure.

## Effects of Pesticides on Commercial Fisheries

## A Progress Report

Philip A. Butler, Pesticide Program Coordinator  
Bureau of Commercial Fisheries  
Gulf Breeze, Florida

During the past two years, the Bureau of Commercial Fisheries' pesticide studies have been gradually concentrated at the Biological Laboratory at Gulf Breeze, Florida. Much of the early work had to be concerned with development and standardization of testing methods since the response of marine animals to pesticides varies significantly from that of many fresh water forms used as test animals. This phase of the work has been completed in so far as the laboratory studies are concerned, and much of our effort is being directed now towards the standardization of techniques for the field program.

The investigations fall into three categories. Still the most urgent and requiring a majority of the effort is the determination of the acute toxic levels of the more important chemicals now in use or expected to go into production soon. The second type of investigation involves observations of possible toxicity due to chronic exposure to relatively low concentrations. This work involves few species and only the most common pesticides, since observation periods extend approximately six months. Emphasis is placed on possible ill effects during the early growth of the test animals.

The third phase of the program involves the evaluation of important chemicals under field conditions. The objectives are to relate laboratory findings to field results under varying conditions of terrain and weather so that pesticides having minimal effects on commercial fisheries can be identified.

The diversity of commercially important marine species has made it necessary to limit the screening program to representative species of the major groups of animals.

Acute toxicity levels are determined by exposing groups of shrimp and crabs to several concentrations of each pesticide for a period of 48 hours. All of the shrimp tests and most of the crab tests are conducted in running sea water to which an acetone stock solution of the pesticide is introduced at a continuous rate. Because of their insolubility in acetone and comparatively low toxicities, some of the herbicides and fungicides are tested on crabs in standing water aquaria. Constant-flow systems, in which the test solutions are renewed continually, have the advantage of ensuring sufficient oxygen and the desired concentration of pesticide.

#### Mollusks

The commercial oyster, and the New England hard clam, are the principal mollusks used in the screening program. Incidental observations have been made on other clams and mussels typical of the estuarine habitat.

The acute toxicity of each pesticide is determined by exposing separate groups of small oysters to several concentrations of the chemical for a period of 96 hours. Tests are conducted in running water aquaria to which acetone-stock solutions of the pesticide are introduced at a continuous rate. The reaction of an oyster when sufficiently irritated by contaminated water is to close its shell. The oyster does not feed while closed and therefore does not grow, so relative chemical toxicity is indicated by changes in growth rate. Consequently measurement of shell growth is an objective method for evaluating the effects of pesticides. Average shell growth of oysters in each test concentration is compared with control animals receiving no pesticide to determine median toxicity values.

In general, there was no decrease in growth rate and in some cases, treated groups grew slightly better than controls. While clams do not reach maturity at this age, the oysters spawned spontaneously during the same periods that controls did. Mortality in all groups was comparable and in many cases was caused by predators (crabs) that grew up in the experimental aquaria. It was noteworthy, that all aquaria maintained a high population density of local animals whose swimming larvae came into the tanks naturally with the water supply. More than fifteen local species of mollusks, echinoderms, and worms were identified in the test and control aquaria.

At the termination of these experiments, the oysters were screened to determine whether they had acquired any tolerance to the individual pesticides. In no case was such an effect observed.

### Fish

Laboratory and field studies show many of the commonly used pesticides are highly toxic to estuarine fish. Because of their abundance in local waters and commercial importance, we have used mullet and spot primarily in our tests.

Twenty-four and 48 hour median tolerance limit values, are obtained by exposing groups of ten fish to five or more concentrations of each chemical. The tests were conducted in running sea water aquaria.

In general, the chlorinated hydrocarbons such as DDT and endrin, are most toxic. Ten of them or about half of those tested caused a 50% kill in the test animals within 24 hours at concentrations of less than 10 parts per billion. Some of the newer pesticides are safe to use at levels as high as 2 parts per million. The organic phosphorus compounds are very toxic at levels approximately 1 part per million while the herbicides are relatively non-toxic.

GULF STATES MARINE FISHERIES COMMISSION  
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"FEDERAL RESEARCH ON COMMERCIAL  
SHRIMPS IN THE GULF OF MEXICO - - 1962"

Joseph H. Kutkuhn  
Bureau of Commercial Fisheries  
Galveston, Texas

In preparing for scheduled participation in the proceedings of the Shrimp Research Committee at the March 1963 meeting of the Gulf States Marine Fisheries Commission, it was planned that the Bureau of Commercial Fisheries representative would summarize general progress in Bureau shrimp research since the March meeting 1 year earlier. Such a review seemed appropriate in view of the considerable increase in funds (\$500,000) allocated for Federal research on Gulf of Mexico shrimp resources in fiscal years 1962 and 1963. All of the work reported was supervised out of the Bureau's biological laboratory at Galveston, Texas.

With the aid of an annotated hydrographic chart, the geographic extent and organization of the Bureau's shrimp research activity were briefly described. Studies of the biology and dynamics of the brown and white shrimps now center on stocks lying between the mouths of Mobile Bay and Rio Grande River, of the pink shrimp on stocks occurring along the coast of southwest Florida.

The overall research program is subdivided into four sections, each of which deals with interdependent yet well-defined phases in the life history or development of our commercial shrimp populations.

The first section is concerned with determining the distribution of concentrations of spawning shrimp, the seasonal patterns of spawning intensity, and the ecological factors governing reproductive potential. The next subdivision entails a rather extensive study of the distribution and abundance of shrimp larvae, as well as of the environmental factors governing their survival during movement from offshore spawning grounds to inshore nursery grounds. Research within both of these program subdivisions relies heavily upon systematically collected biological samples, and upon concurrent oceanographic data representing measurements of environmental factors such as sea temperature, salinity, and circulation. To obtain this material, cruises with research vessels are made once monthly and cover a major portion of the continental shelf off the Gulf coast of the United States. All such research activity along the northern rim of the Gulf involves Bureau personnel operating out of Galveston, whereas similar activity off southwest Florida involves personnel of the University of Miami which is currently performing research under Bureau contract.

The third subdivision comprises various research projects dealing with the inshore or late postlarval and juvenile phases of resource development. Of primary interest here are the seasonal occurrence and relative abundance of postlarvae at the time they pass through bay entrances during their movement from offshore spawning grounds to estuarine nursery areas. Indices of postlarval abundance exhibit considerable promise as a means for predicting the

(Kutkuhn #2)

later abundance of commercial-size shrimp as well as corresponding fishing success. Current efforts are being directed on a large scale toward assessment of the sampling techniques now employed to obtain them. Participating with Bureau personnel in this attempt to provide the postlarval index with a measure of reliability are the Gulf Coast Research Laboratory and the Universities of Miami, Southwestern Louisiana, and Texas, each of which has recently been awarded a Bureau contract.

The fourth and final section of the Bureau's shrimp research program embodies a broad study of those portions of Gulf shrimp populations comprising the larger and older, subadult and adult shrimp taken from inshore and offshore waters by commercial fishing fleets. Principal activity involves the conduct of mark-recapture experiments to determine at approximately what point in shrimp life history population growth and mortality are in balance and harvesting should begin. Other activity includes the extensive sampling of commercial shrimp landings and fishing operations to provide more accurate fishery statistics for use in the analysis of population trends and in studying the effects of fishing on the shrimp resource. Work to determine the differential selectivity of various trawl-mesh sizes will begin shortly.

Following the introductory review, results of the previous year's research activity were demonstrated on a series of charts. In a few instances, such activity represented the analysis of data gathered 2 years earlier (1961), the delay stemming from the fact that field collections must often undergo lengthy preparation before analysis can begin. In other instances, the material presented was immediately up to date. The preliminary nature of all results was stressed.

Examination of 1961 sample material relating to studies of the distribution and intensity of spawning activity in stocks of brown and white shrimp off eastern Texas and western Louisiana revealed: (1) the year-round presence of ripe and recently spent brown shrimp females; (2) an indication of heightened, semiannual spawning by the brown shrimp (late winter to early spring, midsummer to early fall); (3) that mature brown shrimp were rarely found inside 15 fm.; (4) that no mature white shrimp had been collected beyond 15 fm.; and (5) the occurrence of ripe or recently spent white shrimp females throughout the period March to January.

Information from 1961 sampling operations to determine the seasonal distribution and abundance of Penaeus shrimp larvae in the same area tended to corroborate, for brown shrimp beyond 15 fm., the seasonal pattern of spawning activity evidenced (above) by the condition of reproductive organs in the adult shrimp. Year-round distributions of nauplii, protozoa, mysis, and early postlarvae all exhibited corresponding peaks in relative abundance. Associated studies to ascertain the role of oceanic currents in the movement of larval shrimp from offshore spawning grounds to inshore nursery grounds showed that currents gradually shifted from predominantly alongshore in February to directly onshore by May. This period of current shift coincided with heightened brown shrimp spawning that occurred during late February, March, and early April. Water temperature, measured just off the ocean floor, ranged seasonally at 7½ fm. from about 50°F. in the winter to 85°F. in the summer, but in the neighborhood of 45 fm. (where much of the brown shrimp spawning takes place), remained nearly constant the year round at about 67°F.



(Kutkuhn #3)

The continuing survey of brown and white shrimp postlarvae as they move through Galveston Entrance was only briefly reviewed since most of those present were already quite familiar with this research activity, having kept abreast of its development over the past several years. It is still too early to speculate on shrimping prospects for the western Gulf in 1963, but the March index of abundance for brown shrimp postlarvae was approximately the same as that for March of 1962, while the April index promises to be slightly lower than that of a year ago. Similar though not as intensive surveys are now being conducted by Bureau personnel at Port Isabel, Aransas Pass, San Luis Pass, Sabine Pass, Caminada Pass, and Bay St. Louis. Resulting data will lead to more reliable "overall" indices, and will demonstrate relative variations in postlarval abundance from area to area as well.

During 1962, juvenile brown and white shrimp in Galveston Bay yielded a record-high 1.1 million pounds to commercial fishermen for sale as sport fishing bait.

Work on utilizable portions of brown, pink, and white shrimp populations (subadult and adult shrimp) was largely confined to dynamics research which involved determination of shrimp movements, and estimation of growth and/or mortality. For the sake of brevity, preliminary results of mark-recapture experiments conducted in 1962 and early 1963 are presented in the accompanying table.

In accordance with plans contained in the Bureau's expanded program of shrimp research which was presented to the Commission in September of 1962, catch-sampling personnel are now located at Brownsville, Aransas Pass, Galveston, Morgan City, Houma, Pascagoula, Tampa, and Key West. Besides working with Branch of Statistics agents towards the general improvement of fishery statistics, they are also (1) aiding in the conduct of mark-recapture experiments by recovering marked shrimp; (2) sampling locally for seasonal abundance of postlarvae; and (3) checking on the extent of discarding in areas where it is frequently practiced. Observations aboard a commercial trawler operating off the Texas coast in August 1962 yielded, for instance, the first useful measurements of this wasteful activity.

(Kutkuhn #4)

SUMMARY OF 1962 MARK-RECAPTURE EXPERIMENTS WITH COMMERCIAL SHRIMPS

Species	When	Where	Mark	Initial length	Release	Recovered	Growth	Mortality	
								Fishing	Other Loss
				$\frac{\text{mm.}}{\text{+}}$	No.	No.	mm./day	%/mo.	%/mo.
Brown	Apr.	Tex.	Stain	$\frac{0}{+} 175$	2,431	153	---	30	62
			Tags	$\frac{\delta}{\delta} 145$	1,692	87	---	---	---
Brown	July	La.	Stain	115 <sup>1/</sup>	2,370	624	---	---	---
		Tex.	Stain	105 <sup>2/</sup>	2,973	74	---	---	---
Pink	Mar.	Fla.	Stain	128	2,496	563	---	21	40
Pink	Aug.	Fla.	Stain	< 100	19,860	36 <sup>4/</sup>	---	---	---
Pink	Dec.	Fla.	Stain	130	2,350	800+	0.2	29	48
White	Sept.	La.	Stain	120 <sup>5/</sup>	4,196	273	0.7	19	81

<sup>1/</sup> Of 3 size groups, represents the one containing smallest shrimp;

<sup>2/</sup> Of 2 size groups, represents the one containing smallest shrimp;

<sup>3/</sup> Growth estimates not feasible because of erratic return within size groups; mortality estimation impractical due to (1) the short span of time within which recoveries were made, and (2) the effect of the count-size law in Texas which discouraged return of the small experimental shrimp.

<sup>4/</sup> 26 recaptured on Sanibel fishing grounds, 10 on Tortugas grounds; experiment was initiated at Indian Key, midway between the two areas.

<sup>5/</sup> Of 3 size groups, represents the one containing smallest shrimp.