



THE MIAMI LABORATORY, A HISTORY OF FEDERAL FISHERIES RESEARCH
IN MIAMI, FLORIDA

BY

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Preface

This report is a history of the U.S. Government's activities in fishery science in Miami, Florida. The objective is to document the growth and development of the federal fisheries research laboratory on Virginia Key established in 1965. The focus is primarily on events in the decades between 1965 and 2005, but it begins by describing earlier local and academic efforts that influenced the choice of Miami as the location for the laboratory. From its early beginnings, the facility has grown to become one of the leading federal fishery science centers in the nation. It was originally named the Tropical Atlantic Biological Laboratory, but it was renamed the Miami Laboratory as it became part of the newly established Southeast Fisheries Center (later renamed the Southeast Fisheries Science Center). The federal investment has produced many noteworthy and outstanding accomplishments over the ensuing years, and since the laboratory has reached its fortieth anniversary, it seems worthwhile to establish a record of the events and people who participated in its establishment and ongoing research programs.

This work was made possible through the contributions of many people who graciously contributed interviews, photographs, and documents. I sincerely acknowledge and appreciate everyone's support. I particularly wish to acknowledge the efforts of Mr. Kimrey Newlin, Ms. Barbara Palko, and Ms. Jennifer Schull in this regard. I also wish to acknowledge and thank Mr. Alex Chester, who reviewed and provided text to update the manuscript for the years since my retirement.

Beginnings

The appointment of Mr. Spencer F. Baird as U.S. Commissioner of Fisheries in 1871 marked a beginning in a nation-wide federal presence in fishery research in the United States. Surprisingly, a similar early date marked the beginning of a federal fisheries research interest in Miami, Florida. As U.S. Commissioner of Fisheries, Mr. Baird maintained copious correspondence with U.S. citizens who were interested in fishery affairs. One of those citizens was Mr. H. D. Pierce, a lighthouse keeper at the Biscayne Bay Lifesaving Station in Miami, Florida. In early reports of the United States Fish Commission, one can find letters from Mr. Pierce to Mr. Baird in which Mr. Pierce offers assistance in furnishing specimens that might be of scientific interest (Reports of the United States Fish Commission, vol. III, p. 332 and vol. IV, p. 263-266). Mr. Pierce also put forth an interesting hypothesis. It was based on his observations of summer "cold-kills" in nearshore waters, and it stated that there was a southward-flowing ocean current along the eastern coast of Florida, running counter to the Florida Current. Over a half century later, this countercurrent was documented and studied by south Florida oceanographers using modern scientific instrumentation.

Interest in marine science in Miami continued as the area developed from its early days as a Native American trading village on the shores of Biscayne Bay to the beginnings of the metropolitan center that it is today. In 1943 a major step in marine research was taken by the University of Miami when it established a marine laboratory for research on its campus in Coral Gables. Dr. F. G. Walton Smith, a British marine biologist who had investigated the declining sponge fishery in the Bahamas in the early 1940s, was selected to head the laboratory. His vision was to create a world-class marine science facility that would match programs at major institutions such as Woods Hole (Massachusetts) Oceanographic Institution, Scripps (California) Institution of Oceanography, and the Beaufort (North Carolina) Fisheries Laboratory. It might be said that under his direction, marine biology, oceanography, and fishery science were officially founded in Miami.

Dr. Clarence P. Idyll directed the fisheries section of the new Marine Laboratory at the University of Miami. His section offered academic courses in fisheries and conducted fishery research for the State of Florida Board of Conservation. In time the growing marine center was noticed by federal fishery administrators, and by 1954 two federal fishery offices were also operating at the university in Coral Gables, Florida. The federal offices were the Exploratory Fishing and Gear Technology Base and the Fishery Statistics Office. These marked the first capital investment in federal fishery science in the South Florida region. Both offices reported to the Bureau of Commercial Fisheries (BCF), United States Fish and Wildlife Service, Department of the Interior.

Construction of the Rickenbacker Causeway in 1946 made Key Biscayne and Virginia Key (the most northerly of the Florida Keys) more easily accessible from downtown Miami. Subsequently, the University of Miami established a Virginia Key campus for its Marine Laboratory, giving it direct access by boats and vessels to the Atlantic Ocean. In 1955 the university expanded the Marine Laboratory complex by building the Grosvenor Building, which provided additional space beyond the existing Agassiz and Collier Buildings on Virginia Key. The Grosvenor Building would also provide space to include the BCF Statistics Office. The BCF Exploratory Fishing and Gear Development Unit, however, would be transferred to the northern Gulf of Mexico.

Mr. Reeder Sands became chief of the BCF Exploratory Fishing and Gear Development Unit. It included Mr. Dick McNeeley and Mr. James B. Higman, who was a recent masters degree graduate of the fishery program at the University of Miami. The facility was supported by a fishery research vessel named the *R/V George M. Bowers*. Mr. Sands was actually preceded as unit chief by Mr. Carl Carlson; however, in 1954 Mr. Carlson transferred to the Exploratory Fishing Base headquarters in Pascagoula, Mississippi. Reportedly, Mr. Sands became dissatisfied with a shifting emphasis at Miami from exploratory fishing to the use of underwater television technology for studying fishery resources, and within a few years all of the Miami exploratory fishing operations were transferred to Pascagoula.

The federal Statistics Office staff at the university included Mr. Billy Greer (chief), Mr. Pete Maley, and Ms. Ruth Savitt. In 1955 it moved from offices from the Coral Gables campus to the university's Marine Laboratory campus on Virginia Key. Mr. Maley served as a port agent, responsible for visiting local seafood dealers to collect fishery landings information. Ms. Savitt served as a data transcriber and secretary, responsible for handling multiple office duties. In those days there was much hand transcribing and processing of data—adding machines were the only computational equipment available. Mr. Greer soon transferred to the Bureau of Commercial Fisheries Regional Office in St. Petersburg, Florida, and was replaced by Mr. Lloyd Johnson. Mr. Johnson, Mr. Maley, and Ms. Savitt continued with the Statistics Office into the 1960s and 1970s.

In 1958, federal authorities decided to establish a BCF field station in Miami that would be called the Miami Field Station of the Galveston Biological Laboratory. The University of Miami Marine Laboratory complex on Virginia Key was chosen for the station's location where it could operate in close cooperation with university scientists. BCF biologists at the station investigated the biology and life history of pink shrimp in south Florida. Pink shrimp was discovered as a viable fishery resource in 1949 and led to a major fishery. Several hundred vessels fished seasonally on the Dry Tortugas grounds in the Florida Keys and on nearby Sanibel grounds. Mr. Thomas J. Costello and Mr. Donald M. Allen

transferred from Galveston, Texas, to the Galveston Field Station in Miami and were the first employees. Mr. Costello served as station chief, and later Mr. Harold Hudson, Ms. Nell Benson, and Mr. Billy Drummond joined as staff members. One of the major projects of biologists at the Galveston Field Station was the marking of juvenile shrimp with fluorescent dyes to allow their tracking and to describe their offshore migration patterns. In addition, the BCF supported several studies with university scientists that included the collection of shrimp larvae in plankton nets, tagging of adult shrimp with Peterson-type disc tags, and sampling of commercial catch. These enabled investigators to describe the life cycle of a very important commercial fishery species in South Florida.

Tropical Atlantic Biological Laboratory (1965-1970)

The decade of the 1960s became a time of expansion for the Bureau of Commercial Fisheries. Ocean science in that decade became widely recognized for new and exciting commercial and recreational opportunities. In this regard, the BCF established several new regional fishery research laboratories, including a laboratory on Virginia Key. The new laboratory would open in 1965 and be called the Tropical Atlantic Biological Laboratory. Construction of the laboratory followed similar new facilities in Tiburon, California (1961); La Jolla, California (1963); and Milford, Connecticut (1964); however, the history of the laboratory actually began in the Pacific Ocean, almost half a world away.

In 1963, Mr. Donald L. McKernan, one of many notable and capable directors of the BCF, established a Tropical Atlantic Tunas Investigations Program. Mr. McKernan served as Director of the Honolulu (Hawaii) Biological Laboratory and as the Director of the Alaska Region prior to assuming his post as Director of the BCF. The Honolulu Laboratory conducted biological and fishery oceanographic studies relating to the Pacific tuna fisheries; however, the expanding U.S. tuna fleet was seeking new fishing grounds and looking to the tropical Atlantic Ocean for expansion. Successful tuna fishing had been conducted in the Atlantic Ocean by French purse seine vessels and Japanese longline vessels, and the success of these fleets further encouraged the U.S. industry. McKernan was anxious to provide supporting research for the expansion of the tuna fleet in the Atlantic and began to transfer key Honolulu Laboratory personnel to facilities at the Navy Yard Annex in Washington, D.C. The facility was named the Washington Biological Laboratory, and a former Navy ATA sea-going tugboat, the *R/V Geronimo*, was acquired and outfitted as a fishery oceanographic research vessel. A sister vessel, the *R/V Undaunted*, was added in 1964. Mr. Vernon Brock, Dr. Thomas S. Austin, and Mr. Robert C. Wilson were key personnel who transferred from the Honolulu Laboratory to the new Washington Biological Laboratory. Their first major activity was to organize and coordinate an international oceanographic study of the tropical Atlantic Ocean, officially named the International Cooperative Investigations of the

Tropical Atlantic. In this effort, two large-scale synoptic tuna surveys—named Equalant II in 1963 and Equalant III in 1964—were conducted. The results of these surveys were published in atlas form in 1973, and cruise data were permanently housed at the National Oceanographic Data Center in Washington, D.C.

Only for a short time, however, did the Washington Biological Laboratory remain home to the tropical Atlantic studies. The central focus for tropical Atlantic tuna studies would be the newly constructed Tropical Atlantic Biological Laboratory in Miami. This decision came after considerable political support from local officials in Miami as well as from very influential men such as U.S. Congressman Dante Fascell and U.S. Senator Claiborne Pell. Miami Metro Mayor Chuck Hall and other Miami Metro Commissioners agreed to deed five acres of land on Virginia Key to the federal government for construction of the new laboratory. The land conveyance document specified “the land shall be used for public purposes, primarily for research on the living resources of the sea or their environment.” Thus, the new laboratory was built on the five-acres of land across the Rickenbacker Causeway from the University of Miami’s Institute of Marine Science (formerly the Marine Laboratory). Now there would be two major marine facilities on Virginia Key: one operated by the University of Miami and one operated by the federal government. The university’s marine facility had become a major center internationally for marine science research, and the choice of location for the federal facility was sealed with a promise of cooperation and interaction.

In 1964, the M. R. Harrison Construction Company began construction the new BCF Tropical Atlantic Biological Laboratory. The U.S. Navy provided engineering oversight, and in August 1965 most of the staff at the Washington Biological Laboratory transferred to Miami. Until the building was completed, however, the laboratory had to operate from temporary offices on the second floor of the United States Post Office in downtown Miami on Northeast Third Street. The new laboratory staff had expected to occupy the facility within a few weeks of their arrival; however, Hurricane Betsy struck on September 8, delaying completion and occupancy. The building was engineered to withstand a hurricane storm surge, with each wing greatly elevated above sea level. Consequently, storm waters did not reach the nine-foot elevation of the office wing or the thirteen-foot elevation of the laboratory wing. The only serious damage was to uninstalled overhead garage doors and a large fuel storage tank that floated and lodged nearby against a chain link fence. Dignitaries at the formal dedication on November 20, 1965, included Mayor Chuck Hall; Congressman Dante Fascell; Oceanographer of the Navy, O. D. Waters; Assistant Secretary of the Interior, Stanley A. Cain; President of the University of Miami, Henry King Stanford; and U.S. Navy Reserve Chaplain, Ivan Hoy. The dedication brochure stated “This Dedication marks the emergence of Miami as a major oceanographic center. It celebrates two events: the twenty-first anniversary of the founding of the Institute of Marine Science and the establishment of an important new

Federal laboratory for the study of the tropical Atlantic.” Following the dedication, the building was opened for tours, and the tour included a small submarine proposed for use in marine research.

Dr. Austin was appointed as the Tropical Atlantic Biological Laboratory’s first director. Mr. Brock returned to Hawaii, Mr. Wilson remained in Washington, D.C., and twenty-two laboratory staff and twenty vessel personnel transferred to Miami from the Washington Biological Laboratory. The latter continued to operate for several years in which Mr. Ralph Silliman conducted population studies and Dr. Woody Chamberlain and Mr. Rick Waller conducted environmental studies of the coastal waters of New Jersey.

The Miami staff increased significantly. Dr. Albert Jones was hired as Assistant Laboratory Director. He had been an assistant professor at the University of Miami in the Fisheries Division at the Institute of Marine Science and had just completed a year’s fellowship at the Fisheries Laboratory, Lowestoft, England. Dr. Merton C. Ingham, a graduate of Oregon State University, joined as head of the Physical Oceanography Program, replacing Dr. Paul Mazeika who chose not transfer from the Washington Biological Laboratory. Miss Esther Sell was hired as secretary to Dr. Jones. She came from Texas where she had worked for the United States Department of Veteran Affairs.

Building Arrangement

The Tropical Atlantic Biological Laboratory included the main laboratory building, a small dock on Bear Cut (an inlet from the Atlantic Ocean to Biscayne Bay), and a 200,000 gallon outdoor seawater settling tank. The main building contained specially designed small and large wet laboratories for experimental studies of tuna and other fishes. Seawater was pumped from Bear Cut to the outdoor seawater settling tank located behind the laboratory and then to a tank on the roof of the laboratory. From there the seawater was supplied to laboratories on the third floor and to small and large wet laboratories on the second floor of the west wing of the building. The small wet lab contained banks of glass aquaria for larval fish studies, while the large wet lab contained larger tanks to accommodate juvenile and adult fish. It was fitted with a trap door in the floor and a chain hoist so that tanks containing fish could be hoisted from the outside at ground level and into the laboratory. Seawater was not circulated but was discharged into a small pond located behind the building. Previous to the building’s construction, the pond had been a launching basin for recreational boats. At that time it was perennially open to Bear Cut, but in later years construction of the building in the watershed obstructed a natural flow of freshwater to the pond. Also, winter storms and periodic beach restoration projects by the United States Army Corps of Engineers

contributed to long-shore sedimentation. Consequently, for all practical purposes the opening of the pond to Bear Cut was closed.

The design of the laboratory created two wings that intersected to form a “V” shape. The west wing contained offices on the third floor for the scientists. Each of these offices consisted of a smaller inner room opening to a central hallway and opening to a larger outer room with windows. Usually a senior investigator occupied the smaller, inside room with its space for desks and bookcases. One or two technicians then occupied the larger room with windows, laboratory benches, microscope work stations, and other equipment and storage. In addition to the two wet laboratories, the second floor of the west wing housed freezer rooms for holding dead organisms and necropsy rooms for dissecting and examining specimens.

Ground floor of the eastern wing was left open but protected by overhead roll-up, chain-link doors that were designed to blow out with a storm surge if necessary. The area inside the garage doors was generally used to store equipment. The first floor contained administrative offices and a receiving-shipping room. The second floor contained a large seminar room, and the third floor contained a library. Offices in the eastern wing were designed for staff who did not need laboratory space. They were generally single rooms, although the director’s office was a three-room suite on the third floor. The Miami Field Station of the Galveston Biological Laboratory and the Statistics Office occupied offices on the second floor. These two units had been invited to share space in the new Tropical Atlantic Biological Laboratory building, and Dr. Austin had more than accommodated their need for office space. As a result, the head of the Galveston unit occupied an office larger than the Director of Tropical Atlantic Biological Laboratory. This did not seem to bother Dr. Austin, but some junior staff pondered the director’s lack of rank-consciousness.

Administrative Services

Laboratory scientists were often uninformed and uninterested in the complexities of the federal bureaucracy. Instead, they relied on administrative staff to guide them in managing budgets and adhering to federal regulations. Administrative staff included Mr. Willis Siferd, III and Ms. Shirley Parker, who transferred from Washington, D.C. It also included Ms. Sharon Parsons Marshall and Mr. Phillip Hill, who joined after the laboratory was established in Miami. Together, Mr. Siferd and his administrative group provided effective administrative services. Although he was steadfast that all operations should be governed by the intent and letter of federal regulations, discussion (sometimes lengthy) usually led to negotiated settlements. The administrative group at various times employed electricians, plumbers, and

air conditioning specialists for maintenance. Mr. Marcel Staniorski (aka Sands) was the first building superintendent, and Mr. Ed Esham, a plumber, came later. Mr. Dan McCarthy, Mr. Al Harris and Mr. Phil Colon served in similar capacities in later years.

Programs and Personnel

The initial staff personnel that moved to Miami from the Washington Biological Laboratory are listed in Appendix Table 1. Dr. Austin was the director, Ms. Helen V. Donn was the secretary, and Mr. Siferd was the administrative officer. Mr. Siferd's staff handled the details of the move.

Mr. Paul Sund led the Tuna Program; Dr. William Richards studied tuna larvae; Mr. John P. Wise analyzed fishery statistics; and Mr. Thomas C. Potthoff and Mr. David C. Simmons studied tuna food habits. Mr. Conrad V. W. Mahnken and Mr. Jack Jossi were biological oceanographers (plankton and primary productivity); Mr. Julian Goulet and Ms. Cora Slade were physical oceanographers; and Mr. John W. Van Landingham was a chemical oceanographer. Physical science technicians were led by Mr. Donald P. Wagner. Mr. Gerald L. Hood was the marine superintendent, and Mr. Francis W. Szallinski and Mr. Theodore E. Sorensen were vessel captains. During the first year of operation, Dr. Merton C. Ingham joined the laboratory as head of the Physical Oceanography Program; Mr. John T. Brucks joined as physical oceanographer; and Mr. Alexander Dragovich joined as a biologist to study tuna food habits. Other personnel added to the staff during this period are listed in Appendix Table 2.

Shortly after the facility was dedicated, a decision was made to transfer most of the Brunswick (Georgia) Biological Laboratory staff to Miami. The research program at Brunswick focused on systematics of fishes and included a staff of systematic zoologists, a scientific illustrator, administrators, and a fairly extensive museum collection of fish. To accommodate the new employees and their fish collection, a one-story annex building was constructed on the Tropical Atlantic Biological Laboratory property behind the main building and across the pond from the seawater settling tank. The new building provided storage for the fish collection and offices for the systematic zoologists. Mr. Fred Berry was the program chief, Mr. George C. Miller was a zoologist, and Mr. Grady Reinert was a scientific illustrator. The transfer brought a significant number of books, journals, reprints, and reports that were added to the laboratory's library. The collection included early Bureau of Fisheries publications contributed by the BCF Laboratory at Ann Arbor, Michigan. These specialized fishery holdings complemented those of the marine science library at the University of Miami's Institute of Marine Science.

Dr. Robert V. Miller joined the group shortly afterwards from the Chesapeake Biological Laboratory. He was especially interested in clupeoids (herrings), Mr. Berry in jacks (carangids), and Mr. George C. Miller in sea robins (triglids). Each published extensively on these groups. Dr. Robert V. Miller later transferred to the BCF headquarters in Washington, D.C. and in time became the Deputy Director of the Marine Mammals Program at the Northwest and Alaska Fisheries Center.

Another federal marine science laboratory was designated for construction on Virginia Key. A year after the Tropical Atlantic Biological Laboratory opened the Atlantic Oceanographic and Meteorological Laboratory (AOML) was established by the Environmental Sciences Services Administration, United States Department of Commerce. Dr. Harris B. Stewart was chosen as AOML's first director. Programs of research included: physical, chemical, and geological oceanography research and hurricane meteorological research. These complemented the research programs at the University of Miami and at the Tropical Atlantic Biological Laboratory. AOML staff, however, had to occupy temporary quarters near downtown Miami at 1000 South Miami Avenue until their uniquely designed, five-story laboratory building on Virginia Key was built in 1971, just across Virginia Beach Drive from the Tropical Atlantic Biological Laboratory. The AOML facility was dedicated in June 1973.

Dr. Austin served as the director of the Tropical Atlantic Biological Laboratory until July 2, 1967. He navigated through the laboratory in a wheelchair due to a physical handicap from poliomyelitis contracted years earlier when he was beginning his career as a physical oceanographer. Courage and perseverance marked his character. If he was not at his office desk, one would expect to find him in a colleague's office where he would be patiently discussing some issue of importance. Such meetings usually ended with his views prevailing and his colleague more or less satisfied. Dr. Austin graciously hosted several parties at his home on Key Biscayne, where the laboratory staff gathered much as a family. He took an interest in Miami's community affairs as well as the laboratory interactions with other federal agencies. One thing he missed, however, was participating in oceanographic cruises. Nevertheless, he regularly kept in touch with the at-sea activities of the laboratory's vessels at sea through a single side-band radio link between the laboratory's base radio station, KAG, and the research ship.

In July 1967, Dr. Austin accepted a position as Director of the National Oceanographic Data Center in Washington, D.C. Having missed the politically active atmosphere in the nation's capitol, he looked forward to being involved again in coordinating oceanographic research on a national and international level. His secretary, Ms. Donn, transferred to AOML where she served for a number of years as secretary to the director. Dr. Albert Jones temporarily assumed the duties of laboratory director and served in that role until April 1968 when Dr. Carl J. Sindermann was appointed director. Prior to coming to Miami, Dr.

Sindermann was director of the BCF Laboratory at Oxford, Maryland. In Miami he would steer the laboratory's tuna oceanography research, but his primary interest was diseases of marine fish and shellfish. In Miami he would continue those studies and produce several outstanding publications. He also had a philosopher's sense of humor (readily apparent to close observers) which was revealed to a wider audience in his book, "Winning the Games Scientists Play."

Research at the Tropical Atlantic Biological Laboratory continued to focus on resources of the eastern tropical Atlantic off Africa. It soon became apparent, however, that the region might not be the bonanza that had been anticipated. Initial exploratory cruises by U.S. tuna purse seine vessels had mixed results. In 1967, three U.S. vessels caught 1,000 metric tons; in 1969, twenty-two vessels caught 18,000 metric tons—these were modest catches and not promising enough to stimulate further participation. Consequently, the industry's vision shifted to other areas. Some of the vessels fishing in the eastern Pacific would travel through the Panama Canal to land their catches at canneries in Puerto Rico. While crossing the Caribbean Sea, crews often observed tuna schools that suggested that there were sizeable resources that could possibly support a fishery. Consequently, the staff at the Tropical Atlantic Biological Laboratory initiated research in the western-central Atlantic Ocean and Caribbean Sea, and by the end of 1971, the laboratory's field research program had shifted from the eastern tropical Atlantic to the western Atlantic and Caribbean Sea. This spared vessel and scientific crews the long and monotonous seventeen-day Atlantic crossing from Miami to Dakar, Senegal, or Freetown, Sierra Leone—the first ports of call on the West African coast.

Within BCF, the laboratory had lead responsibility from 1965 to 1970 for the U.S. Tropical Atlantic Tuna Research Program. Consequently, laboratory scientists were included in U.S. delegations to the International Commission for the Conservation of Atlantic Tunas (ICCAT). In these meetings they reported research results to the ICCAT Standing Committee on Research and Statistics. But with U.S. tuna operations headquartered in southern California, the Miami Laboratory staff had difficulty maintaining constituency involvement. The laboratory also suffered local criticism that its research was not directed at fishery problems in the southeastern United States. In addition, the analysis of Japanese longline catch data (the only comprehensive fishery statistics available) made it seem that the Miami program was not directly serving U.S. interests. In short, the laboratory did not have a ready constituency to justify its research, and in time the BCF transferred lead responsibility for tropical Atlantic tuna to the La Jolla (California) Laboratory. From there, subsequent population studies would be conducted. Scientists at the Tropical Atlantic Biological Laboratory, nevertheless, continued to study tropical tuna biology and coordinated a joint ICCAT tagging program in the eastern Atlantic Ocean.

Vessel Operations

Tuna investigations were primarily based on information from cruises of the *R/V Geronimo* and *R/V Undaunted*. These were docked at Dodge Island, which is Miami's commercial seaport near downtown. Initially, the marine superintendent's office was located at the laboratory on Virginia Key, and in that office the laboratory staff could gather for daily radio communication with the ships when they were at sea. Later, the marine superintendent's office transferred to a new facility, the National Ocean Survey ship base that had been constructed on Dodge Island. The base was named the Southeast Marine Support Facility and was a unique component of Dodge Island. Although dwarfed in size by towering facilities for the large cruise ships and by an extensive land area set aside for commercial freight, the flag hung proudly at the base where the fishery and oceanography research vessels were docked.

Vessel operations were expensive, and operating two research vessels, the *R/V Geronimo* and *R/V Undaunted*, proved a strain on the Tropical Atlantic Biological Laboratory's budget. Expenditures included the high cost for dry dock and maintenance as well as unexpected items such as generator repairs or hydraulic winch failures. Consequently, the *R/V Geronimo* completed only two cruises from Miami before it was transferred to the Galveston Biological Laboratory in June 1966. One of its cruises was to the northeastern coast of South America and the eastern Caribbean Sea; the other was off Bimini in the Bahamas. The *R/V Undaunted*, however, continued to serve the laboratory through 1970 and completed cruises to the eastern Atlantic, western Atlantic off South America, and the Caribbean Sea. The primary purposes of these cruises were exploratory fishing for tunas and associated fishery-oceanographic studies. The first part of each cruise was devoted to seining for baitfish, which were kept alive in a special bait tank located on the stern of the ship. Once bait was secured, the vessel would begin a station-to-station track to collect physical and chemical oceanographic data, including temperature, salinity, and oxygen. These were collected by salinity-temperature-depth (STD) recorders, hydrocasts, or bathythermographs at pre-selected stations. Plankton net and neuston net tows were made to collect zooplankton and fish larvae. Chlorophyll measurements were also recorded. A visual search was maintained during daylight hours for sea birds or other signs of surface-schooling tunas, and whenever a tuna school was located, it was fished. Those were exciting times. Several crew members were former commercial tuna fishermen and looked forward to participating in their work. They would grab gear, lower fishing racks at the stern of the vessel, and bait one, two, or three-pole rigs, depending on the size of the fish in the school. Hooked fish were jerked from the water and hurled over the fishermen's heads to land on the deck for biologists to collect measurements, stomach and gonad samples, etc. At the end of the catch, a fish or two were selected for sashimi.

Cruise legs lasted about thirty days. It was a long and arduous stretch. Occasionally tempers ran short and the vessel and scientific crews always looked forward to their next port call. The scientific crew usually stood six hours on watch, followed by six hours off watch. The entire day was consumed by work, eating, and sleeping with little time for leisure activity (not that there were many things to do or places to go on a 150-foot vessel). The crew usually stood six hours on watch and six hours off watch in the early years, but later union regulations imposed shifts of eight hours on and sixteen hours off. Ship's officers belonged to the Masters, Mates, and Pilots Union, engineers to the Marine Engineers Beneficial Association, seamen to the Master Seaman's Union, cooks and stewards to the Marine Cooks and Stewards Union, and radio operators to the Marine Radio Operators Union. Labor-management issues were introduced to the laboratory by these unions and were a trying experience for science administrators. Although work procedures were formalized by labor contracts, vessel and scientific crews continued to work as partners to meet their challenges at sea.

Ports of call for the *R/V Undaunted* in the eastern Atlantic Ocean were Dakar, Senegal; Freetown, Sierra Leone; Accra, Ghana; Abidjan, Ivory Coast; Lagos, Nigeria; and Lobito, Angola. While in port, there were sometimes meetings with foreign marine scientists. Those represented high points on the cruise. Visits are recalled with scientists at Freetown; Dr. Berrit and Dr. Le Guen at the ORSTOM Laboratory at Abidjan; Dr. M. Cadenat at Gorée Island, Senegal; and Dr. Vasco Valdez, who visited from Portugal while the vessel was at Lobito, Angola.

Obtaining foreign clearances for the ship through the U.S. State Department was a continual problem. Clearances were often received just before or even after the vessel's departure from Miami, and sometimes the crew was uncertain whether the vessel actually had official clearance to operate in the territorial waters of a particular foreign country. Usually this was not a problem because the work was conducted well offshore, outside territorial limits. On one occasion, however, the *R/V Undaunted* drifted overnight and was close to the twelve-mile limit off the coast of Gabon. In the early morning a large vessel was observed steaming in the direction of the research vessel. Suspecting this was a government patrol vessel, the captain anxiously decided it would be wise to leave the area quickly, so he steamed southward, leaving the pursuing vessel behind. The research vessel then passed along the coast of Congo-Brazzaville where it was within sight of the coast, but where it also did not have official clearance, and then it proceeded to its scheduled port call in Lobito, Angola.

Port calls in the western Atlantic Ocean were made at Belem, Brazil; Paramaribo, Surinam; Willemstad, Curacao, (Netherlands Antilles); Port of Spain, Trinidad and Tobago; Bridgetown, Barbados; Cumana, Venezuela; Guanaja (Bay Islands), Honduras; Cristobal, Panama; and San Juan, Puerto Rico. In Panama,

a scientific delegation from the University of Panama in Panama City visited the vessel at the dock in Cristobal on the Caribbean coast. The willingness of faculty and students to make a relatively long trip across the Isthmus to visit the vessel demonstrated their earnest interest in marine science. The group was given a special welcome and tour of the vessel. The scientific crew of the *R/V Undaunted* also visited with marine laboratory staff at Cumana, tuna cannery operators at Guanaja, local residents at Utila Island, Honduras, and with fishery and U.S. State Department representatives at a number of other ports of call (Bridgetown, Barbados; Fort de France, Martinique; and Paramaribo, Surinam).

In 1966, a cruise of the *R/V Undaunted* to the Lesser Antilles was supplemented by an aircraft survey to assist the crew in locating tuna schools. A commercial fish spotter, Mr. Johnny O'Connor, was engaged for the survey. Mr. Paul Sund accompanied the flight as a scientific observer traveling from Puerto Rico to Martinique. Dr. Albert Jones continued on the flight to eastern Venezuela. The plane flew along east-west transects, generally following the vessel track to assist in locating schools of fish. It progressed southward through the Lesser Antilles, and each day's flight lasted about six hours, which was a long time in a noisy Cessna 182. At the end of the day, the pilot and the observer were tired, but both still faced maintenance and refueling duties to prepare for the next day's flight. In addition, there was usually a speeding, nerve-racking taxi ride with a local driver from an airstrip on a remote section of a Lesser Antilles island to a hotel in a more populated area. The survey, nevertheless, indicated the potential presence of fishery-important concentrations of tuna in the area. This information was then provided to the fishery departments of the Caribbean islands. The results were also published in the fishery journal, *Commercial Fisheries Review*.

Research operations at sea were arduous and unpredictable. Some stories of laboratory scientists were held only in memory; others readily shared them (see Merton Ingham. 1999. *Undaunted tales--non-scientific adventures of seagoing scientists*. Word Studio, Falmouth, Massachusetts, 110 p., ISBN 0-9654360-4-7). Between cruises, laboratory scientists were busy processing and analyzing data and biological samples. Biologists analyzed stomach contents for food habit studies and gonad samples for fecundity determination. Marine technicians processed physical oceanographic data and assisted with analyzing salinity samples in the chemistry laboratory. Later, when a salinity-temperatures-depth (STD) recorder was acquired, taking water samples for salinity determination and bathythermograph slides for temperature determination became obsolete. Cruises that carried an STD also included electronic technician Mr. Ben Culverhouse to ensure the instrument's performance. Physical oceanographic data were sent to the National Oceanographic Data Center for archiving, and original cruise reports were sent to the NMFS laboratory at Pascagoula for permanent storage.

Research Accomplishments

The laboratory's first major progress report in 1969 listed 147 published research papers. Research programs emphasized tuna biology and fishery oceanography. Scientists in the tuna biology program were active in programs of the ICCAT Standing Committee on Research and Statistics. U.S. scientists also worked with scientists from ICCAT member countries to collect, organize, and analyze information on the region's tuna fisheries. In the tropical Atlantic, these included pelagic longline fisheries that were conducted primarily by vessels from Japan fishing in the region, purse seine vessels from France fishing in the Gulf of Guinea, and scattered local artisanal fisheries. Japanese scientists generally published data reports on the longline fishery catch, and Mr. John P. Wise analyzed these data extensively to prepare charts of the Atlantic-wide distribution of species of tuna and billfish. A Mathatron paper tape computer facilitated his data analysis, and it was common to see him in his office with seemingly miles of paper tape covering the floor as the analyses were run. Ms. Gay Ranallo assisted with these compilations.

Dr. William J. Richards was an expert on scombroid larvae. He was assisted by Mr. Thomas C. Potthoff. Dr. Richards sorted many plankton and neuston net tows and published descriptions of many of the fish larval forms they recovered. Mr. Potthoff prepared and stained specimens for microscopic examination and published on fin ray development in tuna and dolphin (*Coryphaena* spp.).

Mr. David Simmons and Mr. Alex Dragovich, who joined the laboratory from the NMFS Biological Laboratory in St. Petersburg, Florida, conducted studies on fecundity and maturation of tuna. Ms. Essie Coleman-Duffie and Mr. Joe Tashiro were hired to assist Mr. Dragovich. They processed stomach and gonad samples and published reports on food and fecundity of tuna. Before working for BCF at St. Petersburg, Mr. Dragovich studied food habits of tuna for the California Department of Fish and Game. He was a classical marine biologist with broad knowledge and command of a number of languages. Mr. David Simmons resigned from the laboratory to pursue private interests; among other things, he designed and built an aluminum-hull vessel.

Laboratory studies on larval fishes were highly successful. Encouraged by Dr. Richards' interest in larval fish, Dr. Charles Mayo, III, and later Dr. Edward Houde (a graduate of Cornell University) and Ms. Barbara Palko (who joined Tropical Atlantic Biological Laboratory from the University of Miami Cellular Biology Laboratory) collected fish eggs from plankton tows. Some tows were made in the Florida Current at stations between Miami and Bimini, Bahamas. Other tows were made just a mile or two offshore at the western edge of the current or from the laboratory's dock at Bear Cut. The eggs were mostly unidentifiable to species or even to family. Only by hatching and rearing immature forms through

a series of growth stages was their identity revealed. Over fifty-five species of fish eggs were reared in the small wet laboratory to an identifiable larva or juvenile stage. The hatching of fish eggs was an exciting event. A high point was the successful rearing of tuna larvae from eggs, which preceded a similar accomplishment by the Japanese by about six months.

Scientists in the Tuna Biology Program obtained information and samples from the commercial tuna industry. Del Monte Corporation, IBEC, Starkist, and Van Camp Seafoods operated tuna canneries in Puerto Rico that received shipments of fish caught on longlines by foreign-flag vessels in the Atlantic. Plant managers were cooperative in allowing biologists to take samples. The laboratory contracted with the Puerto Rico Department of Natural Resources Laboratory in Cabo Rojo, Mayaguez, to obtain size composition data from these landings. In addition, Mr. Ed Scott spent a year stationed at several West African ports to collect biological data from the commercial tuna landings. His work was conducted by contract with the University of Miami, and when he returned, he continued his work at the Miami Laboratory for many years in the Gamefish Program.

Laboratory scientists observed the efforts of fledgling U.S. companies attempting to enter the domestic canned tuna market. It proved difficult for these companies to compete with major, nationally known brands. However, one Florida company that was unsuccessful with tuna became somewhat successful with a product they developed using mullet. A quantity of mullet yielded less canned product than tuna, but the lower price for the raw material made it economically competitive. Given the name "Lisa," it received high market acceptance, especially among Florida's Latin community. Unfortunately, the new enterprise was doomed when prices for mullet suddenly increased because fishermen could not meet the increasing market demands. Consequently, it became unprofitable to manufacture and market Lisa.

Communications and Community

Ms. Ann Weeks was the laboratory's editorial assistant from 1966-1970. She had former experience with the newspaper industry, and her husband had been a reporter, writer, and city editor for the *Miami News*. She was a skilled editor, and scientists benefited from her review of manuscripts. At this time, the BCF was attempting to improve the writing skills of its scientists, and Dr. Ralph Hile and Mr. Paul Eschmeyer, two senior scientists in the bureau, served as a national editorial board. They critically reviewed all scientific manuscripts before they were approved for publication. They also distributed a series of notes on style and grammar as instructions to writers. An author having a manuscript reviewed by a program supervisor, a laboratory director, Ms. Weeks, Dr. Hile, and Mr. Eschmeyer was often greatly humbled by the experience. A chapter could be written to detail the counsel given to BCF authors by Dr. Hile and Mr.

Eschmeyer. Followers of their commandments were offered favorable editorial reviews; non-adherents risked eternal rejection of their manuscripts. Most authors seemed to appreciate the sincere, scholarly efforts and the persistence of Weeks, Hile, and Eschmeyer to improve overall writing skills. The editor's 1965-1969 "Flotsam and Jetsam" memos contained stern rules for what constituted good scientific writing. A few examples from Editorial Memo, "Flotsam and Jetsam" No. 23 (April 1967) and their not-without-humor Christmas message "Mensis Duodecimus" from Editorial Memo No. 20 (December 1966) are shown in Appendix Table 8.

Mr. Grady Reinert joined the laboratory in 1966 from the BCF Laboratory in Brunswick Georgia. His expertise was creating precise scientific illustrations of fishes for the Systematics of Fish Program as well as illustrations and drafting for other programs. Previously he had drawn botanical illustrations at Florida State University and was a talented artist in his own right. Also, he is remembered for batiks of marine life that he and Ms. Gay Ranallo exhibited at the laboratory and at the BCF headquarters in Washington, D.C. These artists once collaborated on a mural of marine life that adorned the exterior wall of the annex building for several years. The mural could be seen from Rickenbacker Causeway by travelers passing to and from Key Biscayne (see Figure 11 in Photo Gallery).

Open house at the laboratory was an annual event. It was a thrill to see the interest displayed by young students and adults. Several hundred people usually attended the one-or two-day event, and the laboratory staff took special interests in serving the community. The staff also gave talks at civic club meetings. For several years Ms. Barbara Palko took a show-and-tell exhibit on marine life to elementary schools and hosted class visits to aquarium rooms at the laboratory.

The laboratory served as host to several outside organizations during this period. Among these were Mr. Robert Gibbs and Mr. John Brown of the United States Department of the Interior. They were sent from the Secretary's Office to deal with a proposed expansion of the Miami Jetport, a landing strip in the Everglades used for training. The Jetport was considered for expansion to ease over crowding at the Miami International Airport. The Interior Department, however, was concerned about pollution in the environmentally-sensitive ecosystem, and after a couple of years of consultations, the Jetport plans were cancelled. The Miami Laboratory also hosted a NOAA Dive Center managed by Mr. Dick Rutowski and Mr. Marc Kaiser, who conducted diver training and maintained a hyperbaric chamber for treating victims of diving accidents. Another group hosted at the laboratory was a branch of the American Littoral Society. Mr. Alex Stone was a volunteer interested in environmental issues and contributed his time to lead the group.

Shifts in Science Policy and Administrative Oversight

A nationwide interest in marine science developed during the 1960s, and the period sometimes is referred to as the “Decade of Oceanography.” The Tropical Atlantic Biological Laboratory benefited from this national focus on living marine studies, and its staff was likewise encouraged by the national interest and by BCF leadership. The parent agency, the U.S. Fish and Wildlife Service, gave primary attention to recreational and commercial fishery constituents, and laboratory scientists frequently met with Bureau of Commercial Fisheries (BCF) Regional Directors, Dr. Seton Thompson and Dr. Richard Whiteleather at scientific and industry meetings such as the Gulf and Caribbean Fisheries Institute and the Southeastern Fisheries Association. Mr. Joseph E. King in BCF headquarters (who seemingly single-handedly managed the national administration as well as the laboratories) also found time to interact with laboratory scientists at meetings such as the annual Pacific Tuna Conference at Lake Arrowhead, California.

As the laboratory entered the 1970s, however, its focus would shift from fishery oceanography to fishery stock assessment. In that regard, it was about to face new challenges, new directives, new opportunities, and a new national administrative structure. Fishery managers who formerly relied on fishery oceanography for fishery development would now rely on fishery science for resource conservation and management.

Early Years of the Southeast Fisheries Center, 1970-1978

In October 1970, the BCF and marine portions of the Bureau of Sport Fisheries and Wildlife were moved to the U.S. Department of Commerce under a newly-formed National Oceanic and Atmospheric Administration (NOAA). The formation of NOAA was designed to bring together federal organizations that conducted research of the oceans and atmosphere. Within NOAA, the National Marine Fisheries Service (NMFS) was formed, and within it, the Tropical Atlantic Biological Laboratory became part of the Southeast Fisheries Center. The latter was one of four national offshore fishery research centers created by the reorganization (Northeast Fisheries Center in Woods Hole, Massachusetts; Southeast Fisheries Center in Miami, Florida; Northwest and Alaska Fisheries Center in Seattle, Washington; and Southwest Fisheries Center in La Jolla, California). The objective was to organize within each center the regional fishery research facilities in each region. In addition, coastal research centers were designated at Beaufort, North Carolina; Galveston, Texas; Sandy Hook, New Jersey; Milford, Connecticut; and Oxford,

Maryland. These later would become part of their respective regional science centers, but the reorganization would take some time to complete. As a result, the organizational structure of the new Southeast Fisheries Center (in later years renamed the Southeast Fisheries Science Center) was not formally approved until January 1972. In time, however, the center would include the Tropical Atlantic Biological Laboratory (renamed the Miami Laboratory); BCF laboratories at Pascagoula, Mississippi; Bay St. Louis, Mississippi; and Brunswick, Georgia; and the Bureau of Sport Fisheries and Wildlife laboratories at Panama City, Florida; and Port Aransas, Texas. Later, laboratories at Galveston, Texas; Beaufort, North Carolina; and Charleston, South Carolina, were added. This greatly expanded fishery center was “charged with the responsibility of conducting research leading to national and international management of fishery resources in the adjacent oceanic areas from Cape Hatteras, North Carolina, through the Gulf of Mexico, into the Caribbean Sea, and southward off the northeastern coast of South America.” Today, the basic structure still exists with the Southeast Fisheries Science Center’s Directorate in Miami and its laboratory facilities located at Beaufort, North Carolina; Miami and Panama City, Florida; Pascagoula and Bay St. Louis, Mississippi; Lafayette, Louisiana; and Galveston, Texas.

A major change in management style and program structure also accompanied the new center. Research programs were organized under a matrix management system rather than a hierarchical system in which a laboratory director served at the top of each laboratory hierarchy. It was assumed that the new system was implemented partly to integrate the laboratories into the center as a whole, partly to account for overlapping capabilities among the laboratories, and partly to maximize the resources of the center. In any case, the matrix management system established program managers responsible for developing overall program objectives and monitoring progress of research, regardless of where the research projects were conducted. Task managers were established with the responsibility for supervising the resources and activities of the programs. A facility manager was responsible for physical plant operations at each location. Most often, a senior staff person at each facility was appointed “officer-in-charge” and was token “laboratory director” responsible for general supervision and for mediating any administrative problems that could be solved locally. The Center Director, Deputy Center Director, and Associate Director for Resource Research in Miami provided overall direction and support and represented final authority. The matrix style made for an interesting organizational chart.

In 1971, Mr. Harvey Bullis was appointed as the Southeast Fisheries Center Director. He was a graduate of the Marine Laboratory at the University of Miami and had continued his interest in marine biology as director of the BCF Exploratory Fishing and Gear Development Base at Pascagoula. He had also been the Director of the Pascagoula Exploratory Fishing and Gear Development Base. In 1970, however, with the formation of NOAA, he and Dr. Robert Edwards (Director of the BCF Laboratory at Woods Hole,

Massachusetts) were assigned to BCF headquarters in Washington, D.C. Both were forward thinkers, and they took the opportunity to help shape the agency organizationally to meet new changes anticipated on the scientific and political horizon. Once Mr. Bullis arrived in Miami as Southeast Fisheries Center Director, he was assisted with administrative duties by Mr. Johnny Butler (to February 1975) and Mr. Ernie McRae (after 1975). Both men were recruited from positions at Pascagoula where Mr. Bullis had served as base director, and they provided help with day-to-day operations, thus allowing Mr. Bullis to perform other duties required of the center director. Mr. Tom Vanselous, recruited from the Bay St. Louis Laboratory, also served in an administrative capacity for Mr. Bullis.

Creation of the Southeast Fisheries Center initially caused consternation among those who would have preferred the older political and scientific autonomies of the laboratories. Within the Miami Laboratory, some of its veteran personnel saw the new center organization as imposing. Paradoxically, some personnel in other laboratories believed that the Miami Laboratory staff obtained special treatment simply by their proximity to center headquarters, i.e., they shared the same building.

Although immersed in duties as center director, Mr. Bullis still capitalized on his former experience in exploratory fishing by enlisting systematic zoologists throughout the world to study and describe new or rare species collected on cruises of the *R/V Oregon I*. He also maintained a collection of freshwater turtles in the back yard of his Key Biscayne home. And after retirement, he specialized in raising bromeliads and helped to popularize the tropical plant group among amateur gardeners.

Building Arrangement

During this period, the center director's office was moved from the third floor to the large office suite on the second floor, formerly occupied by the Galveston Laboratory Field Station. A workshop—which had been installed in one section of the receiving-shipping room on the first floor, and in which Mr. Wagner, a skilled marine technician, had fashioned specialized field equipment—was closed and henceforth used for storage of office supplies. The Fish Systematics Program was discontinued, and its fish collection was transferred to the Florida State Museum in Gainesville, Florida. The annex building was used for a short time by the NOAA Field Finance Office. Later it was divided to provide offices for statistics personnel and space for a new seminar room (the original seminar room on the second floor of the main building was converted to a computer room housing a new Burroughs 6800 computer). The wet laboratories in the eastern wing of the main building were gradually converted to office space, and the remaining experimental studies were moved to converted space on the ground level. These modifications reflected changing objectives and needs of the center and laboratory.

Administrative Services

Administrative services at Miami during most of this period were under the direction of Mr. Don Wagner. As chief marine technician for Tropical Atlantic Biological Laboratory, Mr. Wagner had served as field party chief on several cruises of the *R/V Undaunted*, and he had supervised a group of marine technicians including Mr. Michael Donahue, Mr. Edward Hyman, Mr. Andrew Ramsay, and Mr. Stuart Smith. But with a shift in the center's research fleet away from Miami, Mr. Wagner and other marine technicians were assigned new duties in the laboratory. He readily accepted the challenges of his new role and proved to be an excellent administrative officer. All the administrative officers, however, seemed frustrated by the scientists' continual impatience with seemingly slow bureaucratic procedures. Mr. Wagner handled the complaints well and is remembered for having a bottle of anti-acid tablets handy on his desk. He continued as administrative officer until he resigned to establish a cabinet-manufacturing business in Miami.

Vessel Operations

Operations of all large vessels under the Southeast Fisheries Science Center were centered at the Pascagoula Laboratory, formerly the BCF, Exploratory Fishing and Gear Development Base. In time, the *R/V Undaunted* was transferred to the United States Merchant Marine Academy at Kings Point, New York. There it was used for training and renamed the *Kingspointer*. NOAA Corps Officer Dr. John Lamkin at the Miami Laboratory recalls experiences aboard the *R/V Undaunted* during his years at Kings Point, particularly the ship's tendency to roll in even fairly calm seas. That characteristic was well remembered by laboratory scientists and crew members as well. A favorite pastime on the *R/V Undaunted* was to observe the inclinometer in the galley. On at least one occasion it was reported to have registered a 49-degree roll!

The *R/V Oregon II*, a large vessel that provided ample research support during this period, was procured and based at Pascagoula. The vessel was a major platform in the synoptic MARMAP surveys in the Gulf of Mexico, and also was used by the Commercial Fisheries Investigations Program for surveys of shrimping grounds off the coast of the Guianas and northern Brazil. These surveys were conducted under the U.S.–Brazil Shrimp Agreement, and featured participation by Mr. Alex Dragovich, Dr. Al Jones, and scientists from Brazil and Guyana. Ports of call included Port of Spain, Trinidad; Paramaribo, Surinam; and Belem, Brazil, where laboratory scientists visited their counterparts in marine and fisheries science.

Programs and Research Accomplishments

Major research programs at the laboratory in the early 1970s were: Oceanic Game Fish Investigations, Commercial Fishery Investigations, Atlantic Bluefin Tuna, MARMAP I, and Biochemistry. Scientists in these programs studied the billfish fisheries, the Atlantic bluefin tuna fishery, the Guianas/Brazil shrimp fishery, the Bahamas spiny lobster fishery, the calico scallop fishery, and the Florida inshore trap fisheries for reef fish, spiny lobsters, and stone crab. The Galveston Laboratory Field Station in Miami was terminated, and its scientists were reassigned to the Miami Laboratory, where they would shift their research from pink shrimp to calico scallops. The fishable stocks of scallops off the eastern coast of Florida were dependent on successful settlement, development, and growth to fishable size. Settlement, however, was quite variable and the fishable resource was not consistently available in one particular area. Mr. Tom Costello, Mr. Donald Allen, and Mr. George C. Miller carried out biological studies with support from Mr. Robert Cummins and the crew of the *R/V George M. Bowers*. They would locate calico scallop beds, track the growth and development of young scallops to fishable size, and report on scallop growth and maturation. The program employed a state-of-the-art underwater photographic system called the Remote Underwater Fisheries Assessment System (RUFAS). Spiny lobster research under MARMAP II were carried out by Mr. David Sutherland, Mr. Douglas Harper, and Ms. Essie Coleman-Duffie. Those studies led to a better understanding of the availability of the highly variable fishery resource.

Oceanic Game Fish Investigations Program

The Oceanic Game Fish Investigations Program was established in 1972. By that time the interest of U.S. commercial fishermen in tropical tuna had faded. Nevertheless, U.S. sport fishermen actively sought marlins and sailfish in waters off the southern portions of the United States and in the Bahama Islands and in the Caribbean Sea. These sport fishermen constituted an influential constituency that sought additional information on the resource and on catches of the species taken on commercial longline operations. The Oceanic Game Fish Investigations Program, therefore, replaced the Tropical Tuna Program and began to focus on billfish resources. The program conducted studies on the biology and life history of marlins and sailfish, and laboratory biologists collected samples and catch data at sport fishing tournaments in the Bahamas, U.S. Virgin Islands, Puerto Rico and other locations in the Caribbean region. Also, a time-series of billfish catch data was assembled, which later proved useful in measuring trends in relative abundance of blue and white marlin. These data also formed an important information source for stock assessments. Program biologists also studied a sport fishery for swordfish that developed and was popular for a few years in south Florida. Mr. Ed Scott and Mr. Edward Hyman attended tournaments in

the Bahamas and in the Caribbean; Mr. Monty Lopez, a Miami Laboratory employee, and Mr. Paul Pristas, stationed at the Panama City Laboratory, attended tournaments in the Gulf of Mexico; and Dr. Grant L. Beardsley directed the program. Dr. Beardsley had originally obtained his undergraduate degree in English and had served as officer and pilot in the U.S. Air Force. Nonetheless, he decided to pursue a career in marine science and took graduate studies in fishery biology at the Institute of Marine Science in Miami.

The Cooperative Game Fish Tagging Program at Woods Hole, Massachusetts, was transferred to Miami soon after Oceanic Game Fish Investigations began. Mr. Frank J. Mather, III, an avid sport fisherman and associate scientist at the Woods Hole Oceanographic Institution, started tagging bluefin tuna several years earlier. He had a life-long interest in bluefin tuna, pursuing them as an angler and as a researcher. He initiated bluefin tagging on a small scale, but in time hundreds of fish were tagged with the volunteer cooperation of sport fishermen. Analyses of the recovered tags established the general migration patterns of bluefin, including a trans-Atlantic movement. Anglers were encouraged and sport fishermen were furnished additional tags and tagging equipment. Eventually the program expanded to include other billfish and greater amberjack. During these years, Mr. Mather spent winters at his home at Key Biscayne, Florida, and as the job of managing the growing tagging program expanded, Miami Laboratory staff, under the direction of Dr. Chester Buchanan, offered assistance in managing the distribution of tags, keeping records in a tagging database, and distributing tagging materials to cooperating anglers. In time, the laboratory assumed full responsibility for the Billfish Tagging Program, and Mr. Mather continued his association with the program for many years. Tag returns also documented the transatlantic movements of blue marlin and the seasonal movements of white marlin from their winter grounds off Venezuela to their summer grounds in the Gulf of Mexico and off the Mid-Atlantic States.

Atlantic Bluefin Tuna Program

The Southeast Fisheries Center accepted responsibility for the Atlantic Bluefin Tuna Program in 1974. At that time the bluefin tuna fishery in the western Atlantic was expanding. U.S. fishermen developed the ability to purse seine medium-sized bluefin that schooled in the summer off the Mid-Atlantic and New England coasts. With the aid of aerial spotting, purse seining became a highly effective fishing technique. Previously, the fishery had only concentrated on large fish, which tended not to school and were mainly available to surface fishing off New England during the summer. The additional effort of purse seining on medium-sized fish, however, raised concern for the well being of the resource. In this regard, Dr. James Tyler became the first chief of the Atlantic Bluefin Tuna Program. Mr. Peter Wilson and Mr. Pete Rivas, familiar with bluefin issues in the Atlantic, were hired as fishery biologists in 1974. Studies on

bluefin reproduction and migration were conducted by Dr. Raymond Baglin. Dr. Wesley Parks joined in 1975, and Mr. Michael Crow, Dr. Mark Farber, and Mr. Ray Conser were hired as population dynamic analysts. Dr. Beardsley was assigned to the Atlantic Bluefin Tuna Program, and Dr. Richards and Mr. Potthoff continued their studies of scombroid larvae. Dr. Michael Parrack of the Galveston Biological Laboratory carried out population studies of bluefin tuna, and in later years, he and his staff of Dr. Scott Nichols, Dr. Susan Brunenmeister, and Ms. Patty Phares would transfer from the Galveston Laboratory to augment the expanding group of population biologists in the Miami Laboratory.

An early task of the Atlantic Bluefin Tuna Program was to determine the age of individual fish. Mr. Fred Berry, in charge of the age and growth studies, was assisted by Mr. Dennis Lee and Mr. Andy Bertolino. Mr. Berry was a systematic zoologist but applied himself to the bluefin tuna age-determination task with enthusiasm. His laboratory was crowded with vertebrae in various stages of preparation for counting annual rings to determine age. Spines and otoliths from tuna also bore annual marks and were used to estimate age.

Commercial Fisheries Investigations Program

Laboratory scientists directed their attention to the western-central Atlantic shortly after the arrival of Mr. Harvey Bullis as center director in 1971. Their efforts resulted in the establishment of the Commercial Fisheries Investigations Program. U.S. vessels fished for shrimp off northeastern Brazil and the Guianas (French Guiana, Surinam, and Guyana) and landed their catches at facilities in French Guiana (PIDEG), Surinam (Bumblebee Seafoods), Guyana (Sahlman Brothers Seafoods and Versaggi fleet), and Trinidad and Tobago (International Seafoods). Other U.S. fishermen fished for shrimp in Mexican waters in the Campeche, Tampico, and Contoy areas. They also fished for snapper and grouper off Mexico and around the islands of the Caribbean Sea (including islands claimed by Colombia). Their catches were usually delivered to U.S. shore facilities, most commonly at Texas and Florida ports (Key West, Fort Myers and Tampa). Spiny lobster fishermen in Florida fished in Bahamian waters and landed their catches at ports in south Florida. But many countries at this time were extending their territorial sea limits to 200 miles, which threatened to exclude U.S. fishermen from traditional international fishing grounds. The United States, of course, sought fishing agreements with the above nations in order to maintain access by U.S. fishermen. Mr. Bullis decided that the foreign governments might be more receptive to U.S. fishing proposals if those proposals included offers of partnerships in scientific research. Consequently, the Commercial Fisheries Investigations Program at Miami became involved and prepared background documents that described the fishery resource, historical landings, and the size of the U.S. fleet fishing in the waters of each nation. If an agreement was reached, program staff assisted in monitoring U.S.

participation in the respective fishery using logbook reporting, and they participated in cooperative studies with scientists of the respective country.

A successful agreement was negotiated with Brazil. It was named the U.S.-Brazil Shrimp Fishing Agreement and allowed United States flag vessels to fish in the waters off northeastern Brazil. An agreement also was negotiated with Mexico that allowed U.S. flag vessels to shrimp on the Tampico and Contoy grounds but not on the Campeche grounds. In addition, a fixed number of U.S. vessels were allowed to continue snapper and grouper fishing in Mexican waters. A treaty was developed with Columbia to allow U.S. fishing for snapper and grouper around some of their Caribbean islands. However, in August 1975, a U.S. delegation met with Bahamian officials in Nassau, and the negotiations did not go well. The U.S. delegation consisted of representatives from the State Department, Coast Guard, and NMFS (including Southeast Fisheries Center). The Government of the Bahamas declared spiny lobster a creature of the continental shelf, took control, and consequently, in January 1976 U.S. fishermen were excluded from their traditional lobster fishing grounds in Bahamian waters.

The U.S.-Brazil Shrimp Agreement required fishermen on U.S. flag vessels to submit logbook catch and landing reports. These were completed by the fishermen and listed the daily catch for each vessel that fished in the agreement area off Brazil or in the area off the Guianas. Processing plant personnel completed landing reports that showed total trip catch for each vessel by species and size category. Processing the numerous records was a cooperative effort between the Commercial Fisheries Investigations Program, the center data management group, and the marketing and statistics group. Mr. Tom Chewing, computer programmer from the data management group, was a great help in implementing the system. Mr. Alex Dragovich, who was assigned to the Guianas-Brazil shrimp studies, and Mr. Lloyd Johnson from the marketing and statistics group, made several trips to Guianas and Trinidad ports to meet with plant managers to assist in meeting reporting requirements. The first U.S.-Brazil Shrimp Agreement was in time renewed for an additional five years, but then the Government of Brazil ended the agreement, thereby allowing Brazilian fishermen exclusive rights to the resource.

Stock Assessment Research

Stock assessment research would become the central focus of the laboratory staff at Miami, particularly with regards to bluefin tuna and other large pelagic fishes. Dr. Wesley Parks conducted the initial population studies on bluefin tuna, and the International Commission for the Conservation of Atlantic Tunas (ICCAT) was the venue for reporting research results. By 1975, the studies were well developed and a total of fifteen manuscripts were prepared for presentation at the November meetings of ICCAT. A decline in abundance of bluefin tuna was quantified, giving substance to the observations made years earlier by Mr. Frank Mather and others. Hypotheses regarding one versus two north Atlantic stocks, however, would be argued on a continuing basis.

Stock assessment studies expanded with the passage of the Fishery Conservation and Management Act in 1976. Fishery management plans prepared under the act required estimates of maximum sustainable yield, and this was a problem for many of the southeastern fisheries. Generally there was not a long history of recorded commercial fishery statistics for many of these fisheries, and recreational catches were poorly estimated. Data on size or age composition of the catches, as well as other basic biological information, had not been collected. The shrimp, reef fish, and stone crab fishery management plans mostly relied on simple surplus production models or averages of historical catches as “best available” estimates of maximum sustainable yield. Over time, however, stock assessment scientists maximized the information that could be extracted from the available data, experimented with new population models, and introduced statistical measures of confidence into their estimates. Dr. Philip Goodyear introduced the concept of compensatory mortality (developed in his earlier studies on striped bass) to assessments of red snapper and other reef species. He was thoughtful and dedicated in his scientific work, characteristics that impressed audiences at fishery management council meetings. He was also an avid angler and enjoyed opportunities for a day’s fishing in Biscayne Bay or in the ocean off Miami as a diversion and relaxation from demanding analytical work.

Marine Resources Mapping Program (MARMAP)

During the early 1970s, NMFS undertook a national program to describe the full array of the nation’s marine resources. This effort was named the Marine Resources Mapping Program (MARMAP). MARMAP comprised three parts: MARMAP I included planktonic (larval) life stages, MARMAP II included demersal resources, and MARMAP III included pelagic resources. Laboratory scientists were active in planning MARMAP surveys in the southeast under the national MARMAP Program Director, Dr. Kenneth Sherman. Earlier studies in southern California (CALCOFI) had demonstrated that plankton

could be quantitatively sampled and the numbers of eggs and larvae could provide an index of spawning population size. MARMAP I was an effort to expand this approach nationwide. Staff at the laboratory collected and sorted plankton from the Gulf of Mexico and in waters off the Atlantic states. Some plankton samples were sent to Poland to be sorted at the Polish Sorting Center. Also, a corps of biologists and graduate students were kept busy by the ambitious field schedule, including Ms. Sharon Kelly-Fraga, a principal assistant to Dr. William Richards, and Mr. Thomas Potthoff.

Dr. Richards described the larval stages of a number of species of tuna, snapper, and grouper. Materials were provided to cooperating ichthyologists who were interested in describing the larvae of particular taxonomic groups. Eggs and larvae of bluefin tuna found in the eastern Gulf of Mexico in the spring pointed to a western Atlantic spawning area for this species. This area was sampled in several years to develop an index of the western Atlantic bluefin tuna population. Mr. Thomas Potthoff published on small juvenile bluefin tuna collected from the stomachs of terns at a nesting colony in the Dry Tortugas. His study substantiated bluefin spawning grounds in that area. Mr. Potthoff also published on larval morphology, including studies on fin ray development in species of *Coryphaena* (dolphins).

MARMAP II studies at the laboratory were less extensive since the center's major work on demersal fishes was centered at Pascagoula, Mississippi. MARMAP II at Miami included local studies on blue crab populations in Biscayne Bay and calico scallop populations in the Cape Canaveral area. These were carried out by the calico scallop research team consisting of Mr. Tom Costello, Mr. Don Allen, and Mr. George C. Miller. No MARMAP III studies were conducted at Miami.

Biochemistry Program

In July 1971, the Chemistry Program at the Pascagoula Laboratory was transferred to Miami. Ms. Mary Thompson, Mr. Robert (Rocky) Farragut, and Mr. Harold (Hal) Thompson made up the program staff. The program was housed in the laboratories formerly used by the Oceanographic Chemistry Program during the Tropical Atlantic Biological Laboratory years. Exploratory cruises of the *R/V Oregon II* had located an unusually large concentration of deep-water shrimp off Aruba in association with oily deposits. The hydrocarbons in the sediments were characterized, and their concentrations in shrimp tissue were measured. Program staff also carried out electrophoresis studies to discriminate between eastern and western Atlantic groups of bluefin tuna. In time, Ms. Mary Thompson was appointed as Deputy Center Director, Mr. Farragut suffered a heat attack and died, greatly saddening the Miami staff, and Mr. Harold Thompson ultimately accepted a position with the Food and Drug Administration in Arkansas. With his departure, the Biochemistry Program ceased to exist in Miami.

Aquaculture

The Larval Rearing Program was visited by many people interested in applying their experimental techniques to commercial aquaculture. Entrepreneurs were hopeful that artificial culture of marine species could help meet an increasing demand for seafood in the United States. They also recognized the demands of hobby aquarists for cultured marine fish versus wild-caught specimens. Ms. Barbara Palko answered many questions posed by visitors and shared her knowledge regarding the raising of reef fishes and marine tropical species. Mr. Fred Berry likewise answered many questions about Florida pompano. Mr. Tom Costello, Mr. Donald Allen, and Mr. Billy Drummond provided information on freshwater and marine shrimp culture.

Fishery Management

Passage of the Fishery Conservation and Management Act created a requirement in NMFS to manage the fishery resources of the nation. Before passage of the act in 1976, the laboratory's mission had been the study of marine resources and fishery development. The BCF had created strong ties to the commercial fishing industry, and service programs, such as vessel financing, product development, and marketing, were key activities along with basic biological research. But now the agency was thrust into regulatory responsibility, and this required scientific information to manage the resource. Thus, the agency's mission shifted to determine the status of fishable stocks and to determine the productive capacity of the resources. The goal was to prevent overfishing and promote optimum harvest. In this mission, basic biological research was still needed, but the driving objective now was to link basic biological research to population studies. After all, there were new questions to be answered: What were the unit stocks? What was their productive capacity? What was their response to exploitation? How could the economic viability of the fisheries be best maintained?

In 1977, the center formed the Office of Fishery Management to assist with the new responsibilities to the three regional fishery management councils in the southeast: South Atlantic Fishery Management Council, Gulf of Mexico Fishery Management Council, and Caribbean Fishery Management Council. These had been formed by the Fishery Conservation and Management Act to regulate fishing within the new 200 mile Exclusive Economic Zone claimed by the United States. Dr. Albert Jones was placed in charge of the office, and his staff included Mr. Thomas J. Costello, Mr. Donald M. Allen, Mr. Michael Justen, Ms. Catherine Hill, Dr. Joan Browder, Mr. George Darcy, Ms. Susan Coleman, Mr. Robert Cummins, and Mr. Wayne Witzell. The office worked closely with the newly created Fishery Management Councils. Mr. Cummins, the former chief of the Brunswick Exploratory Fishing Base, was

at the Miami Laboratory, and he undertook a three-month detail assignment at Charleston, South Carolina, to assist the establishment and initial operations of the South Atlantic Fishery Management Council. And within the Office of Fishery Management, the staff worked diligently to prepare a draft fishery management plans for shallow water reef fish and spiny lobsters for the Caribbean Fishery Management Council. In addition, a cruise of the *R/V Oregon II* was conducted to explore deep-water reef resources within the jurisdiction of the Caribbean Fishery Management Council. The office also prepared draft stone crab fishery and groundfish fishery management plans for the Gulf of Mexico Fishery Management Council. The Groundfish Fishery Management Plan was ultimately not adopted because the croaker fishery in the Gulf of Mexico did not develop as anticipated—a result of unfavorable economic factors and an apparent decline in the availability of the resource. However, the groundfish plan assembled a wealth of background information that was useful in future studies. The Gulf of Mexico Fishery Management Council contracted to Louisiana State University for the preparation of a shrimp fishery management plan and to Florida Sea Grant for a reef fish fishery management plan, and for these the Office of Fishery Management responded to requests for statistical and biological information. To help further the fishery management process, Mr. Tom Costello and Ms. Lynn Pulos published a NOAA Technical Memorandum titled, *How to prepare a fishery management plan*. It proved to be a useful guide to personnel of the SEFC and the councils.

Dr. Joan Browder was the author of the draft Groundfish Fishery Management Plan. She came to the laboratory with a background in freshwater ecology. Her interest in this continued along with new interests in marine ecology. Dr. Browder made a number of significant contributions to the center's scientific programs and was especially interested in the ecology of the Everglades. She presented a noteworthy paper, "New approach to developing the quantitative relationship between fishery production and the flow of fresh water in estuaries," at the National Symposium on the Flow of Fresh Water to Estuaries. Dr. Durbin Tabb of the University of Miami's Institute of Marine Science and scientists at the NMFS Galveston Laboratory also pursued the idea of measuring fresh water levels in the Everglades and using them as indicators of fishery recruitment.

Technical Information Management Service

A major change in the management of fishery information was made in 1977 when responsibility for the collection of fishery statistics was transferred from the NMFS Southeast Regional Office to the Southeast Fisheries Center. This change responded to the need for detailed statistical data to meet the responsibilities of the Fishery Conservation and Management Act. The Statistics Division was set up under the umbrella of the Technical Information Management Service with a charge to “collect and provide data and information in as near-real-time as possible.” Organizationally, the Technical Information Management Service was a unit under center headquarters. Prior to 1977, each laboratory or program generally maintained its own data files. There was no central data depository and finalization of data often lagged months and years behind collection. Under the new act, management procedures, increased computing capability, and quick and easy access to a comprehensive and wide range of fishery information, including fishery statistics, would be needed.

The Technical Information Management Service was established by the center to meet the need for centralized data collection, archival, and retrieval. It consisted of three sections: Statistics, Data Management, and Information Dissemination. Statistics was an ongoing operation, while data management and information dissemination were essentially new undertakings. The objectives of these sections were not quickly or easily achieved. Dr. Paul Hooker, Associate Center Director for Resource Research, was instrumental in the design of the Technical Information Management Service, and Mr. H. Erich Groess was selected as chief. Mr. Ed Burgess was placed in charge of the Statistics Section. They responded immediately to meet the new responsibilities, and a staff with training in statistical methodology was recruited. These included Mr. Herbert Prytherch, formerly port agent in North Carolina, and Ms. Beany Slater, a graduate of Florida A&M University. In January 1978, Mr. Burgess transferred to the Southeast Regional Office. He was replaced by Mr. Kimrey Newlin, who was hired in October 1978 from his former position as logistics analyst in the U.S. Department of Defense. Mr. Newlin served as chief of statistics for the next several years. During this period, Dr. Larry Massey transferred to Miami from the Beaufort Laboratory. Dr. Massey served the center and laboratory in a number of roles over the years, including within the Technical Information Management Service. A knowledgeable expert in a number of technical and planning areas, he provided insightful advice to managers and staff alike, and assisted on many research projects as well.

Statistics

Collection of statistics on the nation's commercial fisheries was a federal responsibility. The annual *Statistical Digest* published by the BCF reported amounts and values of commercial fishery products, numbers of fishermen and fishing vessels, and it provided detailed descriptions of selected fisheries. The focus of the digest was commerce and little consideration was given to the application of the data to biological aspects of fishery problems. In 1956, Mr. Charles Lyles, Chief of the Southeast Region Statistics Office in New Orleans, wisely began to collect detailed information on landings by trip of individual vessels in the U.S. Gulf of Mexico shrimp fishery. However, for other fisheries in the southeast, only monthly summary landings by species and wholesale seafood dealer were collected, and only an annual inventory was made of the number of vessels, boats, and fishermen.

The statistics staff consisted of port agents located at major fishing ports. Agents collected landing statistics and provided a service as informal sources of information for fishermen. This latter proved especially important as numerous new and changing federal regulations were introduced. A port agent's work was mainly spent collecting landing statistics in the shrimp fishery by interviewing wholesale dealers and vessel captains for information and data on landings and fishing effort. Periodically they would telephone the current landings and price data to a central location for twice or thrice weekly publication in a consumer report titled the *Market News Bulletin*. Also, shrimp data collected by the port agents were computerized and summaries were published by the statistics headquarters staff in Washington, D.C. These summaries became important sources of information for biologists studying the shrimp fishery, and they became important for developing fishery management plan for shrimp under the Fishery Conservation and Management Act.

In 1976, a major change was made in field operating procedures for Gulf of Mexico shrimp statistics. The archival of individual landing records for shrimp was replaced by an accumulated or consolidated records system. In effect, this created two types of data files in the archives and a set of associated computer software to address each. Moreover, this occurred at a time when stock assessment scientists needed more detail in catch records, rather than consolidated records. Consequently, in 1978 the Technical Information Management Service assumed responsibility for managing the historical data files for the Gulf of Mexico shrimp landings that had been created and maintained since 1961 by the Washington headquarters office. Software used to create the files was made available to the Technical Information Management Service, but the individuals directly involved in their creation and familiar with the details of the computer programs did not transfer. Moreover, the software had to be significantly modified to work on computer systems available to the center. It took center personnel several years to

create a smoothly functioning data system. Finally, in 1980 the field procedures were changed to again collect landings information on a per-trip basis in the Gulf of Mexico (i.e., a return to the pre-1976 method of data collection).

The Technical Information Management Service in 1978 conducted a major telephone survey to estimate catch and effort of sport fishing vessels targeting blue marlin on the Atlantic coast. The blue marlin survey, overseen by Mr. David Hamm and Ms. Beany Slater, used state boat registration files to contact individual fishermen and captains to determine the number of blue marlin caught (a rare-event capture) aboard their boat within a particular time frame. The project pioneered a vessel sampling frame and survey to estimate catch and effort for a rare-event species. The survey was perhaps the first directed effort in the southeast to collect statistical data on a recreational fishery in response to a specific management information need.

Other problems undertaken by the Technical Information Management Service were the implementation of new mandatory reporting procedures in the fishing industry, development of cooperative federal and state statistics agreements, data confidentiality regulations between state and federal agencies, and the protection of confidential and sensitive data involving endangered species and illegal sizes. Steps were also taken to redirect fishery data collection to more effectively meet the needs of stock assessment scientists and fishery managers. The process was necessarily slow, and it took several years to shift the historical emphasis from shrimp statistics to encompass a broad array of fishery resources, including the taking of biological samples from individual fish. Funding was always a limiting factor, and unless a port agent had an assistant, there was little time for adding new duties to an already busy schedule. Moreover, some port agents considered the taking of biological samples (e.g., scales, otoliths, gonads) beneath their position. Progress, nevertheless, was steady and most port agents eventually accepted the changes, and an effective network of field sampling developed.

Data Management

Data management was tasked to design, develop, and implement information systems to support administrative, enforcement, research, and management needs. The Technical Information Management Service provided a centralized computing system to the center, and in March 1978, time on a Honeywell computer at the United States Civil Service Commission in Macon, Georgia, was procured to serve as the central host with some of the individual SEFC laboratories networked to it. Later, a Burroughs 6800 computer was installed at Miami and networked to the laboratories and to the NMFS Southeast Regional Office in St. Petersburg, Florida. The Burroughs 6800 connected with a Burroughs 7800 at Seattle,

Washington, and provided improved and more economical computational facilities. In essence, they joined the Southeast Fisheries Center and Miami Laboratory to the first national NMFS computer network. The Burroughs 6800 and its associated equipment were installed in the large seminar room on the second floor of the main building. This would be in sharp contrast to the laboratory's next generation computer, which was a dwarf in physical size but a relative giant in computing capability.

Information Dissemination

This unit of the Technical Information Management Service handled both internal and external communications for the center. All publication and editorial functions were channeled through the unit. Ms. Lynn Pulos served as the Editorial Assistant and held to the standards introduced earlier by Dr. Hile, Mr. Eschmeyer, and Ms. Ann Weeks for editing scientific manuscripts. A center newsletter was published on a monthly or quarterly basis between 1973 and 1988. Editors of the newsletter during that period were Ms. Gay Ranallo and Ms. Katherine McRae. The newsletter featured articles on research progress and personnel notes intended to promote a sense of identity among personnel at the different laboratories in the center.

Cooperative Academic and International Programs

Scientists benefited from activities with nearby academic institutions. Several laboratory senior staff held adjunct faculty appointments at the University of Miami, Florida International University, and Florida Atlantic University. These provided opportunities to teach occasional courses, mentor students, and give special lectures.

The Cooperative Institute of Marine and Atmospheric Science (CIMAS) was established at the University of Miami's Institute of Marine Science in the spring of 1977. CIMAS, a cooperative agreement between NOAA and the University of Miami, was spearheaded by Dr. Harris Stewart, Director of Atlantic Oceanographic and Meteorological Laboratory. The Southeast Fisheries Center likewise welcomed an opportunity for a professional relationship with the university and funded several fishery related CIMAS research programs.

Scientists in the Southeast Fisheries Center and Miami Laboratory were active in international fishery programs. Chief among these were the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Western Central Atlantic Fisheries Commission (WECAFC), the Cooperative Investigations of the Caribbean and Adjacent Regions (CICAR), the International Oceanographic

Commission's Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE), Mexus-Gulf Cooperative Program (MexUS-Gulf), and bilateral fishery agreements with Brazil, Mexico, and Colombia.

The Food and Agriculture Organization of the United Nations (FAO) established the Western Central Atlantic Fisheries Commission (WECAFC) in November 1973. About thirty countries joined the commission, and it provided an effective means for countries to share information and discuss common problems of fishery management. Meetings of the commission and its special working groups were of considerable assistance, especially to the smaller countries of the region, where professional fishery staff might be only a single fishery officer. The United Nations Development Fund, headquartered in New York City, financially supported the Western Central Atlantic Fishery Project (WECAF), companion to WECAFC. The project had bases in Panama City, Panama; Kingston, Jamaica; Port of Spain, Trinidad; and Bridgetown, Barbados. Two exploratory fishing vessels contributed by Japan were based in the region: one at Kingston and one at Bridgetown. Mr. Warren Rathjen and Mr. Robert Wolf were BCF/NMFS employees and were provided on loan to head the Barbados project. Dr. Albert Jones and Mr. Donald Wagner participated in cruises on the project vessel *R/V Calamar* at Barbados. Cruises to explore the availability of tunas for support of small-scale fisheries around the islands of the Lesser Antilles were remembered for their scientific results. They also were remembered for the vessel's short, five-foot bunks, obviously built to accommodate smaller bodies.

The International Oceanographic Commission, an organization of the United Nations Educational, Scientific and Cultural Organization (UNESCO), sponsored a project called Cooperative Investigations of the Caribbean and Adjacent Regions (CICAR). CICAR's emphasis was on oceanography and marine biology and complemented other FAO projects in fisheries. Dr. Harris B. Stewart was lead U.S. scientist and the first chairman of CICAR. Center scientists were active in fishery research and participated in and contributed to a CICAR II Symposium held in Caracas, Venezuela, in July 1976. UNESCO published oceanographic papers given at the symposium. Papers on fisheries, aquaculture, and marine biology were published by FAO (FAO Fisheries Report No. 200). As a sequel to CICAR, the International Oceanographic Commission sponsored the IOCARIBE project, which coordinated research programs in oceanography and sea turtle conservation. Mr. Fred Berry, manager of the center's Marine Mammals and Endangered Species Program, organized a Western Atlantic Turtle Symposium in 1978. Country representatives, with financial help from IOCARIBE, prepared documents concerning marine turtles in their country. This was followed in the next year by a successful symposium in San Jose, Costa Rica, and the publication of a major report on sea turtle activities in the region.

Personnel Notes

There were many personnel changes in 1977. Dr. William Richards was appointed Miami Laboratory Director. Ms. Mary Thompson, Deputy Southeast Fisheries Center Director, transferred to the Washington, D.C. Office of Program Planning. Dr. Richard Berry, previously Director of the Shrimp Program at the Galveston Biological Laboratory, accepted the position of Deputy Southeast Fisheries Center Director. Mr. Robert Cummins left to become the Director of the Pascagoula Laboratory. Mr. Rolf Juhl resigned to take a position in the U.S. State Department in Mexico City as Fisheries Attaché. Ms. Muriel Cole, from the Program Planning Division, was appointed as Director of the Administrative Office in Miami.

The NOAA Field Finance Office, headed by Mr. Jack James, was located at the Annex Building of the Miami facility in space previously occupied by the Systematics of Fishes Program and its fish collection. In time, the office was transferred to the NOAA Ship Survey Base on Dodge Island and then transferred to Kansas City, Missouri. Ms. Anne Overby, a field finance employee, joined the fishery service in 1981 and served effectively in the statistics group of the Technical Information Management Service and later the Office of Research Management.

Fishery Management Science Assumes a Major Role

The Fishery Conservation and Management Act of 1976, along with the Endangered Species Act of 1972 and the Marine Mammals Protection Act of 1972, brought major changes to federal research programs and to the Miami Laboratory. They created a focus on the nation's natural resources, their health, and their protection. In the southeast, however, there was a difficult and perplexing situation. A great variety of species supported a number of small-scale fisheries that were geographically spread widely. Fishery research in the region had concentrated on two major large-scale fisheries, shrimp and menhaden, and there was a dearth of biological and life history information concerning most of the remaining regional fisheries. Classical fishery models applicable to fisheries of temperate waters were not immediately applicable to subtropical species, and few population studies were underway. Laboratory scientists, however, were skilled and had experience through former activities with the Atlantic tuna commission (ICCAT) and the FAO regional fishery commission (WECAFC). These experiences would become a foundation for the ensuing years, leading to the development of a center of excellence in fishery science and population biology.

The Middle Years of the Southeast Fisheries Center, 1979-1982

Dr. William W. Fox, Jr. served as the Director of the Southeast Fisheries Center from October 1978 through December 1982. He was an undergraduate and masters degree student at the Institute of Marine Sciences and had worked in the Miami Laboratory as a student assistant analyzing Japanese longline fishery data with Mr. Jack Wise. After receiving his doctorate at the College of Fisheries, University of Washington, he was employed at the Southwest Fishery Center (La Jolla, California) until he was appointed Director of the Southeast Fisheries Center. Dr. Fox was highly respected by his colleagues as a scientist and as a fishery administrator. At the time of his appointment, the center had completed its first years under the new (1976) 200-mile federal jurisdiction. The focus of NMFS was primarily on domestic fisheries. The U.S. tuna industry—no longer particularly interested in the tropical Atlantic—had found promising fishing in the western Pacific and had largely moved to foreign flag operations. In the southeast, agreements with Brazil, Mexico, and Colombia, which had sustained U.S. involvement for several years, had expired.

A principal challenge to the center and Dr. Fox, therefore, was to strengthen technical support for the Magnuson Fishery Conservation and Management Act, Endangered Species Act, Marine Mammals Protection Act, and ICCAT. Dr. Fox recruited scientists experienced in population studies and

experimental statistics. Dr. Michael Parrack, Dr. Scott Nichols, Dr. Susan Brunenmeister, and Ms. Patty Phares transferred from the Galveston Biological Laboratory to the Miami Laboratory to bolster the existing population dynamics team. Dr. Joseph Powers, experienced in porpoise studies at the La Jolla Laboratory, transferred to Miami in 1979, and Mr. James Zweifel, an experimental design statistician, transferred from La Jolla and joined the Technical Information Management Service group. Dr. Gerry Scott and Dr. Nancy Thompson, recent graduates of the University of Rhode Island, joined the staff at Miami to conduct marine mammal and sea turtle research.

Administration

Mr. Ben Jimenez became the Executive Officer and head of Administrative Services during this period. He transferred to Miami from U.S. Customs in San Juan, Puerto Rico. His experience as an officer in the U.S. Army Reserves added to his skills in supervising an orderly and efficient administrative department. He was also an attorney and later entered private practice in Miami. Ms. Susan Sutherland, Ms. Peggy Solomon, Ms. Christy Noble, Ms. Ann Minnus, Ms. Lucy Pasquarella, and Mr. Vaughn Carroll served in administration. Mr. Seymour Mendelssohn served as a management analyst. Mr. Al Harris and Mr. Phil Colon served in building maintenance.

Vessel Operations

After the *R/V Geronimo* and *R/V Undaunted* were transferred, the Miami Laboratory was left without a research vessel, except cruises conducted on vessels based at Pascagoula. In later years, Dr. James Bohnsack, chief of the reef fish team, was successful in procuring the *R/V Charles Darwin* for studies in the Florida Keys. He often hosted groups of visiting dignitaries touring the laboratory and took such opportunities to emphasize that Miami was the only NMFS laboratory without small vessel support. This had its effect, and the needs of the Reef Fish Program were met, first with the *R/V Charles Darwin*, and subsequently with other vessels. Later, the Marine Mammals Program acquired a small craft for research, named the *R/V Tursiops*, which served the need for inshore marine mammal surveys.

Programs and Research Accomplishments

Research was reported in annual reports produced by the center to highlight significant contributions to fishery science and management. Highlighted accomplishments from 1982 illustrate some of the activities during this period:

- Provided analytical support for the U.S.-Canada-Japan tuna negotiations in Miami in 1982.
- Held an international workshop on age determination of oceanic pelagic fishes in 1982.
- Completed the annual Atlantic Bluefin Tuna/ Billfish Sport Fishing Survey.
- Conducted ichthyoplankton surveys to estimate the size of the bluefin tuna spawning population in the Gulf of Mexico. Prepared stock assessment reports for Atlantic bluefin tuna, blue marlin, white marlin, and sailfish for ICCAT meetings.
- Surveyed the emerging bottom longline snapper and grouper fishery in the Gulf of Mexico.
- Conducted experiments on the selectivity of wire fish traps.
- Conducted aerial and ground truth surveys of selected sea turtle nursery beaches and prepared a population estimate of the number of female sea turtles in the southeastern United States.
- Operated the cooperative Sea Turtle Salvage Network and distributed several thousand posters to advertise the toll-free hot line number that allowed scientists to assess the extent of sea turtles found dead or injured along the beaches of the southeastern United States.
- Published a Manual on Sea Turtle Research and Conservation in cooperation with IOCARIBE.
- Estimated the abundance of bottlenose dolphin from aerial sampling surveys in five southeastern areas.
- Used tagging and aerial surveys to study the behavior of bottlenose dolphin in localized inshore areas to determine dynamics of association and define discreteness of local populations.
- Operated an expanded cooperative Southeast Marine Mammal Stranding and Salvage Network, which reported a total of 157 cetaceans representing at least fifteen species.
- Prepared a National Correspondent's Report for the WECAFC Working Party on Assessment of Marine Fishery Resources.
- Operated the State/Federal Statistics Program with participation by seven state agencies.

Reef Fish Studies

Dr. James Bohnsack's team of reef biologists included Mr. Douglas Harper, Mr. David McClellan, Mr. David Sutherland, and Dr. Ausbon Brown. The team conducted studies at Looe Key in the Florida Keys and developed a visual census technique to contrast reef communities where fishing was prohibited to nearby communities where fishing was permitted. In non-fished communities, the species were more diverse and the populations of fish more numerous than in non-fished areas, and the upper food chain species, such as snappers and groupers, were more prominent. These results lent strong support to the developing concept of using marine reserves as a practical method for fishery conservation and management. The concept of marine reserves was vigorously discussed in national and international circles. Dr. Bohnsack presented his ideas and research at a number of meetings and symposia. The fishery management councils cited this research as justification for establishing marine reserves as tools for managing and conserving living marine resources.

Stock Assessment

Stock assessment analyses and population studies were slow to develop in the southeast, primarily because of a paucity of appropriate data. The shrimp fisheries had a sustained production and did not appear to be in trouble. Menhaden fisheries, with only a small number of operators, appeared to be somewhat self-regulating. There were signs of overfishing in other fisheries, but since the fisheries were for the most part small, multi-species fisheries, these signs largely escaped notice. The decades of the 1980s and 1990s, therefore, would prove to be a catch-up period.

Progress in fishery stock assessment was encouraged by ICCAT and later by the Magnuson Fishery Conservation and Management Act. ICCAT was proposed at a conference of plenipotentiaries in Rio de Janeiro in May 1966, and it entered into force in March 1969 with ratification by Spain, the seventh member country. The first ICCAT meeting was held in December 1969 at FAO headquarters in Rome, Italy. Mr. Vasco Valdez (Portugal) was elected chairman of a scientific committee called the Standing Committee on Research and Statistics (SCRS). Mr. J. P. Wise (Miami Laboratory) was appointed convener of a Sub-Committee on Stock Assessment. The work of ICCAT was jump started by an FAO meeting on Atlantic tuna stocks held in Miami in 1968. At this meeting the status of yellowfin, albacore, bluefin, bigeye, and skipjack tuna stocks was discussed. These species were discussed again at the SCRS meeting in Madrid in November 1970. The Sub-Committee on Stock Assessment noted a need to improve catch sampling and encouraged better reporting of catch and effort statistics. To further these

goals, the SCRS established sub-committees on statistics, subpopulation identification, and stock assessment, and scientists from the Miami Laboratory served in various capacities.

A second impetus that promoted population studies was provided by the Fishery Conservation and Management Act. Research at the center was directed by the first two national standards of the act: 1) management based on the best available scientific information, and 2) management for maximum sustained yield, as modified by appropriate economic and social factors to achieve optimum yield. The requirement to determine maximum sustainable yield for stocks in each fishery management plan stimulated data collection and analysis.

By 1981 the laboratory had responded by directing more of its resources to stock assessment, data collection, and supporting biological studies. For science administrators, it was a choice of the proper mix of research at three levels: stock assessment work versus other fishery-related research; balance of stock assessment research among fisheries under the laboratory's responsibility; and level of stock assessment analysis for a particular resource with respect to frequency, precision, and combination of analytical methodologies.

The first Southeast Fisheries Center Stock Assessment Workshop, held in August 1982, was attended by more than fifty people representing state agencies, fishery management councils, and laboratories in the Southeast, Northeast, and Southwest Centers. Dr. Joseph Powers chaired the workshop, and more than thirty stock assessment reports and associated documents were submitted. Working groups were convened for billfish, swordfish and sharks, groundfish and coastal pelagics, marine mammals and sea turtles, menhaden and coastal herrings, reef fish and reef resources, and shrimp. Earlier in the year, a bluefin tuna analyses had been reviewed by a separate group of experts in preparation for submission to the ICCAT Standing Committee on Research and Statistics. Species covered in the workshop and in ICCAT's review represented an extremely diverse set of biological resources and a complexity of stock assessment research that would challenge scientists and resource managers in the southeast.

Economics Research

Under the Fishery Conservation and Management Act, information on fishery economics had comparable importance to biological information, since the goal of management was to maintain the economic health of the fishing industry as well as the biological health of the resource. Early fishery regulations primarily relied on catch limits to improve or maintain the condition of the resource. These sometimes arbitrarily favored particular groups of fishermen at the expense of others. New regulations, therefore, had to be devised to achieve economic and social objectives as well as an equitable distribution among fishermen.

Establishing specific economic objectives in fishery management plans, however, proved elusive. What “optimum yield” meant in practical terms was difficult for fishery management councils to reconcile. Nevertheless, research in the economics of fisheries charged ahead and developed an array of basic economic information needed and plans to collect the data. Mr. John Poffenberger, Mr. Michael Justen, Dr. Patricia Conroy, and Mr. John Ward were staff economists in the Economics and Statistics Office of the center and carried out early work in fishery economics. Later, Mr. Poffenberger would take charge of the Statistics Program for the center. His background in economics and his analytical skills were valuable in successfully developing and implementing new projects in statistics, such as logbook reporting systems for pelagic and reef fish fisheries.

Other economics resources and talents were also available in the southeast. NMFS Southeast Regional Office economists who had been involved in BCF and NMFS marketing programs turned their efforts to natural resource economics. Economists at state universities in Florida, Louisiana, and Texas, and in the South Carolina Department of Natural Resources had active fishery economics research. These conducted studies, through contracts and in-house support that provided economic data for both commercial and recreational fisheries.

Economic decision rules were first incorporated into the Gulf of Mexico Shrimp Fishery Management Plan, and regulations under the plan sought to protect small shrimp until they had grown to a larger size before harvesting. Inshore areas of the Dry Tortugas were closed to fishing year-round to protect small shrimp. Fishing grounds offshore of Texas were closed seasonally (approximately forty-five days in June and early July) to prevent the harvest of small shrimp during the period when they increased rapidly in size and migrated from inshore nursery grounds to offshore. In most years the benefits of the closure were positive in dollar value, because the delayed harvest allowed shrimp to grow to a much larger, more valuable size. Texas closure analyses in succeeding years continued to be useful to quantitatively justify maintaining the regulation. Dr. Scott Nichols and Mr. John Poffenberger were responsible for developing the biological and economic models, respectively.

Statistical Surveys

A Fishery Statistics Plan was published in October 1980 that laid out a comprehensive program for collecting fishery statistics in the region. Emphasis was on a cooperative effort between federal and state governments. This and subsequent plans provided the impetus for gradual improvement in the quality of fishery statistics vital to providing estimates of the condition of the managed stocks.

A primary effort was the development of the State-Federal Cooperative Statistics Program. Both state and federal agencies needed statistical data to manage fishery resources. Of course, it made no sense to duplicate efforts, and neither group had sufficient resources to accomplish the entire job. The intent of the cooperative program, therefore, was to divide responsibility and share information. A congressional appropriation of \$1.6 million was secured with the help of the Gulf States Marine Fisheries Commission, and of this \$1.0 million was directed to state agencies for data collection and \$0.6 million to the center for data processing. The data collection funds were then allocated among the eight southeastern states, Puerto Rico, and the U.S. Virgin Islands according to geographical size of each and the size, extent, and complexity of their fisheries. Data processing funds at the center provided for centralized data processing, storage, and access. Mr. James Zuboy was in charge of the center's Cooperative Statistics Program at this time. Also, Dr. Peter Eldridge of the South Carolina Department of Natural Resources accepted the role to visit each state fishery agency to develop a cooperative statistics agreement tailored to the unique conditions in the state. The objective was to expand the collection of detailed fishery statistics for stock assessment and management and to provide access to current, region-wide fishery statistics. As part of the effort, each state statistics office was provided with a state-of-the-art microcomputer to assist with data processing. With the agreements, personnel, and microcomputers in place, the program was off to an ambitious start. However, the job of entering fishery statistics into a unified database was a formidable task, and it took some time to develop the capability for remote data entry whereby each state could do its own data entry and validation.

In September 1979, Mr. Darrell Tidwell joined the Technical Information Management Service as a computer programmer. He had worked at Miami for the NMFS Galveston Field Station as an undergraduate student, and after completing his degree, he returned to Miami to work at NOAA's Atlantic Oceanographic and Meteorological Laboratory until he accepted a position at the Miami Laboratory. He was later placed in charge of data management and was instrumental in handling data operations for the state-federal statistics program.

The southeast still lacked detailed statistics for most of its fisheries. Mr. James Zweifel, a statistician in the center, spearheaded a plan for a Creel Survey Sampling Project that would collect biological and fishing effort information for population studies. The name of the program was soon changed to the Trip Interview Program, and its goal was to obtain a representative sample of fishing trips with data on total catch by trip, species, and size composition of the catch, and a record of fishing gear used and fishing effort expended. Biological samples for growth, maturity, and fecundity studies would also be obtained. If sampling were truly representative and adequate, even total catches could be estimated in a fishery from a sampling program, obviating the need for a total census of landings. This idea was attractive because of the diversity and widespread nature of the fisheries in the southeast. Thus, the ambitious program was initiated as part of the State-Federal Statistics Program. The Trip Interview Program design was flexible and could be implemented full scale or downsized by conducting certain portions or operating at certain levels. However, it soon proved impractical to conduct sufficient sampling to satisfactorily estimate total catches. Moreover, the fishery management councils required precise measures of landings to manage quotas and would not accept the inherent variability in sample estimates of total landings. Some states (e.g., Texas) already had a recordkeeping system that was a census of total finfish landings by species but lacked effort data. Other states (e.g., Florida, Louisiana and most other southeastern states) inaugurated trip ticket systems that provided a census of finfish landings and some effort data. The Trip Interview Program, however, became the leading sample design and repository for information from biological samples. Also, it provided size composition information on catches which could be associated with time, area, gear, and effort of capture.

Cooperative Studies

A Southeast Sea Turtle Stranding and Salvage Network was conceived and designed as the result of two meetings held in 1979. It would become a cooperative effort among the Southeast Fisheries Center, the Southeast Regional Office, the United States Fish and Wildlife Service, and the Smithsonian Institution. In time the network expanded to include the northern Atlantic states, Puerto Rico and the U.S. Virgin Islands. The network consisted of volunteers who performed regular beach patrols and served as contacts to organize rescue operations for stranded animals.

In the spring and summer (April-September) of 1980, over 1,200 sea turtles were stranded on beaches ranging from northern Florida to Virginia. This was a major concern to biologists and the public alike. At least some of the turtles were accidentally caught in dredging operations. The U.S. Army Corps of Engineers was conducting routine maintenance dredging during those months at the Cape Canaveral Ship

Channel, and sea turtles were vulnerable to capture and death by the hopper dredges. Miami scientists worked with the corps to adjust the dredging schedule to seasons that would minimize turtle mortality.

Several comprehensive reviews of southeastern fishery resources were conducted in this period. In 1980 the Office of Fishery Management organized a Spiny Lobster Workshop. It was a cooperative effort between NMFS, Florida Sea Grant, and Florida Department of Natural Resources. NMFS had collected commercial landing statistics and the other groups had conducted biological studies. Managers had speculated for some time about the magnitude of the recreational catch of spiny lobsters, but they had no quantitative estimates. Many recreational fishermen brought small boats to the Florida Keys for the special two-day recreational fishing season just prior to the opening of the regular season. Dr. Bruce Austin, economist at the University of Miami, Institute of Marine Sciences, spearheaded a project to estimate recreational catches during this special two-day season. Trustee inmates from a nearby Florida state prison served as volunteers, and with sharp eyes they recorded license tag numbers on boat trailers as they passed the single highway entry point to the Florida Keys. Dr. Austin later conducted a post-season mail survey that asked boaters about their fishing practices and the number of lobster caught. The responses, along with the number of boats that had moved to the Keys during this period, allowed the first estimate of the size of the recreational catch.

In addition to the lobster recreational fishery survey in 1980, the Food and Agriculture Organization held a Shrimp Workshop in Key West, Florida, and it brought several world-recognized biologists and ecologists to the meeting. Dr. Michael Parrack and other shrimp biologists from the center presented papers. Also, a Snapper-Grouper Colloquium was convened in Panama City, Florida, in 1980. It was organized by the center and the Gulf States Marine Fisheries Commission to bring together a Gulf-wide body of information on these fishery resources.

Competent librarians and library assistants have always staffed the laboratory's library. The librarians brought dedication and special skills to their duties. Ms. Raissa Maurin served at the beginning of the Tropical Atlantic Biological Laboratory years. She was a former medical librarian at the Veterans Administration and brought professional librarian experience. Ms. Mary Ellen Fabal assisted her. Later, Ms. Elizabeth Leonard, previously the librarian at the Northeast Fisheries Center in Woods Hole, Massachusetts, brought her experience that she had achieved in a fishery-oriented library. Following Miss Leonard's retirement, Ms. Julie Josiek and later Ms. Harriet Corvino continued to provide excellent library services. Dr. James Bohnsack was a perennial member of the library committee, as well as Mr. Wayne Witzell, who often assisted with advice and with help in moving of the heavy collections when shelving needed to be rearranged. Today, library services continue under the leadership of Ms. Maria

Bello. Support from NOAA's centralized library and annual meetings of NOAA librarians resulted in new and enhanced library technologies and capabilities for the employees. Also, the laboratory's library (specializing in fisheries), the AOML library (specializing in oceanography), and the University of Miami Institute of Marine Science library (specializing in general marine sciences) were complementary, providing personnel at the three facilities a broad range of subject materials.

Miami Laboratory Matures and Broadens Its Horizons in New Research Directions

By the early 1980s, the National Marine Fisheries Service (NMFS) had settled into its new responsibilities for resource management. Applied science was the accepted mission, and in this regard the center and laboratory were in line with qualified scientific support to assist the Gulf of Mexico, South Atlantic and Caribbean Fishery Management Councils; the Gulf States and the Atlantic States Marine Fisheries Commissions; and the southeastern states, Puerto Rico, and the U.S. Virgin islands. Scientific information and advice was also provided to NMFS Southeast Regional Office in St. Petersburg, Florida, and to NMFS headquarters in Washington, D.C.—these being primarily occupied with policy, legal, and constituent matters.

As the center and laboratory approached the years leading to the end of the century, stock assessment studies continued to be a major focus, along with supporting biological studies and data collection activities, including new directions in community and ecosystem ecology, habitat requirements, and population biology. In addition, as society increased its appreciation for the need to protect and conserve species at risk—such as marine mammals, sea turtles, and other threatened or endangered marine species—the center placed added emphasis on basic biology, monitoring species population levels, and understanding human-induced sources of mortality, including those associated with fishing gear interactions.

Later Years of the Southeast Fisheries Science Center, 1983-2000

Dr. Fox resigned as Southeast Fisheries Center Director in December 1982 to accept a position as the Director of the Cooperative Institute of Marine and Atmospheric Science (CIMAS) at the University of Miami's Rosenstiel School of Marine and Atmospheric Science (formerly Institute of Marine Sciences). The center and laboratory benefited from his move to CIMAS, since under his direction the level of cooperation between the university and the center would be elevated. Visiting professors, postdoctoral investigators, and special lecturers at CIMAS developed new ideas in fishery science, and university graduate students provided a labor pool for center and laboratory research. In 1992, a Cooperative Unit for Fishery Education and Research (CUFER), with Dr. Joseph Powers as director, also was established at the university and provided education for graduate students in population dynamics, who, in turn, became a potential source for future employees.

While still Center Director, Dr. Fox secured a Senior Scientist position which allowed Dr. William Richards, the Miami Laboratory Director, to resume his full time research on larval fishes. Dr. Albert Jones then served as the Miami Laboratory Director from January 1984 to January 1985. Subsequently, the laboratory was realigned to separate scientific research from activities that supported research. Dr. Jones became head of the new Economics and Statistics Office, which contained the statistics, economics, and data management functions. Dr. Walter Nelson, recruited from the Pascagoula Laboratory, became the Miami Laboratory Director. When Dr. Nelson retired a few years later, Dr. Joseph Powers succeeded him as Laboratory Director. Dr. Jones continued as Director of the Economics and Statistics Office until 1990. That year, supervision of statistical agents under the Economics and Statistics Office was transferred to the individual SEFC laboratories at Beaufort, Charleston, Miami, Pascagoula, and Galveston. The purpose was to integrate data collection with scientific programs in the laboratories, a move to vertically integrate research. The Economics and Statistics Office was renamed the Research Management Division, which retained responsibility for region-wide statistics programs (e.g., logbook programs), center research planning and reporting, coordination with fishery management councils and states, and administrative support for the center and laboratory.

Dr. Richard J. Berry succeeded Dr. Fox as Center Director. He had served as Deputy Center Director under Dr. Fox, and in his new position Dr. Berry kept the center and the laboratory on a steady course. His tenure was marked by gains in the center's capability to meet responsibilities on schedule. The center and laboratory had done well in moving from a basic science research mode to an applied science, information-delivery mode, and his dedicated direction played an important role in this transition. Laboratory research, as before, continued to be guided by the needs of the fishery management councils, the Endangered Species Act, and the Marine Mammals Protection Act. During this period, Dr. Nancy Thompson directed the Sea Turtle Research Program, and Dr. Gerry Scott directed the Marine Mammals Program. Both programs conducted synoptic surveys using research vessels and aircraft that enabled researchers to estimate population numbers in marine waters of the region.

In 1985, the laboratory was reorganized into two research divisions: the Coastal Fishery Resources Division and the Oceanic Fishery Resources Division. These managed programs for Reef Resources, Protected Species, and Oceanic Pelagics. Responsibility for economics research, statistics, and data management remained with the Economics and Statistics Office. The Coastal Fisheries Resources Division was responsible for all center coastal stock assessments except menhaden, which was accomplished at the Beaufort Laboratory. Research projects included population dynamics, environmental interaction, and management systems for shrimp, coastal pelagics (mackerels), reef resources, marine mammals, and sea turtles. Studies included the distribution and abundance of

ichthyoplankton in the Gulf of Mexico and the ecology and dynamics of coral reef fish species of the southeast Florida coast.

The Oceanic Fisheries Resources Division studied Atlantic tunas, billfishes, swordfish, and sharks, and managed the Oceanic Pelagics Program. The division was vertically integrated to give the program greater flexibility and to allow a more rapid response to changing situations in these fisheries (i.e., increasing involvement of the fishery management councils and requests for assistance from the NMFS Northeast Regional Office regarding management of bluefin tuna). These situations required greater attention than the requirements of ICCAT alone. The Oceanic Fishery Resources Division conducted population, statistical, and ecological assessments of billfishes, tunas, and swordfish. Major efforts included tournament and dockside sampling for catch, effort, and biological data on billfish, a cooperative billfish-tagging program with recreational fishermen, and studies of the growth of billfishes and bluefin tuna.

The assessment capabilities of the laboratory improved through the development of its staff. Dr. John Hoey, a scientist with experience in the swordfish fishery in the northeast, was hired to work on oceanic pelagics. Mr. Ray Conser transferred to the Northeast Fisheries Science Center and was replaced by Dr. Philip Goodyear. Mr. Mike Parrack took leave to pursue graduate studies at the University of Washington, College of Fisheries, and later returned to the center.

Dr. Berry was appointed director of the Northwest Fisheries Science Center in Seattle, Washington, in 1985, and Dr. Bradford Brown was named to succeed him as Southeast Fisheries Center Director. Dr. Brown had served as Dr. Berry's deputy, and under his direction work at the laboratory continued to emphasize stock assessments. Dr. Powers was appointed to a Senior Scientist position. This allowed him to focus on stock assessment research and to serve as the center's reviewer of stock assessment reports. By this time, assessment reports were being prepared at Beaufort and Galveston as well as at Miami, and Dr. Powers provided guidance that ensured that all work passed scientific muster. He was then elected Chairman of ICCAT's Standing Committee for Research and Statistics in 1997 and served in that role for four years.

The laboratory was now functioning without a director. Dr. Nancy Thompson managed the Coastal Fisheries Program and Dr. Gerry Scott managed the Oceanic Fisheries Program. Dr. Brown was a hands-on manager and met often with Dr. Thompson and Dr. Scott and their staffs to deal with day-to-day issues. Hurricane Andrew, a category-5 hurricane, made landfall just south of Miami in August, 1992, and although the buildings at the laboratory were only slightly damaged, many of its staff experienced

catastrophic losses of homes and property. The laboratory served as a communications center and a base to direct assistance for many weeks. Dr. Thompson and Dr. Scott played central roles in directing relief efforts and in coordinating assistance to impacted employees.

By 1997 the organizational structure of the center and the laboratory had not changed for over eight years. Changing needs and new responsibilities again required realignments, many of these designed to better interact with NMFS headquarters in Silver Spring, Maryland. The laboratory was replaced with two research divisions: Sustainable Fisheries, under Dr. Gerry Scott; and Protected Resources and Biodiversity, under Dr. Dr. Steven Swartz. Dr. Swartz transferred from headquarters to take the position and brought marine mammal research expertise as well as experience gained while working for the Office of Protected Resources. Dr. Nancy Thompson became Deputy Center Director and was able to make the successful transition from fishery biologist to science administrator, a change often difficult for many professional scientists.

The Protected Resources and Biodiversity Division subsumed the research programs of the previous Coastal Resources Division along with Marine Mammal responsibilities. Shortly after the new division was formed, Ms. Sheryan Epperly transferred from the Beaufort Laboratory to head the Sea Turtle Research Program.

The Sustainable Fisheries Division included the stock assessment responsibilities of the former Oceanic Fisheries Resources Division, as well as the fishery statistics group, which consisted of Mr. Guy Davenport and port agents throughout the region. Additional assessment personnel were assigned to the division, including Ms. Patty Phares and Mr. Mike Schirripa, along with the Migratory Fisheries Biology Program under Dr. Eric Prince.

The Research Management Division was divided into two new entities: a Science Planning and Coordination office, and an Operations, Management, and Information office. Science Planning continued under Dr. Albert Jones until his retirement in early 1998. Mr. Alex Chester moved to Miami from the Beaufort Laboratory in January 1998 to take the position vacated by Dr. Jones. The Operations, Management, and Information office consisted of two groups: Administration under Ms. Rosetta Lima, and Information Technology first under Ms. MaryAnne Camp, and later Mr. Charles Lavarini.

Administration

Ms. Susan Sutherland, who served as chief of administrative services after Mr. Ben Jimenez resigned, accepted a position in 1986 at NOAA headquarters in Washington, D.C. Her husband, Mr. David Sutherland, transferred at the same time to the NMFS Statistics Office in Silver Spring, Maryland. Administrative services then began a long period under the direction of Ms. Peggy Solomon. She was assisted by Ms. Dorothy Hill (budget), Ms. Cathy Steward (personnel), Ms. Molly Elliott (purchasing), Ms. Jean Smith (administrative), and Mr. Vaughn Carroll (office assistant). Ms. Solomon had extensive knowledge of the center's budget and managed the complex task of balancing numerous fiscal accounts under frequently shifting allocations. Often the budget for the center and laboratories was not certain until well into the new fiscal year, since initial allocations were often late and funds were sometimes increased or withdrawn by NMFS headquarters, depending on priorities or restrictions at the national level.

Ms. Jean Smith and Ms. Cathy Steward eventually transferred to administrative positions at AOML. Ms. Dorothy Hill retired, and Ms. Peggy Solomon transferred in 1997 to the NMFS Southeast Regional Office. Ms. Rosetta Lima transferred from NOAA headquarters, where she had budget experience at the national level, to serve as head of Administrative Services. She was assisted by Ms. Charlotte Kijek-Stevens, budget analyst; Ms. Elizabeth Perez, purchasing agent; Ms. Lourdes LeBroc, administrative assistant; and Mr. Vaughn Carroll, office assistant. Together, they met the administrative needs of the center and research divisions during this period of transition.

Mr. Jeff Willoughby and Mr. David Senn handled maintenance operations and were later joined by Mr. Juan Carlos Orellana. Mr. Willoughby was formerly with the Miami Police Department and Mr. Senn previously worked in the Administrative Services branch of AOML. But by now the Miami facility buildings were showing their age, and Mr. Willoughby and Mr. Senn brought professional skills to the front, and as funds became available, they oversaw renovations and a general refurbishing of the buildings and grounds. During the 1990s, the importance of environmental compliance and employee health and safety was elevated to a high level by NOAA. Mr. Willoughby ably performed the duties of safety coordinator, and Mr. Kimrey Newlin took the lead in ensuring that scientists were trained in the use and disposal of potentially harmful chemicals. In 1998 Mr. Bob Walker accepted these responsibilities.

NOAA Corps officers had various assignments at the center and laboratory, and some officers provided staff support to the center director's office. Mr. Frank Arbusto took on this assignment in 1991 with a philosophy that no problem was too difficult to solve, and he provided able assistance in this regard.

During the early years of the laboratory, Mr. Grady Reinert served as scientific illustrator. Later, the staff at the AOML provided illustrating and drafting services for the center. Mr. Andrew Ramsay at AOML, a former marine technician at the Tropical Atlantic Biological Laboratory, provided photographic services. Eventually, Mr. Jack Javech, a talented scientific illustrator, was hired at the Miami Laboratory to assist, among his other duties, in preparing scientific illustrations of larval fishes for Dr. Richards' ichthyoplankton research.

Information technology continued to grow in importance as fishery scientists became more reliant on electronic means for data storage, analysis, model building, and communication. Mirroring the information technology revolution that occurred during this period, the center shifted its data processing emphasis from large, single mainframe computers in the early 1980s to a system of networked microcomputers. Ms. MaryAnne Camp led the information technology group and she was assisted by software specialists, Mr. Carl Kinerd, Mr. Lloyd Muccio, Mr. Ken Zinniger, Mr. Lee Weinberger, and Ms. Susan Molina; and hardware specialists, Mr. Stuart Smith, Mr. Howard Shirley, Mr. Mal Brassfield, and Mr. John Holzman.

Vessel Operations

Using the *R/V Oregon II* for surveys the Gulf of Mexico, the Marine Mammals Program assembled data to make initial population estimates of marine mammal populations in the southeastern United States. In addition, the Marine Mammals Program acquired the *R/V Tursiops*, a small vessel for use in Biscayne Bay and other inshore waters along the eastern coast of Florida, and it was employed to study the use of photography to identify individual bottlenose dolphin (*Tursiops truncatus*).

In August 1998, the center obtained a second large vessel, a former Navy vessel that was rechristened the *R/V Gordon Gunter*. The 224-foot vessel was named for Dr. Gordon Gunter for a well-know marine biologist and educator who worked in the northern Gulf of Mexico area for many years. The ship was based at the Pascagoula Laboratory.

Fishery Management

Fishery management plans were being adopted by fishery management councils and implemented by NMFS in increasing numbers, all of which called for increased attention of center and laboratory staffs. Plans for coastal pelagics and snapper and grouper in the south Atlantic were implemented in 1983, and plans for reef fish and coral in the Gulf of Mexico were implemented in 1984. The fishery management plan for mackerels initially set maximum sustainable yield at 37.0 million pounds for king mackerel, but a revised stock assessment with new information lowered maximum sustainable yield to 26.2 million pounds. Moreover, tagging data indicated that there were two king mackerel groups: one Atlantic group that was being underfished and another Gulf of Mexico group that was being overfished. Elimination of overfishing became the principal requirement to help in restoring king mackerel resources to a level of maximum sustainable yield. Catch quotas were implemented to reduce overfishing, and they became a contentious issue among recreational and commercial fishermen as well as among various gear-type fisheries. In addition, catch quotas required close monitoring by NMFS to assure that quotas were not exceeded. Ultimately these management measures succeeded in reducing overfishing and rebuilding the stocks to healthier levels.

Reef Fish Studies

Reef fish were a prominent part of research programs at Miami. Dr. Richards' studies on larval fishes included snappers and groupers, and in the 1990s he began intensive efforts to plan and execute a projected monograph on larval fishes of the western-central Atlantic Ocean. Dr. Richards compiled basin-wide information on the egg, larva, and early juvenile stages of fishes and took the lead in bringing the publication to fruition. It was published in August 2005 by CRC Press as a two-volume set of more than 2,500 pages and was titled, "Early Stages of Atlantic Fishes: An Identification Guide for the Western Central North Atlantic."

Dr. Bohnsack continued to evaluate the efficacy of marine protected areas as innovative techniques to enhance and protect marine biodiversity and to supplement existing fishery management strategies. Stock dynamics of reef fish were studied by monitoring communities of several reefs, by experimentally removing predators, and by mathematical modeling. Communities on several reefs near Miami were visually monitored to determine species present, abundance, and size. Data were collected for a multi-species analysis of the potential impact of offshore oil development on sizes and species of reef fishes. And investigations at Looe Key National Marine Sanctuary demonstrated that fishing significantly altered species-habitat associations as well as size and abundance patterns.

Biological studies provided basic information for developing management strategies for the severely depleted species of goliath grouper and Nassau grouper. Both had ceased to be part of the commercial fishery, and recreational catches were exceedingly low. Life history information was meager until Dr. Ann Marie Eklund initiated studies to document the life history and habits of both species. Catch restrictions followed and reports from fishermen and divers indicated that the goliath grouper population was beginning to recover. Dr. Stephania Bolden conducted a study of Nassau grouper in the Exumas, Bahamas and tagged Nassau grouper with acoustic tags to track their movements and home ranges. Several expeditions were made to the Bahamas, each involving the assembly and transport of dive and acoustic equipment. The complexities of operating in a remote location were surmounted, and hitherto unknown habits and behavior of the species were uncovered and proved to be useful in management. A study of Nassau grouper spawning aggregations off Long Island, Bahamas, was initiated by Dr. Eklund and Ms. Jennifer Schull, and a black grouper project at Carysfort Reef, Florida, was undertaken by Dr. Eklund.

Oceanic Pelagic Studies

The Oceanic Gamefish Program, directed by Dr. Eric Prince and assisted by Dr. Mark Farber, sponsored an international symposium on billfish and conducted pioneering work with acoustic tags on bluefin tuna. In addition, historical records at taxidermy shops provided valuable records of fish sizes. Annual reports of the cooperative tagging program informed fishermen of the numbers of fish tagged and recovered, along with the results of associated research. Mr. Ed Scott, who sampled many tournaments in the early years of the program, was in charge of the Gamefish Tagging Program. Mr. Michael Judge also sampled tournaments, and later took charge of the Gamefish Tagging Program.

Migrations of bluefin tuna had long been the subject of tagging studies. Information from the recovery of a tagged fish, however, revealed only the individual sizes, locations, and times of tagging and recovery. It showed nothing about events in between. Dr. Prince, along with investigators from Hopkins Marine Station, Pacific Grove, California, began using tags that periodically recorded location and other information. The investigators experimented with permanently placed internal tags and with external pop-up tags that would release after a certain time period, rise to the surface, and transmit stored data to a satellite. Dr. Prince realized it would not be easy to capture and control a several hundred pound adult bluefin tuna long enough to apply a tag and release the animal in a viable condition; nevertheless, he discovered that a captured bluefin tuna was surprisingly calm if its eyes were covered with a towel. Working quickly to surgically implant the tags, bluefin tuna were tagged with the special tags and

released. Initial results were encouraging and researchers waited anxiously for recoveries that would yield valuable information on the travel routes each animal had taken.

The laboratory began an Observer Program in 1992 to monitor the bycatch of the U.S. swordfish longline fishery. Mr. Dennis Lee, assisted by Ms. Cheryl Brown, led this effort and arranged with vessel captains to carry a NMFS observer onboard. He also arranged logistical and administrative matters and supervised collection and management of the reported data. Information on bycatch, necessary for stock assessment calculations, had previously not been reported. The Observer Program provided critical information to determine the condition of Atlantic swordfish stocks. As interest in bycatch increased among other scientists and the general public, the program, as well as other observer-based sampling programs, provided increasingly valuable and relevant information for the management of target and non-target species.

Protected Species Studies

Special protections were mandated under the Endangered Species Act or the Marine Mammal Protection Act for at least twelve species of sea turtles, whales, and fishes in the southeast. Consequently, several efforts were instituted by the center to promote species protection, research, and population recovery. These included the Sea Turtle Stranding and Salvage Network, the monitoring of sea turtle nesting beaches, the use of Turtle Excluder Devices (TEDs) in shrimp trawls, and public education. Often one would see laboratory scientists, Ms. Barbara Schroeder or Ms. Wendy Teas, conducting sea turtle nesting surveys along Virginia Key beaches. In addition, Mr. Wayne Witzell made visits to the endangered Kemp's ridley sea turtle nesting beach at Rancho Nuevo, Mexico, to help study, monitor, and safeguard nesting females along with their eggs and hatchlings. He also undertook a major field operation to study the population, health, and migration of juvenile Kemp's ridley sea turtles in the Ten Thousand Islands area of southwestern Florida.

In the late 1980s, many Caribbean and South American countries were interested in sea turtle conservation, and thirty-five of the existing thirty-eight countries participated in a Western Atlantic Turtle Symposium organized by the Southeast Fisheries Center. Together, they shared reports and ideas for the conservation and protection of sea turtle populations, and they produced several products that included a report titled, *U.S. National Report for the Western Atlantic Turtle Symposium*, a manual of sea turtle research and conservation techniques, and a computerized information data base.

To better understand the distribution and abundance of sea turtles, surveys using aircraft were conducted for a series of years over nesting beaches during the sea turtle nesting season. Quarterly surveys over a three-year period from Cape Hatteras, North Carolina, to Key Biscayne, Florida, along with ground-truth sampling were used to estimate population abundance. They also yielded an index of relative abundance of sea turtles that was especially significant for calibrating stock assessment models. Vessel surveys of sea turtles were also made in the Cape Canaveral Channel to locate sea turtles prior to the start of dredging operations.

Laboratory biologists were often called to respond to reports of stranded marine mammals. They assisted with technical advice, collection of pertinent information on the stranding, and necropsies of dead animals. At times, stranded, live marine mammals were transferred to the laboratory pond where they would be attended by volunteers and scientists twenty-four hours a day in hopes of recovery and release. Studies of marine mammals were conducted for inshore and offshore populations of bottlenose dolphins and larger cetaceans, and those studies reported a surprisingly large number of species in southeastern U.S. waters. Laboratory scientists also carried out studies on the behavior and dynamics of bottlenose dolphin in Biscayne Bay. In this research, Ms. Blair Mase and Mr. Joseph Contillo photographed and learned to recognize individual dolphins from their unique fin and body shapes and scars.

Aerial sampling surveys for estimating the abundance of bottlenose dolphin in Pensacola and Choctawhatchee Bays, Florida, and in Port Royal and St. Helena Sounds, South Carolina, were undertaken in 1983. These were the last of the priority inshore sampling areas in the southeast where live-capture quota recommendations needed to be established. These surveys were followed by a second phase of studies to obtain seasonal data for regional density and abundance estimates. In these studies, estimates of seasonal abundance were conducted of bottlenose dolphin in the waters surrounding Key West, Pensacola, and Choctawhatchee Bay, Florida; in Timbalier and Terrebonne Bays, Louisiana; and in Port Royal and St. Helena Sounds, South Carolina. These estimates, along with those completed in previous years for other priority areas, were used to develop management recommendations for the live-capture fishery for dolphins.

Aerial surveys off Cape Hatteras and boat-based surveys of cryogenically marked bottlenose dolphin in Mississippi Sound and in the Indian and Banana Rivers were used to analyze animal length frequencies and to describe local herd biodynamics. These efforts were particularly important in light of the severe die-off of bottlenose dolphins in the late 1980s. Information derived through this research contributed to the stock being classified as “depleted” under the Marine Mammal Protection Act.

South Florida Ecosystem Studies

The Miami Laboratory, in coordination with AOML and the Florida Keys National Marine Sanctuary, became a key player in NOAA's efforts to study the potential impacts of Everglades' restoration on living marine resources in coastal waters and adjacent coral reefs. The Florida Everglades had been a national environmental priority since the Department of the Interior intervened in the proposed enlargement of the Miami Jetport. Now federal agencies and the State of Florida were given the added governmental role of developing a plan to restore a large south Florida environment drastically altered decades earlier by the draining of wetlands for modification of natural water flows. Dr. Bradford Brown represented the National Marine Fisheries Service on the federal task force, and Dr. Joan Browder and Ms. Carole Goodyear, both ecologists, represented the center and the laboratory at numerous meetings during which a recovery plan was developed, and they ably represented NMFS on teams that included individuals from the United States Army Corps of Engineers, United States Geological Survey, and state agencies. New funding to study the possible effects of changed fresh water runoff patterns became available and fueled important research within the center and by several cooperating universities. In this Dr. Nancy Thompson served to direct the overall research program for the center and oversaw the development of a cooperative, peer-reviewed proposal process.

Stock Assessment

Laboratory assessment scientists faced a number of fishery crises at the beginning of the 1990s:

- Fishing mortality on Atlantic swordfish was excessive. Over a ten-year period the spawning biomass of swordfish and the percentage of older fish in the population had declined substantially.
- Blue marlin and white marlin were believed to be at or near the point of full exploitation. Blue marlin was beginning a recovery from the excessive catches (principally longline) in the 1960s and mid-1970s. However, these species faced increasing mortality associated with the escalating yellowfin tuna longline fishery in the Gulf of Mexico and increased swordfish longline fishing in the Caribbean Sea.
- Mackerel stocks appeared to be recovering from earlier overfishing. Gulf populations of king mackerel had been managed under a rebuilding program since August 1985. By 1988 the spawning stock biomass had shown some gains and recruitment was stable. Rebuilding programs for Spanish mackerel began in July 1987 and by 1988 there were signs of recovery.

- Red drum were believed to be heavily overfished prior to moving offshore to spawn since fish less than twelve years of age were poorly represented in the offshore spawning population. Continued harvesting of adults would further reduce the spawning stock and increase the risk of a collapse of the red drum fishery.
- Red snapper, the most important species in the Gulf reef fish complex, were determined to be severely overfished from both directed and bycatch fisheries. This species was considered to be in worse condition than red drum when that fishery was closed to all further harvest in the Exclusive Economic Zone.

Laboratory scientists made steady improvements in stock assessment methodologies and gained respect with the councils, ICCAT, and others. Notable among these scientists were Dr. Philip C. Goodyear, Dr. Joseph Powers, Dr. Gerry Scott, Dr. Michael Prager, Dr. Michael Parrack, Dr. Steve Turner, Dr. Christopher LeGault, Dr. Michael Schirippa, Dr. Clay Porch, Dr. Mauricio Ortiz, Dr. Craig Brown, and Ms. Nancie Cummings. Several of these investigators were products of the CIMAS academic partnership. When the shark fisheries appeared to be overfishing stocks severely, center director Dr. Bradford Brown realized that the available biological information was insufficient to support the needed stock assessments. In response, he recruited a noted shark biologist, Dr. Jose Castro, to begin a Shark Biology Program. Dr. Castro's studies of basic shark life history added information that was useful in shark assessments that began to restore the overfished stocks.

Over the years major assessments were completed for king and Spanish mackerels, red snapper, red grouper, and gag. These were then updated as new data became available. Other assessments, less rigorous because of scanty data, were completed for greater amberjack and cobia. The management of king mackerel was a success story in the southeast, and the improvement in the recovery of mackerel stocks through research, assessment, and decreased fishing effort was held up as a model.

Statistics and Economics

The statistics and data management groups had been operating under the Technical Information Management Service umbrella since 1977. Mr. H. Erich Groess left in 1981 and was replaced by Mr. James Zuboy. A significant accomplishment during this period was the establishment and development of the State-Federal Statistics Program. Mr. John Poffenberger, resource economist at the center, later became head of statistics. He led the statistics group and was responsible for many of its major accomplishments over the years. The mackerel fisheries were monitored by quota. Collection and reporting of real time catch data were the responsibilities of Mr. Poffenberger, Mr. Ernest Snell, and the

staff of port agents. Mr. Poffenberger and Mr. Snell maintained close contact with port agents and wholesale fish dealers during the mackerel fishing seasons. They monitored catches weekly and alerted the NMFS Regional Office when they expected that the quota would be reached. Laboratory staff assisted as observers aboard mackerel purse seine vessels. Fishing success for mackerel depended on weather which was highly variable; nevertheless, careful monitoring and the advice given to fishery managers were on target and quotas were never exceeded. Mr. Guy Davenport supervised the federal port agents in Florida and later directed federal port agents for the entire region.

Reef fish and Swordfish Logbook Programs were developed and operated by Mr. Poffenberger and his statistics staff. Both programs provided valuable data for stock assessment scientists evaluating reef fish and swordfish fisheries. Ms. Maria Llaneras, Ms. Laura Bishop, Ms. Vickie Williams and others recorded incoming data, and Dr. Jean Cramer assisted with scientific and technical aspects of the Swordfish Logbook Program.

Research Management

The Research Management Division prepared annual research plans for the center and laboratory to meet constituents' needs. The laboratory was a major contributor of stock assessment information for fishery management councils, ICCAT, the Marine Mammals Commission, and organizations associated with the Endangered Species Act. Each year the division met with the staffs of the southeast fishery management councils and other constituents to determine information requirements. They then attempted to match the center's resources and capabilities with those needs. Laboratory directors, under guidance from the division, then prepared written project statements, setting out objectives, procedures, and schedules for each research project. These became "contracts" between project leaders and science administrators. Project statements also became the basic information documents for preparing and submitting operational information in response to numerous administrative requests from regional and headquarters offices. Using the project statements, scientific staffs were spared many hours of diversion from their principal work by submitting pertinent information in project reports only once per year.

The Fishery Conservation and Management Act continued to receive attention from the United States Congress. Their actions affected policy, programs, and activities at the center and laboratory levels of NMFS. By the mid 1990s, the act had been renamed the Magnuson-Stevens Fishery Conservation and Management Act. In 1996, an amendment (the Sustainable Fisheries Act) required NMFS to develop and publish a five-year strategic plan for fisheries research. This was an opportunity for scientists in NMFS to express their views and influence the direction of NMFS research programs. Likewise, it was an

opportunity for the citizens of the country to make their concerns better known to those managing and conducting the scientific research. The Sustainable Fisheries Act established new biomass-based definitions of “overfished” and “overfishing” which presented new stock assessment challenges and data collection needs. It also changed the basis of fishery management for the region and the nation.

The NMFS Strategic Plan for Fisheries Research was published in 1998. In a sense, it brought public attention to a long series of internal planning activities and documents within the NMFS organization. Almost each new directorship within NMFS had initiated some sort of “new plan.” These planning documents forced changes for a time, but often were forgotten or possibly found a place on a dusty bookshelf where they were of historical interest only.

A Management Information System was initiated by the NMFS headquarters in the mid 1990s to apply the tools of information technology to the management of science within NMFS. Research in NMFS was diverse and complex, and while center and laboratory directors had a hands-on feel for the research processes, it was difficult for fishery administrators at the national level to grasp the total picture of how research funds were spent and how to measure the effectiveness of existing research. The Management Information System attempted to provide this information to managers at the national level. Laboratory project leaders and program managers entered data on personnel, funding, objective, constituents, and relation to national goals and objectives of the NMFS Strategic Plan. This produced a rather voluminous information base that allowed managers to gain a better knowledge and appreciation for the diversity and complexity of fishery science research within the agency.

Organizational and Personnel Changes

As the end of the 1990s approached, Dr. Brown stepped down as center director and took a position as SEFSC Senior Scientist, with special responsibilities for IOCARIBE coordination, the United Nations Large Marine Ecosystem Program, and for input to the NMFS’s Equal Employment Opportunity and Diversity initiatives. In his place, Dr. Nancy Thompson was named as the Acting Center Director. The center was in capable hands and research at Miami was flourishing. In the relatively short space of thirty-five years, the Miami Laboratory as part of the Southeast Fisheries Science Center had established itself among the top fishery laboratories in the world in the quality and scientific credibility of its analyses and the development of new scientific assessment methodologies.

A New Century

The millennial change saw the center well situated to take advantage of important new research directions and opportunities. Dr. Nancy Thompson was officially named Southeast Fisheries Science Center Director in 2001. She selected Mr. Alex Chester as Deputy Director. High on their priority list was a renewed attention to the partnership functions of the southeastern fishery management councils, fishery commissions, states, and NMFS Southeast Regional Office.

The Current Years, 2000- 2005

As interest in fishery management issues broadened throughout society and as new interest groups became familiar with the management process, fishery regulations and their underlying scientific basis became even more controversial. Over time the process became heated, and nationwide NMFS came under increasing criticism and pressure, evidenced by an accelerating number of lawsuits. In the southeast region, legal action tended to focus on endangered species issues (for example, TED requirements for shrimp trawls) and habitat issues (essential fish habitat definitions), but it also included challenges to more traditional catch and effort limits on various finfish species. Science was not immune to scrutiny by the various fishing and environmental interests. Dr. Thompson recognized the need to increase the openness of scientific discussion and debate, as well as to broaden participation beyond NMFS in the preparation and review of regional stock assessments.

Taking the Northeast Fishery Science Center's process for conducting stock assessments as a model, and combining that with her experience conducting assessments through Turtle Expert Working Groups, Dr. Thompson collaborated with personnel of the Southeast Fisheries Science Center, the NMFS Southeast Regional Office, and the three fishery management councils in the southeast to develop the Southeast Data, Assessment and Review (SEDAR) process. Each SEDAR assessment cycle consisted of three workshops: first, a data workshop to discuss the kinds and qualities of data available from various sources (state, federal, university, etc.) and to recommend assessment strategies; second, an assessment workshop to discuss and develop various assessment methods and results; and third, a review workshop to assess the assessment and make recommendations. Each workshop was attended by various subject matter experts, including representatives of the fishing industry and environmental groups, and was chaired by an independent scientist. Workshops were open to the public, and results were disseminated in the form of written reports provided to the councils and to the public via the Internet. Overall, SEDAR made stock assessments more labor intensive and more formal, but the results were better accepted by managers and stakeholders.

The new century was characterized by exciting research possibilities and opportunities to enhance ongoing work. Examples included new responsibilities in economics and social science research, a renewed focus on coral reefs and coral reef communities, enhanced stock assessment capabilities, expanded observer programs, greater emphasis on bycatch problems and solutions, programs to engage regional fishing industry groups and individuals in cooperative research partnerships, and environmental challenges associated with the development of liquid natural gas terminals in the Gulf of Mexico. In addition, the center continued to expand its role to promote the attraction of talented students interested in fishery science and stock assessment to various academic institutions, including those which historically served the Hispanic and Black communities.

Besides the director and deputy director, the following people served in the Southeast Fisheries Science Center Directorate: Ms. Sophia Howard (administrative assistant and Freedom of Information Act Coordinator), Dr. Michael Parrack (stock assessment methodology), Dr. James Berkson (Virginia Tech Cooperative Unit), Dr. Joseph Powers (chief stock assessment scientist), and Ms. Essie Duffie (outreach and minority serving institution coordinator).

Operations Management and Information

The new administration in Washington, D.C., placed a greater emphasis on improving the management of federal agencies. Understandably, the center was very much a part of NOAA's efforts to restructure administrative services, to improve the flow and use of information and information technology, to reaffirm workplace health and safety as the highest priority, and to significantly expand and strengthen the role of strategic planning. Needless to say, the added responsibilities put increased burdens on the Office of Management Information staff and resources, and once in a while some after-hours complaints may have been uttered. Nonetheless, the staff pitched in and somehow always seemed to get the job done.

This new period opened with Ms. Rosetta Lima as the chief of the administrative unit. During these years, the budget staff was consumed with a transitioning to a major new Department of Commerce software system. Help was desperately needed, and Ms. Isabel Holder was hired from the United States Navy in 2002 to fill the position of lead budget analyst. Ms. Holder brought incredible energy and dedication to the job, and when Ms. Lima retired late in 2003, Ms. Holder was named to head up administration. Around this same time, longtime center librarian, Ms. Harriet Corvino, retired, and the center replaced her with Ms. Maria Bello. Ms. Bello was familiar with the NOAA library system and made important strides to digitize center research products and to improve access to electronic journals.

In the area of environmental compliance and safety, Mr. Dan Poulos joined the staff and soon made important advancements in Miami and at other center laboratories.

Late in 2000, Mr. Charles Lavarini retired and was replaced by Ms. Susan Molina as Chief of Information Technology. Rapid increases in computer technology, so apparent through the 1980s and 1990s, did not abate. The new century saw the information technology group poised to take advantage of the new opportunities in website development, on-line data entry and storage, geographical information systems, advanced database designs, etc. As information technology professionals retired or moved to other jobs, the group was able to hire several new employees, including Ms. Adrianna Senna, Mr. Loyd Darby, Mr. Patrick Cope, Mr. Tyree Davis, Mr. Carlos Rivero, and Mr. Patrick Gilles.

The Science Planning and Coordination Office experienced its share of changes as well. Dr. Peter Thompson came from the Environmental Protection Agency on a detail and soon impressed everyone with his formal planning skills and ability to articulate strategic concepts. He was a leader and key catalyst in the production of several strategic research documents, including the coral reef and billfish plans. After significant coral reef funding was received, he was assigned to manage the southeast program and guided it successfully through its first few years. He replaced Mr. Alex Chester as Planning Chief in 2002. Shortly afterwards, Dr. Theo Brainerd, arrived at the center to complete a NOAA Leadership Competencies Development Program managing the Coral Reef Program. He liked Miami so much that when a position opened as coral reef manager, he applied and joined the planning group. Longtime member Mr. Kimrey Newlin retired in 2005 and was replaced by Ms. Jennifer Schull.

The increased complexity and agency concentration on Office of Management Information functions soon lead headquarters to suggest that centers and regional officers consider elevating it to full divisional status. Dr. Nancy Thompson was an early and eager supporter of this structural approach, and in 2005 named Dr. Peter Thompson to head up the new division, which included administration, information technology, and science planning.

Economics and Social Science

By the late 1990s, most economics expertise in the southeast was located at the NMFS Southeast Regional Office in St. Petersburg, Florida. The staff was unable to meet the rapidly expanding requirements for economics and social science analysis mandated under the Magnuson-Stevens Act, particularly in light of the increased number of fishery management plan amendments and associated regulatory options. This was true throughout the country, and headquarters was successful in convincing Congress to significantly expand agency programs in these areas. In the southeast, the decision was made

to establish a new social science research group under the center directorate. Dr. James Waters of the Beaufort Laboratory was selected to lead the proposed group. His first assignments were to develop an economics research plan and to begin filling the newly established positions. Through hard work, he was able to hire three talented, recent economists: Dr. Juan Agar, Dr. David Carter, and Dr. Larry Perruso. They rapidly made progress in developing research programs, taking advantage of funds available from headquarters and through the Coral Reef Program, and providing support to the NMFS Southeast Regional Office in the area of amendment review and economics assessment. The group also was able to hire an anthropologist, Dr. Brent Stoffle, who is experienced in characterizing fishing communities and evaluating effects of fishery regulation.

Protected Resources and Biodiversity Division

Dr. Steven Swartz left the center in 2003 to accept a position in the headquarters office of Science and Technology working on NOAA's new PPBES (Planning, Programming, Budget, and Evaluation System). He was replaced in 2004 by Dr. James Bohnsack, former team leader for biodiversity and coral reef studies. At this time the division comprised several teams: Marine Mammals, Sea Turtles, South Florida Ecosystems, Coral Reef Unit, and Early Life History. The following descriptions are a sampling of important new projects concerning protected species and coral reef resources inaugurated during the past five years.

Protected Resources

The marine mammal group under Dr. Lance Garrison successfully participated in several new programs, including the highly publicized effort to rescue the critically-endangered right whale from extinction. These cetaceans migrate southward to wintertime breeding grounds off Georgia and northern Florida. They are highly susceptible to ship strikes, and Dr. Garrison and his group worked to understand patterns of seasonal migration and helped to develop methods to reduce fatal collisions. In addition, as part of the agency effort to reduce mortality associated with fishing operations, comprehensive research was conducted on bottlenose dolphin stocks in the Gulf of Mexico and western North Atlantic Ocean. Bottlenose dolphin research has long been an important focus of research in the southeast, and over the past two years this work was recognized in the form of solid commitment by Congress and the agency. The marine mammal group worked cooperatively with center researchers in Beaufort, North Carolina, and Pascagoula, Mississippi, and with various university cooperators, to develop and participate in region-wide studies designed to identify genetically distinct dolphin stocks and to assess geographic range and relative stock strength. Of considerable interest was the potential role of human-mediated sources of

mortality. The largest number of marine mammal strandings occurred along the southeast coast, and these keep the strandings group busy. Ms. Blair Mase and Dr. Ruth Ewing (DVM) were constantly on the road addressing marine mammal issues, including arranging for assistance to and rehabilitation of live, stranded animals. This activity was a very visible one, and not without its critics and second guessers. Ms. Blair and Dr. Ewing earned high marks for their ability to interact with the public and to explain complex situations to the news media.

The sea turtle group, under Ms. Sheryan Epperly, historically emphasized abundance and distribution studies, as well as evaluations of fishing gear impacts on turtle populations. The resulting data served as input to various assessments conducted through Turtle Expert Working Groups, consisting of various government, academic, industry, and non-governmental organization scientists. Recent assessments included loggerhead and Kemp's ridley sea turtles. Currently underway is a leatherback sea turtle assessment for the entire North Atlantic basin. Two quantitative ecologists, Dr. Paul Richards and Dr. Chris Sasso, were hired to help with the rapidly increasing assessment workload. During the period since 2000, two major efforts to reduce fishing gear related mortality were completed. The first, an analysis of stranding data, revealed that large loggerhead turtles were disproportionately killed in shrimp trawls. Measurements revealed that these large, reproductively valuable individuals were too big to fit through the release mechanisms of the conventional Turtle Excluder Devices (TEDs). This information was the scientific basis for a new regulation that required large-opening TEDs in the shrimp fishery. The second was a successful three-year study conducted with gear technology researchers at the SEFSC Pascagoula Laboratory, the Observer Program in the SEFSC Sustainable Fisheries Division, and the fishing industry to reduce the mortality of sea turtles in the pelagic longline fishery. The mortality of loggerhead and leatherback sea turtles could be dramatically reduced, without reducing catches of target species, by changing baits from squid to mackerel and by using circle hooks in place of the industry standard "J" hooks. In addition, innovative techniques (e.g., line cutters, dehookers) were developed to release with minimum injury turtles that were incidentally caught. Regulations based on these research results were put in place to reopen the Grand Banks (previously closed to United States fishers due to high turtle catches) to the swordfish fleet. Research in this area continues, particularly on ways to optimize the use of bycatch-reducing strategies in the tuna longline fleet. Recently, Ms. Lisa Belskis developed the group's website, making available to the public information on strandings, training materials, and various reports and publications. Mr. Wayne Witzell, longtime turtle biologist at the center, retired in 2005 after concluding his research in southwestern Florida.

Coral Reef Studies

By the close of the 1990s, it had become obvious that the health and productivity of coral reefs were in decline worldwide, and in many areas this trend had reached crisis proportions. In response, President Bill Clinton issued an executive order establishing the United States Coral Reef Task Force that was assigned the responsibility "to preserve and protect the biodiversity, health, heritage, and social and economic value of United States coral reef ecosystems and the marine environment." To the extent feasible, all federal agencies were required to take concrete steps to protect coral reefs and associated resources. Coral reef research responsibilities within NOAA were split between the National Ocean Service and NMFS, which were required to work together cooperatively to form an overall NOAA program.

The center, which for years had focused on coral reefs and coral reef fish communities, was exceptionally well positioned to compete for newly available funding to conduct research off Florida and in the United States Caribbean region. The overall program, managed first by Dr. Peter Thompson and later by Dr. Theo Brainerd, incorporated existing coral research themes with stimulating new directions to successfully pursue research projects at every center laboratory. Themes include mapping and monitoring, evaluation of marine protected areas, societal and economic aspects, coral health and restoration, fishing gear impacts, overfishing, inshore-offshore habitat connections, and large and small scale recruitment dynamics.

The Protected Resources and Biodiversity Division played a major role in these studies. Dr. Margaret Miller led an important effort to understand factors affecting the growth, distribution and restoration of various corals. Her work, documented a drastic decline in staghorn and elkhorn corals, the major reef-forming species in the Atlantic Ocean and Caribbean Sea, that formed the basis for consideration of these species for protection under the Endangered Species Act. Dr. Miller and her small team of coral investigators have made important contributions in coral restoration technology, region-wide investigations of coral genetics and stock fidelity, understanding factors affecting coral growth and survival, and documenting impacts of coral diseases and bleaching. In addition, Dr. Miller has been expedition leader on a cooperative project with the United States Fish and Wildlife Service to monitor and document coral reefs and associated living marine resources off the Caribbean island of Navassa, a United States possession near Haiti. Dr. James Bohnsack and his research team have continued cooperative research with the University of Miami to evaluate coral reef fish communities off Florida. Their work has demonstrated a general decline in these resources over time, with the most severe reductions observed to be geographically closest to centers of human population and fishing pressure. Work in the Florida Keys

National Marine Sanctuary indicated generally healthier fish populations for some exploited species in protected areas compared with those areas without protection. Dr. John Lamkin and his team, using naturally-occurring chemical tracers in fish ear bones (otoliths), have demonstrated ecological connections between inshore habitats and offshore coral reefs. In particular, the work has illustrated the specific inshore habitat dependencies of the juveniles of various coral reef fish species. Research also is underway to explore whether and to what extent fish larvae and juveniles spawned in the western Gulf of Mexico are transported via the Gulf Loop Current to reside as adults on coral reefs off Florida. In other research, Dr. Anne Marie Eklund used advanced acoustic gear to locate and ground-truth spawning aggregations of various coral reef fish species.

Sustainable Fisheries Division

The Southeast Fisheries Science Center's reorganization in 1997 consolidated virtually all of Miami's fishery dependent data collection activities and stock assessment expertise into the Sustainable Fisheries Division led by Dr. Gerry Scott. At this time the division has the following teams: stock assessment, fishery statistics, fishery dependent data collection, biological investigations, and observers programs. Two important new funding sources have influenced the group over the past five years. In the first, the division took part in a major agency effort to quantify stock assessment capabilities and determine the resources necessary to successfully meet new responsibilities under the Sustainable Fisheries Act. The resulting Stock Assessment Improvement Plan was the basis for new budget requests which have so far been successful at bringing additional resources into the agency, including the Southeast Fisheries Science Center. In the second effort, the division has participated in the Cooperative Research Program, an effort to encourage federal scientists and constituent groups, including the fishing industry, to work together on relevant data collection and research issues.

Stock Assessment Enhancements

Agency-wide stock assessment responsibilities increased markedly as a result of the Sustainable Fisheries Act, which for the first time required biomass-based evaluation of stock status. Recognizing that new resources and personnel were needed to meet the new demands for data and analysis, NOAA Fisheries and the regional science centers developed a Stock Assessment Improvement Plan. This plan, which defined several tiers of performance, was influential in attracting additional funding. Beginning in 2002, the center received significant new resources, and funds were used for several related purposes: improved data collection, addition of stock assessment scientists and support personnel, and enhanced relationships with universities for the purpose of attracting and developing graduate students in population modeling

and assessment. Several positions were recruited and filled at the field laboratories in Galveston and Beaufort, which elevated the overall capability of these programs and made them full participants in the new Southeast Data Assessment and Review process described earlier. Miami, too, was able to add personnel including Dr. Shannon Cass-Calay, Dr. Josh Nowlis, Dr. Elizabeth Brooks, Dr. Guillermo Diaz, and Dr. Ching-Ping Chih (all recent PhDs with new ideas and state-of-the-art quantitative skills). Using new computational approaches and improved technology, the assessment group extended existing models and developed new probability-based models to evaluate and address various stock assessment problems. Much of this progress was made possible by a dramatic improvement in the overall quality of fishery dependent and independent data sets in the Gulf of Mexico, much of it funded by the new assessment funds, as well as for species specific programs such as red snapper. Collection of commercial data was improved by the widespread adoption of trip ticket systems by the various states, expanded port agent activity under Mr. Guy Davenport, and database maintenance and development by Mr. Josh Bennett. Increased emphasis on fishery observer programs also occurred, and that program, too, hired new employees, including Ms. Cheryl Brown and Mr. Larry Beerkircher. Biological investigations did not suffer either, with the Billfish Program hiring Mr. Derke Snodgrass and Dr. Joe Seraphy to advance the center's expertise in various aspects of billfish ecology and conservation.

ICCAT and SEDAR assessments continued to make demands on the staff, who responded excellently, often working several months and extra hours to complete analyses. The peer-review rigors of both processes demanded the highest quality work, and the division members came through time after time. In addition, this time period saw a renewed interest in the U.S. Caribbean region and the sustained health of managed marine resources in those areas. Important regional assessments included red snapper, goliath grouper, yellowtail snapper, red grouper, king and Spanish mackerel, gag grouper, triggerfish, vermilion snapper, queen conch, and greater amberjack. In the ICCAT arena, the division took the lead internationally in updating and elaborating assessments of bluefin tuna, bigeye tuna, yellowfin tuna, swordfish, blue marlin, white marlin, and sailfish, and assisting to evaluate various shark populations and other highly migratory species. As always, these activities generated their share of controversies both nationally and internationally, and scientists and managers were kept busy describing various assessment strategies, results, and rebuilding projections under various regulatory scenarios.

During this period, the center significantly expanded its efforts to collaborate with various universities to advance academic opportunities for a new generation of stock assessment scientists. In addition to historic ties with the University of Miami (CIMAS), the Sustainable Fisheries Division supported graduate student scientists at Virginia Institute of Marine Science and Imperial College, London. Recently, the center embarked on a cooperative venture with the Virginia Polytechnic Institute and State

University in Blacksburg, Virginia, to develop a cooperative unit for education and research. Dr. James Berkson, the center's onsite coordinator, energetically pursued programs designed to identify and attract talented undergraduate students to the stock assessment field. Efforts to date have been extraordinarily successful and the program is fast becoming a model for NMFS efforts to develop and train quantitative assessment scientists.

Cooperative Research Programs

The center has a long history of involving members of the fishing industry in scientific research activities. For example cooperative work with fishermen and fishing groups was pivotal during the development and evaluation of gear modifications required to reduce sea turtle bycatch (TEDs) and finfish bycatch (BRDs) in shrimp trawls. Center scientists have long recognized that fishermen have knowledge, skills, vessels, and equipment that could be applied with advantage to various research questions. Many fishermen, too, recognize that credible science is the key to good fishery management, and are willing to collect and share information to improve that process.

Since 2001, the center has sponsored a formal research program designed to emphasize and stimulate scientific research featuring cooperative efforts between scientists and fishermen. The intent has been to build on the collective experience of fishermen and scientists to gather and analyze fishery information, and to provide the best advice possible to fishery managers. The program, managed by Dr. Gerry Scott, has two components. The first sponsors research and data collection activities by various partner institutions such as state agencies, universities, and independent laboratories. The second, based on a competitive, proposal-driven process, is open for any individual or institution to propose research projects designed to address regional, high priority needs. Both components are characterized by joint participation by scientists and fishermen. Funding decisions are made by a panel of non-NOAA fishery experts guided by a set of priorities developed during a widely-attended cooperative research workshop held in 2002. Priorities include gear research, bycatch characterization, collection of biological samples, cooperative statistics data collection, tagging, and cooperative research on a variety of key species, including sharks, reef fish, and shrimp.

The program has been successful in attracting high quality researchers and in developing ties between scientists (NOAA and non-NOAA) and the fishing community. Examples include cooperative efforts to enhance observer programs in the Gulf of Mexico shrimp fishery, work to refine longline fishing practices to minimize bycatch of sea turtles, billfish, and other species, description of bycatch patterns in the reef fish fishery off the southern eastern coast of the United States, catch and release mortality of red drum

caught in the South Carolina recreational fishery, and development and deployment of electronic logbooks to better gauge fishing effort in the reef fish and shrimp fisheries. The center will continue to promote cooperative research and intends soon to conduct a second constituent workshop, this time to evaluate the program as well as to refine priorities.

Conclusion

The Southeast Fisheries Science Center has truly met the vision that its founders sought forty years ago. Its structure, role and mission have changed from the early years as the Tropical Atlantic Biological Laboratory as the tools and technologies of fisheries research advanced and as the needs and interests of society changed. But underlying these changes is a fundamental and constant adherence to the idea that science should form the basis of sound resource management. Accordingly, scientists and directors at the Southeast Fisheries Science Center adhere to this philosophy passionately and continue to work diligently to produce scientific products that are both intellectually challenging and responsive to fishery management needs. On the occasion of the 40th Anniversary of the Southeast Fisheries Science Center, thanks are due to all who have worked to establish the center, to keep its work relevant and timely, and to advance the field of fishery research for the well being of living marine resources and the benefit of society.

Appendix Tables

- Table 1.** Personnel of the Washington Biological Laboratory, *R/V Geronimo*, and *R/V Undaunted* who transferred to Miami, Florida, in 1965.
- Table 2.** Tropical Atlantic Biological Laboratory staff in 1966.
- Table 3.** Southeast Fisheries Center and Miami Facility staff in December 1975
- Table 4.** Southeast Fisheries Center and Miami Laboratory staff in December 1981.
- Table 5.** Southeast Fisheries Center and Miami Laboratory staff in May 1984.
- Table 6.** Southeast Fisheries Science Center and Miami Laboratory staff in 1993 and 1994.
- Table 7.** Southeast Fisheries Science Center and Miami facility staff in December 2005.
- Table 8.** Excerpts from Editorial Memos of Ralph Hile and Paul Eschmeyer, Bureau of Commercial Fisheries editors, 1965-1969.

Appendix Table 1. Personnel of the Washington Biological Laboratory, *R/V Geronimo*, and *R/V Undaunted* who transferred to Miami, Florida, in 1965.

Thomas S. Austin, laboratory director	Vessel Personnel, <i>Geronimo</i> and <i>Undaunted</i>
Catherine R. Burke, data processing assistant	Richard E. Adams, first officer
Helen V. Donn, secretary to the director	Thomas H. Appleton, radio officer
Howard Foulk, physical science technician	Charles Birds, cook
Julien R. Goulet, physical oceanographer	Frank A. Ciaramitaro, skilled fisherman
Gerald L. Hood, marine superintendent	Frank W. Debus, first officer
Craig Johnson, electronic technician	Elias Eide, skilled fisherman
Jack W. Jossi, biological oceanographer	Lawrence G. Fagan, chief engineer
Conrad V. W. Mahnken, biological oceanographer	S. E. Gislason, skilled fisherman
Betty Merrick, clerk-typist	Harold R. Holdsworth, chief engineer
Shirley M. Parker, supply assistant	Warren Joseph, skilled fisherman,
Thomas C. Potthoff, fishery biologist	James E. Karr, steward-cook
Andrew J. Ramsay, biological technician	Harry T. Matsuhara, skilled fisherman
Robert M. Rawes, supply assistant	Roger E. Meyer, chief engineer
Dr. William J. Richards, zoologist	Torao Okamoto, skilled fisherman
Willis Siferd, III, administrative officer	Robert Roper, chief engineer
David C. Simmons, fishery biologist	Theodore E. Sorensen, master
Cora E. Slade, oceanographer	Richard E. Sorensen, second assistant engineer
Paul N. Sund, oceanographer	Yutaka Sugimoto, skilled fisherman
John W. Van Landingham, chemist	Francis W. Szalinski, master
Donald P. Wagner, physical science technician	George A. Wentzell, leading fisherman
John P. Wise, fishery biologist	

Source of information: Weeks, Ann. 1970. Tropical Atlantic Biological Laboratory, progress in research 1965-1969 Miami, Florida. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Circular 344: 65 p.

Appendix Table 2. Tropical Atlantic Biological Laboratory staff in 1966.

Director's Office

Thomas S. Austin, director
Helen Donn, secretary to director
Albert C. Jones, assistant director
Esther Sell, secretary to assistant director
Ann Weeks, writer-editor
Grady w. Reinert, illustrator
Raissa Maurin, librarian
Mary E. Fabal, library technician

Physical Oceanography Program

Merton C. Ingham, physical oceanographer
John W. Van Landingham, chemist
Julien R. Goulet, physical oceanographer
John T. Brucks, physical oceanographer
Cora E. Slade, oceanographer
Anzilia Wilkins, chemist
Craig Johnson, electronic technician
Benjamin J. Culverhouse, electronic technician

Biological Oceanography Programs

Conrad V. W. Mahnken, biological oceanographer
Jack W. Jossi, biological oceanographer

Tuna Biology Programs

Paul N. Sund, oceanographer
Dr. William J. Richards, zoologist
John P. Wise, fishery biologist
Thomas Potthoff, fishery biologist
Edwin L. Scott, fishery biologist
Catherine R. Burke, data processing assistant
David C. Simmons, fishery biologist
Alexander Dragovich, fishery biologist
Gabrielle M. Ranallo, data processing assistant
Mead M. McCabe, biological technician
Gwendolyn M. Mosby, biological technician

Systematics of Fishes Program

Frederick H. Berry, zoologist
Dr. Robert V. Miller, zoologist

George C. Miller, zoologist
Tomio Iwamoto, fishery biologist

Administrative Office

Willis S. Siferd, III, administrative officer
Phillip T. Hill, personnel management specialist
Shirley M. Parker, supply assistant
Sharon P. Marshall, administrative clerk
Robert M. Rawes, supply assistant
Marlah C. Kimbro, clerk-typist
Richard Love, clerk-typist
Betty Merrick, clerk-typist
Ann M. Purnell, clerk-typist
Edward E. Esham, maintenanceman
Marcel F. Sands, maintenanceman

Biological Aids

Gary R. Armistead, biological aid
Dennis S. Bald, biological aid

Marine Technicians

Donald P. Wagner, physical science technician
Andrew J. (Jack) Ramsay, biological technician
Howard Foulk, physical science technician
Michael T. Donahue, physical science technician
Stuart W. Smith, physical science technician
Edward E. Hyman, physical science technician

Marine Services

Gerald L. Hood, marine superintendent

Vessels, *R/V Geronimo* and *R/V Undaunted*

Crew members who joined TABL in 1966 (see Appendix Table 1 for crew members who transferred to Miami in 1965):

John A. Coito, skilled fisherman
Robert M. Ferguson, second assistant engineer
John C. Forrest, leading fisherman
William J. Kilbride, mess attendant

Appendix Table 3. Southeast Fisheries Center and Miami Facility staff in December 1975.

Center Staff

Harvey R. Bullis, fishery biologist, director.
Thomas J. Costello, fishery biologist, assistant to the director.
Willis S. Siferd, administrative officer, budget officer.
Mary H. Thompson, deputy director, deputy director.
Donald P. Wagner, physical science technician, assistant to the director for support operations.

Ecological Investigations

John T. Brucks, oceanographer.
Robert N. Farragut, research chemist, program manager.
Dr. Herman E. Kumpf, fishery biologist, program manager.
Barbara J. Palko, fishery biologist.
Harold C. Thompson, research chemist.

Fishery Analysis – Billfish

Dr. Grant L. Beardsley, fishery biologist, program manager.
Chester C. Buchanan, fishery biologist.
Edward H. Hyman, biological technician.
Allyn M. Lopez, biological technician.
Paul J. Pristas, fishery biologist.
Edwin L. Scott, fishery biologist.

Fishery Analysis - Bluefin Tuna

Raymond E. Baglin, fishery biologist.

Frederick H. Berry, fishery biologist.
Dennis W. Lee, biological technician.
Dr. Wesley W. Parks, operations research analyst.
Luis R. Rivas, fishery biologist.

Fishery Analysis - Gulf & Caribbean

Donald M. Allen, fishery biologist.
George C. Boucher, biological technician.
Alexander Dragovich, fishery biologist.
Dr. Albert C. Jones, fishery biologist, program manager.
Edward A. Perez, biological technician.
David C. Simmons, fishery biologist.

MARMAP II

Essie M. Coleman, biological technician.
Robert Cummins, fishery methods & equipment specialist, program manager.
Douglas E. Harper, biological technician.
Robert M. Jenkins, fishery methods & equipment specialist.
Walter C. Mann, fishery biologist.
George C. Miller, fishery biologist.
David L. Sutherland, fishery biologist.

MARMAP I

Thomas C. Potthoff, fishery biologist.
Dr. William J. Richards, zoologist, program manager.

Source of information: The Southeast Fisheries Center. December 1975. Prepared for review by the National Academy of Sciences and the National Academy of Engineers. SEFC, Miami, Florida (ML Archive 3).

Appendix Table 4. Southeast Fisheries Center and Miami Laboratory staff in December 1981.

Miami Laboratory

Dianne Allen
 Judith Applegate
 Scott Bannerot
 Dr. Grant Beardsley
 Andy Bertolino
 Dr. Susan Brunenmeister
 Suzanne Burns
 Joseph Cerwin
 Tom Chewing
 Essie Coleman
 Ramon Conser
 Michael Crow
 Warren Davis
 Alex Dragovich
 Dr. Mark Farber
 Phyllis Fisher
 Donald Gentile
 Doug Harper
 Jack Javech
 Julie Josiek
 Sharon Kelley
 Carl Kinerd
 Tom Kisting
 Dennis Lee
 Walter Mann
 David McClellan
 Dr. Michael McGowan
 Dr. Scott Nichols
 Patty Phares
 Tom Potthoff
 Dr. Joseph Powers, director.
 Eric Prince
 Dr. Bill Richards
 Edwin Scott
 David Sutherland
 Joe Tashiro
 Dr. Nancy Thompson
 Teresa Wilson

Center Headquarters

Dr. Dick Berry, deputy director.
 Dr. William Fox, director.
 Sarah Greenberger

Robert Jenkins
 Dr. Mike Parrack
 Lynn Pulos
 Martha Trelles

Resource Research

Fred Berry
 Bonnie Knutson
 Dr. Herb Kumpf, chief.
 Sandra Lincoln
 Bill Pringle
 Will Siferd

Fishery Management

Donald Allen
 Dr. Joan Browder
 Marilyn Cluxton
 Tom Costello
 George Darcy
 Catherine B. Hill
 Dr. Albert Jones, chief.
 John Poffenberger
 John Ward
 Wayne Witzell

Planning

Dr. Larry Massey
 Seymour Mendelssohn

Administration

Vaughn Carroll
 Phil Colon
 Christina Grice
 Al Harris
 Benjamin Jimenez, chief.
 Katherine MacRae
 Ann Minnus
 Christy Noble
 Lucy Pasquarella
 Juan Perez
 Mary Rivera
 Noel Silva
 Jean Smith
 Peggy Solomon

Susan Sutherland
 Lucille Todriff
 Jerri Unsell

**Technical Information
 Management Services**

David Dingley
 Carmen Madruga
 James Zuboy, chief.

Statistics

Terry Culbertson
 Tom Dawley
 Bill George
 Monty Lopez
 Sam Michael
 Kim Newlin, chief.
 Anne Overby
 Ernest Snell

Survey Design

Herb Prytherch
 Beany Slater
 Dr. James Zweifel

Data Management

Margery Bastian
 Margaret Christian
 Lourdes Corvo
 Doris Dillman
 Gwen Fuller
 Jon Houghton
 Gary Kinklel
 Maria Llaneras
 Edward Narewski
 Stuart Smith
 Darrell Tidwell, chief.

NOAA Dive Center

Marc Kaiser
 Dick Rutowski, chief.

Source of information: Miami facility telephone list, December 10, 1981 (ML Archive 50)

Appendix Table 5. Southeast Fisheries Center and Miami Laboratory staff in May 1984.

Miami Laboratory

Dr. Scott Bannerot
 Henry Bartley
 Dr. Grant Beardsley
 Andy Bertolino
 Mal Brassfield
 Dr. Joan Browder
 Richard Brown
 Suzanne Burns
 Tom Chewning
 Marilyn Cluxton
 Pat Conroy
 Ramon Conser
 Joseph Contillo
 Nancie Cummings
 Kevin Davis
 Alex Dragovich
 Essie C. Duffie
 Dr. Mark Farber
 Phyllis Fisher
 Cindy Foltz
 Doug Harper
 Jack Javech
 Robert Jenkins
 Dr. Albert Jones, director
 Julie Josiek
 Sharon Kelley
 Dennis Lee
 Monty Lopez
 David McClellan
 Dr. Michael McGowan
 Dr. Scott Nichols
 Judith Ortner
 Ralph Owen
 Patty Phares
 John Poffenberger
 Tom Potthoff
 Joseph Powers
 Eric Prince
 Brett Schavey
 Barbara Schroeder
 Gerry Scott
 Edward Scott
 Jerry Seitlin
 Beany Slater
 Brenda Smith

Kim Steward
 David Sutherland
 Joe Tashiro
 Dr. Nancy Thompson
 John Ward
 Amy Webster
 Mike White
 Dr. James Zweifel

Center Headquarters

Doris Bergen
 Dr. Dick Berry, director
 Dr. Bradford Brown, deputy
 director
 Dr. Mike Parrack
 Marilyn Phillips
 Dr. Bill Richards
 Martha Trelles
 Carol Wolf

Resource Research

Fred Berry
 Lorraine Berry
 Dr. James Bohnsack
 Harriet Corvino
 Dr. Herb Kumpf, chief
 Sandra Lincoln
 Dr. Larry Massey
 Seymour Mendelsohn
 Lynn Pulos
 Willis Siferd
 James Zuboy

Fishery Management

Donald Allen
 George Darcy
 Wayne Witzell

Administration

Vaughn Carroll
 Phil Colon
 Helena Gore
 Al Harris
 Dorothy Hill

Cathy Hudmon
 Benjamin Jimenez, chief
 Katherine MacRae
 Bill Marr
 Ann Minnus
 Christy Noble
 Lucy Pasquarella
 Rita Sabina
 Frank Schroer
 Jean Smith
 Peggy Solomon
 Susan Sutherland

**Technical Information
 Management Services**

Anne Overby
 Vacant, chief*

Statistics

Guy Davenport
 Sam Michael
 Kim Newlin, chief
 Anne Overby
 Herb Prytherch
 Ernie Snell

Data Management

Margery Bastian
 Ken Brown
 Montye Camp
 Doris Dillman
 Bill George
 Victor Jimenez
 Tom Kisting
 Maria Llaneras
 Edward Narewski
 Kathy Schavey
 Stuart Smith
 Darrell Tidwell, chief
 Mark Walker

NOAA Dive Office

Marc Kaiser
 Dick Rutowski, chief

* In 1985 Darrell Tidwell was appointed chief of the Technical Information Management Service and MaryAnn Treadway was appointed chief of Data Management. Source of information: Miami Facility telephone list, May 8, 1984 (ML Archive 50).

Appendix Table 6. Southeast Fisheries Science Center and Miami Laboratory staff in 1993 and 1994.

<p>Miami Laboratory Office of the Director Dr. Joseph Powers, director Brenda Smith</p> <p>Coastal Fishery Resources Division Fred Arocha Robert Bayley Tracey Baynes Dr. James Bohnsack Dr. Stephanie Bolden Dr. Joan Browder Al Catalano Michael Delay Dr. Ann Marie Eklund Kellie Foster Dr. C. Phillip Goodyear Doug Harper Jack Javech Dr. Darlene Johnson Anthony Martinez David McClellan Robert Miller Cindy Nettles Dr. Nancie C. Parrack Patty Phares Kathleen Prunier Scott Sandorf Michael Schirripa Wendy Teas Dr. Nancy Thompson, chief Wayne Witzell Amy Woodhead</p> <p>Miami Statistical Field Office Guy Davenport, chief</p>	<p>Oceanic Fishery Resources Division Andy Bertolino Dr. Benjamin Blaylock Mal Brassfield Cheryl Brown Dr. Craig Brown Jose Castro Joseph Contillo Dr. Jean Cramer Ryan Elliott Tom Greig Justin Grubich Larry Hansen Haolan Steve Huang Dennis Lee Blair Mase Mary Nunez Dr. Clay Porch Dr. Michael Prager Dr. Victor Restrepo Dr. Gerald Scott, chief James Tobias Dr. Stephen Turner</p> <p>Migratory Fishery Biology Division Robin Carter Dr. Mark Farber Christopher Jones Michael Judge Dr. Eric Prince, chief David Rosenthal</p> <p>SEFCAR Program Dr. Seong Sig Cha Dave Goldman Tom Jackson Dr. Claire Paris Ricardo Paris Dr. Andrea Roepke Dr. Cynthia Yeung</p>	<p>Center Headquarters Fred Berry Dr. Bradford Brown, director Essie C. Duffie Sophia Howard Thomas McIlwain Dedra Mitchell Bergita Phillips</p> <p>Research Management Division Margery Bastian Eve Bayley Joshua Bennett Laura Bishop Jennifer Boser Dr. Ausbon Brown Vaughn Carroll Harriet Corvino Susan Dana Molly Elliott Carole Goodyear Dorothy Hill Dr. Albert Jones, chief Sharon Kelley-Fraga Maria Llaneras Dr. Larry Massey Sam McConnell Teresa McCormick Seymour Mendelssohn Kim Newlin Anne Overby Dr. Mike Parrack John Poffenberger Eva Porter Herb Prytherch Dr. Bill Richards Robert Robins Frank Schroer David Senn</p>	<p>Beany Slater Ernest Snell Peggy Solomon Mary C. Steward Vicky Williams Jeff Willoughby Barbara Zeno Dr. James Zweifel</p> <p>Data Management Division David Bailey Susan Beauparlant Inta Berzins MaryAnn Camp, chief Tom Fleming Susan Gold Ellie Gonzales John Holzman Charles Lavarini Lloyd Muccio Edward Narewski Howard Shirley Stuart Smith Ann-Marie Staub Robert Walker Lee Weinberger Bill Young Ken Zinniger</p> <p>SERO Enforcement Becky Stefanescu</p> <p>American Littoral Society Alex Stone</p>
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Source of information: SEFC and Miami Laboratory telephone list, January 1993 (ML Archive 50); SEFC and Miami Laboratory December 1994 program documents.

Appendix Table 7. Southeast Fisheries Science Center and Miami facility staff in December 2005.

Center Directorate

Agar, Juan Dr.
Carter, David Dr.
Chester, Alex
Duffie, Essie
Howard, Sophia
Parrack, Michael Dr.
Perruso, Larry
Powers, Joseph Dr.
Stoffle, Brent
Thompson, Nancy Dr., director

Protected Resources and

Biodiversity

Belskis Lisa
Bohnsack, Jim Dr., chief
Browder, Joan Dr.
Cardenas, Hernando
Castro, Jose
Contillo, Joseph
Davis, Natasha, Ltjg
Epperly, Sheryan
Ewing, Ruth Dr.
Frias-Torres, Sarah Dr.
Garrison, Lance Dr.
Gerard, Trika
Harper, Doug
Hazra, Destiny
Jackson, Tom
Javech, Jack
Johnson, Darlene Dr.
Johnston, Lyza
Jones, David
Kellison, Todd
Koch, Veronique
Kramer, Lindsey
Lamkin, John Dr.
Lara, Monica Dr
Litz, Jenny
Martinez, Anthony
Mase, Blair
Mason, Benjamin
McClellan, David
Miller, Margaret Dr.
Richards, Bill Dr.
Richards, Paul Dr.
Sasso, Chris Dr.
Smith, Brenda

Stokes, Lesley
Teas, Wendy
Tuohy-Sheen, Liz
Wicker, Jesse
Williams, Dana
Whitcraft, Samantha
Zaretsky, Susan

Sustainable Fisheries

Abercrombie, Debra
Allen, Maryann
Baertlein, Paul
Baertlein, Neil
Balchowsky, Heather
Beerkircher, Larry
Bennett, Joshua
Bertolino, Andy
Brooks, Elizabeth Dr
Brown, Craig Dr.
Cass-Calay, Shannon Dr.
Chih, Ching-Ping Dr.
Cummings, Nancie
Davenport, Guy
Diaz, Guillermo Dr.
Eyo, Pamela
Hall, Jeremy
Judge, Michael
Keene, Kenneth
Kerstetter, David
Lee, Dennis
Matter, Vivian
Mazuera, Luis
Mccarthy, Kevin
Mcconnell, Sam
Mitchell, Dee (Berry)
Nowlis, Joshua
Orbesen, Eric
Ortiz, Mauricio Dr.
Phares, Patty
Poffenberger, John
Porch, Clay Dr.
Porter, Rachel
Prince, Eric Dr.
Rice, Patrick
Rosenthal, David
Saul, Steve
Scott, Gerald Dr., chief
Serafy, Joe Dr.

Slater, Beany
Snodgrass, Derke
Turner, Stephen Dr.
Venizelos, Arietta

**Office of Management
Information**

Aguilar, Sandra
Albertson, Helen
Bello, Maria
Brainerd, Theo Dr.
Brassfield, Mal
Cano, Antonio
Carroll, Vaughn
Cope, Patrick
Darby, Loyd
Davis, Tyree
Desanctis, Cassio
Dudnik, Denis
Gilles, Patrick
Heberling, Sarah
Holder, Isabel
Holzman, John
Leon, Daniel
Ling, Sam
Lutz, Olive
Massey, Larry Dr.
Molina, Susan
Muccio, Lloyd
O'Leary, Jay
Orellana, Juan Carlos
Overby, Anne
Perez, Elizabeth
Poulos, Dan
Ramos, Eduardo
Rivero, Carlos
Rodriguez, Herlinda
Schull, Jennifer
Senn, David
Serra, Adriana
Shaw, Kevin
Shirley, Howard
Stevens, Charlotte
Thompson, Peter Dr., chief
Walker, Robert
Weinberger, Lee
Willoughby, Jeff

Appendix Table 8. Excerpts from Editorial Memos of Ralph Hile and Paul Eschmeyer, Bureau of Commercial Fisheries editors, 1965-1969.

1. From Editorial Memo No. 21, January 1967:

"The scar tissue from the verbal injuries we received after the distribution of Editorial Memo No. 1 is sufficiently resorbed that we dare mention "Results and Discussion" anew. We now seldom receive manuscripts that contain both stereotyped section headings but a number still have a "Discussion" at the end. We cannot decide whether it is so hard for authors to abandon the heading or whether our obduracy is being put to the test.... We remain firm in our view that readers are entitled to section headings more explicit than "Results" and "Discussion"."

2. From Editorial Memo No. 38, October 1969:

"They won't go away:

Our weasel-word pals associated with and related to continue to weaken statements. occur still bores and still fathers many illegitimate indirect sentences. this, these, hold their popularity as introducers of ambiguities. there, is, are, was,... seem almost to gain esteem as time-wasters and sentence-twisters. A gem from copy: "...good, rapid information."

3. Photocopy of Editorial Memo 20, December 1966 (Christmas letter from Hile and Eschmeyer to laboratories, with their editorial markup:

RECEIVED
DEC 19 '66
DIRECTOR BA
ASST. DIRECTOR ACS
CHIEF CLERK
ADMIN. ASSISTANT
Editorial Memo No. 20
No. 20
December 1966

Mensis Duodecimus

We have reached, once more, that joyous period of softened hearts and thinned wallets. For the editorial unit the month is the last in our second year of Earnest Endeavour. The work load has been heavier in 1966 than in 1965 but improvement in the quality of manuscripts has been sufficient to make the work of the staff a little easier. We do not suggest cheerfully that real clunkers no longer reach our office or that we no longer wrestle with weak organization, vague wording, faulty syntax, jargon.... But all in all, affairs go noticeably better, and we are confident that the advancement will continue of continued advancement.

We credit the improvement to the increased care of Division authors and the more effective handling of copy in the laboratories. We appreciate deeply your patience, assistance, and cooperation, and we wish you all

Happy Holidays

Ralph Hile
Paul Eschmeyer
Shen Rappaport

Picture Gallery

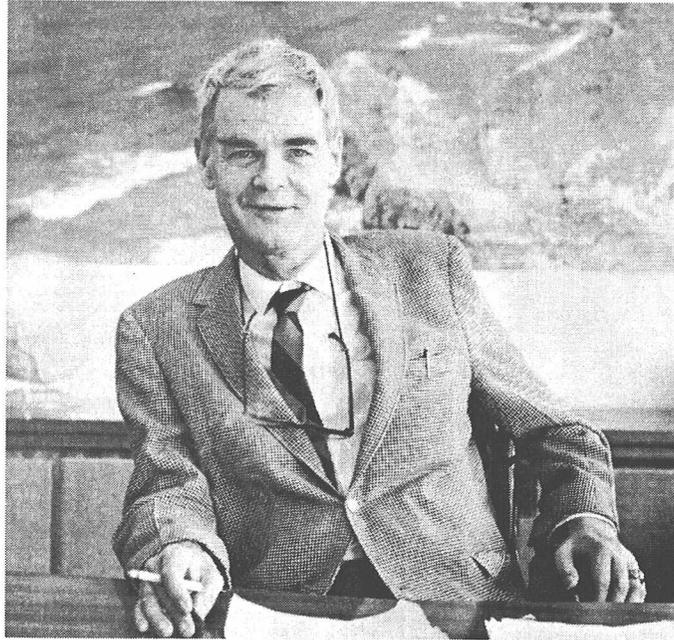


Figure 1. Thomas S. Austin, first Director of the Tropical Atlantic Biological Laboratory, Bureau of Commercial Fisheries. He became the director of the National Oceanographic Data Center in June 1967.



Figure 2. Carl J. Sindermann succeeded Thomas Austin as Director of the Tropical Atlantic Biological Laboratory.

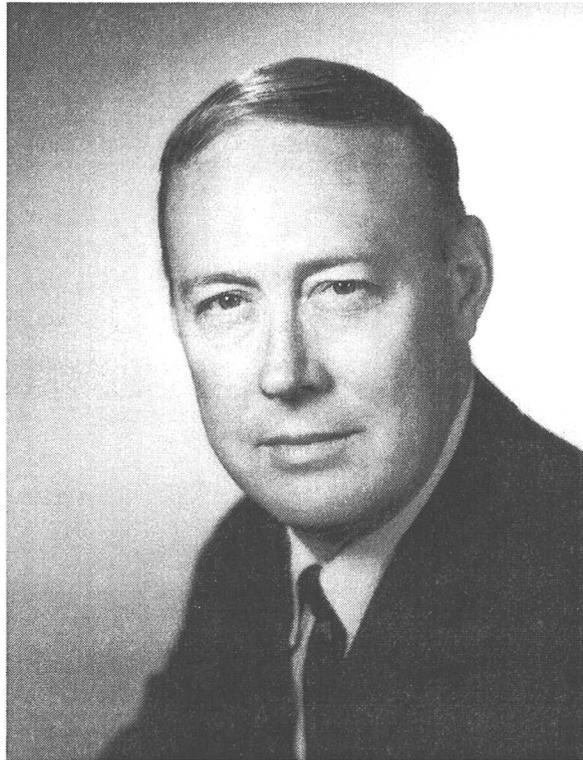


Figure 3. Harvey Bullis succeeded Carl Sindermann as the Director of the Tropical Atlantic Biological Laboratory.



Figure 4. William W. Fox, Jr. succeeded Harvey Bullis as Director of the Southeast Fisheries Center.

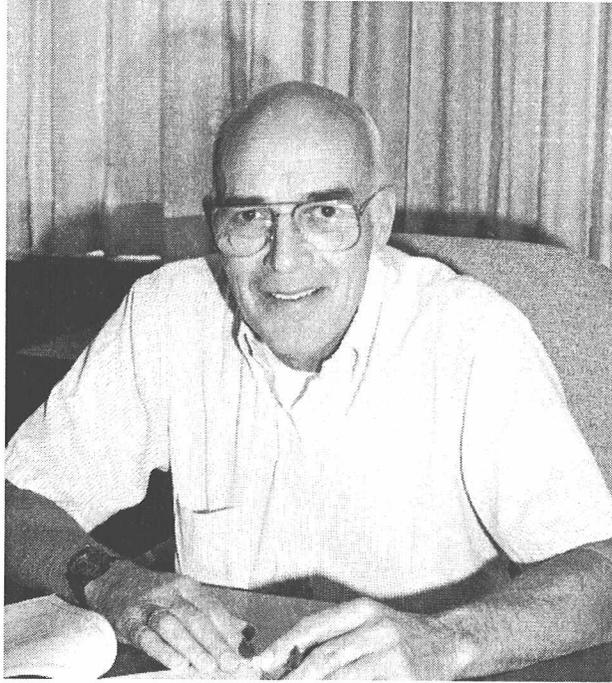


Figure 5. Dick Berry succeeded William Fox as Director of the Southeast Fisheries Center.

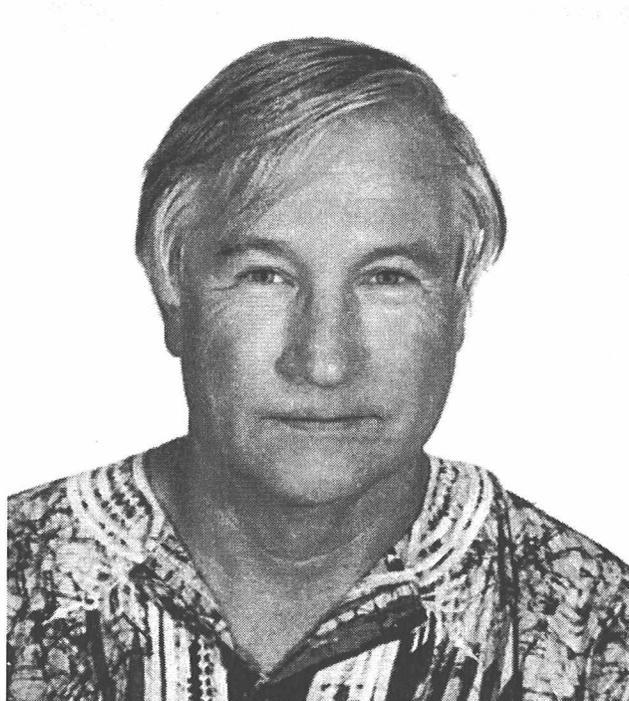


Figure 6. Brad Brown succeeded Dick Berry as Director of the Southeast Fisheries Center.

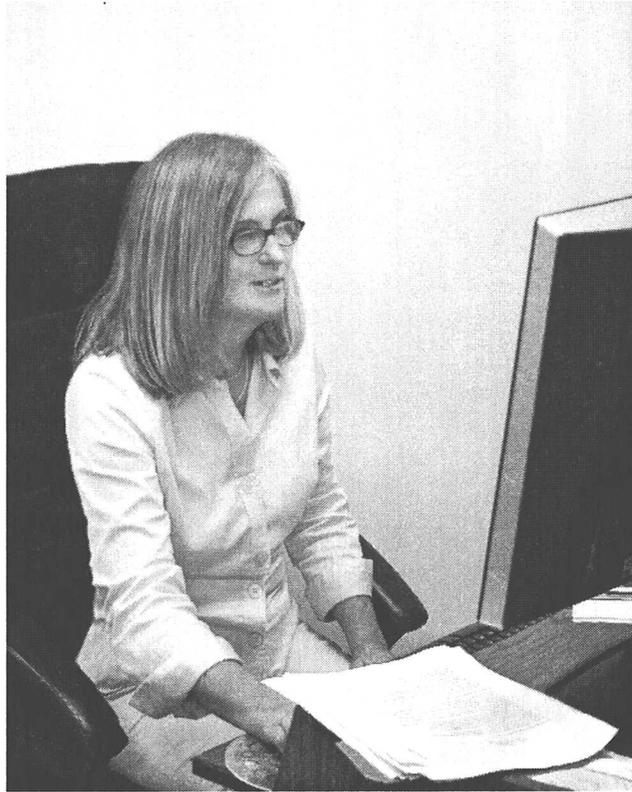


Figure 7. Nancy Thompson succeeded Brad Brown as Director of the Southeast Fisheries Science Center.



Figure 8. Aerial view (7500 feet) of Virginia Key Marine Science Complex. The Tropical Atlantic Biological Laboratory (“V” shape) is at 9 o’clock, the University of Miami at 10 o’clock, the Miami Seaquarium at 12 o’clock, the Atlantic Oceanic and Meteorological Laboratory at 6 o’clock.



Figure 9. Front view of the Tropical Atlantic Biological Laboratory, Bureau of Commercial Fisheries, Miami, Florida, in the final construction stage in 1965.

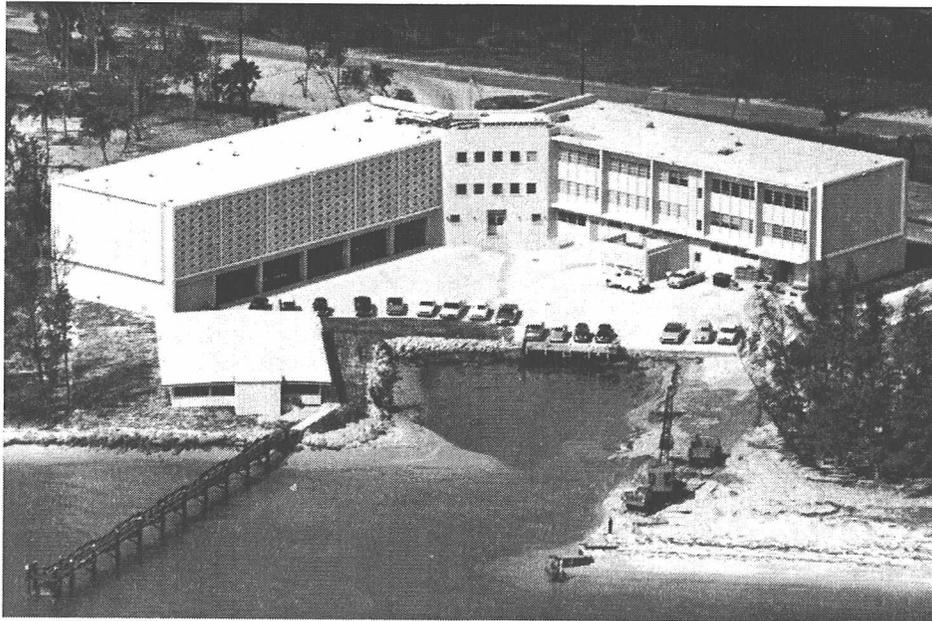


Figure 10. Rear view of the Tropical Atlantic Biological Laboratory in final construction stage in 1965, looking north from Bear Cut. The small building in left foreground is used for salt water settling before scientific use.



Figure 11. Grady Reinert and Gay Ranallo painting a mural of marine life that adorned the exterior wall of the annex building. It was visible from the Rickenbacker Causeway.

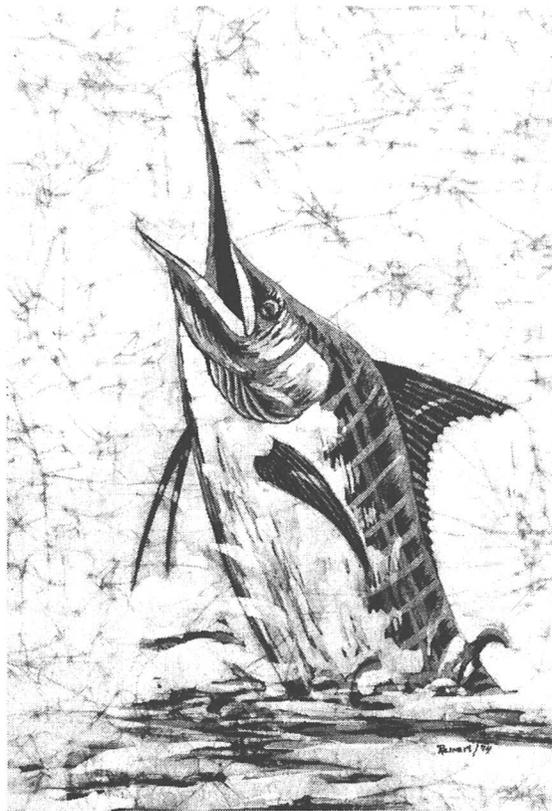


Figure 12. Batik design by Grady Reinert, scientific illustrator at the Tropical Atlantic Biological Laboratory.

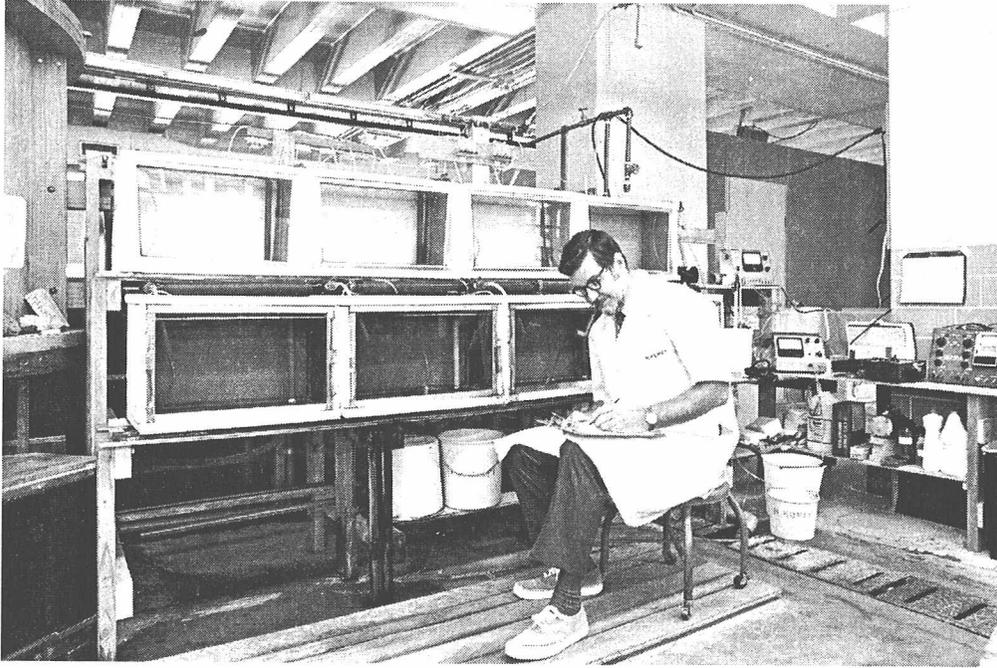


Figure 13. Herb Kumpf recording data in experimental fish laboratory.

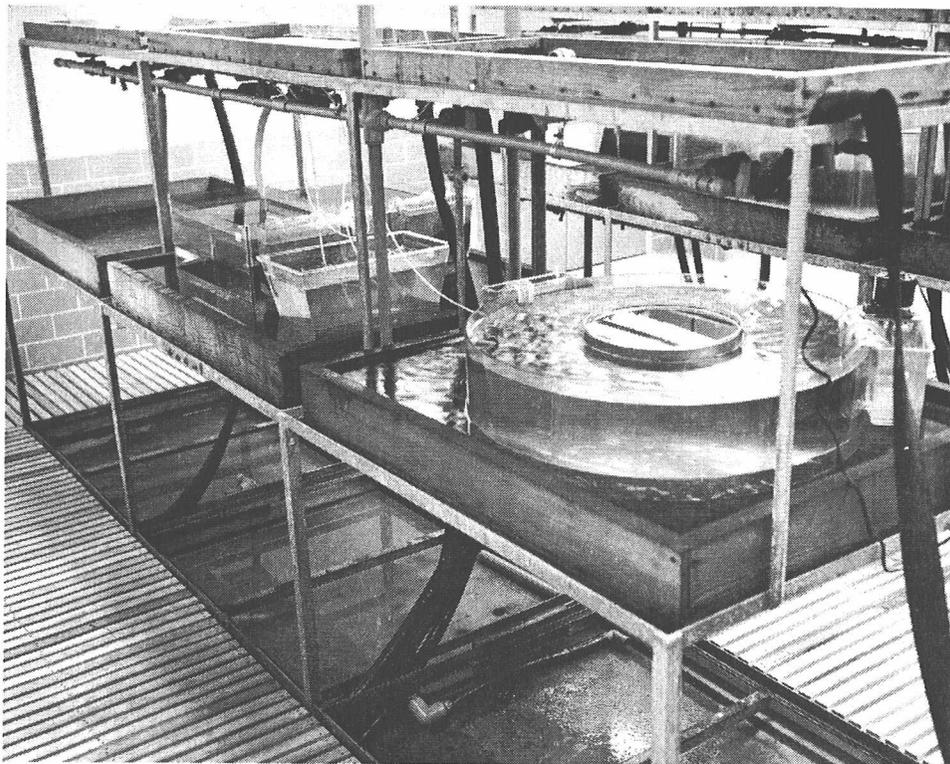


Figure 14. View of Environmental Biological Laboratory at the Tropical Atlantic Biological Laboratory. This shows a few of the many separate holding tanks in use.



Figure 15. Nancy Davis, biological aide, punches data on a Mathatron computer for later analysis by Tropical Atlantic Biological Laboratory scientists.

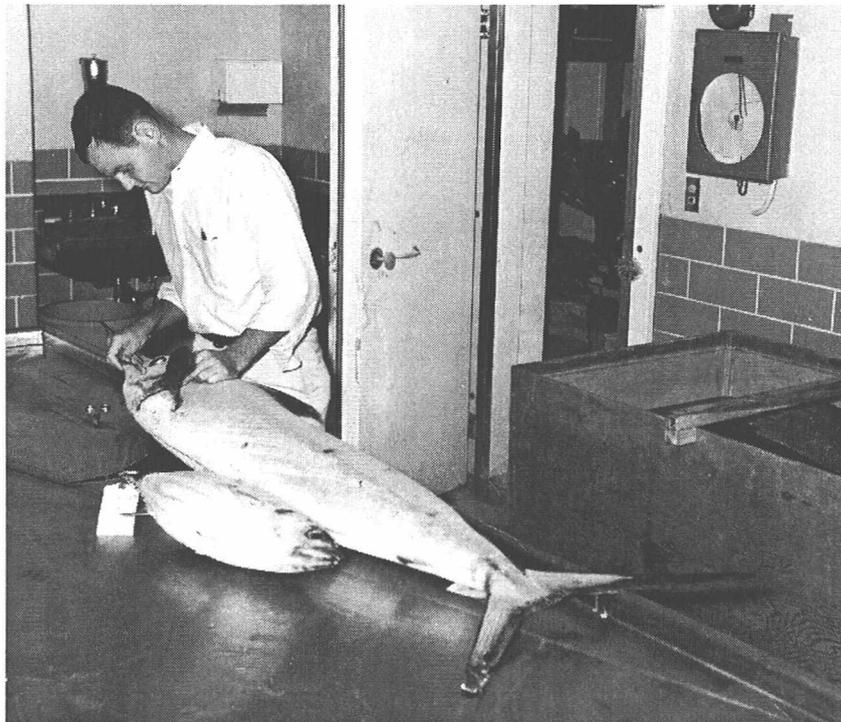


Figure 16. Biologist David Simmons examining frozen specimens of billfish and tuna returned from Tropical Atlantic Biological Laboratory vessel cruises, October 6, 1966.



Figure 17. Janice Castille records data in large aquarium room at the Tropical Atlantic Biological Laboratory. The two-way glass window behind the aquarium permitted scientists to observe fish without being seen.

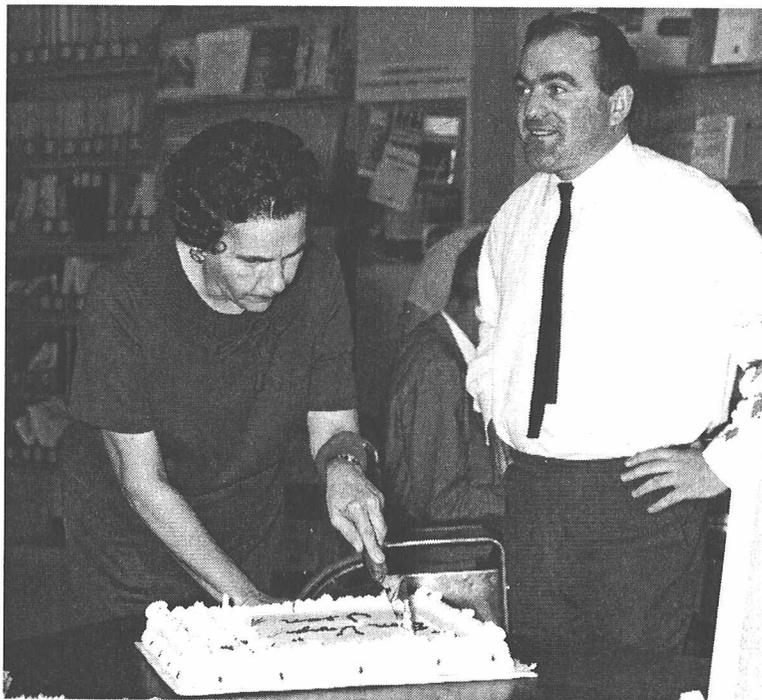


Figure 18. Visiting scientist Jean Claude LeGuen and secretary Helen Donn during a “bon voyage” party at the Tropical Atlantic Biological Laboratory, November 17, 1966.



Figure 19. Crew of the *R/V Geronimo* was presented with a Departmental Unit Citation by Secretary Stuart L. Udall after the vessel returned from a cruise to the Gulf of Guinea, Africa, in May 1965. Bureau of Commercial Fisheries' Director Donald L. McKernan made the presentation. Director Thomas S. Austin is seated. Captain Theodore Sorenson (holding the citation) stands next to McKernan.

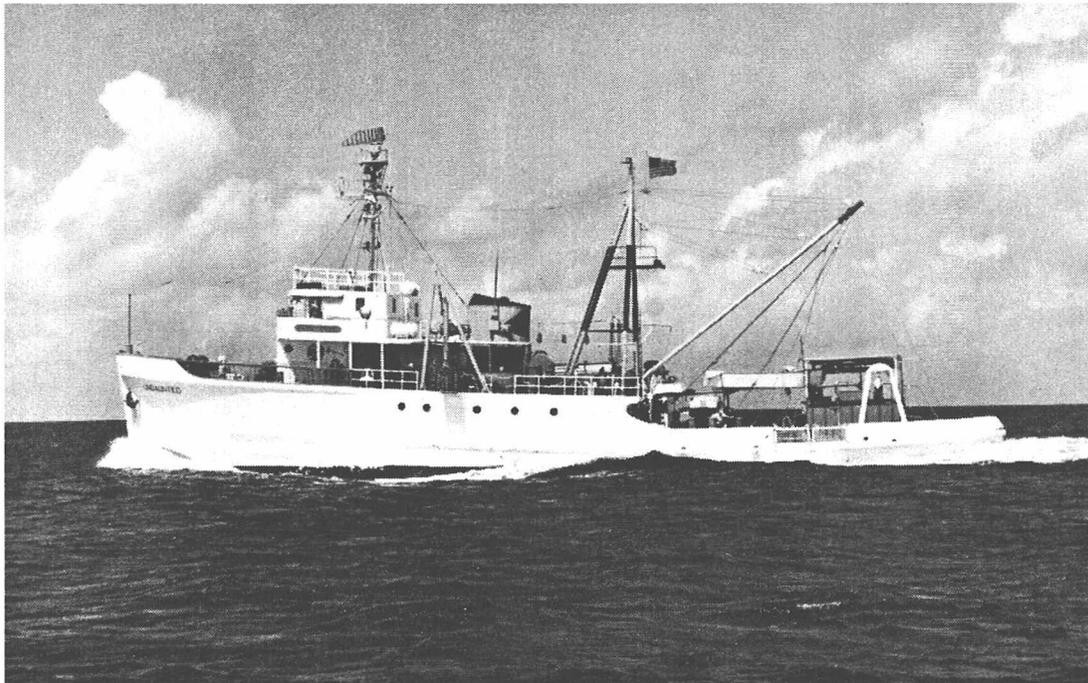


Figure 20. *R/V Undaunted*, research vessel of the Tropical Atlantic Biological Laboratory.

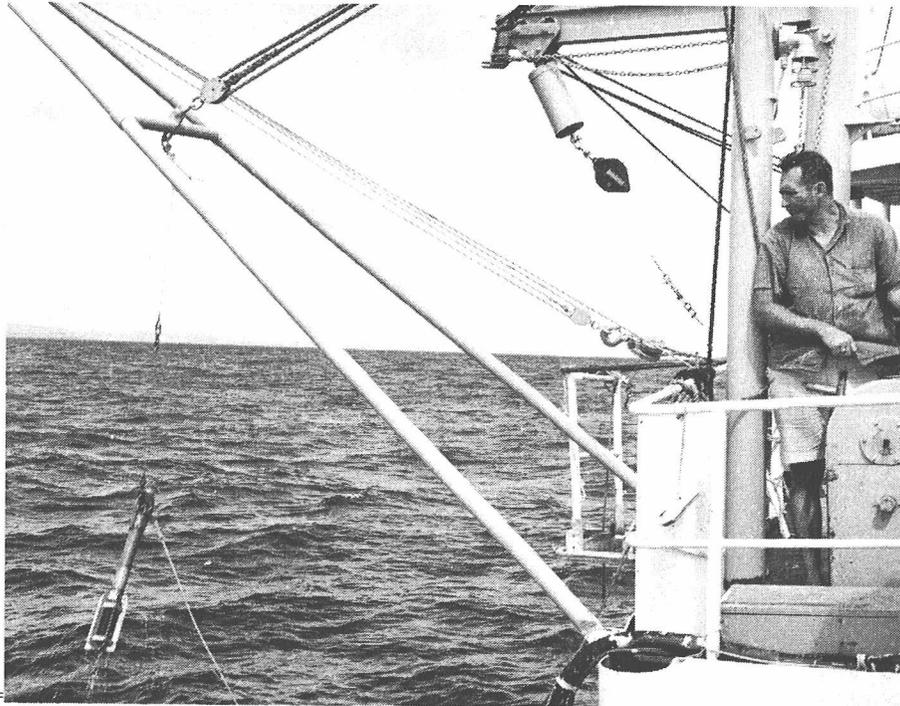


Figure 21. William J. Richards, Tropical Atlantic Biological Laboratory zoologist, retrieves a bathythermograph from the sea off the coast of South America, from deck of the *R/V Geronimo* (winter-spring 1966).

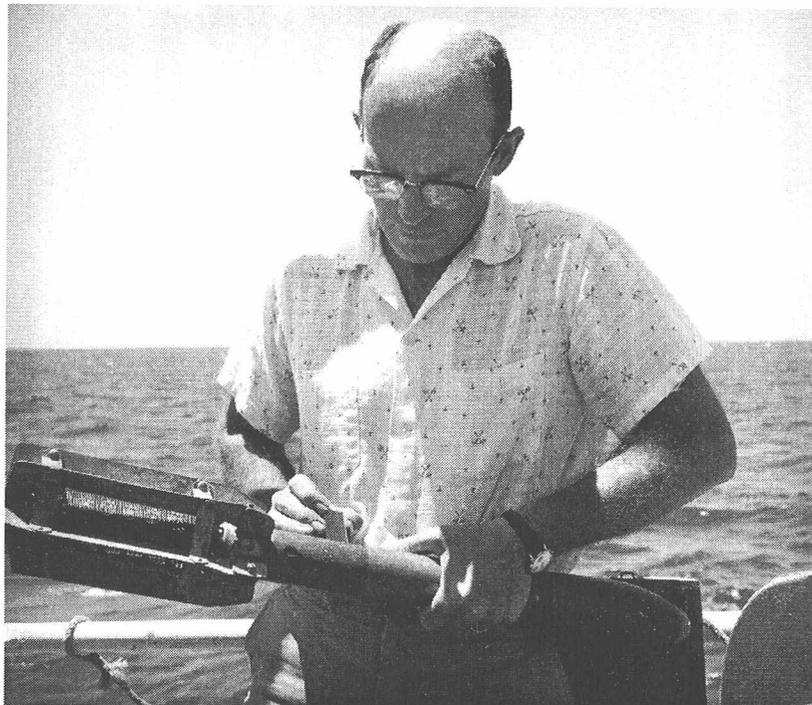


Figure 22. Merton C. Ingham, Tropical Atlantic Biological Laboratory oceanographer, removes slide from a bathythermograph aboard the *R/V Undaunted* while it was on a scientific cruise in the Caribbean Sea.

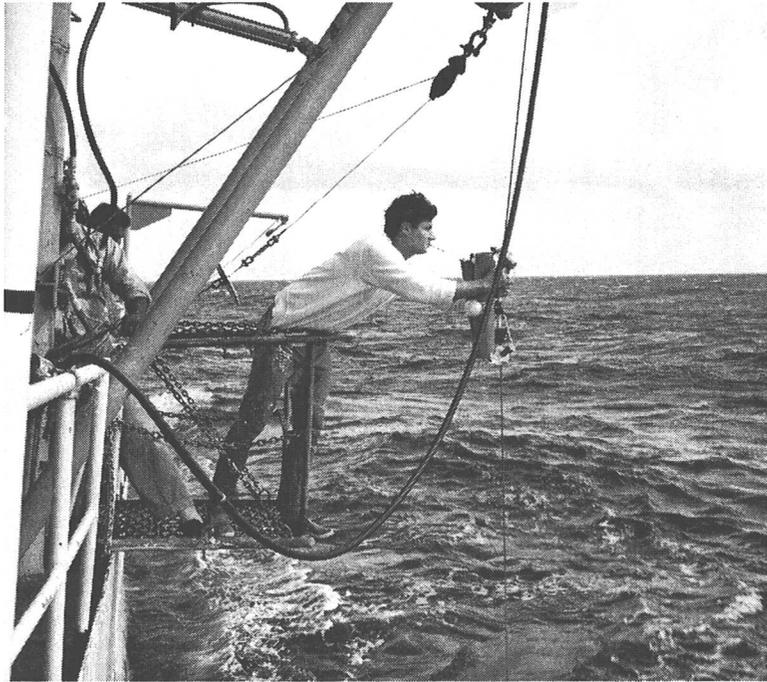


Figure 23. Stuart W. Smith, Tropical Atlantic Biological Laboratory technician, lowers a Niskin bottle from the *R/V Undaunted* while in the Caribbean Sea.

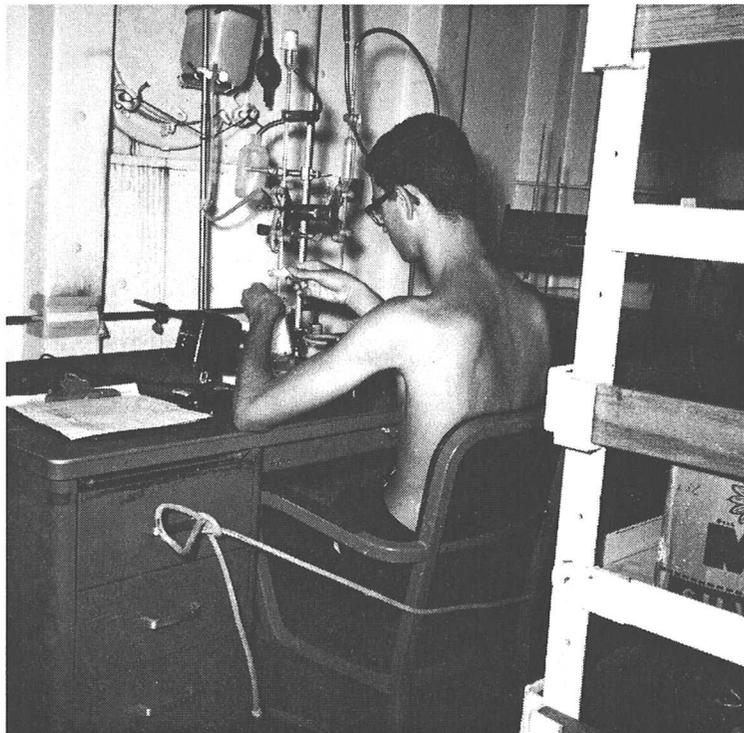


Figure 24. John T. Woosley, III, analyzes samples from a Niskin bottle for oxygen content in the wet laboratory aboard the *R/V Undaunted*. Woosley was a sophomore student at the University of South Florida and worked for Tropical Atlantic Biological Laboratory for several months in early 1966 as part of a college work-study program.



Figure 25. Donald Wagner, marine technician and field party chief of the *R/V Undaunted* on Cruise 2 in the Caribbean Sea and Antilles, lowers an STD “fish” to collect salinity, temperature, and depth data.

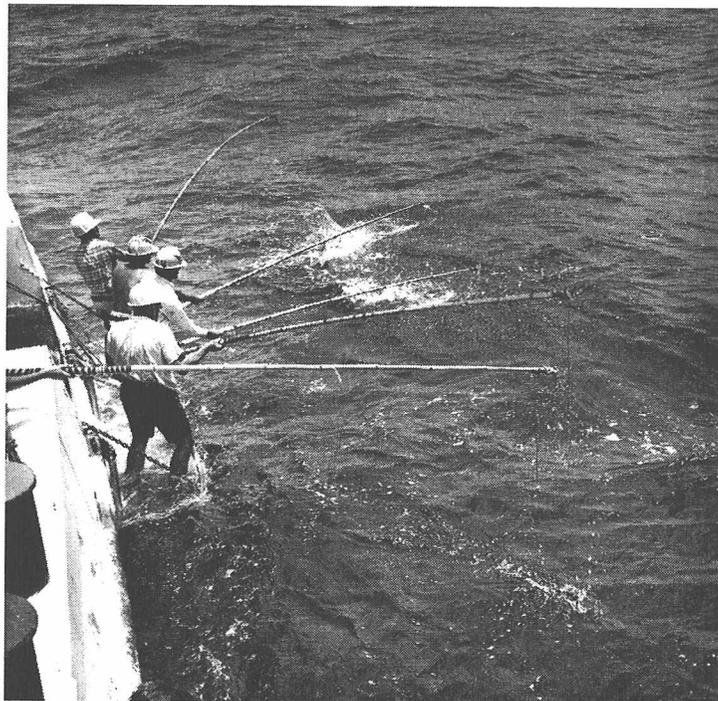


Figure 26. Fishermen aboard the *R/V Undaunted* fishing for tuna near St. Vincent Island, British West Indies. The fisherman on the far left has a fish on his line.



Figure 27. A large (about 100 lb.) yellowfin tuna about to be landed by a fisherman aboard the *R/V Undaunted* on Cruise 2, winter of 1966, off St. Vincent Island, British West Indies.



Figure 28. A deck sample of skipjack tuna caught aboard the *R/V Undaunted* off St. Vincent Island, British West Indies, in the winter of 1966. Field party chief Donald Wagner is facing the camera.



Figure 29. Southeast Fisheries Center headquarters staff, about 1980. Back row (l to r): Bill Fox, George Darcy, Wayne Witzell, Larry Massey, Ernie McRae, Sy Mendelssohn; front row: Gerri Unsell, Doris Dillman, Julie Josiek.



Figure 30. Miami Laboratory staff assembled on the beach in 1986. Front row: Brenda Smith, Lynn Pulos, Vaughn Carroll, Kevin Davis, Jim Bohnsack, Dave McClellan, Wayne Witzell, Jean Smith. Middle row: Andy Bertolino, Teresa McCormick, Dennis Lee, Joan Browder, Doug Harper, Eric Prince, Carole Goodyear. Back row(s): Essie Duffie, Joe Tashiro, Steve Turner, Mark Halsbeck (NOAA Corps), John Hoey, Craig Brown, Walther Nelson, Mal Brassfield, Larry Hansen, Mark Farber, Robert Jenkins, Dave Sutherland, Ausbon Brown, Phil Goodyear.

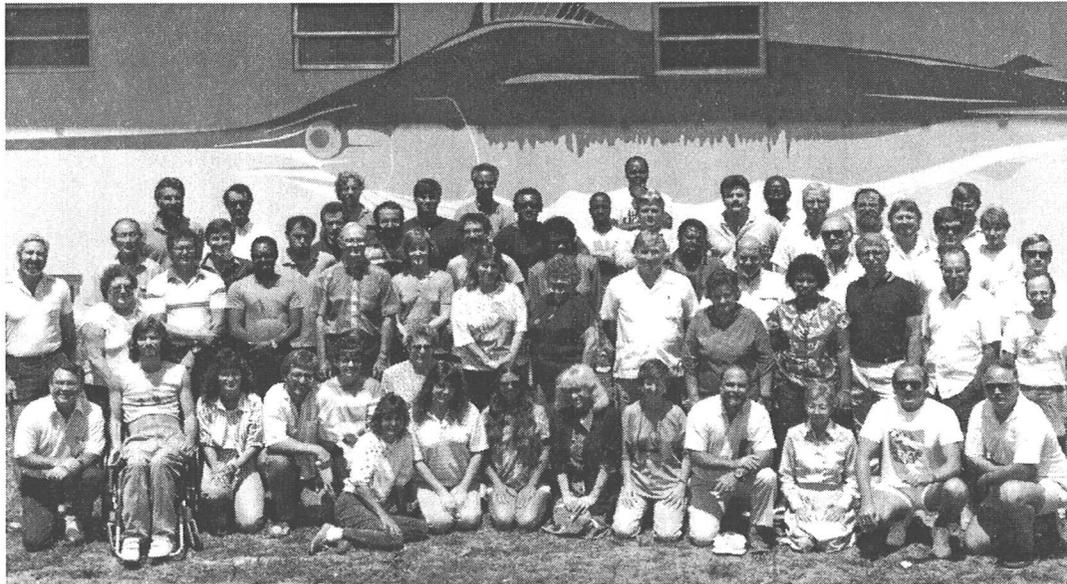


Figure 31. Southeast Fisheries Center headquarters, Economics and Statistics Office, and Miami Laboratory Staff, July 1989. Front row: Walter Nelson, Kevin Davis, Brenda Smith, Ken Seeger, Lynn Pulos, Anne Overby, MaryAnne Treadway (hand on knee), Susan Gold, Jean Smith, Nikki Bane, Peggy Solomon, Jim Bohnsack, Joan Browder, Mark Halsbeck, Wayne Witzell. Middle row: Eric Prince, Teresa McCormick, Dennis Lee, Howard Shirley, Albert Jones, Margery Bastian, Cathy Steward, Dorothy Hill, Brad Brown, Maria Llaneras, Essie Duffie, Larry Massey, Mike Parrack, Andy Bertolino. Back row (s): Joe Tashiro, Larry Hansen, Mark Farber, John Hoey, Lee Weinberger, Gary Roby, Steve Turner, Lloyd Muccio, Craig Brown, Jerry Seitlin, Ausbon Brown, Nolan Alladin, Connie Bates, Rick Barr, Mal Brassfield, Stuart Smith, Vaughn Carroll, Guy Davenport, Seymour Mendelssohn, Robert Jenkins, Grant Beardsley, Herb Prytherch, Douglas Harper, Kim Newlin, David Sutherland, Phil Goodyear, Carole Goodyear, Dave McClellan.



Figure 32. Southeast Fisheries Center headquarters and Economics and Statistics Office staff, July 1989. Back row: Gary Roby, Lee Weinberger, Lloyd Muccio, Jerry Seitlin, Nolan Alladin, Connie Bates, Rick Barr, Stuart Smith, Guy Davenport, Grant Beardsley. Middle row: Howard Shirley, Al Jones, Anne Overby, Margery Bastian, Cathy Steward, Dorothy Hill, Brad Brown, Maria Llaneras, Sy Mendelssohn, Larry Massey, Herb Prytherch, Mike Parrack. Kneeling: Ken Seeger, MaryAnne Treadway, Susan Gold, Nikki Bane, Peggy Solomon.

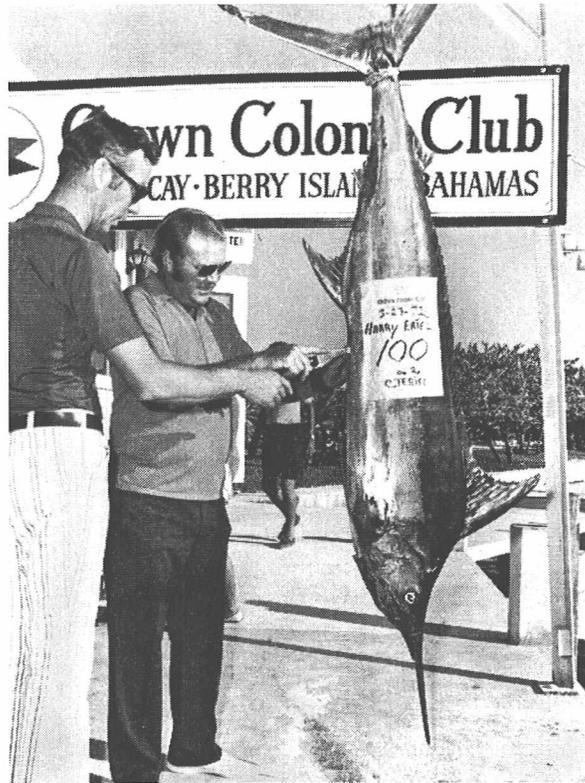


Figure 33. Grant Beardsley and Ed Scott at a billfish tournament, Berry Islands, Bahamas.



Figure 34. Precast concrete artificial habitats prior to placement in the ocean as part of a cooperative Miami Laboratory and University of Miami reef fish study. Shown are (l to r): James Bohnsack, Don Pybas, Bill Richards, Mike McGowan, and Pat Walsh

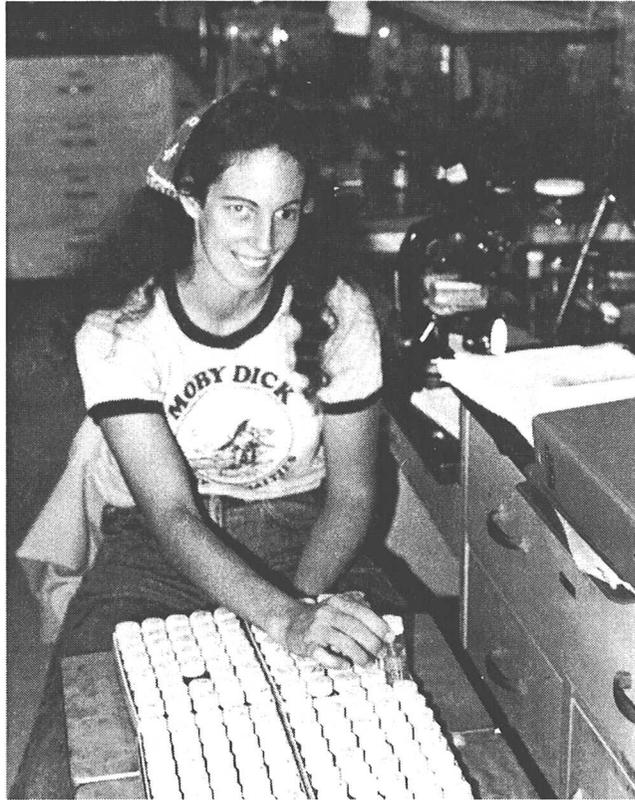


Figure 35. Sharon Kelley-Fraga archiving plankton samples at Miami Laboratory.



Figure 36. School children viewing fish demonstration during a Southeast Fisheries Center open house. Sharon Kelley-Fraga is at the far left.



Figure 37. Attendees at International Billfish Workshop, Miami Laboratory, February 1982. Dr. Eric Prince, organizer of the workshop is at far right



Figure 38. Laboratory staff and visiting scientists at international stock assessment meeting in Miami.



Figure 39. Barbara Palko collecting plankton from Bear Cut dock. Miami Laboratory is in the background.