U.S. Participation in Western Central Atlantic Fishery Activities

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RESUMEN

Tradicionalmente los E.E.U.U. ha tenido enlaces comerciales y politicos en el area del Atlántico Occidental Central (WECA). En pesquerías los E.E.U.U. tienen gran interes en el area por los stocks en comun de la región y porque nuestros pescadores, comerciales y deportistas, han realizado actividades en aguas de WECA durante decadas. En vista de estos lazos los E.E.U.U. participan en la investigación y administración de las pesquerías de WECA.

La participación es por mediación de membrecía en varias organizaciones internacionales las cuales incluyen la Comisión de Pesquerías del Atlántico Occidental Central, la Comisión Internacional para la Conservación del Atun del Atlántico, la Comisión Intergubernamental Oceanografica-Caribe y el Instituto de Pesquerías del Golfo y el Caribe.

Tambien participa directamente por mediación de actividades de investigación del Sevicio Nacional de Pesquerías Marinas al igual por medio de la Ley de 1976 y sus Consejos Regionales, tales como el del Golfo de Mexico, Atlántico Sur y el del Caribe.

INTRODUCTION

At the invitation of GCFI, I was asked to give a talk on the fishery activities and affiliation of the National Marine Fisheries Service (NMFS) in the Western Central Atlantic or WECA. After reviewing several background papers, I gained the impression the fishery activities were many and clear-cut; however, the affiliation part appears vague, so please bear with me. To avoid confusion in this paper, we shall consider the WECA area synonymous with the FAO designated WECAF region.

As you know, fisheries, as well as other marine resources and marine-oriented issues, have finally received world attention through the Law of the Sea deliberations and extended jurisdiction claims by coastal states. This is especially evident in the WECA area with over 44 nations claiming part of the action.

The United States interest in WECA not only stems from its claim over fishery resources within 200 miles, but also its past and present activities in commercial and recreational fisheries. The interest is also evident owing to the commonality of many of the fishes within the region and the environmental unity of the region's ocean system. Because of these aspects of commonality, cooperation in research, development and management between the regional nations is essential. It is a vital reason for all of the WECA nations to cooperate in developing fishery management and conservation programs. In this respect, the U.S., through NMFS, has the interest and intent to go forward.

Background

The WECA area encompasses a single major ecosystem that extends from the eastern tip of Brazil northward through the Caribbean, the Gulf of Mexico and along the southeastern United States coast to Cape Hatteras, North Carolina. The environmental unity of this ocean system is created by the division of the westward-moving South Atlantic Equatorial Current that divides at the easternmost tip of Brazil. The northern branch is known as the Guianas Current; it moves northwestward along the coast and enters the Caribbean through the Leeward Islands, and between Trinidad and Grenada. Small components of the North Equatorial Current enter the Caribbean through the Windward Islands and pass north of Puerto Rico, Hispaniola and the Bahamas, where it is called the Antillean Current. The general clockwise flow of ocean waters through the area assists in forming biological continuity for the diverse fauna. This is a warm tropical area, and adults of few species stray northward of Cape Hatteras into colder waters. Few larvae drifting in the planktonic gyre survive north of that point.

Between eastern Brazil and Cape Hatteras there are numerous river systems (exceeding 160 in total number) contributing to coastal water nutrient enrichment. Among these are such giants as the Amazon, Orinoco and Mississippi.

There are both seasonal variations of magnitude and changing climatological trends that create environmental dynamics of great complexity. These, in turn, provide the habitats and nutrient basis for the productivity of the living resources of the region, which display perplexing changes in apparent abundance and availability.

The physical complexity of the WECA area, frequently called the American Mediterranean, was emphasized when the first attempt was made to establish a fishery statistical program for the area (FAO, 1969, 1971).

The WECAF area is known as the FAO Major Fishing Area 31. The statistical areas proposed to the last plenary session of WECAF by the Working Party on Fishery Statistics are based on 5° squares of latitude and longitude.

DESCRIPTION OF THE MARINE FISHERY RESOURCES AND FISHERIES

The WECA region is exceptionally diverse geographically and climatically, ranging from large temperate continents to small tropical islands. There are vast economic differences between countries, which are reflected in the variety of natural resources exploited. Mexico and Central and South America have large commercial fisheries for shrimp and clupeoids. However, there is much artisanal fishing occurring from vessels (over 8m in length) and boats (under 8m in length) and even some subsistence fishing from beaches and canoes. The inhabitants of the many Caribbean islands, including the Bahamas, rely on a fairly stable artisanal fishery for reef fish and spiny lobsters. Some islands depend almost exclusively on single-species fisheries, for example, Barbados and its flying fish fishery. Cuba, in addition to a large artisanal fishery, also has large commercial fisheries for tuna, reef fish, and

shrimp. Recreational fisheries are developing throughout the WECA area, especially in the United States.

The fishery resources, although as diverse as the region in which they are found, are tied together by the common physical features of the region, such as the Gulf Stream, and often range beyond the boundaries of a single nation. The concept of upstream recruitment of fishery resources is extremely important to this area. The probability exists that some larvae, such as those of spiny lobster and possibly reef fishes, are carried by the Gulf Stream system to develop downstream in other areas, where they may be harvested as adults. This situation can complicate resource management unless all affected areas are involved in the management scheme.

Clupeoid Resources and Fisheries

Herrings (Clupeidae) and anchovies (Engraulidae) comprise the largest single group of fishes landed in the WECA area, and have the largest potential yield (Reintjes, 1978). The group consists of 16 species of menhaden, herring, sardine, anchovy and anchoveta. Clupeoids are most abundant along the continental shelves.

Menhaden off the southeastern United States are the only clupeoids presently fully utilized, with landings of about 700 thousand metric tons per year. Reported catches for other clupeoids in the WECA region are highly inaccurate as much of the harvest is unreported. Potential harvests for these fishes have never been estimated, except for a few species in the northeastern Gulf of Mexico, but there is common agreement that a large potential exists off Colombia, Venezuela and northeastern Brazil.

Industrial clupeoid fisheries off the southeastern United States, Cuba, Colombia, Venezuela and Brazil are similar, that is, various sized vessels fish purse seines. Fish meal and oil are the major products of the fishery. Along the southeastern United States, a small artisanal-type fishery exists from shore and boats. Beach seines, cast nets and lift nets are used in conjunction with a powerful light source, which attracts and congregates the fish schools. These fish are mainly used for bait. Artisanal fishing occurs throughout Mexico, Central and South America, and the Caribbean Sea. Beach seines, lift nets, cast nets and weirs are the main methods utilized. These clupeoids are generally eaten (Estes, 1976; Higman et al., 1978).

Pelagic Resources and Fisheries

Pelagic resources are enormously diverse and can be categorized into two groups: oceanic pelagics and coastal pelagics. Almost all of the pelagic species are distributed throughout the WECA region. Oceanic pelagics, generally, are the highly migratory species of tuna (Scombridae), billfishes (Istiophoridae), swordfish (Xiphiidae) and sharks (predominately Carcharhinidae). Coastal pelagics are less migratory and consist of many species. They include mackerels, bonito, and wahoo (Scombridae); scads and jacks (Carangidae); dolphinfish (Coryphaenidae); flying fish and halfbeaks (Exocoetidae); bluefish (Pomatomidae); and butterfish (Stromateidae). Though pelagic, these fishes generally occur near land masses. Potential harvests for this group as a whole have been estimated by Bullis et al. (1971)

and Gulland (1971), and range from 1,320 to 2,920 thousand metric tons.

Oceanic pelagics, especially the tunas, are actively fished by many nations located both inside and outside the WECA region. Most of the stocks are already harvested close to maximum sustainable yield, the commercial fishery consisting of large vessels fishing longlines and purse seines. Billfishes are almost exclusively fished recreationally along the United States coast, where these fish are either released or mounted as trophies. In other areas of the WECA region, many billfishes are caught as a by-catch of tuna longlining and trolling, these fish generally being eaten. Swordfish are caught commercially off the southeastern United States by longline and harpoon from vessels of various sizes. Like the billfishes, swordfish are taken as a by-catch on tuna longlines.

Coastal pelagic resources can be roughly categorized as to those with and those without potential for fishery development, based upon schooling behavior or gear susceptibility. The group with promising fishery potential consists of scads, butterfish, flying fish, and halfbeaks. These fish occur throughout the area, preferring continental shelves, regions of upwelling, and other areas of plankton concentrations. These fish form dense schools, are attracted to strong light sources at night, and are often associated with schools of clupeoids. Though no large direct commercial fishery exists for these fish, many are taken incidentally to the purse seine clupeoid fishery of the southeastern United States, Cuba, Colombia, Venezuela and Brazil.

The group of coastal pelagics not likely for fishery development are jacks, dolphinfishes, wahoo, bluefish and bonito. These do not densely school, are often solitary, are active predators, and are seasonally abundant. Along the southeastern United States there is no direct commercial fishery for these species, except for a small beach seine fishery for bluefish. However, many of these fish are caught recreationally and as a by-catch of other fisheries. Many are caught by trolling off Central and South America, and in the Caribbean Sea.

Additional species likely for limited expansion are the Spanish mackerels which occur predominantly along continental shelves, following closely the distribution of the clupeoids. The mackerel harvest by the commercial and recreational fisheries off the southeastern United States is approaching maximum production. These fish are caught from bridges, boats and vessels. The Central and South American stocks of mackerel are not yet fully exploited. Mackerels are less abundant in the Caribbean Sea and are taken incidentally in other fisheries.

Demersal Fish Resources and Fisheries

The demersal fishes may be divided into reef fishes and groundfishes. There are more than 30 species of commercially important reef fish, mainly snappers (Lutjanidae) and groupers (Serranidae), fished throughout the WECA area. These fish generally inhabit hard bottoms on continental and island shelves and oceanic banks in depths generally less than 250 meters. The groundfishes include many species of hake (Gadidae), and croaker, drum, sea trout and spot (Sciaenidae). These fish primarily inhabit softer bottoms on the continental shelves. Potential yields of all demersal fish resources in the

WECA area have been estimated by Klima (1976) as about 2.7 million metric tons.

Crustacean Resources and Fisheries

Shrimp is the most valuable crustacean resource in the WECA area. There are more than ten commercially valuable species occurring in the area. Most shallow-water shrimps (Penaeidae) appear to be fully exploited off the southeastern United States and Mexico. Some recent expansion has taken place in the Guianas-Brazil area and in deep water. Increased production of 90 thousand metric tons may be expected (Wise, 1976).

Commercial shrimp fisheries throughout the region use trawls. However, an undetermined amount of artisanal fishing occurs in estuaries and lagoons using cast nets and beach seines from boats and canoes. The Caribbean islands generally have insufficient shrimp nursery grounds, or do not have access to shelf areas. Exceptions to this are Cuba and the southernmost islands in the Lesser Antilles, which operate shrimp fleets similar to those in the United States fishery.

There are two major species of spiny lobster (Palinuridae) occurring in the WECA area. The Bahamas, Brazil, Cuba and the United States presently harvest the majority of spiny lobsters (Wise, 1976). An increase in production, from 30 to 40 thousand metric tons, is expected. The countries with the greatest potential for expansion are Bahamas, Cuba, Honduras, Mexico and Nicaragua.

The crab resource in the WECA area is dominated by the blue crab (Portunidae) along the southeastern coast of the United States. This stock, as well as that of the Florida stone crab (Xanthidae), appears to be near maximum production. Other species of swimming crabs in Central and South America and the Caribbean Sea are presently underexploited by 50-150 thousand metric tons (Wise, 1976).

Molluscan Resources and Fisheries

Seven species of squid (Cephalopoda) occur inshore and offshore throughout the WECA region. These squids comprise an underutilized resource, due to a low market demand. Little is known of their life histories and abundance, but Gulland (1971) estimates a potential harvest of 0.5 - 1 million metric tons. Squid are mainly caught incidentally in the trawl fishery for shrimp. Potential harvest methods include trawls, purse seines and jigging in conjunction with strong light sources at night.

Five species of important octopi (Octopoda) generally inhabit shallow sand grass flats, coral reefs and rocky bottoms. There is no large directed fishery for octopi in the United States, but they are fished commercially and artisanally in Mexico, Central and South America, and the Caribbean Sea. There are no estimates for potential production of octopi in the WECA region, but expanded production might be expected. Countries presently harvesting major amounts of octopi are Mexico, Venezuela, Cuba, Dominican Republic and Puerto Rico (Voss, 1973).

Many other species of mollusks occur throughout the area at generally shallow depths. These include scallops, oysters, mussels and clams (Bivalvia);

and conches, top shell and whelks (Gastropoda). These mollusks occur at generally shallow depths, therefore, production is limited by estuarine pollution and development. Mexico and Central and South America have commercial and artisanal fisheries for oysters, mussels, conchs, clams, whelks, arks and top shell. Increased production from some of these species, especially mangrove oysters and mussels, can be expected. These fisheries are mainly artisanally harvested by hand. The Caribbean islands support fisheries primarily for queen conch and West Indian top shell.

NMFS Activities in the WECA Area

NMFS activities in the WECA area are conducted in coordination with elements of the Office of International Fisheries Affairs (IFA), Southeast Regional Office (SERO), and Southeast Fisheries Center (SEFC). In addition to other aspects, IFA provides guidance in development and implementation of national policy; SERO and SEFC are responsible for designing and conducting programs responsive to national policy.

In this respect, NMFS is directly or indirectly affiliated with numerous organizations in the WECA area, described below.

INTERNATIONAL INSTITUTIONS

Western Central Atlantic Fisheries Commission (WECAFC)

The FAO Regional Commission for the Western Central Atlantic (WECAFC) is the area's single most important fishery organization. Its mission is to promote the development of the region's fishery resources. The original statutes precluded the Commission from participating in the regional management of fishery resources, which other FAO regional commissions are authorized to do. The statutes have since been amended to allow involvement in management (Villegas, 1978).

WECAFC has 27 member countries, both coastal countries within the WECAFC region and countries whose distant-water fleets fish in the WECAFC area. The Commission meets every two years and is responsible for directing the work for the UNDP/FAO Regional Fisheries Development Project (WECAF). Headquarters of the WECAF Project is located in Panama City, Panama, supported by a UNDP budget to which the U.S. contributes over 20% of the total.

The WECAF Project has organized missions, seminars, and workshops, and has prepared a major survey of shrimp, lobster, and fish resources, including detailed species identification books. The project is also cooperating with IOCARIBE in a study of trap fisheries in the Lesser Antilles and of lobster stocks in the Western Central Atlantic.

The WECAF Commission and Project are of special interest to the United States for two reasons:

1. The WECAF Commission's area of responsibility includes part of the U.S. Fishery Conservation Zone (FCZ). In addition, several commercial and recreational species, important to U.S. fishermen, spend at least part of their life cycles off the coasts of other countries in the region. If these species are to be managed through their life cycle, some form of regional cooperation may

be necessary.

2. WECAFC affects the fishing industries of the countries in the region, and can help the U.S. promote their development. WECAFC is currently the only organization which could coordinate: a) regional management, b) training, and c) commercial cooperation.

International Oceanographic Commission for the Caribbean and Adjacent Regions: (IOCARIBE)

IOCARIBE operates as a coordinating body for scientific representatives from countries encircling the Caribbean. At its recent plenary session, research in support of fisheries was accorded top priority. Thus, IOCARIBE provides an effective international scientific cooperative mechanism addressing specific problems of regional and world interest. Proposed IOCARIBE programs concerned with snapper-grouper recruitment, spiny lobster management requirements, and the evaluation of regional turtle stocks all coincide with regional priorities. It is important to recognize that only through institutions such as IOCARIBE can the required cooperation on problems of endangered species of an international nature be effectively addressed.

Marketing Information Service for Latin America (INFOPESCA)

INFOPESCA is a UNDP/FAO project seeking to promote fisheries development by offering marketing services to private companies through government agencies in member countries. Currently, 22 Latin American countries participate in INFOPESCA, and several other countries in Europe and Asia cooperate by providing information on their domestic markets. The United States is not a member of INFOPESCA at this time, but is studying the matter to consider joining in the future.

International Commission for the Conservation of Atlantic Tunas (ICCAT)

ICCAT has been in existence since 1969. Eighteen countries from the Western Central Atlantic and Caribbean area are members, including Brazil and Cuba.

ICCAT has responsibility for obtaining and collating the information necessary for maintaining stocks of tuna and tuna-like fisheries in the Convention area, which includes all waters of the Atlantic Ocean and adjacent seas. The Commission concerns itself with: (1) joint planning of research, coordination of research carried on by agencies of the parties in accordance with its plans, and joint evaluation of the results of such research; (2) the collection and analysis of statistical information relating to the condition of fishery resources in the Convention area; and (3) joint formulation of regulatory proposals for submission to the parties.

To date, the Commission has taken regulatory action with regard to two species of Atlantic tunas—yellowfin and bluefin. The Commission has also embarked on a four-year program to study Atlantic skipjack. Participation of the U.S. in this program will be directed by NMFS Southwest Fisheries Center with assistance from the Southeast Fisheries Center.

Gulf and Caribbean Fisheries Institute (GCFI)

The Gulf and Caribbean Fisheries Institute is an information and service organization administered by the University of Miami. It was formed in 1948 to assist the commercial and sport fisheries of the region. Its principal activity is to organize a meeting once a year to which a wide spectrum of scientists, administrators and industry representatives is attracted. The Institute has provided a valuable service in the form of the annual *Proceedings* of these meetings, since they constitute the most complete and comprehensive historical, scientific and economic account of the Gulf and Caribbean fisheries in existence. The Institute has also served the area through special fishermen's workshops, and by providing technical advice to Caribbean area governments on fisheries problems, either personally by Institute staff or through correspondence.

The organization of the Gulf and Caribbean Fisheries Institute by the University of Miami was significantly helped by the support of the Bureau of Commercial Fisheries, U.S. Department of the Interior, the predecessor of the National Marine Fisheries Service of the U.S. Department of Commerce. This support has been continued throughout the more than 30-year existence of the Institute, and has been a major factor in the effectiveness of the organization.

Mexico-U.S. Cooperative Fishery Research Conferences (MEXUS-GULF)

MEXUS-GULF is a cooperative, research-oriented program between the United States and Mexico. It deals primarily in projects of interest to both nations, such as transboundary fish stocks, pollution, ichthyoplankton and data management. Details of the ongoing work will be discussed at the Fourth MEXUS-GULF Cooperative Fishery Research Conference that follows these GCFI sessions.

DOMESTIC, NON-FEDERAL INSTITUTIONS

Fishery Management Councils

Three of the eight fishery management councils authorized by the Fishery Conservation and Management Act of 1976 are involved with fisheries in the Western Central Atlantic and Caribbean area. Fishery management plans developed by these councils will have major impacts on the area. Even more significantly, fishery management decisions, or the lack of them, by the 40 or more political entities in the area can determine the success or failure of fishery management plans in the U.S. FCZ. This is because most of the fishery resources of the WECA are either shared by fishermen of several countries or because the fish or their eggs and larvae drift or move from waters of one country to another.

Caribbean Fishery Management Council: The Caribbean Fishery Management Council is more intimately involved with the WECAFC area than are other councils. The U.S. FCZ around Puerto Rico and the Virgin Islands is almost completely surrounded by the fishery zones of other countries.

The fishermen of these islands, both U.S. and foreign, have a long heritage of moving and fishing freely from island to island. The council and its staff regularly attend meetings of the institutions of the area, including IOCARIBE, WECAFC, MEXUS-GULF and the Gulf and Caribbean Fisheries Institute. Fishery management plans being developed by the Caribbean Council are spiny lobster, coastal pelagics (mackerels), shallow water reef fish, deep water reef fish, billfish, and conch and whelk--all of regional concern.

Gulf of Mexico Fishery Management Council: The Gulf Council's prime interest in the WECA relates to fisheries shared with Mexico and Cuba. These include shrimp and reef fish such as snapper and grouper. The Council is in the final stages of developing fishery management plans for each of these species. Other species for which the Council is currently developing plans that impact on the area are coastal pelagics, billfish, sharks and spiny lobster. Council members and staff play a key role in WECA institutions, principally MEXUS-GULF.

South Atlantic Fishery Management Council: The South Atlantic Council is primarily involved in resources or fisheries historically shared with the Bahamas. These include billfish, sharks, swordfish, spiny lobster, reef fish and mackerel. Most of the U.S. fishermen who were banned from the Bahamas lobster fishery in 1975 are from Miami, in the South Atlantic Council area. The Council has participated in WECAFC and other area meetings.

State Agencies

Florida and Texas have a very strong interest in WECAFC area matters. Representatives of the fishery resource agencies from each of these states have participated in international fisheries negotiations with Mexico and the Bahamas. Distant water shrimp and snapper/grouper fisheries which operate in several Central and South American countries are based in these states. Fishing agencies of both Puerto Rico and the Virgin Islands are vitally concerned with WECA area matters and maintain a deep involvement. The directors of the fisheries and conservation agencies of all southeastern states are voting members of the Fishery Management Councils and have come to rely on their participation and attendance at Council meetings to stay abreast of area-wide activities.

Academia

There are some 44 installations in the WECA area that are involved, to varying degrees, in marine science research (not including U.S. federal installations). Of that number, 25 are directly part of, or connected with, a university or college. With very few exceptions, academic institutions deal with marine biology, oceanography, and, to some extent, resource evaluation, but little emphasis is placed on resource management. Villegas (1978) states that in the majority of Spanish-speaking countries instructions can be obtained in these fields, but few countries in the Caribbean English-speaking sector can provide local training and teaching. Notable exceptions

include the Department of Zoology of the University of the West Indies, Jamaica and Trinidad; Department of Marine Sciences of the University of Puerto Rico; and the West Indies Laboratory in the U.S. Virgin Islands. A number of U.S. academic institutions, such as the Rosenstiel School of Marine and Atmospheric Science of the University of Miami, Texas A&M University, and Louisiana State University offer undergraduate and graduate programs in marine science. In addition, certain U.S. universities have been involved in special projects in the Caribbean area—Auburn University (aquaculture) and University of Rhode Island (fishery economics and sociology).

DIRECT NMFS PARTICIPATION

At present, under leadership of NMFS/SEFC, five projects have been identified which have special relevance to the WECA area and are, or will be, undertaken during fiscal year 1980. These projects are:

Data Analysis and Data Bank: The project is concerned with fishery resource data and is located at the NMFS Pascagoula and Bay St. Louis, Mississippi, computer facilities. The data include: (a) Exploratory fishing information from 1950 to the present; (b) FAO-UNDP information from the Caribbean Project work; and (c) Texas, Florida, and North Carolina resource assessment records. It is proposed to transfer the above data to the central computer system in Macon, Georgia. An inventory and analysis would be made of the data for distribution to potential users in the WECA area.

Mariculture of Queen Conch: The project is designed to evaluate the technical and economic feasibility of growing queen conch in Puerto Rico, the Virgin Islands and elsewhere in the Caribbean.

Shrimp Tagging in the Guiana Area: As part of the WECAF Project, NMFS/SEFC has a project underway to tag shrimp and conduct estuarine surveys in the Guiana area. It is planned to train biologists from Guiana and Brazil in shrimp tagging techniques. Training is to take place at the Galveston Laboratory. This project is already on track with a biologist from the SEFC scheduled to conduct the estuarine (nursery) work in early November 1979.

Training of WECA Fishery Officials in U.S. Management Methods: It is proposed to offer training to officials of the WECA area to familiarize them with our FCMA Regional Council activities.

Marine Turtle Symposium: The symposium is scheduled for November 1981 in San Jose, Costa Rica. Preliminary administrative actions are underway.

In conclusion, I would like to quote a policy statement from NOAA/NMFS relevant to WECA and which is self-explanatory: "It shall be the policy of NOAA/NMFS to participate with other countries of the Western Central Atlantic and Caribbean area in promoting the conservation and enhancement of the marine living resources of the area so that the people of the countries involved can derive the maximum benefit from their use."

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