a number of organizations and facilities which are capable of coping with some part or all of the problem, and which have common interests. These include the State Board of Conservation, the Game and Fresh Water Fish Commission, the public health agencies, the Corps of Engineers, and certain municipal and industrial elements, in addition to the Fish and Wildlife Service. Certainly the state agencies are active and progressive groups, with clearly demonstrated abilities and interest, as we know from our associations with them in cooperative studies of water-use development projects.

In the way of research facilities, there are the Oceanographic Institute at Florida State University, the St. Petersburg Laboratory of the Board of Conservation, The Marine Laboratory at the University of Miami, and graduate student research programs in the biology departments of the colleges and universities.

It should be emphasized that the Corps of Engineers, which is constructing the Central and Southern Florida Flood Control Project and other projects, is cooperative in the field of fish and wildlife conservation. The Corps not only has its own staff biologist, Mr. Gordon Hall, at the Jacksonville office, but also has enlisted the assistance of marine scientist Gordon Gunter.

Florida's estuarine resources appear to be at a cross-roads, and an unfavorable balance can come in the near future if persons interested in these resources do not continue actively to represent their case. Opportunity still remains to retain these resources, and to regain some of those portions which have been lost. It is not possible to predict what the total effect of the water-use programs on the estuaries will be. We can be sure, however, that the total effect will be unfavorable unless these resources are given every reasonable consideration in project planning. We realize that much needs to be done to further the effectiveness of our activities and the activities of those concerned with the total problem of estuarine conservation.

We are vitally interested, along with you, in the preservation of these resources, which are so outstanding a characteristic of the unique Florida scene. We are disturbed at the deterioration which seems to have occurred, and we shall work with you and for you toward lessening their attrition, within the area of our authority.

DISCUSSION

Caribbean and General Session

Discussion Leader: L. S. MOWBRAY

Discussion Panel: ORIS RUSSELL, FRANK J. MATHER III, HECTOR FERREIRA

The Present Situation in the Fishing Industry of Cuba

JOSE A. SUAREZ CAABRO

Q. Mowbray: How are the tuna and grouper caught in Cuba?

A. Suarez: In Cuba we catch tuna using the Japanese method of pole

and line from small boats. We catch grouper in deep water at Campeche using handlines. We tried electric reels, but fishermen prefer the handline.

Q. Mowbray: Is the region of Guatanamo Bay a productive area for spiny lobster fishing?

A. Suarez: The main spiny lobster grounds are south of Havana. I do not think they catch many spiny lobsters commercially in the area you mentioned.

Q. Russell: What method did you use to obtain your estimates on landings of fish?

A. Suarez: From the canneries and the commercial fishing establishments. Because of taxes and other factors it is difficult to get accurate figures.

Q. Ferreira: What type of tuna do you can?

A. Suarez: Skipjack or ocean bonito (*Katsuwonus pelamis*), and blackfin tuna, (*Thunnus atlanticus*).

Q. Ferreira: Do you consume all your canned tuna at home?

A. Suarez: Yes, we produce about half of our consumption. The other half comes from Spain or the United States.

Q. Ferreira: Do you can other fishes besides tuna?

A. Suarez: No. A few years ago we tried canning sardines but it was not successful.

Q. Rosa: What is the status of your marine laboratory?

A. Suarez: It is closed.

The Marine Fisheries of Yucatan, Mexico

JORGE CARRANZA

Q. Russell: Do you utilize any of the products from your sharks or do you ship them all to the United States?

A. Ferreira: The dried, salted meat provides a very low priced protein product and this is consumed in Mexico. We used to import a great deal of cod but now the shark meat is utilized to a greater extent. Fresh livers for vitamin A are shipped to the U. S. and so are the hides and fins, used by the Chinese population for their famed sharkfin soup.

Q. Strasburger: How many shrimp boats do you have on the west coast of Mexico?

A. Ferreira: The total number of trawlers operating as far south as Salina Cruz probably comes to 500. They are mostly old boats. Close to 100 new boats are being built along the Pacific Coast to replace these older boats.

Q. Murdock: What is the comparative cost of constructing a 67 foot shrimp boat in your yards to those of the United States?

A. Ferreira: Our construction costs are lower than yours by about 25 per cent. New boats, 65 feet long with a Caterpillar engine model D342 are costing from $33,000 to $36,000 on the Pacific coast. I understand your costs are approximately $45,000 for that size boat.

Q. Wilkensen: Is any canning of pilchards done in Mexico?

A. Ferreira: Mexico cans sufficient pilchards for its own domestic market only. The fishing is done on the Pacific Coast only, close to the California border. The canneries are established at Ensenada, B. C., about 60 miles from the border.

Ways and Means of Promoting Improvements in a Caribbean Fishery

DUDLEY W. WILES

Q. Mowbray: What happened after the disastrous hurricane that disabled the fishing fleet in the Barbados last year?

A. Wiles: After hurricane Janet in September, 1955, we had 25 boats completely destroyed, 36 boats knocked to pieces and 19 rowboats lost, to say nothing of fishermen's houses. Their families were completely disorganized and without food or clothing. I suggested that we replace the sailboats with launches. We helped rebuild power type hulls and made the fishermen eligible for a loan from the government. The fishermen could borrow up to $2,160 to help him put a small diesel engine into his boat. We have completed over 25 replacements and repaired all the sailboats that could be fixed. The biggest development throughout the island has been the general mechanizing of the fishing fleet. A few years ago we had only 25 powered boats. When I left Barbados last week we had 197, and 14 more will be registered in another ten days. So we have been moving very quickly to try to get another type of boat which will be safer and do a better job for the fishermen.

Q. Ferreira: How were you able to recruit fishermen to the industry in Barbados to increase your production?

A. Wiles: Actually, we have used the same men and the increasing production was not due to an increased number of fishermen, but to the introduction of the use of gill nets for flying fish. The men have always been available from the sailboats to be used on the boats that are mechanized. Many of the sailboats will not be used any longer.

Q. Mather: In the Virgin Islands we have mostly old fishermen with no young men coming into the fishery. With most of our young men being attracted to other industries such as tourism, I think we might have a recruitment problem in a few years and I want to ask if Mr. Wiles has any comments to make on this situation in the Virgin Islands.

A. Wiles — To recruit new blood into the industry, fishing must be made safer, and a man must be able to make a living wage.

Q. Rosa: — Have you any reason for not including the continental countries such as Venezuela, Colombia and Central America in your zoning scheme? Are there research boats to carry on this program and, if there are such boats, would they carry on all the exploratory and experimental fishing?

A. Wiles: — The idea of zoning the islands of the West Indies was put forth to get things started and to get people thinking that there are some fish in the area. Most reports of this area give a very pessimistic view of the fisheries and we have not found it really to be so. I thought that my suggestion was quite an ambitious task, but the other areas should be included in a larger plan. I really look forward to seeing FAO work on this plan. I thought that if we had a research boat for each zone that a very good start could be made. I would leave the actual planning of the work for the research boats to the fishery advisory committee in each zone.

Q. Kahn: — Where do the subsidies come from that are paid on salt fish? Who receives these subsidies?

A. Wiles: — The government in trying to keep the price of fish down, has subsidized the retail price of salt fish and that has been paid direct to the first importer. Then he is able to sell it to the various retailers at a reduced price. The retailer has a controlled figure set by government audit. Even under subsidy, the price of controlled salt fish is now selling for 8-10 cents a pound higher than fresh fish in some of the colonies.

The Survey of Living Aquatic Resources

H. Rosa

Q. Russell: — How does the FAO award fellowships and grant technical assistance to participating countries? How do they provide the funds?

A. Rosa: — This is administered by the technical assistance board of the United Nations. It is a fund made up by contributions of different countries directed to the United Nations and the technical assistance board divides this fund among the specialized agencies. We establish with this fund a share for each country and, depending upon requests we receive from the countries, we provide experts or technicians. We pay the salaries of the technicians and their traveling expenses and sometimes we provide some equipment. The expenses in the country, like travelling, and per diem, are paid by the country. Regarding fellowships, our main object is to secure continuation of the project. We don't keep a foreign expert in the country for more than two or three years at the most, but we want to make sure that his work will be continued

when he leaves. The country is supposed to supply one competent technician to continue the work. When the expert finds a man really interested in this work he recommends him for a fellowship. We do not normally award fellowships to countries where we have no experts working in the field.

Q. Wiles: Could we look forward to help from FAO in the project I discussed this morning?

A. Rosa: Yes, we have a man working with the Caribbean Commission now. It would be up to him to evaluate this project and recommend what action FAO should take.

Q. Kahn: Do you think FAO would be willing to help train fishery economists by giving scholarships or fellowships to universities for this purpose?

A. Rosa: Yes, if the interested country would request it well in advance we will be glad to consider these fellowships. We recognize that there is a scarcity of fishery economists. Our program is planned a year in advance so that any request now would be considered for 1958.

Activities of the Corps of Engineers as they Affect the Coastal Waters of Florida

OSCAR G. RAWLS

Q. Ferreira: Is the program of the Corps of Engineers financed entirely by the U. S. government?

A. Rawls: The amount of federal contributions in projects varies considerably with the project. In the case of navigational improvements almost the entire cost is borne by the federal government. The local interests, as we call anybody other than the federal government, contribute only the land and rights of way for normal navigation and river and harbor projects. In the case of flood control it's a different matter, and the local contribution is considerable. We divide the categories of benefits into two parts, one being those which are considered to be entirely of federal interest, such as navigation as it may be related to flood control, fish and wildlife activities, and the prevention of flood damage. There is another activity which is predominant in some of these projects, namely increased land use, that is, obtaining greater production by reason of flood protection. Obviously that benefit accrues to the land owner himself, for the most part, although there is a considerable national or federal interest in it. In cases like that the local interests pay for about half.

Q. Russell: Is the migration of mullet out of Lake Okeechobee an annual occurrence?

A. Rawls: Yes, it is usually a small affair and, up until last year, it was the kind of thing that the normal movement of boats

through the locks took care of without any special preparation. But last year, for some unknown reason, these mullet sought to get out by the millions. We couldn't put a fish ladder in that would do anything like the job that can be done by the lock.

Q. Kahn: On the question of evaluating benefits in preparation for engineering projects, there has been the criterion established that the value of the commercial fisheries is established by the value of the annual catch, and the value of the sport fishery is what the sport fishermen spent. I do not think this type of evaluation is correct. What the fisherman has as income is not all profit and besides, when a fishery is destroyed, income is taken away from the processor, wholesaler and the retailer. These factors are never considered. On the other hand, what the sport fishermen spends is not all profit for the area. Would you agree that this evaluation system could be improved?

A. Rawls: Yes, there is great room for improvement in both sports and commercial fisheries analysis of benefits.

The Activities of the Fish and Wildlife Service, Office of River Basin Studies, in Florida

ARTHUR R. MARSHALL

Q. Heydecker: Do you think, on the basis of the studies that you are now making, that it will be possible to appraise the estuarine waters and marshlands to such an extent that you would be able to determine their highest economic use, whether as nursery grounds for the fisheries, or as farm areas?

A. Marshall: Yes, I believe if the proper studies are made we will be able to make reasonably sound estimates of the relative importance of the various possible uses for various stretches of water. Without research, however, this task would be hopeless.