

PRELIMINARY PLAN TO DEVELOP SOME  
MARINE RESOURCES IN THE ATLANTIC  
COAST OF HONDURAS

Oregon State University  
School of Oceanography  
Marine Resources Management

Mirna Marin

Corvallis

1979

- Marine Resource Management Program
- School of Oceanography, Oregon State
- Research Paper

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ceanography  
e University  
egon 97331

## ACKNOWLEDGMENTS

I want to express my gratitude to my advisor, Dr. Victor Neal, for help in finding a program that will fulfill the needs of the area in which I will work.

I am grateful to Ed Condon and all the professors and personnel of the School of Oceanography, that in one way or another, helped me through my studies.

I thank Dr. Ralph Bogart and his wife for all the help that they gave me in different aspects of my career.

I extend my gratitude to the personnel of the Ministerio de Recursos Naturales for all the support during the research.

I give my thanks to the Latin American Scholarship Program of American Universities (LASPAU) and Dr. Marvin Durham for the help to solve the problems that I faced during my studies.

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INTRODUCTION

As a part of the Marine Resources Management program, it is necessary to serve an Internship. Being from Honduras, which lacks the technology and research in the area of Marine Resources Management, my advisor, Dr. Victor Neal, and myself decided to develop a project that would be beneficial to a Marine Resources Program in my country. I spent the winter, spring, and summer terms in Honduras gathering information about intertidal organisms, Artisanal Fisheries, and the possibilities of involving different institutions in a developing plan.

The Universidad Nacional de Honduras does not have an Oceanography School and I will be the first professional with an Oceanographic training at the University. Consequently, there is little scientific research done in Honduras. International researchers have done most of the research about Honduras and the nearby regions.

Most of the information available about the Continental shelf off Honduras and the Northwest Caribbean is related with Plate Tectonics and Geology (1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 15, 19, 20, 23, 26, 27, 31, 32, 34, 35, 43, 44), as well as Physical Oceanography (14, 35, 36, 37, 38, 39, 40, 41). Little information about biological species was found (25, 29, 30, 33). Also only scanty literature about fisheries (13, 16, 17) is available.

The present paper is a brief presentation of the results of the preliminary research realized in Honduras but mainly it is oriented to outline a development plan.

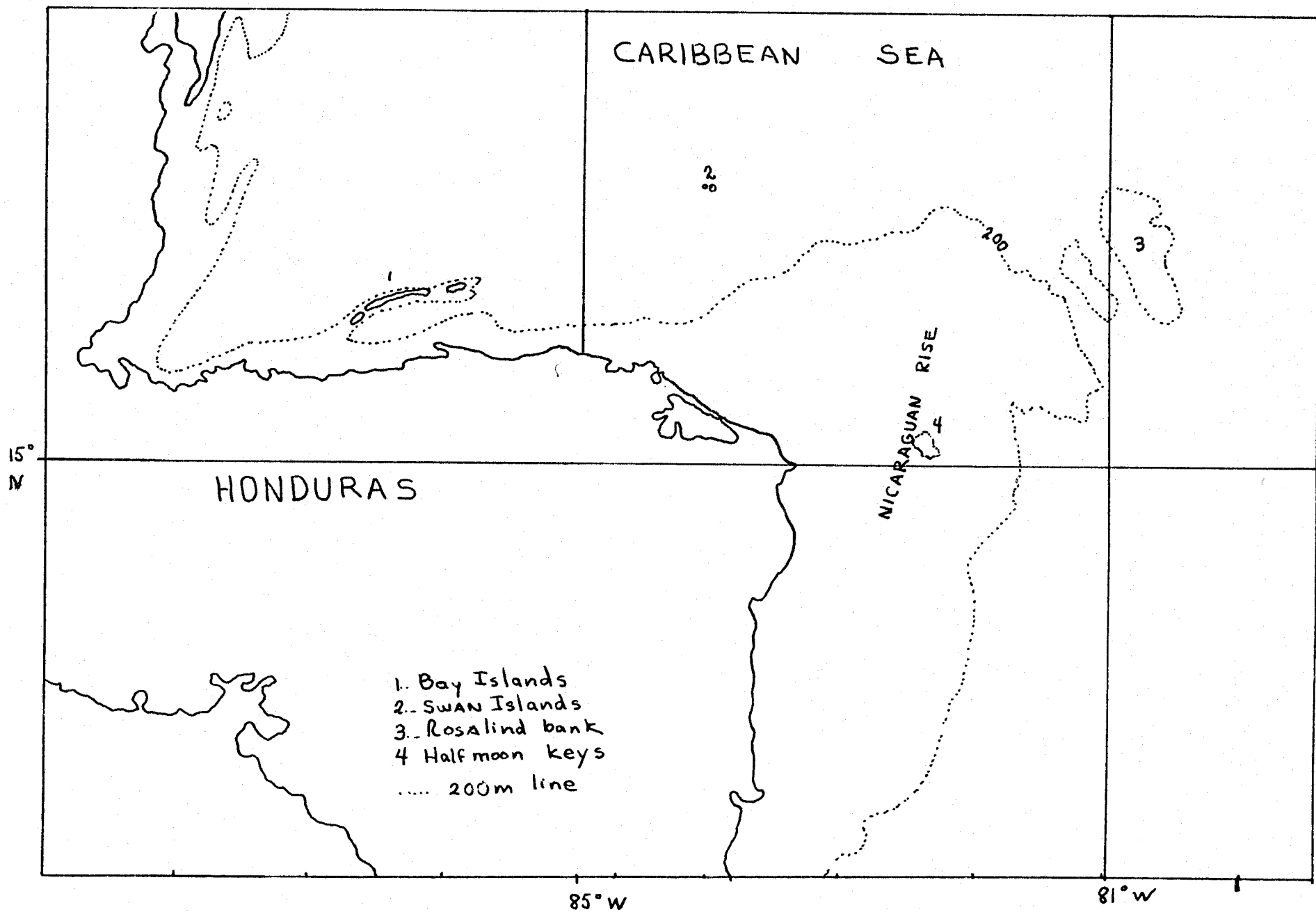


FIGURE 1. Map showing some of the features of the continental shelf of HONDURAS.

## THE RESOURCES

### Geography

The Atlantic coast of Honduras is 683 km long (13). In it are many lagoons and rivers populated with different species of Euryhalin species (13) of fish and invertebrates, mainly shrimp and molluscs (24). The coastal lagoons are used as nurseries by shrimp (17). The beaches are mainly sandy. Few rocky beaches are found but high mountains close to the coast between Trujillo and Balfate apparently have influenced the rocky and uneven shore of Balfate (21). Sandy coves are found in Punta Sal near Tela. The Ocean domain of Honduras, according to its constitution (42), extends to the continental shelf ( $\pm$  200 m deep). The Islandic domain includes the Bay Islands, Swan Islands, Mistenosa Island, Half Moon Keys, and the keys included in the continental shelf at the northern parallel 15° (Fig. 1). In the Bay Islands and the other islands and keys, as well as in the banks, there are many coral reefs with numerous inlets and bays with sandy beaches (27).

### Ports

The main ports of Honduras in the Atlantic Coast are Puerto Cortes, Tela, Ceiba, and Trujillo, of which Tela and Ceiba are the ones from where most of the Banana production is shipped to the international markets. Puerto Cortes is the most modern port and was the first port in Central America to use the "LASH" system. Shipment movement in 1976 was 2.01 million metric tons (9). Trujillo is a port that is being modified to work mainly with oil and wood and related derivatives (9).

### Marine Organisms

There have been recorded 110 species of commercial fishes (13) of

which none is being fished commercially. Invertebrates, mainly shrimp and lobster, constitute the main catch of the industrial fisheries (13, 17). The species of shrimp (10) found in Honduras are:

<u>Penaeus aztecus solutilis</u>	(Brown shrimp)
<u>P. aztecus aztecus</u>	(Brown shrimp)
<u>P. duodarun duorarun</u>	(Pink shrimp)
<u>P. duodarun notialis</u>	(Pink shrimp)
<u>P. brevirostris</u>	(Red shrimp)
<u>P. stylirostris</u>	(Blue shrimp)
<u>P. vannamei</u>	(White shrimp)
<u>P. occidentalis</u>	(White shrimp)
<u>P. schmitti</u>	(White shrimp)
<u>P. setiferus</u>	(White shrimp)
<u>Trachypeneus byrdy</u>	(Zebra shrimp)

of which Penaeus aztecus (both sub-species), Penaeus duodarun (both sub-species) and Penaeus occidentalis constitute the main catch (17) of shrimp. Four species of the large gastropods are especially abundant. These are: Cittarium pica, Strombus gigas, Purpura patula, and Melougena melougena of which Cittarium, Strombus, and Melougena are being exploited by Artisanal Fishermen. Corals and other invertebrates are found in the coral reefs and some rocky beaches, mainly dominated by sea urchins on the rocky beaches (24). Some of the main species of fish caught by the Artisanal Fishermen are listed in Table 1.

TABLE I

Some of the most common species on the Atlantic coast and relative abundance. x = exist; xx = abundant; xxx = very abundant.

Scientific name	Common name		Abundance
	spanish	English	
<u>Auxis rochel</u>	Melva	Bullet mackerel	xxx
<u>Auxis thozard</u>	Melva	Frigate mackerel	xxx
<u>Thunnus thynnus</u>	Atun	Blue fin tuna	x
<u>Thunnus albacares</u>	Rabil	Yellowfin tuna	xx
<u>Thunnus atlanticus</u>	Atun	Blackfin tuna	xxx
<u>Euthynnus alleteratus</u>	Bacoreta	Atlantic little o'Bonito tuna	x
<u>Katsuwonus (Euthynnus) pelamis</u>	Listado	Oceanic bonito	x
<u>Sarda sarda</u>	Bonito	Atlantic bonito	x
<u>Scomberomorus maculatus</u>	Sierra	Spanish mackerel Macarela	xxx
<u>Scomberomorus regalis</u>	Sierra	Cero Macarela	xxx
<u>Scomberomorus cavalla</u>	Carite	King mackerel Kingfish	xxx
<u>Megalops atlantica</u>	Sabalo	Tarpon	xx
<u>Albula vulpes</u>	Sabalo	Bonefish	xx
<u>Mugil cephalus</u>	Lisa	Striped mullet	xxx
<u>Bagre sp.</u>	Guiche	Sea catfish	xxx
<u>Strongylura sp.</u>	Pazaguja	Atlantic needlefish	x
<u>Caranx hippos</u>	Jurel	Crevalle	xxx
<u>Centropomus undecimalis</u>	Robalo		xxx
<u>Elops saurus</u>	Machete	Ladyfish	xxx
<u>Gerres sp.</u>	Palometa	Mojarra	xxx
<u>Eucinostomus sp.</u>	Palometa	Mojarra	xxx
<u>Epinephelus sp.</u>	Mero	Large grouper	xx
<u>Sphyraena sp.</u>	Picuda		
<u>Sphyrna tiburo</u>	Tiburón	Bonnethead martillo	x
<u>Selene vomer</u>	Peje plato	Lookdown	xxx
<u>Vomer setapinnis</u>	Peje plato	Atlantic moonfish	xxx

## HUMAN RESOURCES

INSTITUTIONS

Most of the institutions of Honduras government could be involved in an integral development plan. Until now, they have been working separately and as a consequence of such attitude, they have been duplicating efforts and misusing funds and human effort. It is the intention of the plan that will be developed here to involve those institutions as much as possible.

Ministerio de Recursos Naturales

It is concerned with the Management of Mines, Hydrocarbon products, land use, Fisheries and Wildlife. Actually there is not much being done with respect to fisheries since the institution lacks adequate personnel as well as material and equipment.

Empresa Nacional Portuaria

It is mainly involved with development and management of ports (structures and shipment). It is not doing anything relative to the environmental impact that some of the measure are having and will have in the future.

Secretaria de Comunicaciones y Turismo

It is responsible for the development of information and tourism facilities. There is little being done about tourism facilities.

Ministerio de Education

Its main concern is education and educational processes.

Universidad Nacional Autonoma de Honduras

The university has the capability to do research, since it has trained scientific personnel, but the lack of a functional library, means



of transportation and effective equipment impede research. It is possible that if other institutions provide these it will be possible to develop research that the country needs.

#### Fuerzas Armadas de Honduras (FFAAH)

The Navy, the Air Force, and the Army have materials and human force that could be used in a united effort to get the necessary information with less investment in equipment and material. It is well known that research is useful not only for the civilian institutions, but also could be used by the Fuerzas Armadas de Honduras or at least they could contribute to the development of the country.

#### FISHERMEN

##### Industrial Fishermen

The industrial fishermen (13) in 1976 were 663 working in a fleet of 196 vessels fishing for shrimp and lobster with 10,584 metric tons, using trawl nets, and lobster pots. The income and living conditions of this population is privileged, being almost at the same level of U. S. fishermen. They export most of the catch to U. S. markets and most of the commercial exchange is carried almost directly with U. S. ports.

##### Artisanal Fishermen

In the Atlantic coast, there are 2,946 Artisanal Fishermen (13) of which only 870 are near the main cities. The remaining fisherman are living in zones with few social and medical facilities, few or no means of transportation (roads) and all of them are characterized by a low standard of life and low educational preparation.

The results of the questionnaire presented here were obtained from the fishermen of Cortes and Atlantida which are among the artisanal

fishermen, in better shape. To have an idea of the condition of the other artisanal fishermen it is necessary only to decrease the values of facilities, etc.

Eighty percent of the artisanal fishermen are illiterate.

Fifty Artisanal Fishermen were interviewed from which the following results were obtained:

Housing: 90% own their houses and 10% pay rent

House Construction:

walls: stone 6%; wood 59%; mud 7%; 28% bamboo

roof: concrete 6%; metallic 61%; straw 33%

floor: concrete 9%; bricks 2%; soil 24%; wood 55%

Water facilities: water faucet 57%; well or river, 43%

Sanitary facilities: Outdoor house 55%; none 45%

Fisheries Business

Ownership: owner 74%; employed 3%; share 8%; cooperative 15%

Time dedication: 100% fishermen = 58%; 1/3 of his work as a fisherman = 2%; 1/2 of his time as fisherman = 22%;

occasional = 18%.

Way of selling the catch: with guts 89%; without guts 11%

Fishing Gear

Gear care: know how to build boats, 16%; know how to build nets,

44%; know how to repair nets, 60%

Kind of "vessel": canoe 87%; boat 13%

Propulsion: oars, 77%; motor 23%

Kind of gear: line and hook, 48%; beach seine, 37%; gill net, 10%;

cast net, 5%.

Ninety percent of the fishermen would like to join a good cooperative, or fishermen's association to get more benefits.

All of the fishermen are willing to have classes to improve their methods.

The fishermen interviewed showed some characteristics in common. They all want to improve their methods, and have an open mind to change. Some fishermen communities (Garifona, Misquitos, and others) have a special cultural characteristic in which all the community is involved with fisheries. The man and sometimes the women, go to fish. At the beach the women buy the fish, they take out the guts and dress the fishes, cooking or salting them. Afterwards it is the women who sell the fish in other communities. This is very important to take into consideration since it will be necessary to involve this characteristic with the processes of industrialization and marketing.

OUTLINE OF A TENTATIVE DEVELOPMENT PLAN FOR SOME MARINE RESOURCES  
IN THE ATLANTIC COAST OF HONDURAS

THE NEEDS

To develop the marine resources in the Atlantic coast of Honduras, it is necessary to accomplish at least the following aspects:

A. Research.

It is not possible to develop a management plan without information. The first step of any management planning process is to gather information. Since all the efforts done to gather such information showed a lack of some vital data, it will be necessary to promote research in the following areas:

I. Local, and national laws and projects to clarify the ocean and island domain of Honduras from the legal point of view so that a clear idea of the areas that will involve treaties with other countries is established to avoid misunderstandings.

II. Oceanographic data such as chemical, physical, geological, and biological, as well as topographic and geographic data need to be obtained.

III. Fisheries. A determination of stocks and improvement of statistical data and fishing gear are needed.

IV. Fish Marketing. We must determine the demand of fish on the national, regional, and international market.

V. Coastal inventory. We must determine the best possible use of national land. Make a biological, geological, and social inventory.

VI. We must locate possible economic and scientific support.

## B. Education

To make reality of any development plan, it is necessary to involve the educational process in three levels: Formal: This would be possible by modifying the elementary and high school programs including some knowledge about oceanography and the important of seafood in the diet; Vocational: prepare programs for fishermen and employees that must have jobs related to the ocean or coastal affairs; Collective: use of the media to promote the ideas.

### DEVELOPMENT PLAN OUTLINE

Since my main concern now is the development of the Artisanal Fisheries this will be a global outline, but with emphasis on Artisanal Fisheries.

#### Stage I

- Goals:
1. To motivate the National and International institutions to help the realization of the plan according to their possibilities.
  2. To initiate an intensive research program oriented to an inventory of human and natural resources of the Atlantic coast as well as the Islandic and Oceanic domain of Honduras.
  3. To prepare educational programs and plans to make knowledge available to the population and to train the personnel who will work in different stages of the program.

- Projects:
1. Meetings and seminars to motivate and organize the different National institutions in a Marine Development Committee.

2. Construction of experimental stations on strategic points of the coast and islands.
3. Initiate research with national professionals.
4. Invitation to researchers of different countries.
5. Develop workshops and intensive courses for school teachers and the personnel of the Ministerio de Recursos Naturales.

#### Resources

All the national institutions and their material possibilities.

#### Stage II

- Goals:
1. Classification of the coastal resources according to their potential use (National Parks, Tourism, Fisheries, etc.)
  2. To develop laws and policies to protect the areas and to oversee their development.
  3. To initiate a program for the Artisanal Fishermen including education and economic support.
  4. To develop educational programs.
  5. To continue the research programs.
- Projects:
1. Meetings and seminars to inform the public of the results and projects.
  2. Meetings and seminars to develop policies and projects of development of the areas.
  3. Workshops, intensive classes, and orientation of the Artisanal Fishermen.
  4. Economic support for fishermen including loans and a market for supplies they need.
  5. Seminars and expositions to make the public and schools aware of the results of the programs.

6. Publication of the results accomplished.

### Resources

National and International Institutions.

### Stage III

- Goals:
1. Rational Management of the fisheries in a national interest basis.
  2. Develop a fish industry including the artisanal fishermen in its expansion.
  3. Development of the National Parks and Tourism Areas.
  4. Management of the Marine resources including shipment and subsoil exploitation.

- Projects:
1. Reorganization of the Fisheries department of the Ministerio de Recursos Naturales.
  2. Training of the personnel related to the projects.
  3. Organization of the fish industry and marketing.
  4. Organization of a marine resource committee to coordinate the management of the Marine Resources of Honduras.
  5. Construction and organization of touristic and National Parks facilities.
  6. To organize divulgation programs.

### Resources

All the National Institutions and International Foundations, etc.

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