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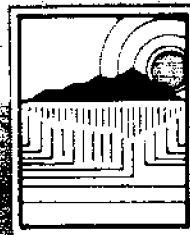
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**In Support of Marine Recreational Fishing**  
**An Assessment of Access and Infrastructure**  
**in Puerto Rico and the U.S. Virgin Islands**

Manuel Valdés-Pizzini, Ph.D.  
Ruperto Chaparro-Serrano  
Jaime Gutiérrez-Sánchez, Ph.D.

Project No. NA86-WC-H-06109

PRU-T-91-001



**IN SUPPORT OF MARINE RECREATIONAL FISHING**

**An Assessment of Access and Infrastructure  
in Puerto Rico and the U.S. Virgin Islands**

by

**Manuel Valdés-Pizzini, Ph.D.**  
Center for Applied Social Research  
Department of Social Sciences, University of Puerto Rico, Mayagüez

**Ruperto Chaparro-Serrano**  
Marine Advisory Service  
University of Puerto Rico Sea Grant College Program

**Jaime Gutiérrez-Sánchez, Ph.D.**  
Department of Social Sciences  
University of Puerto Rico, Mayagüez Campus

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## PROJECT SUMMARY

This project gathered information on the infrastructure (services, businesses and physical facilities) serving the marine recreational fishing industry (MRF) in Puerto Rico and the United States Virgin Islands (PR/USVI). The information was gathered through field observations, on-site assessments, structured interviews with owners and managers, unstructured interviews with government officials as well as with users of facilities and fishery resources, and members of organized groups. The information collected included: location, type of structure, availability of ramps, piers, and services, numbers of people in charge, usage patterns, development plans, sponsorship of activities, jobs generated, dimensions of facilities and more.

The findings of this project are divided into quantitative (statistical) and qualitative portraits of the units inventoried. The statistical portrait provides graphic and tabular representations of the distribution of organizations (marinas, fishing and yachting clubs), facilities and services in Puerto Rico and the U.S. Virgin Islands, and an analysis of their frequencies and regional distribution in relation with MRF development.

The qualitative portrait features detailed descriptions of the regions examined and assessments of both the current use of MRF related infrastructure and the development potential for each region.

The researchers' principal conclusion is that current MRF infrastructure supply (physical facilities and services) cannot cope with the growing demand. By the same token, businesses are increasing in number and variety; these are well located and satisfy local demand for goods and services.

Guidelines for the appropriate development of MRF infrastructure are recommended, and regions with development potential are highlighted.

## ACKNOWLEDGEMENTS

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This project received, from the planning stage to its actual completion, ongoing assistance and advice from UPRSGP director Dr. Manuel Hernández Avila.

Various graduate and undergraduate students participated in the project as field and research assistants. Our special thanks go to Manuel Huertas, Marisol Camacho, and Miguel Sarriera for their outstanding contributions to this project. Dr. David Griffith from East Carolina University collaborated with this team at every stage of the project, including field visits. Nathalie Peter's familiarity with and knowledge about the recreational marine fishing industry in the USVI was vital to this project's success. Miguel Rolón of the Caribbean Fisheries Management Council, and Erasto Nieves, Emilia Medina and José Berríos of the Department of Natural Resources helped our team with their insights on the development of marine recreational fishing in Puerto Rico and the USVI.

Our gratitude is also shared with the components of the MRF clientele who, by welcoming us in their communities, marinas and clubs, showed us the potential of leisure in raising the standard of living and the quality of life in their respective regions. Last, but not least, our families deserve our deepest gratitude. They withstood lonely weekends and late arrivals from day one to the very last.

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## INTRODUCTION

### BACKGROUND

In The San Juan Star of May 3 of 1987, Bill Woods and Joe Martin, both anglers and journalists, discussed the sad state of information and services for the recreational fishermen in Puerto Rico:

The sportsfishermen has for a long time been clamoring for attention. In government circles, the commercial fisherman has been traditionally babied and protected. The commercials and the government have viewed the recreational sector as a bunch of kids with spinning rods, or a bunch of millionaires with big, flashy machines. So traditionally they ignore the interests of the sportsman, refusing to even study the composition of that sector. Consequently, the government provides nearly nothing in the way of facilities to that sector, despite the proven fact that sportfishing is a big income-producer and a boon to economic strength and tourism. (Martin and Woods 1987)

Like many other Caribbean islands and nations, Puerto Rico and the U.S. Virgin Islands are becoming increasingly dependent on their coastal recreation and tourism base. Marine recreational fishing (MRF) and the adequate development of a related infrastructure including boating facilities, lodging, and services are becoming vital to the development of these activities.

Marine recreational fishing is generally believed to encompass leisure activities fully supported by private enterprises and capital. According to local government agencies involved in fisheries development, MRF is basically composed of sportfishermen representing the upper segments of the socio-economic ladder. However, recent research indicates that MRF is also composed of members of the lower and middle economic segments (Boletín Marino UPRSGP, April-May 1987). This combination of recreational fishing populations creates a demand for infrastructure, information and services which is often not satisfied by local businesses, municipalities or the government.

Marine recreational fishing means jobs and business opportunities for coastal communities in Puerto Rico and the U.S. Virgin Islands. But due to a lack of research and information, this activity and its constituent groups remain "invisible" to economists, planners, investors and government officials, thus limiting its development potential. In Puerto Rico and the U.S. Virgin Islands, a formal assessment of MRF-related needs requires the full support of concerned government agencies in order to develop and promote these activities.

Promotion of marine recreational fishing opportunities benefits not only the recreational fishermen (an estimated population of 100,000 for PR and the USVI) but also those who live in coastal communities and depend on outside money (dollars

brought into the community) to provide income. For the Caribbean, such money represented an income of \$4.645 billion (U.S.) in 1984.

Despite its positive economic contribution, MRF currently faces a number of potentially debilitating problems. These problems include inadequate means of access for recreational fishermen, poorly identified relevant constituency groups, infrastructural deficiencies leading to a lack of support for the needs of future recreational fishermen, and the absence of strong linkages with other components of the travel and tourism industries.

As stated in a recent Sea Grant issue paper on Marine Recreation and Tourism, in Puerto Rico and the U.S. Virgin Islands:

The burgeoning use of coastal areas by businesses, marinas, charter boats, restaurants, motels, resorts, second homes and regional cultural festivals attest to the growing economic importance of marine recreation and tourism.

In Puerto Rico and the U.S. Virgin Islands, the number of boats is increasing, and the most important marinas are investing capital in the expansion of their facilities (Nauticon 1985). Faced with growing demands, the supply of facilities and services by both the public and private sectors remains inadequate. Based on available data, it is evident that saltwater sportfishing has been and continues to be pursued by growing coastal populations. This growth and increased participation is reflected by the Club Náutico de San Juan's Sailfish Tournament. Participation in the tournament increased from 14 boats in 1954 to 84 boats and almost 300 competing fishermen from around the world in 1986.

According to a 1979 Clapp and Mayne report, recreational marine fishery of Puerto Rico involved a fleet of some 8,200 boats, representing an \$85.3 million investment (Chaparro 1987).

Marine resource users (boaters, bathers, recreational and small-scale fishermen) fiercely compete for the same area of resource utilization, fish, services, and physical structures. Indicators of the MRF's increasing demand and poorly organized supply include the increasing number of "informal" piers, ramps, launching facilities, and sportfishing clubs; the increasing number of coastal settlers (mostly low income) that rent or lease water access and pier space to boaters and recreational fishermen; and the number of fishing villages (or landing centers) involved in recreational activities (Valdés-Pizzini 1985). In this expansion stage, the MRF industry is being served by the same facilities that nurture tourism, recreational boating, and the artisanal and commercial fisheries.

Identification of needs of access, services, deficiencies in infrastructure, and the tourism/MRF interface are essential to our project and for the future development of these fisheries.

Access is not only how fishermen get to the coastal region by roads, city bus routes and other mass transportation systems, but also how they get to the fishing sites.

If fishery resources are available to anglers, then the accessibility of these stocks must be identified (Radonski et al, 1986). The location of the resource and the distance anglers must travel over water to pursue certain species affect the types of both MRF and tourism development needed. Nearshore species can support fisheries from piers and small boats, both rented and privately owned. The pursuit of fishery stocks further offshore requires specialized boats and equipment. This type of fishery can also support a viable charter and party boat industry. Construction of access facilities such as fishing piers, marinas or charter and party boats should be examined in the context of providing services to the angler.

Since the MRF-related constituency (including its service communities) is not viewed by many as an industry or industrial component in and of itself, it is difficult to secure an accurate statistical picture of MRF. The expenditures of these groups and establishments are likely included (for statistical purposes) as part of services categorized for hotels and other lodging places, business services, amusement and recreation services or under certain manufacturing categories (Radonski et al, 1986). This may be due to the fact that the existing structure of the MRF industry is virtually unknown, since many businesses known to be important fishing components do not consider themselves a part of an MRF industry. Second, it is difficult to attribute some MRF-support components and/or establishments to the MRF industry because they serve other purposes and groups as well.

A strong fishery resource does not necessarily guarantee a viable MRF/tourism industry (Radonski et al, 1986). In order for a community to capitalize on an increased number of fishermen (residents and tourists), it has to provide anglers with needed facilities and services. Campgrounds, motels and hotels, restaurants, bait and tackle shops, fishing guides/services, boat launching facilities, piers and marina facilities are all examples of the various businesses that can benefit from increased recreational fishing activity. Regardless of which sector (public or private) takes the lead, MRF infrastructure must be developed in order to increase opportunities and realize potential benefits. The MRF/tourism industry is highly diverse, being comprised of many varied, yet interrelated businesses. It is important that these components in Puerto Rico and the U.S. Virgin Islands organize as a unit through recognition of these inter-relationships. The industry must realize how each business component relates to the others and how the system must be complete in order to achieve recognition -- and thus benefit -- as an industry. The grouping of various industry components should be initiated by organizations such as the Chambers of Commerce. In addition, it is imperative that individual businesses be organized within each MRF industry component. The distrust that many businessmen have for each other will be difficult to overcome in some communities. However, once organized, either at the component level or at the industry/system level, businesses can work together for the benefit of all involved.

In order to organize the MRF/tourism industry in Puerto Rico and the U.S. Virgin Islands and understand the interrelationships involved, a thorough needs assessment and inventory is also needed as a means of documenting both existing and needed facilities and services.

## INFORMATION CURRENTLY AVAILABLE ON MRF INFRASTRUCTURE

Our team has reviewed several sources of information on infrastructure, access and utilization of coastal recreational resources. Many of the sources reviewed are unpublished government reports (Office of Tourism, the DNR/CZM, CODREMAR, Parks and Recreation) scattered through various agencies and libraries, most of which are located in San Juan.

Most of the reviewed documents are extremely valuable for our project, but obsolete in terms of application, since most are at least a decade old. This situation emphasizes the importance of our project's goal: to produce an updated database and inventory published and available to both the public and to decision makers related to the MRF industry. Other documents consist of an unpublished master's thesis (non affiliated to the Ann Arbor University Microfilm system) in Planning and Architecture, municipal listings of facilities, reports and tourism brochures, and a published coastal atlas and listings of marinas.

In terms of inventory, the agency CODREMAR commissioned a report on the potential development of the government built landing centers, and the management abilities and performance of the fishermen's associations. The report Puerto Rico's Fishing Centers: an Assessment for Development (Romaguera et al 1987) provides a description and ranking of development potential of 63 landing centers. Information on the status of the associations (active, non active), number of members, boats, and location is provided. In terms of physical structures, the report lists and evaluates the conditions of their fish storage facilities, pier(s), office(s), restrooms and lockers. No information is provided on the availability of ramps, bait and tackle, mooring or slips facilities, dry storage, dry dock facilities and miscellaneous services provided (such as ice, oil, gas, food or others).

The CODREMAR report evaluates the various alternatives available for diversifying their operations. This report also recommends that the landing centers "rent space and/or provide repair and maintenance service to others (i.e. sports fishermen)", to add profits to their operations (Romaguera et al., 1987: 63).

The Gufa Náutica de Puerto Rico 1977 (Nautical Guide of Puerto Rico 1977) offers an inventory of the available boating facilities in Puerto Rico, in order to provide the boater and yachtsman information on the planning of cruises. The guide describes 18 fishing and yacht clubs located in eleven municipalities; 8 marinas in five municipalities and 23 ramps in fifteen municipalities. For each organization the guide lists the official name, facilities, services, location, management and adjacent areas of interest.

The Commonwealth of Puerto Rico's Planning Board has produced a document that refers to MRF in passing. Puerto Rico's Comprehensive Plan for Outdoor Recreation (1962) documents the role of leisure as related to outdoor activities among Puerto Ricans. The report cites the 1968 Household Recreation Study, which

states that fishing was the favorite recreational activity in 3% of all households interviewed. The study also stated that the main reason for non-participation in outdoor activities was the lack of appropriate facilities and infrastructure.

The Senate of the Commonwealth of Puerto Rico commissioned a report (Senate of P.R. 1985) on the tourist facilities and services available throughout the southwest coast of the Island. The purpose of the study was to assess the number and quality of recreational facilities that contribute to the planning of a tourism strategy able to compete with the San Juan Metropolitan Area tourism. The report stressed the need for the development of a tourism base supported by natural and cultural attractors; in other words: "an ecological tourism". The report gathers the ideas and planned projects of businesspeople, government representatives, majors and senators from the region. The document lists the touristic facilities for twenty-two coastal and inland municipalities, itemizing the historical sites, popular festivals, artisan fairs, reservoirs, public beaches, "traditional communities", and various recreational facilities such as marinas and camping grounds. Although this document does not list all the recreational facilities in a systematic fashion, it includes one of the first comprehensive lists of such facilities on the southwest coast.

Through the program for the Coastal Zone Management, the Department of Natural Resources has documented the uses of the coast in Puerto Rico. The study Recreación en la Zona Costanera, 1978, (Recreation in the Coastal Zone) lists nineteen boat ramps. This list only provides the municipal location. Other lists include twenty-five marinas, mooring and boat rental facilities, forty-one hotels/motels, twenty-five cottages and camping areas, thirty-two landing centers, and fourteen public beaches. Each listing is accompanied by a short text indicating municipal location, existing facilities, and services.

Puerto Rico and the Sea 1972 is a citizen's report on marine affairs to the Governor. It prescribes an action program for the Commonwealth aimed at the well-being of Puerto Rico through contact with and use of the sea. Recommendations were made in major fields of marine opportunities: living resources, recreation, coastal zone management, research and development, institutional arrangements, and the role of Puerto Rico in the Caribbean. A recommendation on page 32 states, "The Department of Natural Resources should locate, inventory and classify known and potential sport fishing areas throughout Puerto Rico where recreational fishing can be initially concentrated and developed."

Identification of Research Priorities for Coastal Pelagic Fishes in Puerto Rico and the U.S. Virgin Islands is a report based on information gathered by Trent, Brusher and Schmied during a visit to Puerto Rico and the U.S. Virgin Islands during August, 1982. The purpose of this report is to generate the information needed for the development of a draft fishery management plan for coastal migratory pelagic resources in the Caribbean. The report describes coastal fishing areas and conditions of PR/USVI, the results of a recreational angler survey on total expenditures, literature review and research priorities. The report lists a group of key informants in the field of MRF in PR/USVI, "full-time" charterboat operations, and target species for those operations. A survey of recreational fishermen and an inventory of fishing platforms

and access areas was considered to be of high priority for future research of the Coastal Pelagics Program. At that moment, the latter was of a third ranking priority for CODREMAR.

In 1983 the University of Puerto Rico's Sea Grant Program published the extension and educational guide Puerto Rico's Vacation Climate. The brochure features a Beach Access Guide with information on coastal location, the beach descriptions and road access for a total of forty-eight beaches. General information on boating and sailing sites and access opportunities is also provided. The report presents a list of twenty-one Yachting and Boating Facilities in Puerto Rico, with information on the existence of infrastructure and services such as storage, access status (private/public), ramps, piers, nautical location, address, number of slips, general storage, electric power, restaurants, and nearby stores and services. In terms of MRF services, Puerto Rico's Vacation Climate offers a list of sixteen charter and rental boat services. The brochure offers the angler information on weather patterns around the island, target species, fishing methods and seasons, a marine recreation map guide, and general information on dining areas, complemented by a list of sixteen camping grounds.

In 1978 the Coastal Zone Program of the Department of Natural Resources published a report entitled Estudio de Accesos a Playas de Puerto Rico (Study of Beach Access in Puerto Rico). The report presents an assessment of the number, quality, usage patterns and needs of the island beaches. The report ranks as accessible, not accessible, accessible but not for swimming, inaccessible/not for swimming, rocky cliff and mangrove zone. The report lists sixty accessible beaches adequate for swimming and nineteen beaches non-accessible but adequate for swimming. The former are described by municipality, road location, status of adjacent property, and a description of the area, while the latter are marked on a series of maps in the document. The study recommends the development of an inventory of beach access.

The 1987 Yachtsman's Guide: Virgin Islands and Puerto Rico is a practical guide for navigation and coastal recreation in PR/USVI. The guide is updated annually and offers information on the various aspects of MRF and navigation. This descriptive guide introduces the yachtsman to the general character of the islands and to the specifics of navigation. The general information includes: customs and immigration, cruising etiquette, security, anchoring, buoyage, communications, pilotage, currency, water safety, drug use, and collection of coral and shells. In addition to the navigation facilities, the guide lists and reports nineteen diving facilities in the USVI, eight in Puerto Rico and four in the BVI. Words of caution (in terms of pilotage) are presented for each area discussed. The 1987 Yachtsman's Guide: Virgin Islands and Puerto Rico presents (for each island) the main yacht club, marinas and mooring and anchoring areas, each with a general description of the coastal features and attractions, nautical facilities and main services provided. For various of the discussed coastal areas and facilities, the authors present sketch charts, as supplement to the text (for illustrative, not navigational purposes). For Puerto Rico, the 1987 Yachtsman's Guide: Virgin Islands and Puerto Rico offers a ten page section on sportfishing, methods, target species and tournaments. The information is enhanced through the advertisement of MRF and boating services and businesses that accompany the guide.

The University of Puerto Rico Sea Grant Program's Virgin Island Marine Advisory Service (VIMAS) published the U.S. Virgin Islands Marine Recreation Services and Facilities Directory 1986-1987, compiled by Nathalie Peter. This publication serves as a comprehensive guide to most businesses and services related to marine recreation in the USVI. Each listing includes information on the business' island location, name, and address and phone number of the business, along with information on management. The directory includes a long list of services. Of those related directly to MRF, the Directory lists four charter clearinghouses, eighteen marinas, five yacht clubs, sixteen sportfishing charter operations, forty-one watersport businesses, and thirteen fuel and water facilities. In addition, the Directory lists information on local and federal agencies, associations, brokerage and dealerships, repair services, financing and insurance, communications and provisions.

From the previously cited documents, the following conclusions emerge: First, most studies listing facilities and infrastructure are scattered and outdated. Second, organizational and management issues regarding infrastructure have been disregarded. Third, there is a need for common terms and concepts to frame the inventory studies in order to make comparisons possible. Our project addresses areas of research need indicated by Cigler, with an inventory, statistical analysis and development assessment for infrastructure at the coastal regions of Puerto Rico and the U.S. Virgin Islands.

## PROJECT GOALS AND OBJECTIVES

The research team's primary goal was to evaluate access and infrastructure needs of MRF constituency groups in the U.S. Virgin Islands and Puerto Rico in order to better manage fishing demand and enhance the industry's economic vitality.

Development of recreational fisheries in the Caribbean depends on the assessment of the following factors: 1. the resource base, 2. the resource users, 3. the MRF and tourism-support industries and infrastructure, and 4. the public and private organizations that influence this "industry" (Ditton 1983, Schmied 1983).

Consonant with the historical trend of fisheries-related research, most of the current investigations are being conducted in terms of fishery resources (cf. Olsen and Wood 1983). A number of agencies in Puerto Rico and the U.S. Virgin Islands such as the Fish and Wildlife Division (USVI), the Corporation for the Development of Marine, Riverine and Lacustrine Resources (CODREMAR), the Department of Natural Resources (DNR), the Food and Agriculture Organization of the United Nations (FAO), and the Caribbean Fisheries Management Council (CFMC) are assessing resources, experimenting with technical improvements (such as fish aggregating devices), and attempting to measure the effect of MRF in the Maximum Sustainable Yield. Research in this area appears to be abundant and promising.

However, at the present time there is a lack of knowledge about the resource users themselves. Resource users represent one element required by fisheries biologists for developing effective management policies. The projects carried by the University of Puerto Rico Sea Grant College Program (UPRSGCP) Marine Advisory Services (MAS), the University of North Carolina Sea Grant, and the Institute for Coastal and Marine Resources ICMS are studying the social and economic dimension of MRF industry (resource users, infrastructure and organizations). Information derived from research on the resource base, combined with data from the human dimension of recreational fisheries will offer resource managers and policy makers an accurate portrait of the "industry", and thus contribute to the development of policies and management plans in accordance with social, cultural and economic parameters.

The main objective of this project was to satisfy the need for information on marine recreational fishery managers, the MRF/tourism industry and the MRF constituency. This was done through the evaluation of access and infrastructure needs in Puerto Rico and the U.S. Virgin Islands, and through the output of an inventory/data base of MRF facilities and operations. It is hoped that this project will promote marine recreational fishery by serving as a masterplan for the development of infrastructure for recreational fishermen.



## METHODOLOGICAL APPROACH

The data for this study were collected from various sources. Data concerning the inventory of facilities were obtained through direct observations and interviews. Three different interview schedules were used as instruments: one for organizations, another for facilities, and a third for services.

### Units Inventoried

1. **Organizations:** Includes those formal organizations, businesses, corporations and clubs that provide services and infrastructure to fishing activities. These are: marinas, condo-marinas, yacht and fishing clubs, sportfishing clubs and government landing centers (villas pesqueras). These organizations are composed by recreational anglers, sportfishermen and boaters.
2. **Facilities:** In general, includes those structures used, directly or indirectly for any recreational fishing activity. Facilities inventoried are: ramps, waterfront areas, fishing piers, jetties, and bridges.
3. **Services:** Includes those businesses and firms that provide a wide array of services related to recreational boating and fishing. Types of units included are: bait and tackle shops, dive shops, boat rental and sales, charterboat services, sport shops, engine and boat repair, and boatyards.

Information for these schedules was filled out by the researchers and their field assistants who visited the coastal areas using the closest coastal roads and the information obtained from key contacts. It should be mentioned that in Puerto Rico most of the coastal line is bordered by roads (cf. DNR 1978). In addition to field observations a number of secondary sources (discussed in the Introduction) were used in order to mainly detect MRF-related businesses. For the USVI we used Nathalie Peter's Directory as a comprehensive guide to marine-related businesses. Those businesses not included in the Directory were visited and inventoried by Chaparro, Peter, Griffith, and Gutiérrez.

The second source consisted of personal contacts made at the DNR, CFMC, CODREMAR, marinas, sport fishing clubs, boat and accessory retail shops, plus fishermen's association directors and personnel in Puerto Rico and the U.S. Virgin Islands. Information relative to the recreational fishing sector, access and infrastructure was collected in each region. In addition, informants mentioned the names of their peers for further interviews.

Additional information on businesses and services was obtained through the San Juan Metropolitan Area telephone book, The Island Telephone Book (includes all other municipalities), firms that participated in the Caribbean Boat Show, and businesses that advertise or were mentioned in ¿Qué Pasa?, Puerto Rico's official tourist guide published by the Commonwealth's Tourism Office.

#### Preliminary Fieldwork

The first step of this project involved the examination of all available listings and sources of information related to MRF infrastructure and access. Government reports, commercial publications and the phone books' commercial listings were used. Marine agents at the UPR Sea Grant College Program added field information on areas and sites to visit as well as names of people involved in MRF. From those sources the team prepared a "preliminary listing" of sites and businesses to start the inventory. This listing served as a field guide to the team and to the interviewers.

#### Field Visits

Valdés-Pizzini, Chaparro and Gutiérrez visited all coastal areas of the island of Puerto Rico before engaging in the actual collection of inventory data. Our field notes provided information which helped us to construct the instruments and configure a model of the distribution of MRF activities throughout the Island. Similar visits were made in the USVI. In those islands, the team was assisted by marine agent Nathalie Peter. Griffith, Chaparro and Valdés-Pizzini visited all coastal sites in Saint Thomas.

#### Visits and Inquiries at Government Agencies

The teams of both projects maintained extensive contacts with various agencies and entities involved in fisheries and development. Meetings with the Department of Natural Resources, the Caribbean Fishery Management Council and CODREMAR were held jointly. Support from these agencies came forth in terms of information, services and recommendations, and contributed to all aspects of this project. Fisheries data, current surveys of anglers, and creel census data and procedures sharpened our methodological design. The Fish and Wildlife Services of Puerto Rico and the U.S. Virgin Islands also provided information on certain aspects of the industry.

#### Correspondence with Fishing Clubs and Organizations

Letters indicating the intention of our project were sent to those sportfishing organizations and facilities listed in the data base of the UPRSGP Marine Bulletin. The letter briefly explained the project, described the support agency, and requested their help. This step facilitated many field visits since administrators recognized the interviewers as part of the project.

### Information to the Clientele

MRF clientele was also informed of the project by means of an article on Recreational Fishing in Puerto Rico. The article, published in the UPRSGCP Marine Bulletin, spurred responses by MRF clientele. Another article in The San Juan Star described the project and requested that anglers cooperate with information.

As part of this strategy, letters were also sent to marine trade newspapers and magazines. The Tropic Times, a new weekly newspaper, published our letter requesting information. A second letter exhorting those businesses not covered by field interviews to send information or call our office was sent in December 1987.

### Letters of Inquiry to the Mayors of Coastal Municipalities

Part of our project included assessment of MRF development potential in the coastal municipalities. The team sent letters of inquiry on future development plans for MRF, to the municipal governments. To complement our field visits, mayors and planning officials were asked to provide information on the existing infrastructure and charterboat services. In December, eleven municipalities responded to the inquiry. Several indicated interest in developing the MRF industry, and requested our services for their development plans.

### Formal Observations

Interviewers were assigned to specific coastal areas in Puerto Rico. In the USVI, interviews were conducted by MAS personnel and by David Griffith. Geographical quadrants and preliminary infrastructure information of the area were distributed among the interviewers. After completion of a set of municipalities, field personnel returned the filled-out questionnaires and area reports. These were reviewed by the investigators, and visits to the field were made in the company of the interviewers in order to check data collected.

### Inventory

An inventory of organizations, facilities and services was completed. Data in the inventory format were checked several times for accuracy, and managers and personnel in charge were re-interviewed by phone for clarification. Post-inventory field visits also contributed to clarification of the types of infrastructure existing in various regions. Certain businesses, such as hotel/motel lodging and camping grounds were excluded from the inventory, but data files still remain at the MAS office. Criteria for exclusion was the indirect nature of the relationship between MRF and those services. Instead, general comments on their availability are included in the Qualitative Portrait of the regions.

### Data Analysis

Information sought through the three instruments was mostly "open-ended". Valdés and Chaparro turned that information into numerical variables for statistical analysis. The data files and analysis were elaborated in STATPAC. This information is used in the first (quantitative) part of the findings. However, most of the data collected in the field through observations and interviews was also used to perform a qualitative analysis and assessment of the current status and potential for MRF development at the regions studied. That analysis is featured in the second part of the project findings.

## QUANTITATIVE PORTRAIT OF MRF INFRASTRUCTURE

This section summarizes the findings of this research/extension project, showing the statistical distribution of the types of organizations, facilities and services that serve the MRF clientele in Puerto Rico and the U.S. Virgin Islands. The team inventoried and gathered extensive information on 56 organizations, 100 facilities and 221 services/businesses.

Percentages in the figures and in the analysis come from those units in which there was information available for the discussed items. "No response" on various variables was due to a lack of information and the option of "no-response" on the informants' behalf, as well as late entries into the inventory, and denial of information. For a small percentage of units (mostly services in the USVI) the information was obtained through telephone interviews, or by other printed sources such as guides and directories.

Based on the existence of Nathalie Peter's Directory for the USVI, this team decided to use this work as a source of information on VI services. Originally, a description of each business, its address, telephone number and the names of people in charge constituted enough information. However, at the moment of data analysis, an array of key variables was developed from the interview schedule prepared by the team. We selected 16 variables related to services offered by those businesses, and their economic impact. As a result, services in the USVI are not fully represented in the discussion concerning number of employees.

Businesses and service facilities included here are either private or public, but the common and ultimate denominator is that in either category, such facilities serve the MRF clientele on an "open to public, clients or members" basis. This excludes from the inventory those facilities (piers, slips, ramps) operated on a small, family scale, which also serve the MRF but on an informal, private basis.

As an inventory, the data purports to be equivalent to the universe, but a margin of error must be allowed in analysis and description. An un-specified number of facilities is not included; several escaped our field observations; others, small-scale marinas that operate on an informal basis, do not form part of our formal units inventoried. The frequencies presented here must be seen as preliminary data that will be corrected as marine agents, businesses, organizations and government programs contribute to up-dates of the inventory, year after year.

For the purpose of this report Puerto Rico and the U.S. Virgin Islands have been divided into ten different regions. The reasons for their selection and grouping, and their basic characteristics are described in the next section of the report. For the

time being, these regions share geographical and oceanographical characteristics as well as MRF commonalities and user groups. From now on, the regions will be called by their primary municipality (in terms of MRF). The regions are:

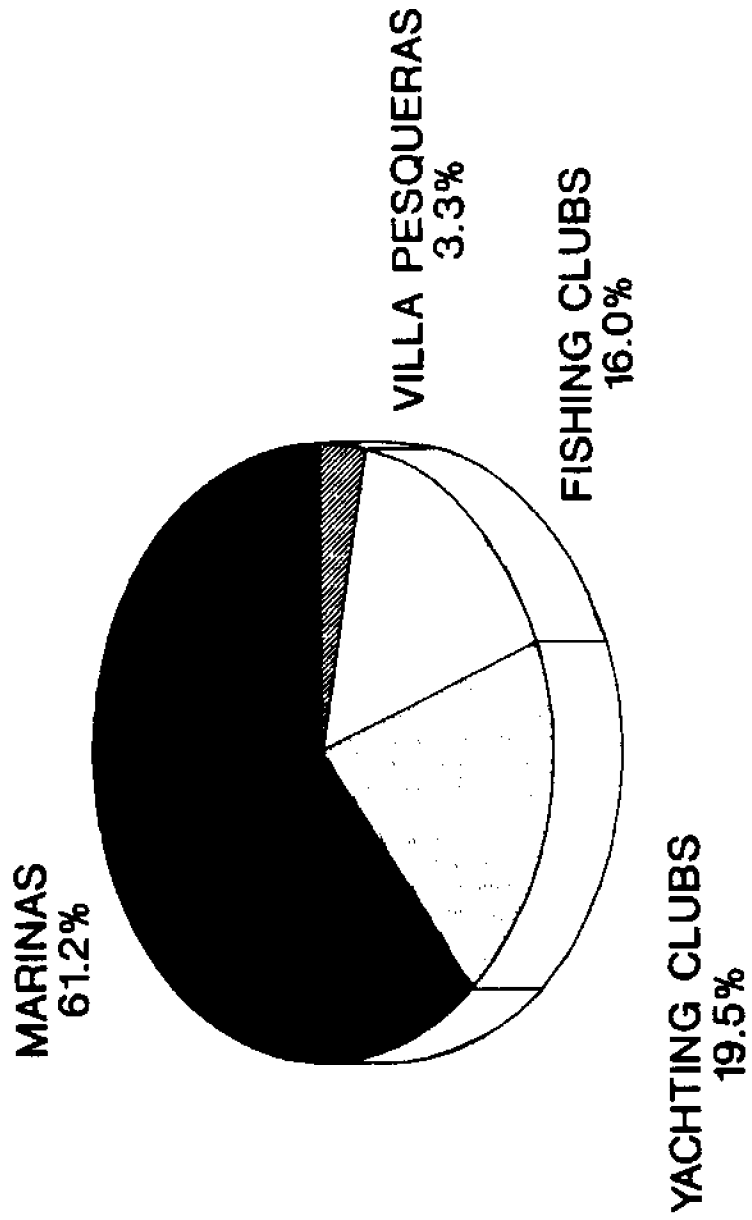
REGION	MUNICIPALITIES/ISLANDS
REGION 1 SAN JUAN	Lofza, Carolina, San Juan, and Cataño.
REGION 2 FAJARDO	Ceiba, Fajardo, Luquillo, and Río Grande.
REGION 3 HUMACAO	Yabucoa, Maunabo, Humacao, and Naguabo.
REGION 4 SALINAS	Juana Díaz, Santa Isabel, Salinas, Guayama and Arroyo.
REGION 5 PONCE	Guayanilla, Peñuelas, Yauco, and Ponce.
REGION 6 CABO ROJO	Mayagüez, Cabo Rojo, Lajas and Guánica.
REGION 7 AGUADILLA	Aguada, Aguadilla Rincón, and Añasco.
REGION 8 ARECIBO	Toa Baja, Dorado, Vega Baja, Vega Alta, Manatí, Barceloneta, Arecibo, Hatillo, Camuy, Isabela and Quebradillas.
REGION 9 VIEQUES/CULEBRA	The island municipalities of Vieques and Culebra.
REGION 10 UNITED STATES	Saint Thomas, Saint Croix VIRGIN ISLANDS and Saint John.

#### Organizations

Organizations serving the MRF clientele present a wide array of economic and social arrangements. In terms of general types, these are marinas, yachting clubs, fishing clubs and villas pesqueras (figure number 1). Marinas are the predominant form of organization in the USVI while the yachting and fishing clubs are more numerous and popular in Puerto Rico. In the category of fishing clubs on this island, a good number of them are small buildings (clubhouses) with no real infrastructure or in-water facilities. These clubs are trying to satisfy a demand for slips and dry-storage facilities by offering their members the hope of future alternatives in that respect. These clubs have consistent plans to build marinas or to get the funds to expand their facilities. Their members are active lobbying at municipal and state levels to find funds to expand both their operation and services needed in their respective areas.

On the northern coast (Arecibo and Aguadilla regions) there are several yacht and fishing clubs with no access to water; but it is their objective to develop such facilities.

**Figure 1**  
**MAJOR TYPES OF ORGANIZATIONS**



The yacht club in Aguadilla consists of a kiosk beside the municipal ramp. This club sponsors fishing tournaments, and is in the process of obtaining a concession for the municipal marina that is soon to be built in the town. In the municipality of Guanica, Cabo Rojo region, there is a fishing club in an isolated rural-coastal section. During our first visit they only had a wooden structure serving as a clubhouse. During our second and last visits their members were clearing an area in the mangrove to build a pier and a "regular ramp" (not included in the inventory).

### Types of Organizations

The team gathered information on the following types of organizations, in order of frequency: (1) marinas, (2) yachting clubs, (3) fishing clubs, (4) condo-marinas, (5) yacht and fishing clubs, (6) marina-hotel, (7) marina restaurant and (8) villas pesqueras (figure number 2).

Marinas are more frequent in the USVI, where slip and dry-storage space is simply a market commodity that attracts seasonal and tourist boaters. In Puerto Rico, marinas are associated with local anglers and yachtsmen organizations at all socio-economic levels. The need for marinas in Puerto Rico is still reflected in the goals and objectives of yachting and fishing clubs.

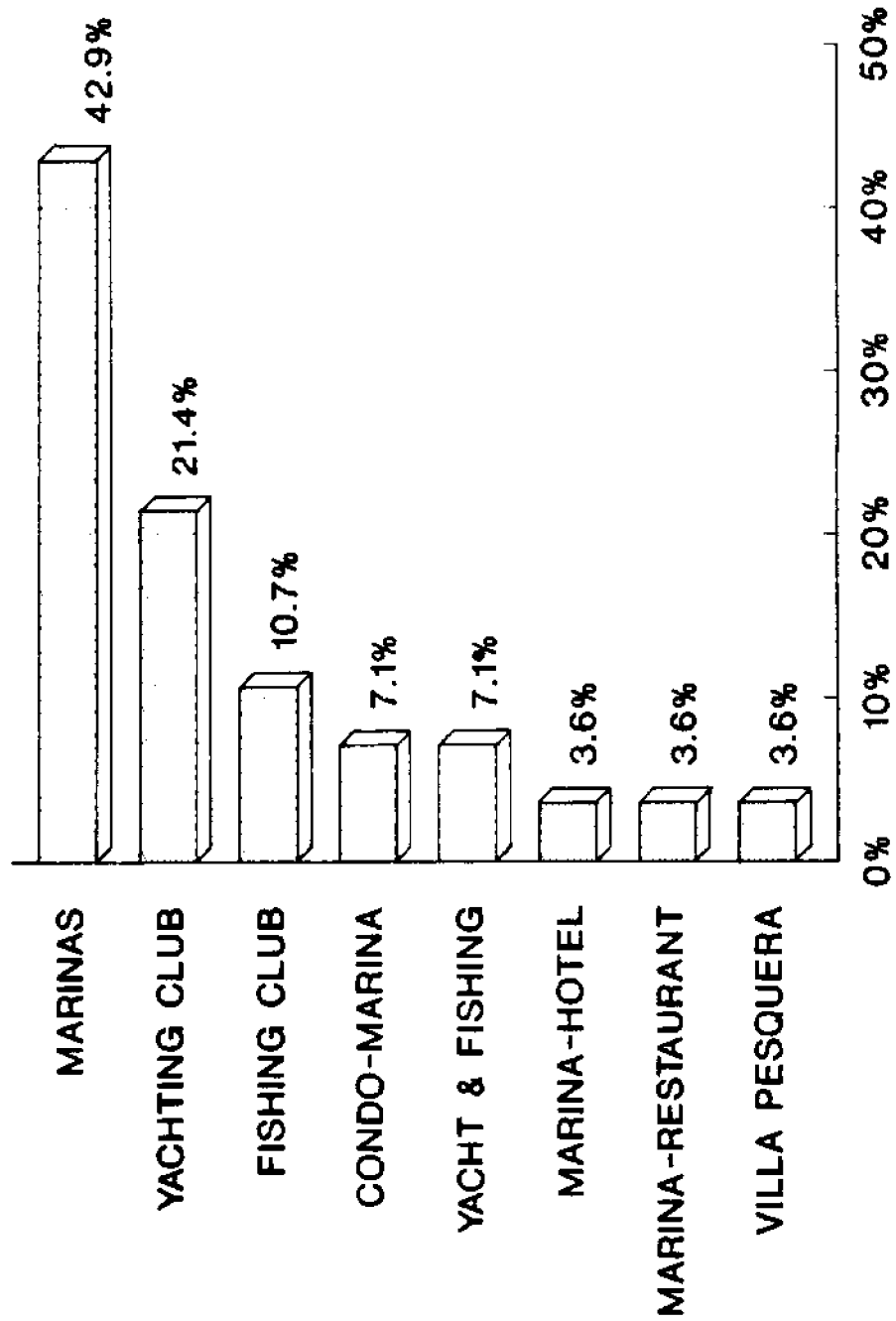
Condo-marinas are also becoming a popular option in Puerto Rico. Marinas are currently used as attractions by realtors and others selling land and condominium space, and serve to raise real estate value. In condo-marinas dry-storage was not included, but in reality the space for boats was quite large since parking space available for the residents is also used as dry-storage space in these condo-marinas.

Two marina-hotels, and two marina-restaurants serve the MRF clientele in Puerto Rico. Interestingly, these are not marinas that also offer those services; instead, they are restaurants and hotels located on the waterfront that have developed a relationship with the recreational anglers and yachtsmen, or that have added the "marina" services in order to attract certain clientele.

In Puerto Rico, two government-funded landing centers function in close relationship with the MRF community. They have been included in the inventory and analysis because of the services and space they provide to the MRF clientele and because they serve as examples of the MRF-commercial fishermen commonalities that can be developed throughout the island. Few of the remaining villas pesqueras examined provided bait, equipment and fuel to the MRF clientele. There is certain apprehension to open their services to those resource users. The vast majority of the villas also suffered from deterioration or closure of the facilities.



**Figure 2**  
**TYPES OF ORGANIZATIONS**



In the Cabo Rojo region, privately owned "fish-houses" provide full services to the MRF users, to the extent that they operate as marinas, without extensive slip and dry-storage capabilities. We consider these "borderline marinas," as such, they were not included in the inventory as organizations.

### Regional Distribution of Organizations

Most of the organizations inventoried were located in the USVI. This is due to the fact that demand for marina and related services exceed the local boundaries. For instance, Puerto Ricans use USVI facilities because of the lack of adequate space for large vessels in Puerto Rico (see Olsen 1979).

Fajardo, San Juan, Salinas and Cabo Rojo followed in the number of organizations (figure number 3). One may argue that San Juan, Fajardo and the USVI form a navigational, recreational and organizational continuum. The area is shared by a community of anglers and yachtsmen who are closely related in terms of class, interests and use of facilities and services. Salinas and Cabo Rojo also share a large number of organizations. However, these two regions serve a different clientele. Predominantly, the USVI, Fajardo and San Juan regions serve MRF participants of high income status, while the other regions serve, to a greater degree, the middle class sector. The sophistication of the infrastructure, services, and the number of slips and dry-storage space differs drastically, with the top regions showing a higher development. Table Number One shows the regional share of types of organizations as conceptualized in this project.

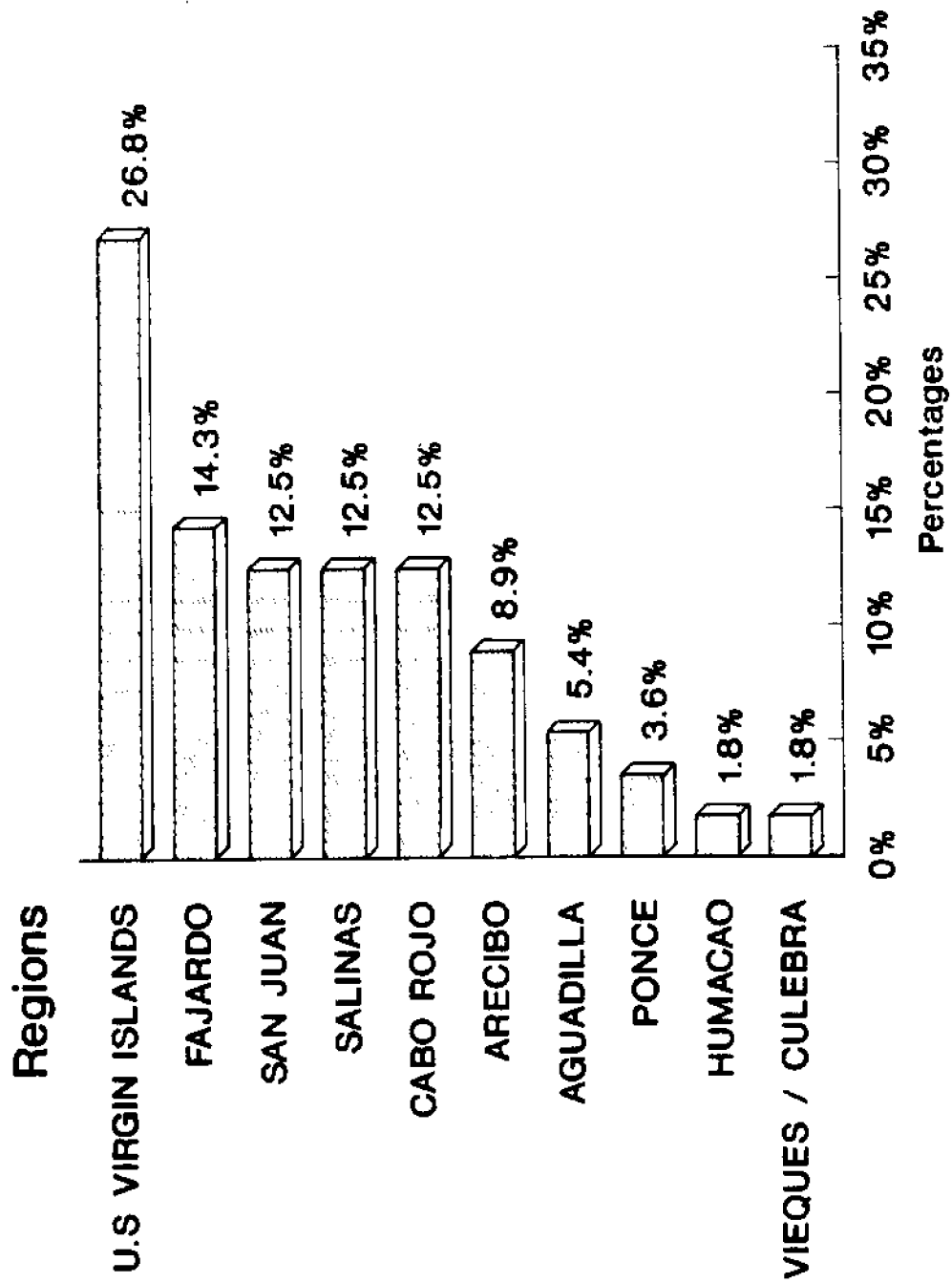
**Table Number 1**

#### Types of Organizations by Region

	Types of Organizations							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
San Juan	2	0	0	2	2	0	0	1
Fajardo	6	0	0	1	0	0	0	1
Humacao	1	0	0	0	0	0	0	0
Salinas	1	3	0	0	0	1	2	0
Ponce	0	0	1	0	1	0	0	0
Cabo Rojo	0	3	2	1	1	0	0	0
Aguadilla	1	2	0	0	0	0	0	0
Arecibo	0	2	3	0	0	0	0	0
Vieques	0	0	0	0	0	1	0	0
USVI	13	2	0	0	0	0	0	0
TOTAL	24	12	6	4	4	2	2	2

Legend: (1) marinas, (2) yachting clubs, (3) fishing clubs, (4) condo-marinas, (5) yacht and fishing clubs, (6) marina- hotel, (7) marina restaurant and (8) villa pesqueras

**Figure 3**  
**REGIONAL DISTRIBUTION OF ORGANIZATIONS**



### Services at Organizations

Services on the premises are an essential component of the organizations serving the MRF clientele. In general, marinas and organizations provide their clients and members with slips and dry-storage space. However, in order to survive economically, these organizations have to expand the services they offer, so as to make the marinas full-fledged "recreational complexes." The goods most frequently provided by the organizations are ice, food (restaurant/cafeteria) and fuel. The least frequent were bait, lodging, boat rental and fishing equipment (figure number 4).

Organizations are also the headquarters for many charterboat operations. These consist of sailing, cruising, scuba-diving and fishing. Fishing charter operations are found in almost 20% of the organizations (figure number 5).

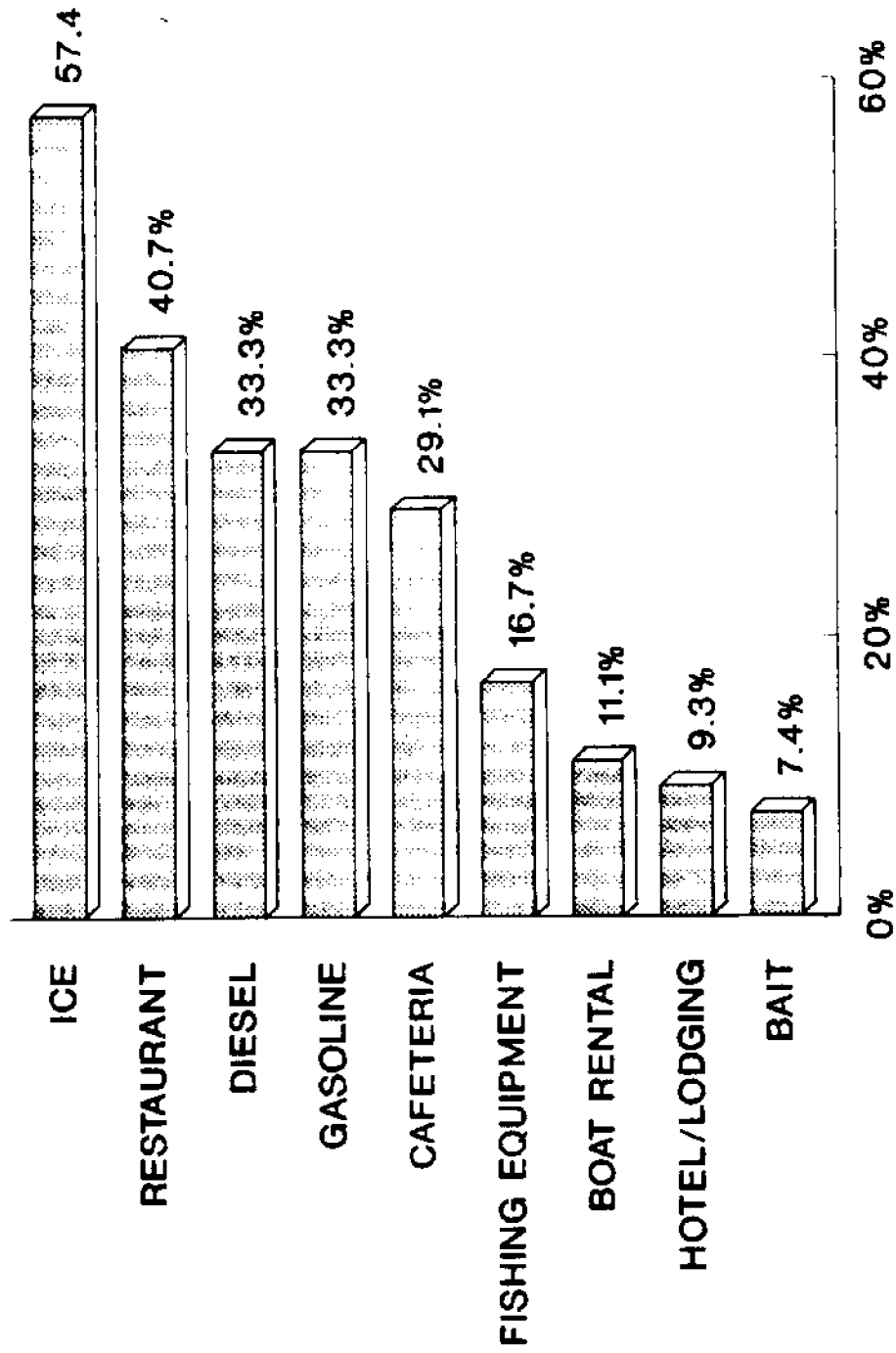
Ramps are another crucial facility offered by the organizations for their members or clients. Of critical importance is the fact that ramps at organizations, mainly in Puerto Rico, are private but are also available to the public at no cost (33.3%) or for a fee (26.7%), as shown in figure number 6. Responses to this question may reflect the good will on behalf of the managers, but in reality, these ramps may not be available for public use. In most organizations the ramps are for the exclusive use of residents, clients (that have their boats stored on the premises) or members.

### Slips and Dry-Storage

As mentioned before, slips and dry-storage space are the critical services and facilities provided by the marinas and organizations in general. Most of the available slips and dry storage spaces are provided by the organizations. Fajardo, USVI and San Juan are the leading regions in that respect (figure number 7). Table number 2 shows the distribution of slips and dry-storage space by regions.

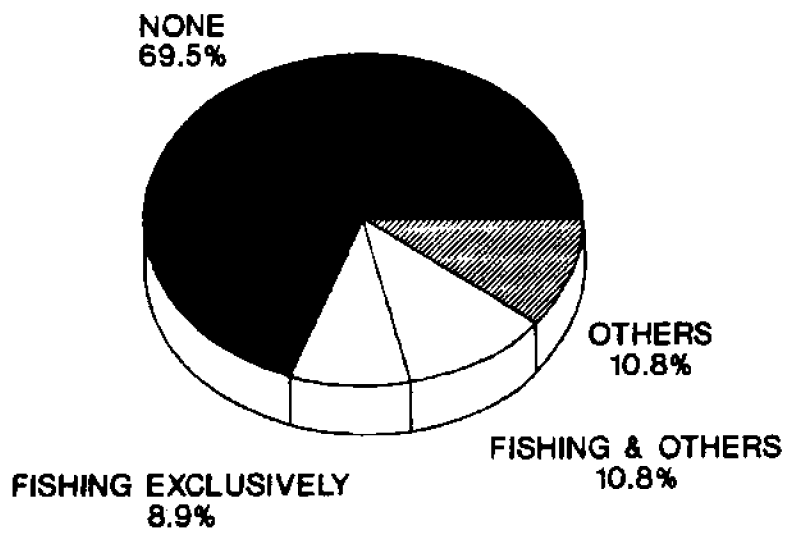
(See figures 4, 5, 6, 7)

**Figure 4**  
**TYPES OF SERVICES IN THE ORGANIZATIONS**

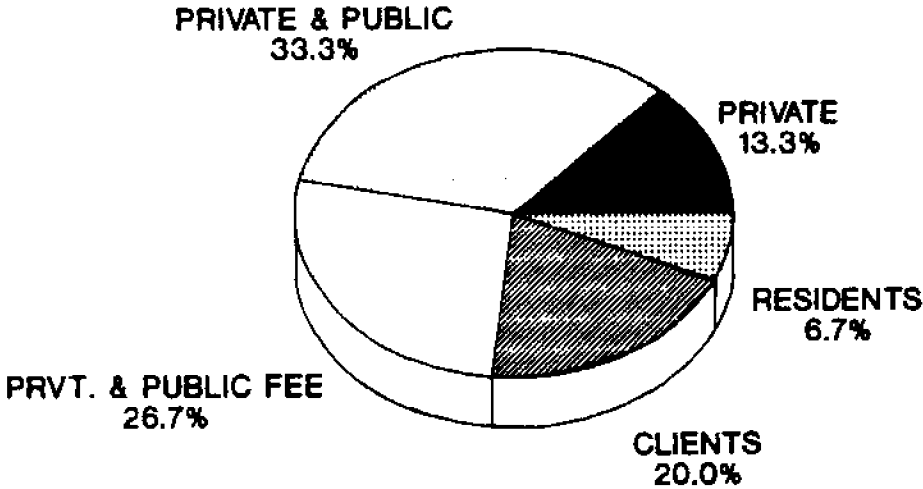


(By Percentages)

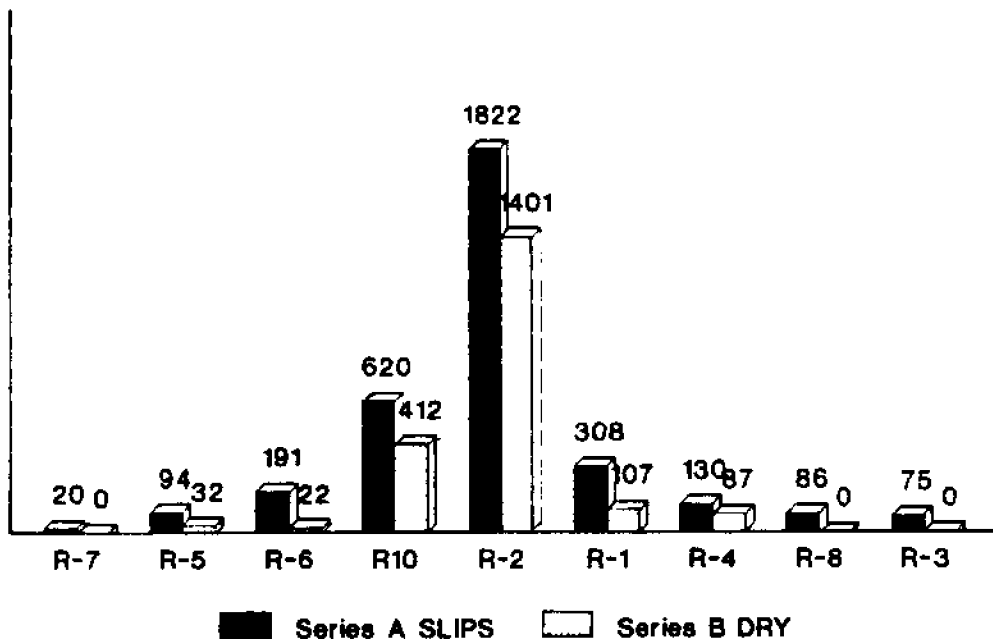
**Figure 5**  
**CHARTER OPERATIONS AT ORGANIZATIONS**



**Figure 6**  
**ACCESS TO RAMPS IN ORGANIZATIONS**



**Figure 7**  
**SLIPS AND DRY STORAGE SPACE BY REGIONS**



(N-3346)



Table Number 2

REGION	SLIPS	DRY-STORAGE
San Juan	308	107
Fajardo	822	1401
Humacao	75	0
Salinas	130	87
Ponce	94	32
Cabo Rojo	191	22
Aguadilla	20	0
Arecibo	86	0
Vieques	0	0
USVI	620	412
<hr/> TOTAL	<hr/> 3346	<hr/> 2061

#### Membership System

Organizations, especially marinas, are becoming independent from the social/sport formal organizations that first gave impulse to the development of fishing and yachting clubs. Presently, only 40.7% of the organizations operate on a membership basis (most of these organizations are located in Puerto Rico). Almost all those in the USVI operate on a service/payment basis, that is, as businesses.

Members of these organizations do not necessarily use the marine related facilities. In many cases club members only benefit from the social status associated with the organization. These organizations have an average of 215 members (with a total of 4,094 members in Puerto Rico/USVI). Membership fees range from none to \$1,350, with an average inscription fee of \$283, and a median and mode of \$100. Membership in itself ranges from 4 to 950 members who pay an average of \$24.00 of monthly fees. Those figures are translated into an operating capital of approximately \$5,000 (on the average) for each organization under the membership system, monies added to the profits in services, profits from fishing tournaments and other recreational activities and revenues from the rent of slip and dry-storage space. MRF organizations in Puerto Rico and the U.S. Virgin Islands generate a total of 461 jobs. On the average, these operations have an average of 9 employees, with a maximum of 50.

#### Sponsorship of Activities

Organizations in Puerto Rico, as opposed to those in the USVI, sponsor or co-sponsor various activities that emphasize the social and cultural character of their enterprise. Most of the organizations studied sponsor activities such as fishing tournaments, marine recreational activities (regattas) and sport and social activities (tennis, domino and golf tournaments, dances). These organizations keep sportfishing

tournaments play a key role in the economic survival of yachting and fishing clubs, marinas and coastal communities.

### Development Plans

At this time, plans for the expansion and building of facilities and the incorporation of services into the organizations do not appear to be priorities for most facilities (figures number 9, 10 and 11). However management and owners do foresee expansion in pier space, slips and the overall marina facilities, as well as in the clubhouse. In the building plans, organizations are looking at the condo-marina business and the expansion of slip space as well as the addition of sports facilities that would turn the marinas into marine recreational centers. This is a common strategy used to make the marina business profitable over the years. As to the addition of services, organizations go slowly on that turf. In the case of Puerto Rico, a number of them simply do not want to open their facilities to the public. Nevertheless, this team feels that they must move toward that direction in order to insure their economic survival. Retail shops, mechanics and repair, and restaurant/cafeterias are the areas of service development projected for the survival of these organizations.

(See figures 8, 9, 10, 11)

### Facilities

Facilities included in this inventory consist of: ramps, waterfront areas, jetties, boardwalks, bridges (used by fishermen) and piers (figure number 12). The region with the highest number of facilities is Cabo Rojo, followed by the USVI (figure number 13). The regions with the lowest number of facilities available to MRF are Humacao and Fajardo. Notice that Fajardo has a high number of physical structures and service facilities, but these are privately owned, and appear in the inventory as services or facilities within organizations.

Ramps and piers are critical facilities for the development of the MRF industry. They are also among the most abundant facilities in the area studied. Cabo Rojo, Arecibo, USVI, Ponce and Vieques/Culebra are the regions with the highest number of ramps. In the case of Arecibo, percentages may be misleading since that region covers a large number of municipalities. Aside from the municipalities of Arecibo and Vega Baja, these facilities are almost non-existent in the region, because of prevalent oceanographic conditions. Most of the piers inventoried were not designed for fishing, but due to the need for coastal water access, they are used as fishing structures. The USVI and Vieques/Culebra have the largest numbers of piers due to the high demand for such facilities imposed by the sailing community and live-aboards on these islands. These piers provide boaters with access to the shoreline. The rest of the regions appear to have a low number of piers, but this is misleading

Figure 8  
SPONSORSHIP OF ACTIVITIES

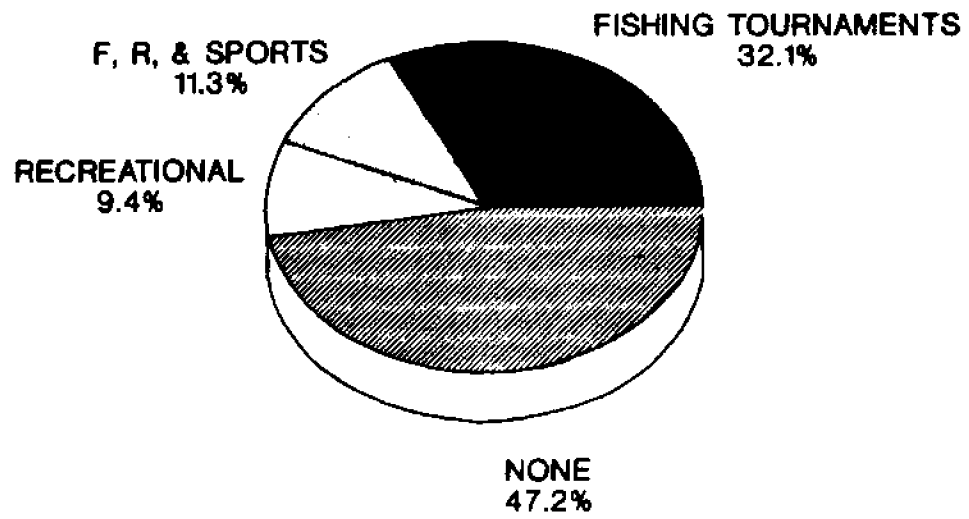


Figure 9  
DEVELOPMENT PLANS TO EXPAND FACILITIES

Types of Expansion

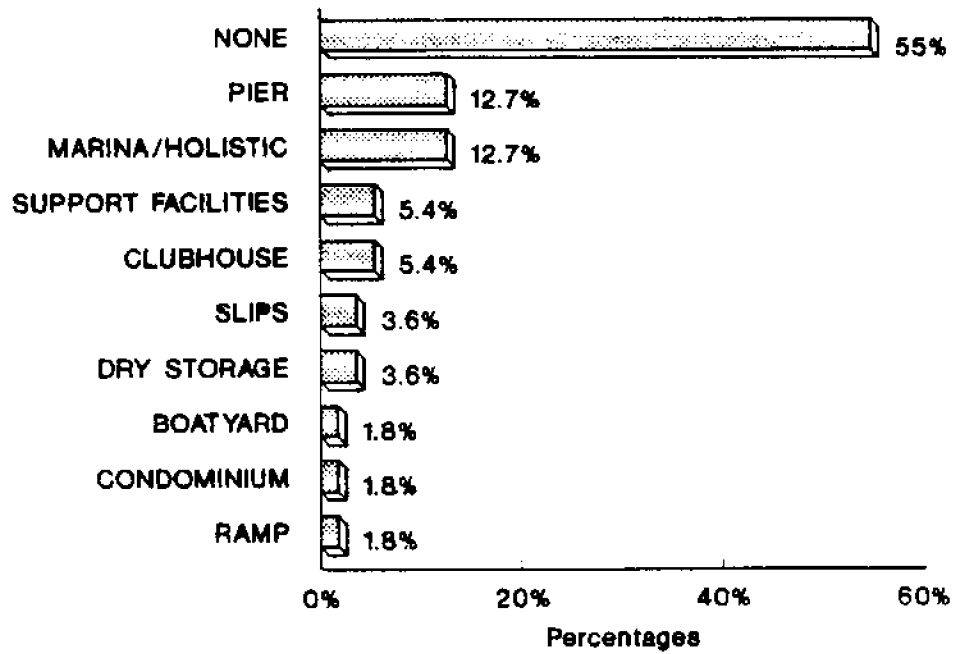


Figure 10  
DEVELOPMENT PLANS TO BUILD FACILITIES

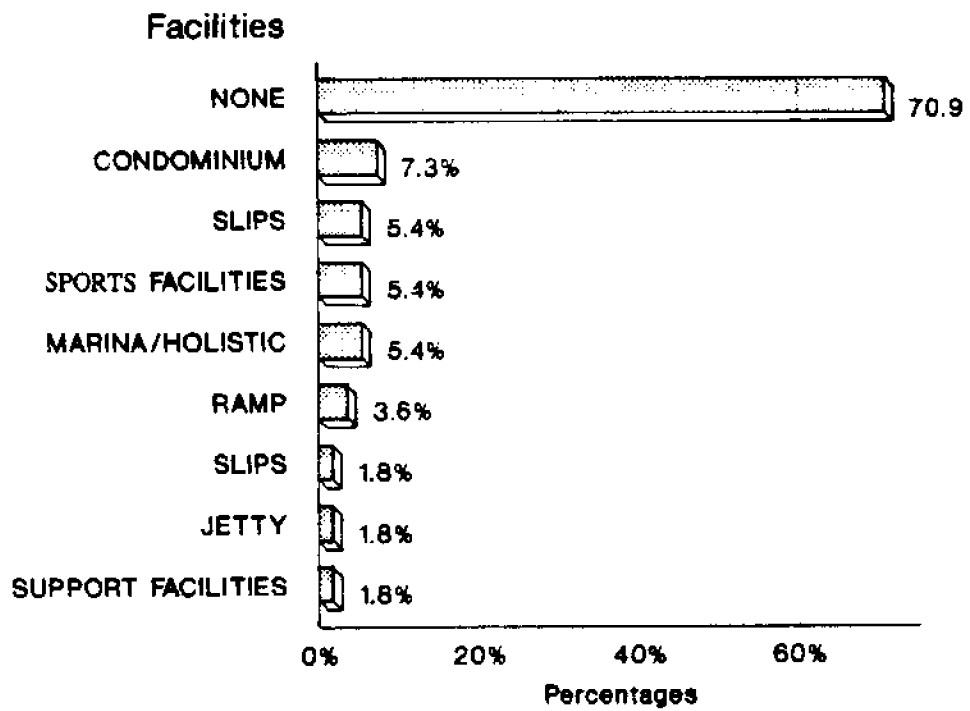
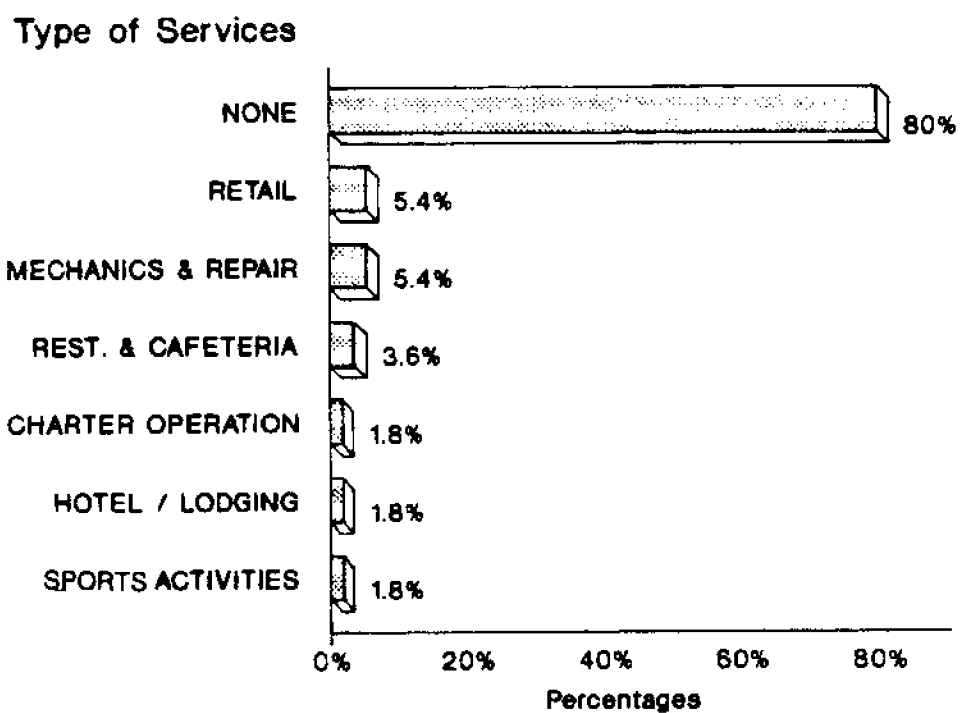


Figure 11  
PLANS TO ADD SERVICES



since most of these regions have a large number of small "private" piers used by residents in the shoreline. That is the case of the Cabo Rojo, Salinas and Vieques/Culebra regions. On the other hand, the Humacao and Ponce regions have a real lack of piers for sailing and fishing "aficionados" (figure number 14).

(See figures 12, 13, 14)

### Ramps

Most ramps in Puerto Rico/USVI are made of concrete and/or cement materials, while less than a third are what we call "regular" or natural ramps made of compacted earth, landfill or rocks that serve for the launching of boats in a given area (figure number 15). The existence of these "regular ramps" is an indicator of the need for that type of infrastructure. Ideally, a ramp providing complete access to the ocean should consist of a ramp plus other support facilities such as: parking space, space for trailer maneuver, security/protection, a pier, lights, and running water. The majority of the ramps inventoried did not have parking of their own, and in many cases, maneuverability was difficult. Security was non-existent in these facilities. A pier with a combination of any support facilities was found in 32.4% of the ramps examined (figure number 16). This indicates a need to include such critical support facilities in future planning of ramps. This fact is enhanced by the fact that 44.2% of the ramps did not have any support facilities at all (idem).

(See figures 15, 16)

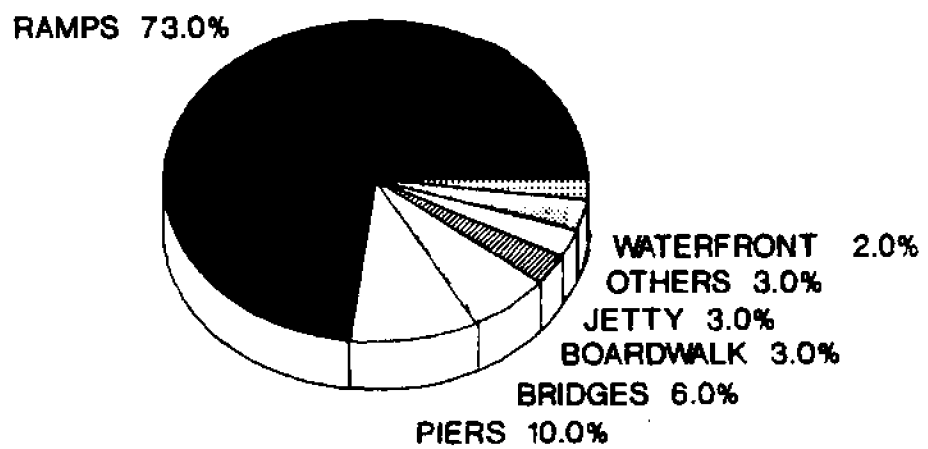
### Services

The USVI (with 46.2% of all services inventoried) features a disproportionately large number of services offered to the MRF clientele, followed by San Juan, Cabo Rojo and Fajardo (figure number 17). This lopsided proportion is due to the fact that a large number of fishing charterboat operations abound in the USVI. The USVI are home to 74.2% of all fishing charter operations in the whole area studied (figure number 18). Overall, fishing charters account for 14% of all services inventoried, surpassed only by scuba and marine shops (figure number 19).

Figure number 19 provides a comprehensive and individualized listing of all services inventoried by categories. Within those categories, we organized services into major types. As such, fishing charters and scuba shops are the most common. In Puerto Rico the number of scuba shops is high. Retail (34%), mechanical/ repair services (26%) and boat and trailer parks (1%), follow in importance (figure number 20).

We also grouped services under the category of services exclusively related to MRF. In doing so we assume that scuba businesses also cater to divers as recreational fishermen, as our pilot surveys have shown in the past. The sale of diving gear and spearguns is considered here as part of the MRF equipment. In the case of Puerto

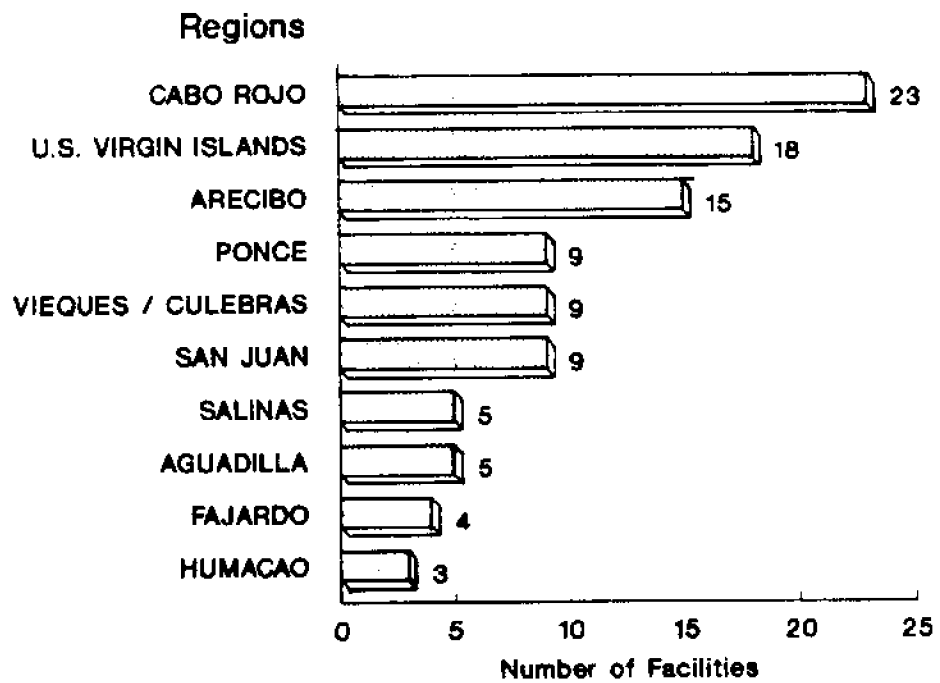
Figure 12  
TYPES OF INFRASTRUCTURE / FACILITIES



(N=100)



Figure 13  
DISTRIBUTION OF FACILITIES BY REGIONS



(N=100)

Figure 14  
**REGIONAL DISTRIBUTION OF RAMPS AND PIERS**

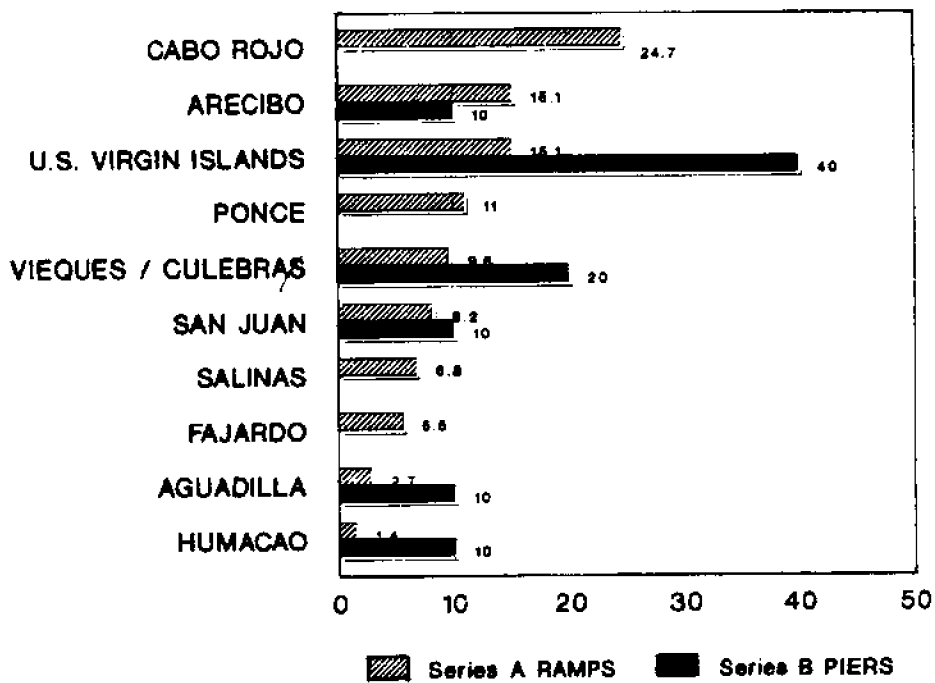
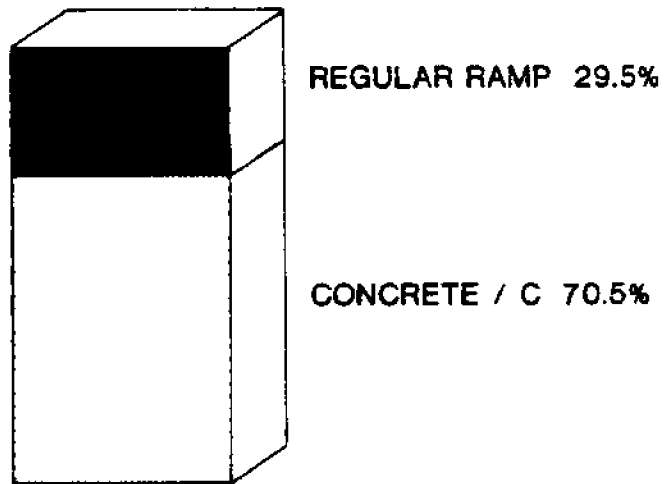
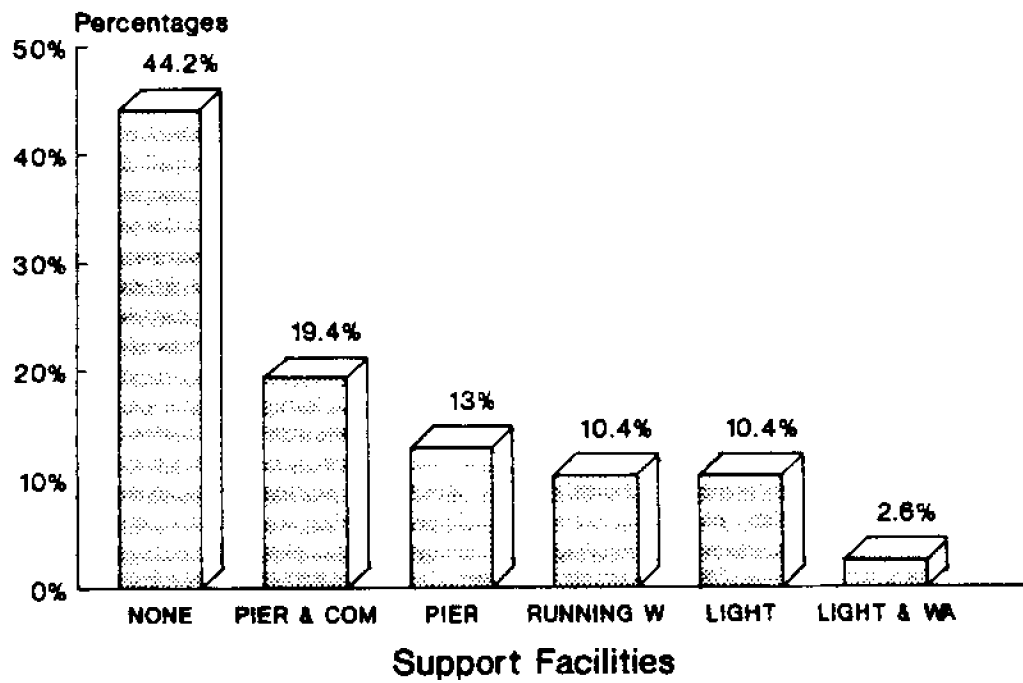


Figure 15  
TYPES OF RAMPS AT THE FACILITIES



(N=78)

Figure 16  
SUPPORT FACILITIES AT THE RAMPS



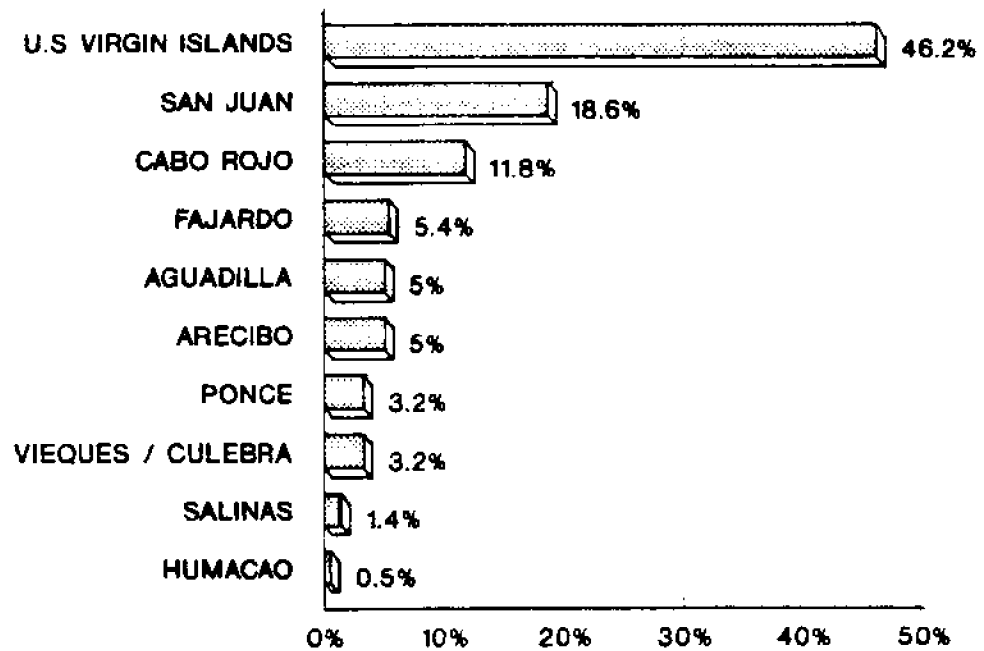
(N=77, One Response Missing)

Rico, coastal area sport shops carry fishing tackle, and therefore were included in the inventory. From that "selected" group, scuba shops had the highest representation in the inventory, followed by fishing charter operations and specialized bait and tackle shops, most of which are located in Puerto Rico (figure number 21).

(See figures 17, 18, 19, 20, 21)

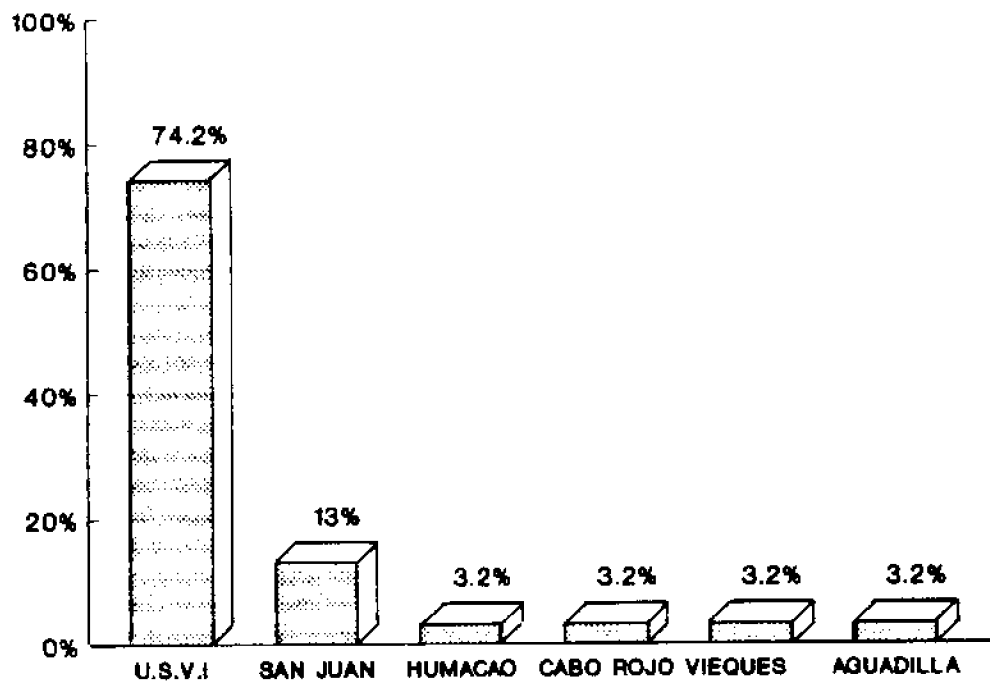
Services appear to be one of the most dynamic sectors of the MRF industry. Unlike organizations, their number is increasing everyday, and their needs for capital are fewer and less demanding. From our observations, the service with the fastest growth rate appears to be the scuba shops and related operations. With the consistent increase in number of boats, the demand for mechanical/repairs for hauls and boats has also affected repair shops as well as businesses in the motor, boats and parts retail sector. Service operations range from one man, self sufficient/independent operator types to businesses employing 19 people. The average number of employees is 3.2 per business. With a total of 221 services inventoried, this represents approximately 707 people serving the MRF clientele, including yachtsmen and marine recreation enthusiasts in Puerto Rico and the U.S. Virgin Islands.

Figure 17  
DISTRIBUTION OF SERVICES BY REGION

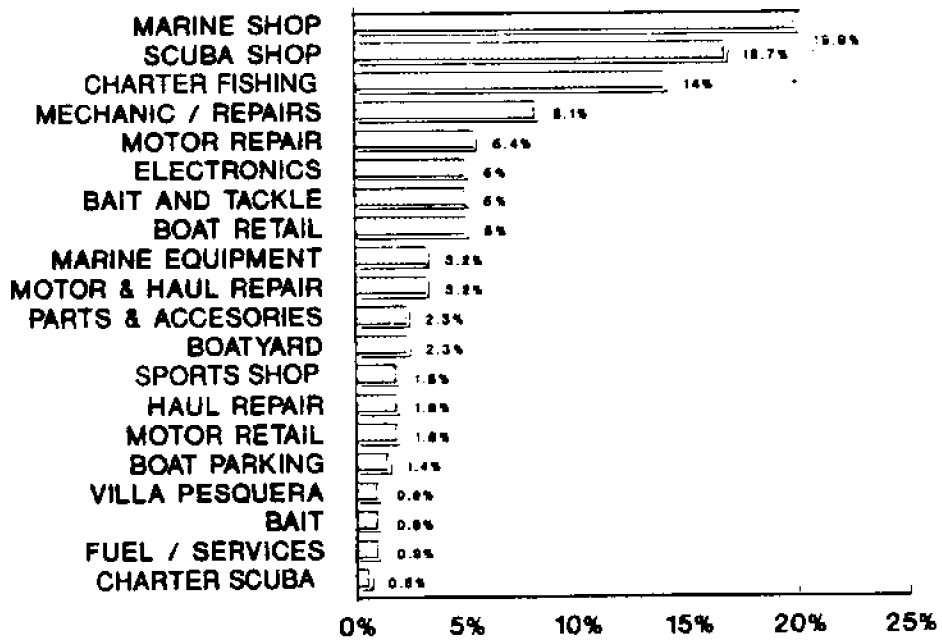


(N=221)

Figure 18  
FISHING CHARTERBOAT OPERATIONS BY REGION

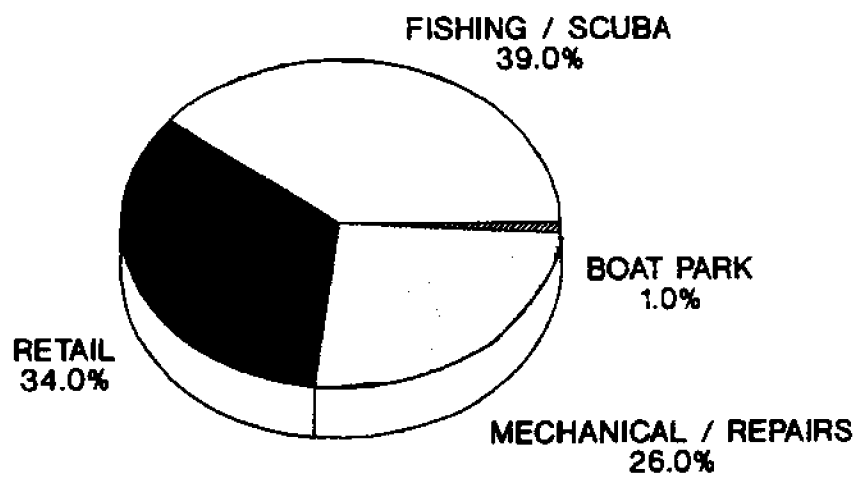


**Figure 19  
TYPES OF SERVICES**

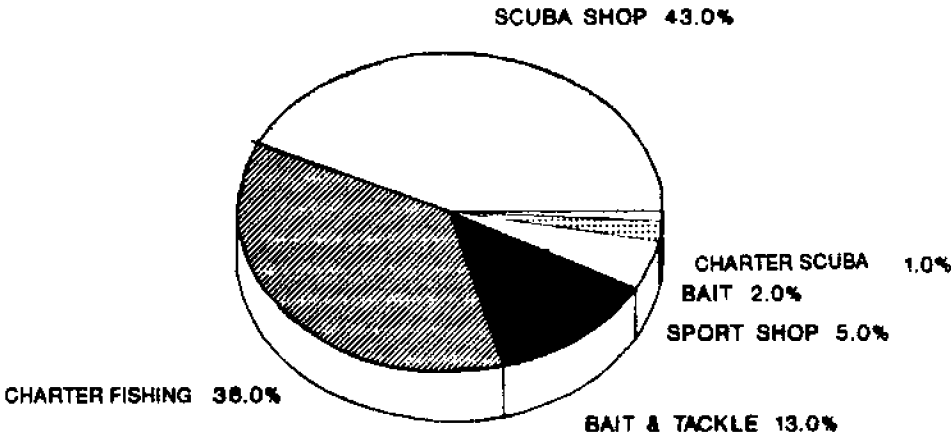




**Figure 20**  
**MAJOR TYPES OF SERVICES**



**Figure 21**  
**SERVICES EXCLUSIVELY RELATED TO MRF**



(N-86)

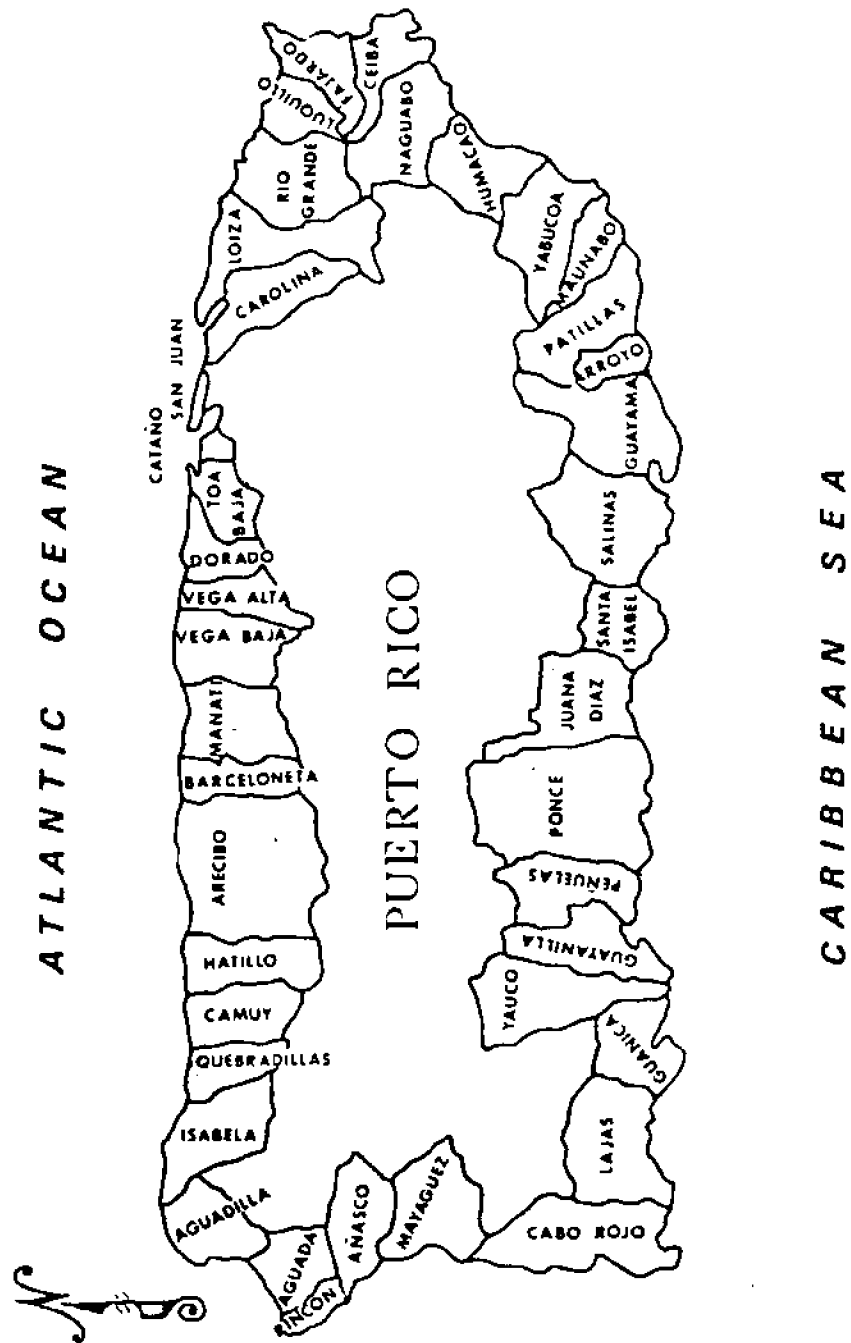
## MARINE RECREATIONAL FISHING INFRASTRUCTURE AND ACCESS: A QUALITATIVE PORTRAIT

This qualitative report provides analysis of PR and the USVI in terms of services and infrastructure available to support MRF activities. The data for the municipalities is grouped under municipal regions. These are formed by various coastal municipalities or islands that share geographical location, environmental characteristics, economic structure, fisheries and demographics. The Puerto Rican island municipalities of Vieques and Culebra are treated as a region. The USVI (St. Croix, St. Thomas and St. John) are also treated as a separate geo-political unit, as a region.

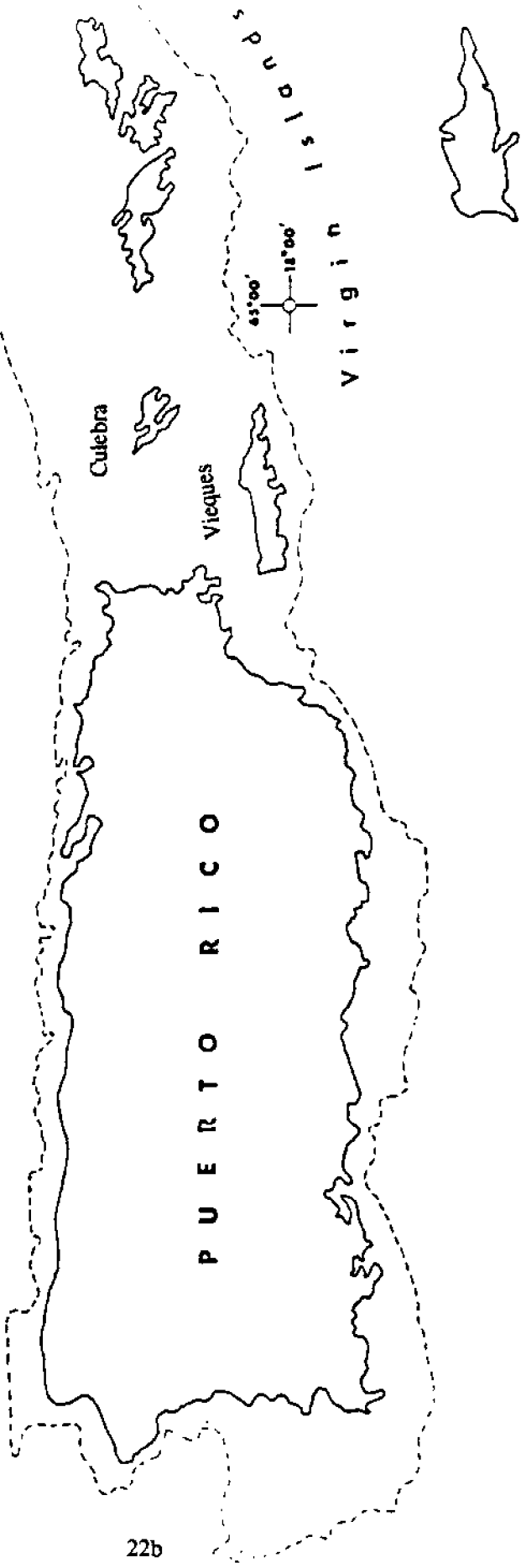
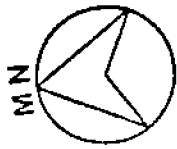
This section summarizes information gathered on organizations, facilities and services through field observations as well as both structured and unstructured interviews with MRF clientele. This qualitative portrait features rather lengthy descriptions of all ten regions in Puerto Rico and the U.S. Virgin Islands, an assessment of the current use of MRF related infrastructure, and the development potential for each region.

(See maps #1 and #2)

MAP NUMBER 1



MAP NUMBER 2



## The North Coast/San Juan Metropolitan Region

### Regional Characteristics

The North Coast contains the municipalities of Cataño, Guaynabo, San Juan, Carolina and Loíza. This region is of critical economic and political importance for Puerto Rico. Central offices for all government agencies are located in San Juan. The heart of the banking and financial sectors is also located in the San Juan metropolitan area (SJMA). Banking, government, and services are vital for the economy of the region. Industrial development of local and North American origin is also crucial for this region, in all the municipalities. Guaynabo, Carolina, Loíza and Cataño, once agricultural towns, have absorbed the population increase of the region with the conversion of agricultural fields into housing projects and industrial zones planned by the Commonwealth's Economic Development Corporation.

This region is also the core of commercial and leisure transportation for Puerto Rico. The Ports Authority has control over a network of piers, harbors and a small airport throughout the San Juan Bay. The Luis Muñoz Marín International Airport is located in Isla Verde in the municipality of Carolina, 15 minutes from San Juan. In the 1950's the Commonwealth's development strategies included building the island tourism infrastructure in San Juan by emphasizing and enhancing the city's old Spanish flavor through historical reconstruction of buildings and monuments. Other priorities included access to beaches, convenience to cultural centers ranging from museums to cafés, and transportation services.

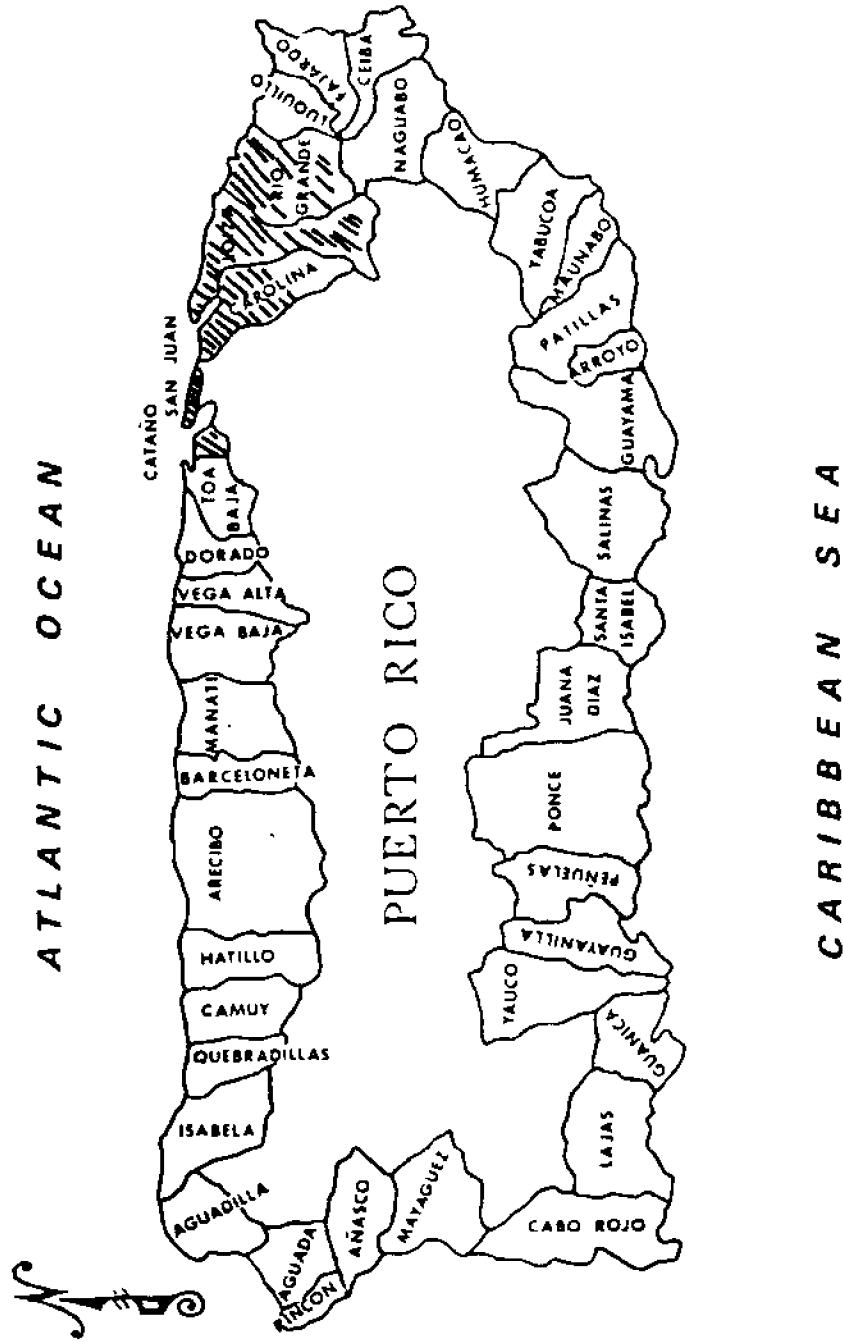
The San Juan Bay to the south and west was also the setting of the urban shantytowns that bordered local highways and marginal mangrove forests extending into the estuarine ecology, almost to the municipality of Carolina (cf. Lewis 1966, Safa 1974 and Ramirez 1976). The shantytown belt surrounded the areas of Old San Juan, Condado and Isla Verde where hotel chains built their hotels. The process of urban renewal (Safa 1974), accompanied by gentrification eliminated the architecture of shantytowns, distributing the population of urban poor throughout public housing projects in the metropolitan area. The hotel and private homes belt, extending from old San Juan to Isla Verde, has brought problems of public access to the beaches, this being controlled by home owners and hotels. The processes of urban renewal and gentrification have also altered beach and estuarine access, favoring industry, tourism and government infrastructure.

(See map #3 and The North Coast-San Juan Demographic Portrait)

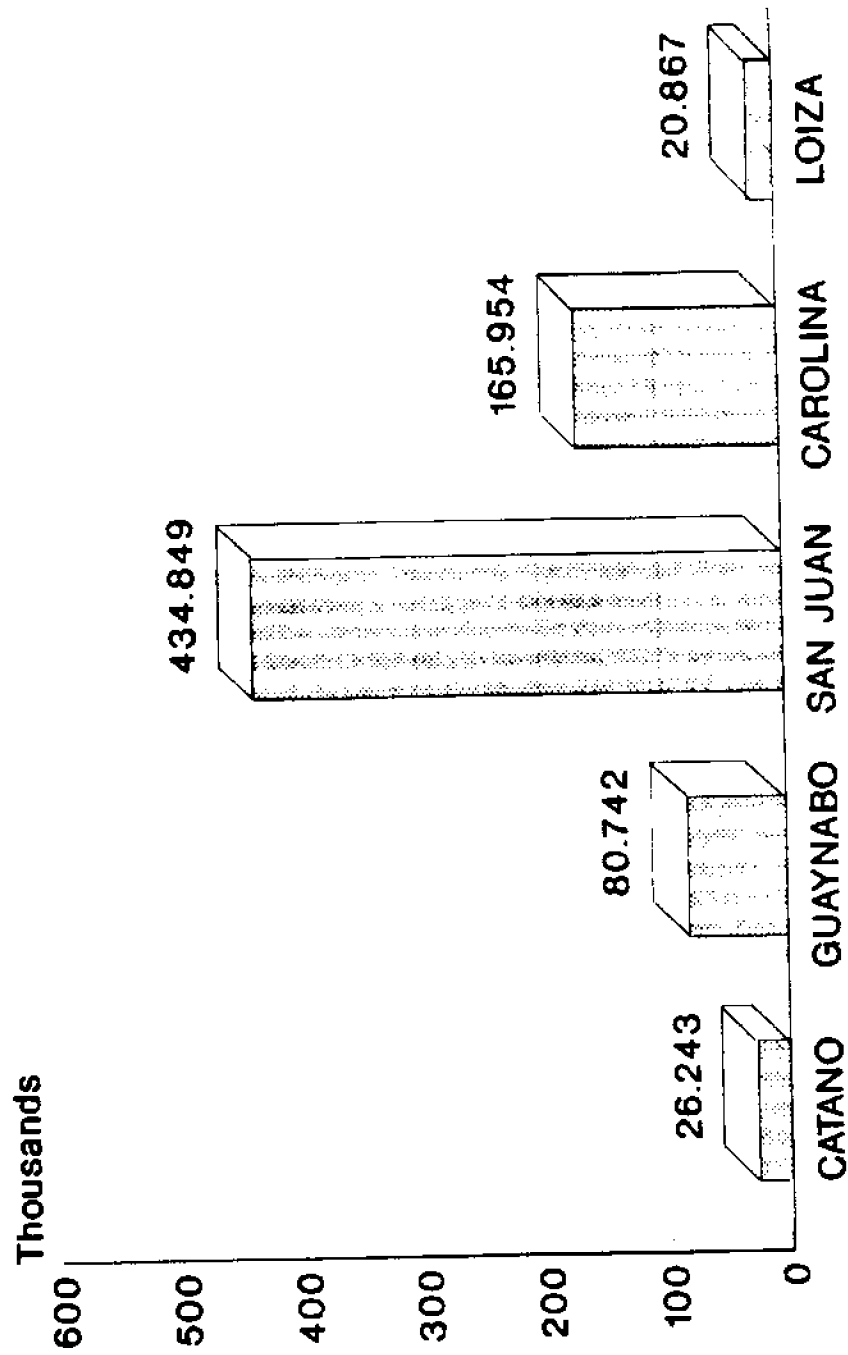
Government officials and others have observed that tourism in Puerto Rico is centralized in San Juan and Carolina, where expensive hotels and casino are the main attractions. (However, there are plans for the re-vitalization of tourism throughout the island). Despite various drawbacks such as the Dupont Plaza fire the tourism industry, measured in hotel rooms occupancy, and expenditures, is on the rise, mainly in the San Juan area. The Office of Tourism publishes ¿Qué Pasa?, a full-color monthly

MAP NUMBER 3

THE SAN JUAN REGION



# THE NORTH COAST-SAN JUAN DEMOGRAPHIC PORTRAIT



(1980 U.S. CENSUS)



magazine with maps and complete information on lodging, restaurants, cultural activities, sports including watersports, natural attractions, transportation, and more for visitors. It covers the whole island, but emphasis is on the SJMA. Similar to Saint Thomas in the USVI, Puerto Rico has expanded tourism expenditures by broadening cruise ship tourism throughout the SJMA and neighboring attractions such as El Yunque, the tropical rain forest.

As presented in this report, San Juan and Carolina are central to the development and maintenance of tourism. Guaynabo has only a small fringe (a couple of miles) of coast, and it is mostly an urbanized municipality. Cataño, an essential area of shantytown settlements is now the home of various factories (eg. the Bacardi plant), ports infrastructure, and private homes and housing projects. A commuter ferry travels from Cataño to San Juan. Lofza is a fringe municipality, which forms part of the region's coastal and recreational continuum. Lofza attracts many local visitors for the festivities of Santiago, their patron saint. Since the sixteenth century (from Santurce to San Juan, Carolina and Lofza) in the heart of the coastal and estuarine ecology, settlers of African origin and descent constituted villages and communities, with their own cultural traits. Although development has altered the location of those settlements, coastal Lofza and portions of Carolina remain homogeneously Black. Tied to the peasant and plantation economy, these settlers have remained poor, with lack of industrial alternatives. The possibility of tourism development in the area has been broached. In terms of tourism, industry, commerce, landscape and coast, the San Juan metropolitan area and the region as such ends in Lofza.

As other municipalities assessed in this report (Arecibo, Ponce, Aguadilla) San Juan has also initiated a process of waterfront development closely linked to urban renewal. The tourist port area in the southern portion of the San Juan islet (once the home of shanty houses) has been remodeled to attract and please cruise ship visitors. Revitalization included the harbor and the buildings, including the desarticulation of brothels and low-class, low-esteem businesses.

The fishing landing centers of San Juan are the sole survivors of gentrification and renewal. Efforts for relocation have failed due to social and political pressures on behalf of the fishermen and other interest groups. Various facilities (La Coal and La Puntilla) have been remodeled by the capital city majors and by CODREMAR. Guaynabo, Cataño and Lofza have government-built landing centers or villas pesqueras. Rough weather (waves and currents) throughout the year, and increased wave action from November to April limit fishing activities. Fishing accidents, although uncommon in Puerto Rico, are particularly notorious in this area. Fishermen use hand-line for snappers and groupers, troll for mackerel and dolphinfish, and scuba-dive. Cast nets for bait, and trammel nets are also used in the bays and estuaries. Traps are not used here.

San Juan is the main harbor for the U.S. (port of origin) longliners, fishing in surrounding waters. These longliners, mostly based in Florida, fish for swordfish, but "bycatches" include dolphinfish, tunas and marlin, which are "dumped" into the local market at prices lower than those established by local fishermen.

Watersports are characteristic of the leisure activities of the region. The Condado and Isla Verde beaches attracts swimmers, water-skiers, windsurfers and surfers that mingle with sun-tanning tourists. Use of beaches by the local population is growing without seasonal differences. However, summer remains the season when locals go to the beaches, and winter when tourist abound. Saint John the Baptist is the patron saint of the capital city, and on June 23 all beaches (now throughout the Island as well) are packed to celebrate the eve of the patron saint's day.

#### Marine Recreational Fishing: Infrastructure and Services

From west to east, the San Juan Bay, San José Lagoon, Martín Peña and the Torrecillas-Piñones system of channels within the mangrove forest form a protected area for boats and MRF infrastructure. This is important since rough weather generally causes erosion on this coast. In terms of MRF development this area is second only to Fajardo. The easternmost portion of the San Juan Bay harbors the Club Náutico and the San Juan Fishing Center and Marina. Essential services and facilities such as bait and tackle, motor and boat repairs, shipyards, boat sales and sportfishing charterboats are offered by these two organizations. The most successful and consistent fishing charterboat operations in the island are also based here.

The organizations in this region are among the most active. Local and international sportfishing tournaments are held at the Cangrejos Club and at the Club Náutico de San Juan. In Carolina, condo-marinas include the Club Náutico, Costa Marina and Vista Mar Marina as well as Cangrejos Yacht Club and the Cangrejos Recreational Corporation. The Isla Verde area of Carolina also offers a variety of services, including a clearinghouse for charterboats.

One remarkable aspect of this region is that the commercial fishermen here share and exchange services with the recreational sector. For example, bait is provided to recreational fishermen by the commercial fishermen of San Juan and Cataño. In Carolina, the commercial landing center operates successfully by providing space for the recreational boats, in slips and dry storage ashore.

Scuba-diving is also favored in this area. Various diving shops, some in hotels, provide charter operations to the local reefs. Sportfishing and scuba diving shops are linked to the Watersports Association, which enjoys a close relationship with the Office of Tourism. One of their objectives is to continue to cater successfully to the U.S. tourist market.

Launching ramps are scarce in this area. Aside from those in the yacht clubs, which are of private use, the SJMA only has three or four. The Isla Grande Ramp at the southeast tip of the San Juan Bay, formerly used for hydro-planes, is the biggest and best one in the area. Unfortunately, it is located in a relatively isolated area, and this poses security problems (cf. Tropic Times 1988). The set of two ramps at the eastern side of the Cangrejos Club (in the La Paseadora) may be accessed for a fee. This locale has parking space available. A fourth (natural) ramp is located in the Condado Lagoon; it is mostly used by boaters waterskiing there. Only small crafts can pass underneath the bridge, thus access to the open sea is limited by boat size.

Recreational fishing from the shore, or from other facilities is pretty common in this region. Urban anglers fish from the Fortaleza Pier, the Three Hermanos bridge, and the Escambrón pier. In Isla de Cabras, surf fishing is popular to the extent that there is a yearly surf fishing tournament and an anglers' association.

#### Development Plans

The municipality of San Juan recently announced the planning of a marina complex in the San Juan Bay. That marina complex will include restaurants, hotels, slips and dry storage space for more than 400 boats, and a fishermen's wharf for the local commercial fishermen to land and sell their catch. This project could satisfy the large demand for boating facilities in the region.

In addition, the municipality of San Juan is already protecting the channel system of the mangrove estuary for the establishment of the agua-guagua or water-bus transportation system. In Santurce, the municipality plans to build a villa pesquera with facilities suitable for serving the MRF clientele as well. Such facilities have great use potential, but their development has been on the drawing board for almost eight years.

Carolina does not have any development plans, but the mayor and planning office recognize the importance of MRF in the local economy. This municipality has already approached MAS for technical help and planning for MRF.

#### Marine Recreational Fishing: Recommendations on Potential Development

This region is considered as "type A" by the research team. Despite its category and the large number of businesses serving the MRF, this clientele and its potential expansion are ill served in the area. With the exception of Carolina's villa pesquera (and the piers and bridges) facilities for recreational anglers are available only for the upper socio-economic segments through the marinas and condo-marinas, where available space is non-existent. Growing numbers of boats and potential anglers have been absorbed by Fajardo and, in a small number of cases, by the USVI. As this report shows, the number of dry storage space and slips is higher in Fajardo than in any other municipality or region in Puerto Rico. As a consequence, growth in the number of slips has increased slowly, almost imperceptible. The only two MRF and yachting organizations of the area, Club Náutico de San Juan and the Cangrejos Yacht Club, have been in existence for more than half a century.

Recommendations in this instance are aimed at the increase of opportunities for boaters and anglers. Expansion in the number of marinas and clubs is out of the question due to the high population density of the area and environmental protection policies for the remaining mangrove areas in the region on behalf of the Department of Natural Resources and Coastal Zone Management. A possible solution to that problem is for the state and/or municipalities to acquire properties currently used for private access to the coast, mooring and slips.

1. Launching ramps are considered a major deterrent to MRF activities and boating in general. The Isla Grande ramp, due to its size, conditions and available parking space presents an excellent opportunity for MRF development in the municipality of San Juan. Modest investments in a pier, lighting, and re-pavement of the parking area could turn this ramp into a favorite spot for boaters and anglers (who also fish in the area). Security is a major issue in the SJMA (where criminal incidence is high); and this ramp lacks protection. Any plan to revitalize the area must consider security guards or state police protection. A parking and/or food-bait-tackle concession must also be considered as a way to cover revitalization expenses, or for the maintenance of the area.
2. Re-vitalization of the Escambrón Pier, which has been used by anglers, will provide an additional opportunity to develop urban fishing piers.
3. In Isla de Cabras, the home of a major surf fishing tournament, the construction of a pier and other waterfront facilities will enhance angling potential in the area. In many occasions government agencies have funds available through state or federal sources to invest in coastal or waterfront infrastructure. These funds would be well invested in such a pier.
4. The Carolina landing center is an example of a villa pesquera that offers services and shares space with the MRF clientele. Upgrading such facilities poses a philosophical and management problem to the DNR (in charge of recreational fishing) and CODREMAR (in charge of commercial fisheries): Who is responsible for that development and up-grading? Re-vitalization of villas pesqueras with "commonalities" capabilities or potential should emerge from the combined efforts of these agencies. Planning in that direction benefits both sectors, and enhances the current set of relationships between them. The municipality of Carolina could also be involved in this development, to help satisfy the perceived demand for such services by a growing population of leisure boaters and fishermen.

## The East Coast/Fajardo Region

### Regional Characteristics

The east coast region is composed of the municipalities of Rfo Grande, Luquillo, Fajardo and Ceiba. Marine recreational activities in this area are varied, with surfing, windsurfing, swimming, sailing, boating, fishing, snorkeling, body surfing, paddleball and picnicking among the most popular. Condos, second homes, hotels, resorts, camping grounds, sea food restaurants, kiosks offering typical fried food are common, and beach festivals and sport competitions are popular coastal activities of significant economic importance to the region.

Increased traffic activity during the weekends is evident on route No. 3 from San Juan to Ceiba. This traffic consists of local residents, tourists, second home and boat owners and other marine recreationists that take advantage of the many natural resources, facilities, infrastructure and services of the region. Fajardo, offers the services of an airport, where air traffic from Vieques, Culebra and the U.S. Virgin Islands is notably active. Fajardo's public ferry service to Vieques and Culebras is administered by the Ports Authority in its commercial port. A private ferry also operates from a dock close to Villa Marina, transporting people to the U.S. Virgin Islands.

ODITE is a regional association organized to promote tourism; it is composed of businesses and organizations from the municipalities of Lofza, Rfo Grande, Luquillo, Fajardo, Vieques and Culebra. This organization reflects the increase and importance of tourism and marine recreational activities in this region. One of ODITE's goals is to change the industrial economy of these municipalities to one dependent on tourism. To reach this goal, ODITE promotes the natural resources in this region such as the bioluminescent lagoons, beaches, islets and island municipalities, coral reefs, rivers, forests, human resources, facilities, services and infrastructure.

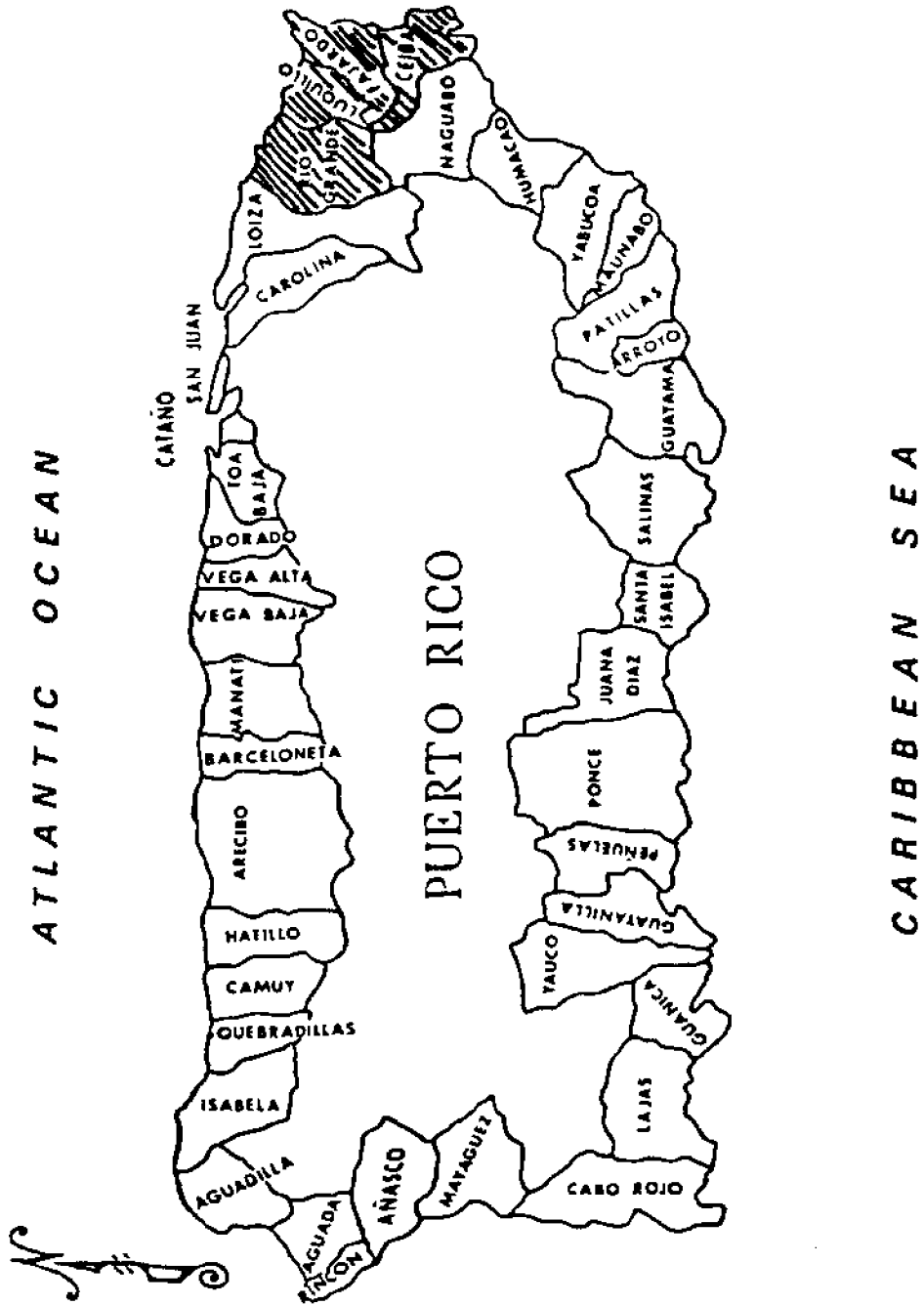
(See map #4 and The East Coast-Fajardo Region Demographic Portrait)

### Marine Recreational Fishing: Infrastructure and Services

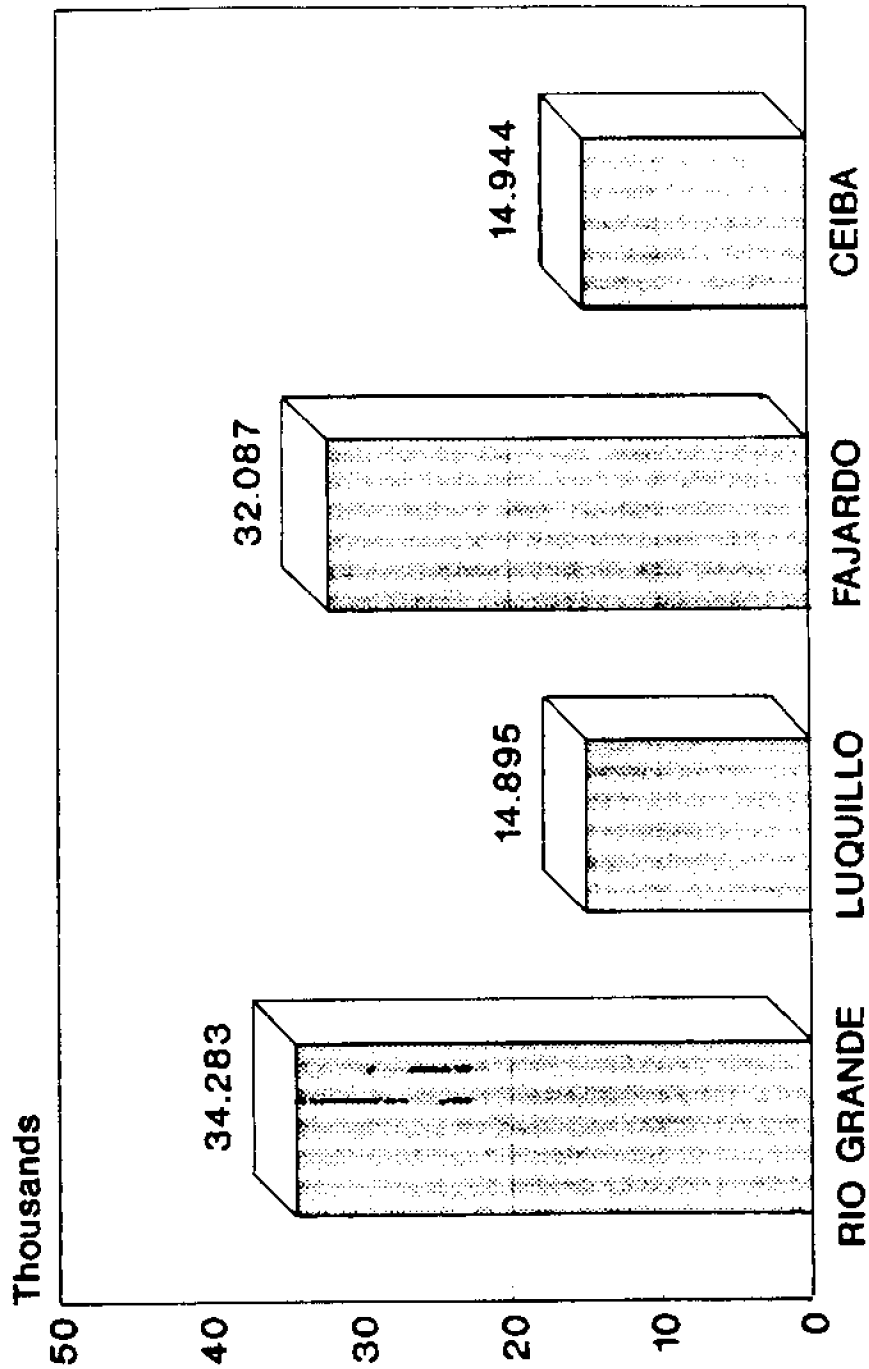
In terms of marine recreational fishing, boating and sailing (MRFB/S), the east region is the most developed in Puerto Rico, with a varied infrastructure of facilities and services. The municipality of Fajardo is the core of activity and development in this region. Its many offshore islets and cays, and its proximity to the island municipalities of Vieques and Culebra as well as to the San Juan metropolitan area and the U.S. Virgin Islands, make Fajardo an ideal site for the development of facilities, infrastructure and services for MRFB/S. Most owners of large boats in P.R. are from the San Juan metropolitan area; many keep their boats in Fajardo. Condo marinas (Villa Marina Yacht Harbor and Inversiones Isleta Marina Inc.) and marinas (Marina

MAP NUMBER 4

THE FAJARDO REGION



# THE EAST COAST-FAJARDO REGION DEMOGRAPHIC PORTRAIT



(1980 U.S. CENSUS)

Puerto Chico, Marina Puerto del Rey and Marina Puerto Real) are popular in this area; most are either expanding existing facilities or plan to do so. Facilities for camping, and trailers and beaches for swimming are also common in this area.

The need for more dock space in Fajardo is reflected by marina waiting lists and by the number of boats anchored off Isleta Marina. Villa Marina, one of the largest marinas on the island, recently completed the construction of dry-stack racks which are already leased. They are planning to expand their haul-out facility for large vessels and the construction of more dry storage. Marina Puerto Real is a relatively new marina at Playa Fajardo; it offers storage for trailable boats and has plans to build a restaurant and dry-stack storage. Fajardo also has a boatyard at "Las Croabas" for repair and maintenance of commercial and recreational boats. This boatyard belongs to CODREMAR but is managed by a concessionaire.

In relation to public ramps and other public access facilities, this region has a minimal infrastructure. Public ramps in this area are characterized by a lack of parking space, lightning, piers, security and lavatories. Many of these are natural ramps, some of them with rough improvements.

In Ceiba, "Marina Puerto del Rey" (will be the largest in P.R.) is currently under construction. This facility will consist of a sixteen-hundred-foot breakwater which will protect approximately seven hundred slips, a modern haul-out facility and dry-land storage for larger vessels, 800 dry stack racks, marine repair, other marine services and supplies along with a restaurant and other facilities. The rest of the municipalities in this region have the minimal infrastructure and almost no services for MRFB/S.

Río Mar in Río Grande, a private resort with golf course, swimming pools, villas and cabanas has plans for the construction of a marina. In the municipality of Luquillo condos and housing developments dominate the scenery. Luquillo also has the "Luquillo Public Beach Park," which consists of cabanas, beach area, picnic facilities, parking and lifeguards. However facilities for MRFB/S are limited to one public ramp. Strong wave activity and lack of havens and protected areas constrain the construction and utilization of ramps and other MRFB/S infrastructure in this northeast region.

Marine recreational fishing is very popular in this region. Anglers can be seen fishing from private piers, jetties and docks, from shore and from small and large boats. Unlike other regions, fishing and yacht clubs are absent in this area. Many of the fishing and yacht clubs in other parts of the island were organized in order to supply the need for facilities, infrastructure and services to local anglers. In this region, access needs and services have traditionally been provided by private marinas and other businesses.

Marine recreational fishermen in this area utilize the services of bait and tackle from the commercial fishermen at the villas pesqueras (landing centers). This region boasts seven villas pesqueras (at Palmer, Luquillo, Las Croabas, Sardinera, Puerto Real, Maternillos y los Machos). Fishermen in this region use hand lines for trolling,



traps and gill nets as their main gears. Various vessels operate in the snapper-grouper fishery. Fishermen associations in this region are well organized, to the extent of having operated (in the past) a regional fishermen's organization.

#### Development Plans

Currently, marine outlet shops are expanding and other new and diverse marine-related businesses are opening their doors (wood-working, electronic repair, engine repair, canvas, paint shops). Marinas are expanding and building hotels and more dock space to its existing facilities. "El Conquistador," a once-closed or temporarily shut-down hotel, has plans to re-open (it has a marina) and the Hilton Hotel chain is planning on building a marina connected to a hotel in this region. All these marine-related services, facilities and infrastructure will allow marine recreational fishing (MRF) to expand. According to the DNR, there are eight petitions pending for marina development for the Fajardo region. This has lead the DNR to develop the planning concept of a marina district, using Fajardo as an experiment. The area already attracts boaters because of the proximity to the islets, island-municipalities, and the USVI. This makes sailing and cruising a safe and enjoying activity. Specialized services catering to the boat owner population is another factor in the future development of the region.

## Marine Recreational Fishing: Recommendations for Potential Development

This region has the advantage that the private sector currently provides many and varied opportunities for marine recreational fishing. However, most of the facilities and services provided by the private sector are for anglers who own a boat. Anglers who do not own a boat have (practically speaking) no access to the resource base. Urban anglers may find their path to water bodies increasingly cut off in coming years as redevelopment spreads.

1. Recreational fishing piers and charter and party boat services (fishing, diving and short trips) add a significant dimension to almost any urban waterfront setting, be it industrial, commercial-residential, tourist oriented or in the heart of a city. Piers are the "poor person's boats," enabling them to reach over the oceans waves to get at the fish. Fishing piers however, are not the only access points for for the boatless. Charter and party boats may serve sport anglers and tourists willing to pay for the services and experiences of deep sea fishing. A project for the training of commercial fishermen as fishing guides and charter boat captains should be implemented by these municipalities. Bait and tackle shops represent another business opportunity for commercial fishermen. Public ferries must take advantage of the available natural resources and improve their services with faster, more comfortable boats and aesthetic improvements. Waterfront revitalization is imperative in all of the municipalities of this region.

2. Public facilities should be upgraded for the benefit of users who cannot afford the cost of private facilities. In the process of providing public access to the fisheries of this region, municipal governments or providers must broaden their focus to one that recognizes that by definition, "access" entails the management and development of certain facilities and services (e.g. parking, restrooms, police services, rentals and concessions).

## The South East/Humacao Region

### Regional Characteristics

The Southeast/Humacao region contains the municipalities of Maunabo, Yabucoa, Humacao and Naguabo. Originally, the research team viewed this area as a separate region in relation with the MRF industry. After the statistical analysis and evaluation of the remaining regions it is valid to contend that this area truly belongs to the Eastern/Fajardo Region. Socially and economically it forms part of a continuum.

The Humacao region was part of a continuum of large landholdings devoted to sugar cane cultivation. These are now becoming urbanized and developed into real estate. A small number of factories and oil refineries are essential to the regional economy. Yabucoa and Naguabo are essentially rural municipalities; sugar cane production and cattle ranching are principal activities. As a municipality, Humacao has a stronger industrial base. In addition to its factories and service-related businesses, Humacao is close to an industrial "belt" in the neighboring towns of Las Piedras and Juncos. Industrial and business development has attracted many important government services including a regional hospital and a four-year college from the University of Puerto Rico.

Marine recreational activities in general appear to be less developed in this region in comparison with the rest of the island. Beaches are common, but access seems to be a problem in the area. Public beaches in Humacao and Yabucoa allow for local recreational activities.

Small-scale fishing is fairly active. Fishermen use traps and lines as their main gear. They also use beach seines and cast nets (Cruz 1985). In Maunabo, gill nets are a popular fishing gear. Fishermen sell their catch to a great variety of local restaurants. Fishermen here also have other jobs and a good number are rural migrant workers part of the year.

(See map #5 and The South-Humacao Region Demographic Portrait)

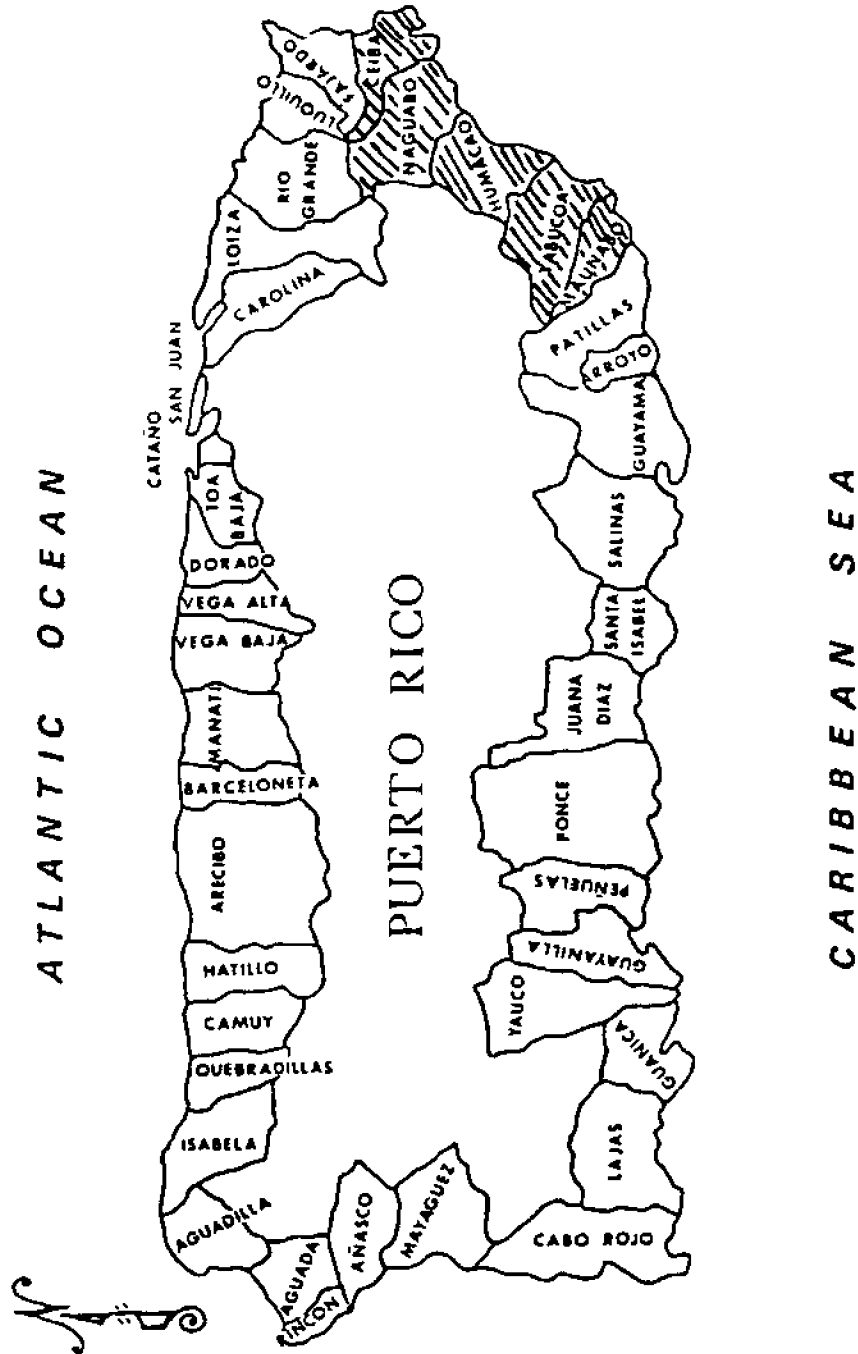
### Marine Recreational Fishing: Infrastructure and Services

MRF infrastructure and services are almost non-existent in this region. There are ramp facilities at the fishing landing centers of Naguabo and Yabucoa, but these are for the use of the local fishermen, and are seldom used by the recreationals. Surf fishing and fishing from bridges at channels is very popular in the area. The pier from the local sugar mill in Humacao's Punta Santiago is used for that purpose.

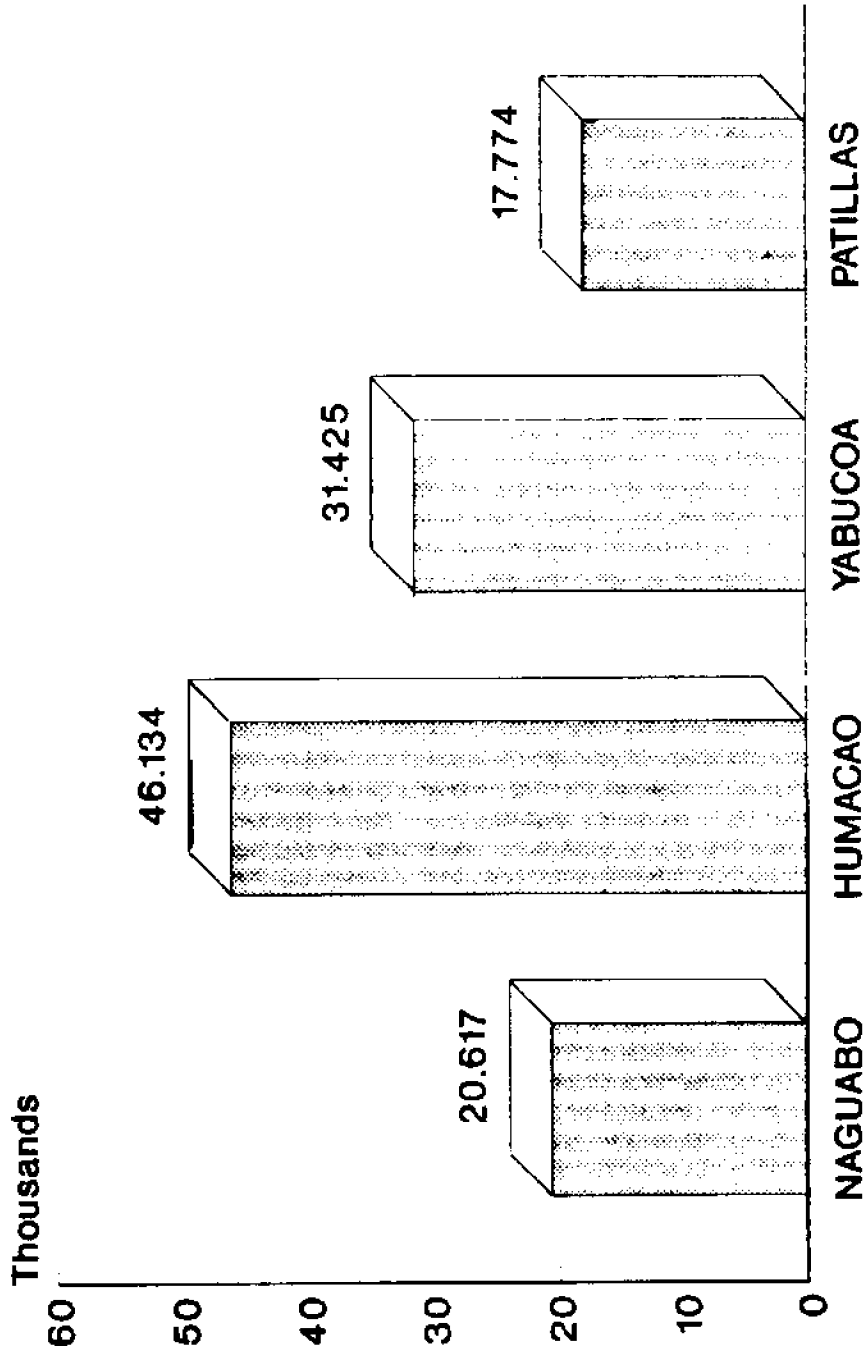
The center of MRF activities in this region is the Palmas del Mar complex in Humacao. Palmas del Mar is a large recreational and housing complex that includes a hotel, apartments, townhouses and houses used mostly as second homes or rented on a

MAP NUMBER 5

THE HUMACAO REGION



# THE SOUTH EAST-HUMACAO REGION DEMOGRAPHIC PORTRAIT



(1980 U.S. CENSUS)

short-term basis. Palmas del Mar also has a marina with slip space, charterboat operations and other services. These facilities are "more private" than others, since access has to be cleared at the complex gate.

#### Development Plans

The municipality of Naguabo is planning the construction of a waterfront area at the main landing center. Part of the plan includes development of marine-based recreational facilities. At the landing center of Punta Tuna in Naguabo, a ramp is expected to be built by the end of this year. Funds (\$30,000) were provided by CODREMAR. The municipality is expected to come forward with various construction materials. Fishermen at that center are eager to explore the possibilities of interacting with the MRF clientele, especially after the construction of the ramp.

#### Marine Recreational Fishing: Recommendations on Potential Development

1. Anglers in this region are basically shore or surf recreational fishermen who use existing structures for that purpose. Fishing piers, platforms and waterfront development are welcomed in this area.
2. The lack of adequate facilities was identified as a major problem. Boaters launch their boats from the beach or go to Fajardo or Guayama for that purpose. The construction of a ramp in the area would be extremely helpful.

## The Southern/Salinas Region

### Regional Characteristics

The Southern/Salinas region is composed of the municipalities of Juana Díaz, Santa Isabel, Salinas, Guayama and Arroyo. This region forms part of the southern coastal plains that have sustained sugar cane production over three centuries. The area is the heart of the Puerto Rican rural south. These municipalities have been, to a large extent, both dependent upon and peripheral to the urban and financial/commercial center of Ponce. The landed oligarchy of this city controlled land and labor in the vicinity, contributing to the polity of Ponce.

Until recently, the economy of this region was dominated by the Mercedita plant in Ponce (for the production of Don Q rum), the central mills of Aguirre in Salinas, and Laffayette in Guayama. This region still remains a poor, rural agricultural enclave with high poverty levels, which are most evident in coastal settlements. Large tracts of land have been given over to vegetable cultivation. Presently, the region is the highest producer of tomatoes on the island.

In recent years a large number of factories have arrived in the region providing a good number of jobs. Among the sugar cane, plantain and tomato fields, petrochemicals, pharmaceuticals and tin manufacturers are making their way into the regional economy. The number of factories and services increases to the east, with the town of Guayama as the central location.

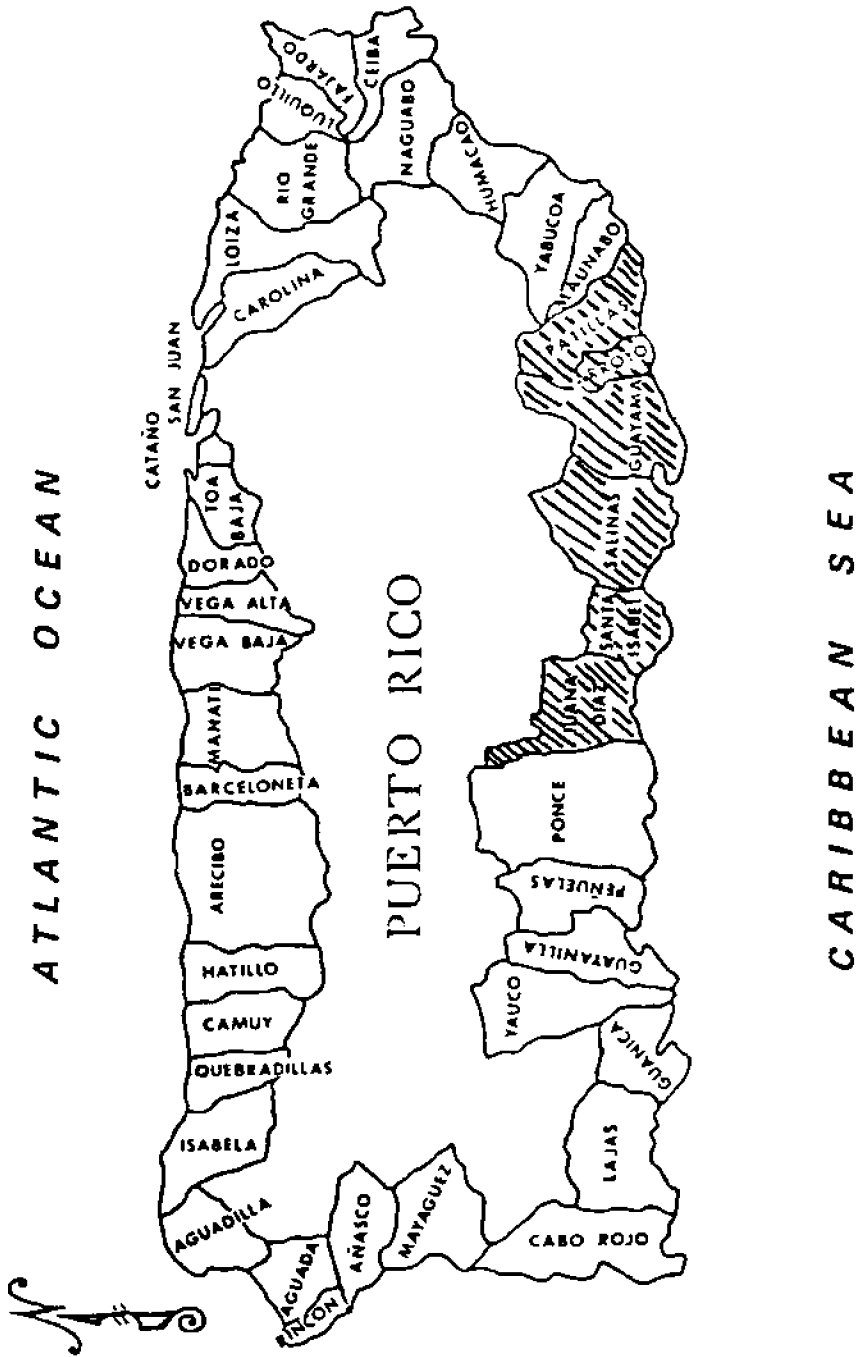
The Commonwealth's Energy Corporation has a thermoelectrical plant in Salinas, which provides employment. The National Guard Training Camp, and the Olympic Facilities, both in Salinas, also draw a considerable number of people into the region as weekend tourists. The local tourism-seafood connection has been of importance for these coastal communities since the early 1950's. For nearly half a century, restaurants along the shoreline have attracted customers, especially in Salinas. This tourism continues and is expanding, since new restaurants have opened, the old restaurants still maintain their competitive status, and seafood is marketed as the trademark of the region. Despite the number of local tourist, lodging facilities appear to be few.

(See map #6 and The Southern-Salinas Region Demographic Portrait)

Essential to local tourism are the region's coastal features, and its potential. The Salinas region contains one of the largest mangrove forest areas in Puerto Rico, including the Jobos and Jobanes Estuary Reserve, protected by CZM and NOAA. This formation, along with cays, islets and reefs, make the region a safe area for boating, and propitious for marine recreation in general. Locals have developed enthusiasm for small sailboat (gambotines) competitions and sailing as a recreational activity. Local tourists, on an informal basis, also enjoy trips (provided by the fishermen and boaters) to the area's reefs, islets, and bioluminescent coves. Jobos Bay is a safe haven that

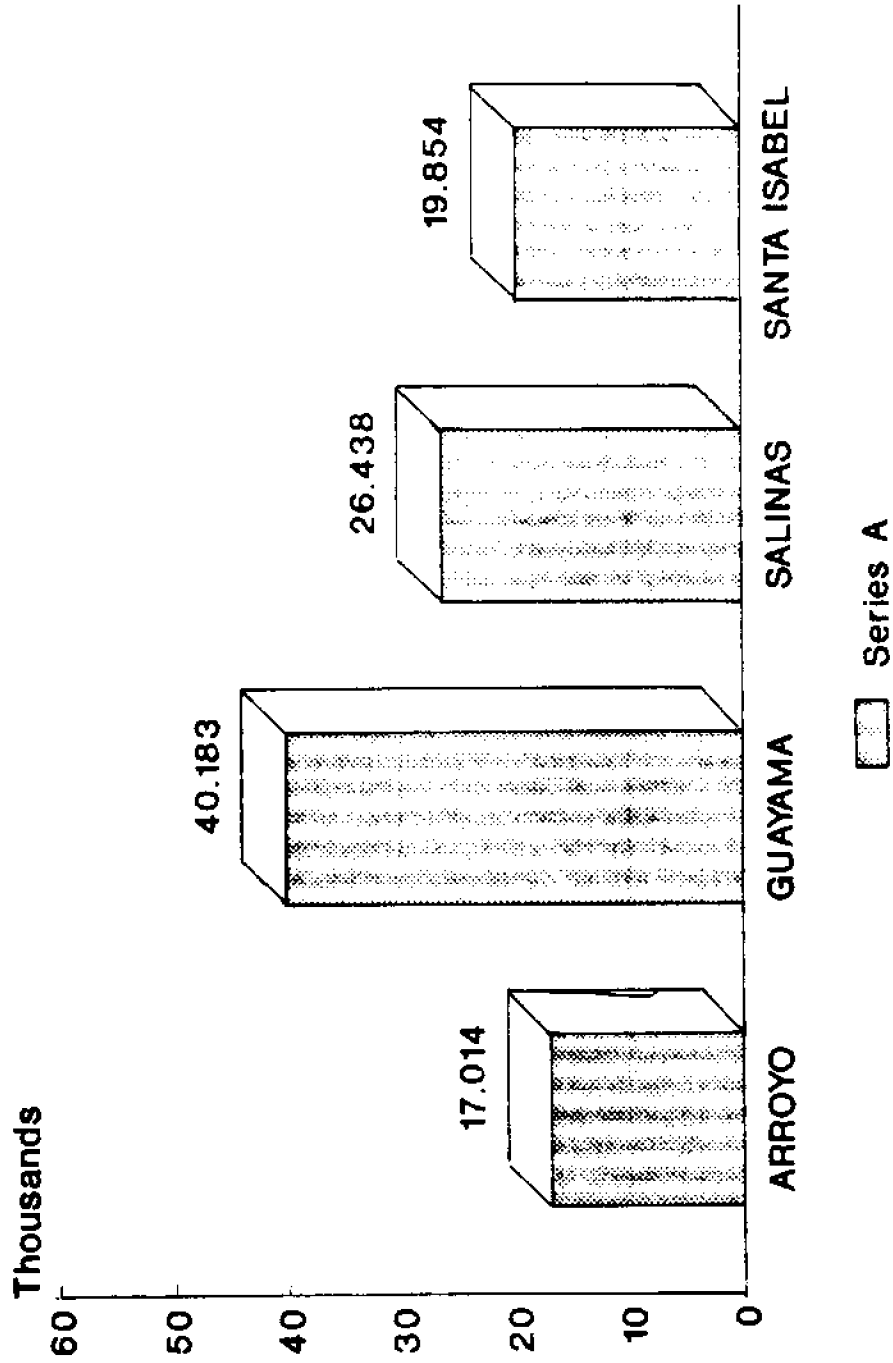
MAP NUMBER 6

THE SALINAS REGION





# THE SOUTHERN-SALINAS REGION DEMOGRAPHIC PORTRAIT



(1980 U.S. CENSUS)

houses both the Ports Authority's electricity generating plant and the Aguirre Central Sugar Mill. CZM contends that this area presents various positive transportation features that encourage industrial or commercial development consonant with the protection of the mangrove forests.

Small-scale fishing for subsistence and market production prevails in this region. Wooden traps (for lobsters), hand and troll lines, and gill nets are the gears employed. The presence of reefs, grass beds and mangrove forests make the use of traps and gill nets feasible here. Field observations and independent assessment of the industry reveal that the villas pesqueras here are usually in "poor condition" and are not used consistently by the fishermen (cf. Romaguera et al 1986).

Fishermen operate as independent producers, rarely contacting associations or formally structured facilities. Wood and zinc-topped shacks accomodating equipment, fishermen, and fish vending and cleaning operations are a common sight, despite the presence of the government-built structures, which, in Salinas and in Arroyo are in good condition. The Arroyo facility is excellent, and sells fish (none in the other municipalities sells fish consistently) and fishing gear. This facility operates as a regional distribution center for gear and fishing supplies. Commercial fishing operations in Salinas include large boats (40 footers) used to fish for snappers and groupers in the nearby Grapplers Bank and in the Eastern Caribbean islands. Fishermen in Guayama lack appropriate facilities. Fishermen in Pozuelo have navigation and mooring problems with their harbor; many of the region use the harbor of the Phillips Petroleum Company for mooring and launching their boats.

#### Marine Recreational Fishing: Infrastructure and Services

In terms of marine recreational fishing, this region is slowly but certainly becoming an important MRF center for local fishermen. Salinas is the hub of this development, but the other municipalities also have facilities and services for the MRF and boating clientele. Typically in the region, boating and MRF services and facilities were of another kind; for example, a restaurant or a hotel/motel has recently expanded to offer maritime services. In Salinas, the El Nautico is a lodging that also serves as a marina with slips (in process of expanding the number) and a natural ramp.

In the area of Playita, in Salinas, the Restaurant El Greco offers another example of MRF diversification; it includes a small marina that offers slips for local boaters, sells ice and fuel, and sponsors various sportfishing tournaments. La Barca is another of this kind. This seafood restaurant offers limited slip space, and a concrete ramp. La Barca has a large parking area for its customers, which also serves as parking space for vehicles and boat trailers, as well as dry-storage for boats. In addition, an outboard motor repair shop in La Playa offers service and parts.

Local fishermen use a natural ramp in La Playita, but it is not functional for maneuvering with medium or large size boats. The villa pesquera has a ramp, and mooring space seldom used by the recreationals. In an interview with members of the board, they expressed their apprehension in sharing those facilities with the recreational

anglers or boaters. Occasionally, if necessary, they provide services and facilities, but these are limited. They contended (and they are not alone) that use for the recreational clientele is against the CODREMAR regulations. (This aspect of the MRF-Commercial Fishermen "commonalities" is addressed in the final recommendations of this report, and is the core of another study by this research team).

In Las Mareas, close to the Jobs Reserve, there is a concrete ramp built by CODREMAR for the commercial fishermen. The ramp is also being used by recreational fishermen and boaters, some of whom live in the nearby area. (Many such residents are establishing vacation homes and, in the process, are also shrinking public access to the bay). This team documented tensions between the fishermen's association and the residents over use of the ramp. Commonalities are a scant "commodity" in this site.

Arroyo, as mentioned earlier, has the villa pesquera of the Virgen del Carmen Fishermen Association. This successful operation also serves as a bait and tackle shop for recreational anglers and scuba-divers. The facilities employed are the remnant of a warehouse and pier once used for the export of sugar. Port activities were virtually paralyzed by 1960, as the sugar industry started to decay. This situation adversely affected the local economy by leaving many longshoremen without jobs (Rodríguez 1980: 29-30, after El Mundo, March 9, 1964). The municipality attempted to rescue the maritime economy with the revitalization of the harbor, which also included the relocation of the fishermen from El Pesca'o, an urban-fishing sector in the waterfront. Circa 1976, revitalization efforts started with the villa pesquera and ended with waterfront development including the construction of a municipal marina with a park for passive recreation. The marina included slip space (in concrete and iron structures) for 15 to 35 footers, a ramp and a jetty. At the various occasions we visited the facilities, these were used by a handful of small-scale fishermen (traps were stored in a pile at the pier), and two or three recreational boaters. Most slips and electrical outlets were deteriorated and not in use. Remains of a barge and a sand extractor remain abandoned and rusted near the ramp. The park is well maintained. Across the street from the ramp, a shop services boats (hauls and motors).

The Guayama Club Náutico is the main facility serving the municipality. Its members are basically recreational boaters. The Club shares its facilities with the Commonwealth's Police Maritime Unit. This is one of the best facilities in the region, with nearly 34 slips, dry-storage space and a ramp.

The Santa Isabel Yacht Club is a small organization and facility that provides an outlet for the development of boating activities in the region. There is a ramp in the facility, space for dry-storage, and a small slip space. Here, more than fishing, small sailboat (gambotines) competitions are very popular. Sailing and boating in the islets, cays and reefs is also an attraction and a common activity. Close to this facility, a shop sells motors, parts and equipment, and offers repairs.

### Development Plans

We did not receive official information on municipal development plans for MRF in this region. Businesses and organizations offered information individually. In Salinas, one of the marinas is already expanding slip space. The rest of the organizations have plans for the renovation of existing facilities, such as ramps, clubhouse and piers.

### Marine Recreational Fishing: Recommendations for Potential Development

Every municipality in this region has organizations, facilities and services that serve the MRF clientele. These absorb local enthusiasts as well as those who can't find space or suitable facilities in their municipalities or in the San Juan Metropolitan Area. Nevertheless, services and space are a problem everywhere. Due to the coastal features presented here, this region has the potential for MRF expansion, but we echo the CZM observations. Any development here should protect the estuaries and mangrove forests. State zoning policies in relation to these resources could be a deterrent for MRF expansion.

1. The issue of commercial fishermen/MRF commonalities is crucial for this area. Commercial fishermen are an optional labor reserve for the expansion of the industry, and could potentially benefit from its current status as mates, guides or skippers. Fishermen in this region, as well as throughout the island, must understand that they can legally provide space and services through the CODREMAR facilities without breaking the law, and that serving the MRF could represent higher incomes and revenues. They must also understand that the choice is theirs, and that government and university agencies and programs are not forcing them into the MRF industry. At least for MAS, that is the policy.

2. Facilities and infrastructure, at the government level, should be viewed as a component of a socio-economic-physical conglomerate that functions as a unit. If one of the parts is missing, then the rest is bound to collapse. A baseball park is nothing without maintenance, management, and community organization in the form of leagues, teams and clubs. MRF is no exception. Facilities must be maintained and managed, and their social components well organized.

In the case of Arroyo we find a municipal marina without management, dependent solely upon the good will of the users. The facilities are deteriorating for lack of use and maintenance. The area poses navigational problems because of sand deposition. Marinas are costly to operate and manage. But they are more expensive, socially and economically, when they remain unused and unproductive for the community and the resource users. The Arroyo Marina should and must be renovated, but it must also be managed. A management profile for local marinas is needed, as commercial marinas are competing for skilled management in the labor market.

A re-assessment of the Arroyo Marina will contribute to increased availability of space and services in the area.

3. We should keep an eye on Santa Isabel, which will slowly become an important site for recreational boating and fishing. Funding for infrastructure at the municipal or state (DNR) levels should address the need for a ramp and additional slip space in the area.

4. DNR is currently studying coastal sites critical for the establishment of new marinas. Complementing this study, assessment of the capabilities for pier and slip space expansion should provide a complete view of the future of the industry. For example: Is it economically and environmentally more feasible to simply approve expansion permits, than it is to recommend new sites for marinas in certain areas, such as this region? Can La Playa in Salinas expand its pier and slip space, vis-a-vis Las Mareas and Jobos Bay?

5. Organizations serving the MRF are basically businesses catering to this new sector. Unlike other areas, MRF clubs appear to be weak in terms of both membership and enthusiasm. Here, this team observed that organization of recreational fishermen is fertile ground for development by local agencies, the University of Puerto Rico's Sea Grant Program, the DNR and others. In the next two years UPRSGP's Marine Advisory Service will take a closer look at the realm of fishermen's organizations, especially in this region.

## The Southern/Ponce Region

### Regional Characteristics

This region is composed of the municipalities of Ponce, Peñuelas, Guayanilla and Yauco. Marine recreational fishing development in this area is scarce and concentrated in the municipality of Ponce. The region has been characterized by industrial and agricultural activities such as petrochemicals, rum distilleries, tuna canneries, coffee, and sugar cane cultivation.

The city of Ponce, which bears the name of the Spanish conqueror of Puerto Rico, was founded in the year 1692. In terms of population density (nearly 300,000), municipal progress and industrial and commercial wealth, it is the second city of the island. It lies near the south coast a little west of the middle of the island. Owing to its wide and well laid out streets, the abundance of its good and solid commercial buildings, its stately and luxurious private residences and its associations for culture and entertainment of recognized high standing, Ponce has been called "the pearl of the South."

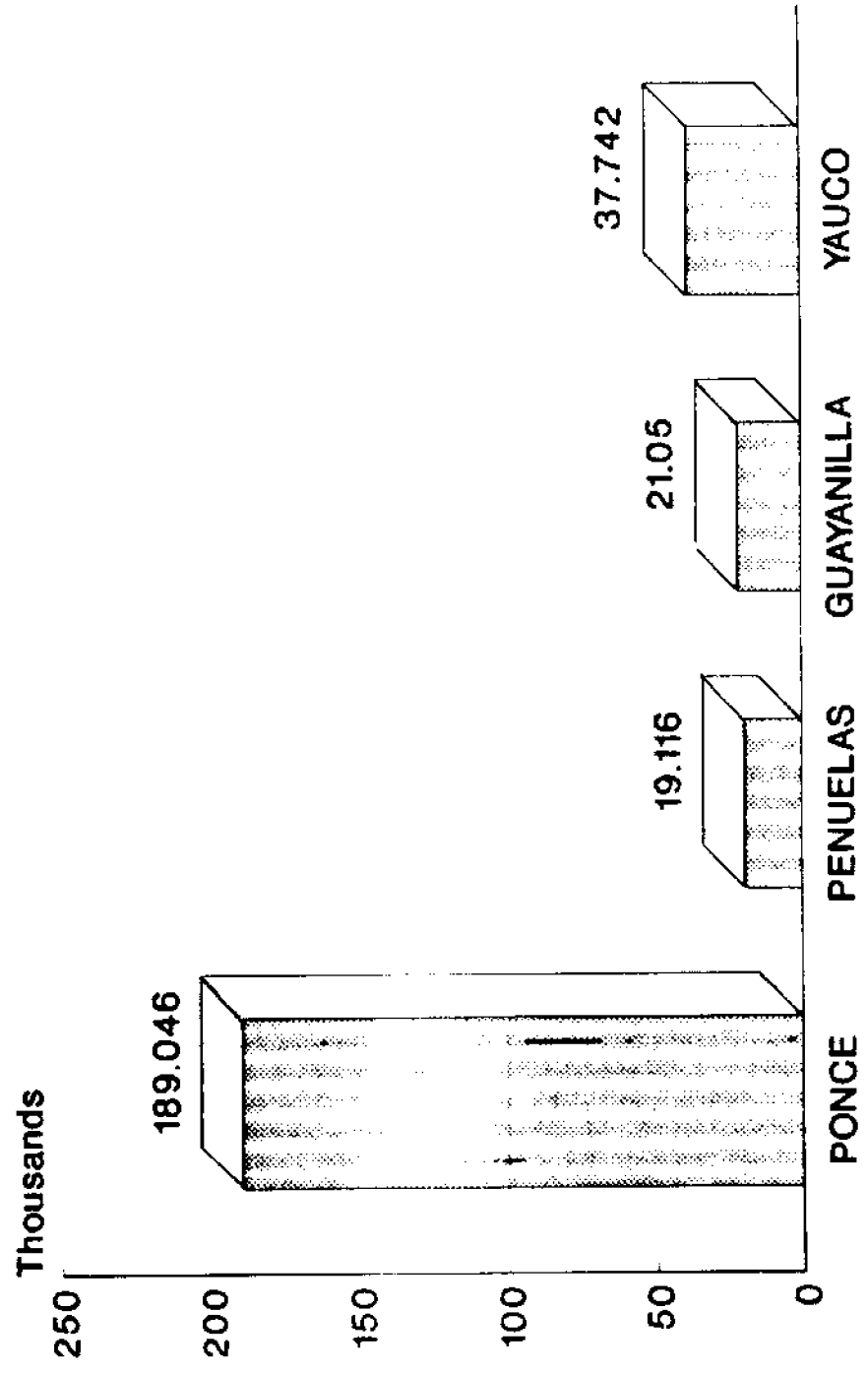
Ponce currently sponsors a program called "Ponce en Marcha." Its goal is to revitalize the existing infrastructure and facilities of the municipality in order to raise the quality of life of its residents. Ponce is the home of the Central Mercedita, one of the most important sugar mills in Puerto Rico, the Serralles rum distillery (home of "Don Q" rum), Empresas Ferré Cement Products, tuna canneries, Vasallo industries, and other high technology industries. Ponce also has a well developed historic and cultural tourism industry. Some of the most interesting sites, monuments and cultural associations are located in the historic center of Ponce. Among them is "Degetau square" with its famous cathedral and picturesque fire house. The Ponce museum and "La Perla Theatre" are two of the most visited cultural institutions of this municipality. Ponce also offers its residents the facilities of its municipal gymnasium, which is open to the public for a modest cost.

The docks of Ponce are the only municipal docks in the island and serve a large part of the island's export and import industry. They are located at Playa Ponce, nearly four miles from downtown Ponce. With two wharves and a large bay, they are equipped for sea going trade. The area of the docks has been one of the beneficiaries of "Ponce en Marcha" with improvements and modernization of the industrial and commercial facilities, and the construction of a boardwalk and public ramp at the "la Guancha" sector, which is utilized by marine recreational fishermen and other recreationists. Ponce also has a beach park, "El Tuque," with a swimming pool and other recreation facilities. Other facilities and services available to residents and visitors include restaurants, shopping malls, universities, organized sports (baseball, basketball, volleyball), bowling alleys and night entertainment.

(See map #7 and The Southern Area-Ponce Region Demographic Portrait)



# THE SOUTHERN AREA-PONCE REGION DEMOGRAPHIC PORTRAIT



(1980 U.S. CENSUS)



### Marine Recreational Fishing: Infrastructure and Services

In terms of organizations, facilities and services for marine recreational fishing, Ponce is home to one-hundred percent of the services and organizations and sixty-six percent of the facilities available in this southern region. The Ponce Yacht and Fishing Club and the Club de Pesca Deportiva de Ponce are the two organizations serving the MRF clientele in the southern region. The Ponce Yacht and Fishing Club is an organization with modern and luxurious facilities (comparable to the marinas of Fajardo) available for the exclusive use of its 950 members. The Club de Pesca Deportiva de Ponce is the other organization, serving the middle class marine anglers of this region with its moderate facilities. These are available to its 118 members and also to the general public. Both of these organizations sponsor billfish fishing tournaments and other recreational activities.

Services for marine recreational fishermen in Ponce are limited to one bait and tackle shop that also rents fishing videos, one hardware store and one sport shop (both sell fishing tackle), two nautical centers that sell boats, motors, parts and accessories, and two diving shops that offer charter fishing and SCUBA services, and also rent and sell fishing equipment.

Ponce's sixty-six percent of the regional facilities include "la Guancha" boardwalk, which is one of the best on the island, with facilities for parking, a ferry to "Caja de Muertos" island, public phone, street food vendors, lighted area, beaches and what is probably the best public ramp in Puerto Rico. These facilities are utilized by recreational fishermen of the area as a means of access to the sea. It is common to see anglers of all ages fishing with hand lines all along the boardwalk or launching their boats to go fishing in the nearby coastal waters. Other facilities of the area consist of public ramps dispersed along the coast.

Yauco is a town situated at the skirts of a mountain and the banks of Guayuco River. Yauco is famous throughout the world as the source of a highly esteemed brand of Puerto Rican coffee, owing to the superior quality of the aromatic berry produced there. This municipality has a limited coastal area, and no marine recreational fishing facilities or infrastructure.

Pefuelas and Guayanilla are the other two municipalities of the south-Ponce region. The only facilities available for marine anglers in these areas are one ramp in each municipality and the piers of the petrochemicals, which are utilized as fishing structures.

### Marine Recreational Fishing: Recommendations on Potential Development

To take further advantage of marine recreational fishing opportunities in this region, several facilities and services are needed: a marina, dry storage space, a boat yard, a fishing pier and fishing charter services. This region lacks these services and facilities, all of which are essential for the development of MRF.

1. A public or private marina open to the general public and offering the necessary services (bait and tackle, fishing charters, cafeteria, food store, ice, fishing guides), and facilities (ramp, boat yard, slips, dry storage) are needed in order to meet boaters' demands for access to the water.
2. A fishing pier or manmade structure is also needed in order to provide sea access to people who don't own boats or have the resources to pay for fishing charter services.
3. It is also important to decentralize MRF services and facilities from Ponce to other municipalities. This would stimulate new business and improve recreational opportunities. Decentralization will also increase the economic activity of these municipalities and foment the revitalization of derelict waterfronts and coastal communities.

## The Southwest/Cabo Rojo Region

### Regional Characteristics

This region contains the municipalities of Guánica, Lajas, Cabo Rojo and Mayagüez. Mayagüez is the urban center of the region, while the rest of the units are rural municipalities moving towards diversified economies. Sugar cane cultivation and sugar production for export and local consumption characterized the region since the early 1900s. Monoculture dominated the traditional cultivation of food crops, raising livestock, and salt production. Cabo Rojo and Lajas cultivated sugar cane processed in the Guánica and Mayagüez central mills. However, agricultural developments in these municipalities are directed towards diversification into aquaculture, rice, and millet production. Lajas specializes in pineapple production and processing.

The region remains a rural-agricultural enclave, although all its municipalities and the surrounding ones are experiencing industrial development of both labor and capital intensive industries. Mayagüez is the center of tuna processing and canning for the U.S. companies. Nearly 4,000 people are employed in the canneries, with a multiplier effect estimated as more than \$100 million yearly in the local economy. Mayagüez, once the heart of the garment industry, is still home to a large number of factories and cottage-scale garment operations. Pharmaceuticals also operate in the area, but to a minor degree.

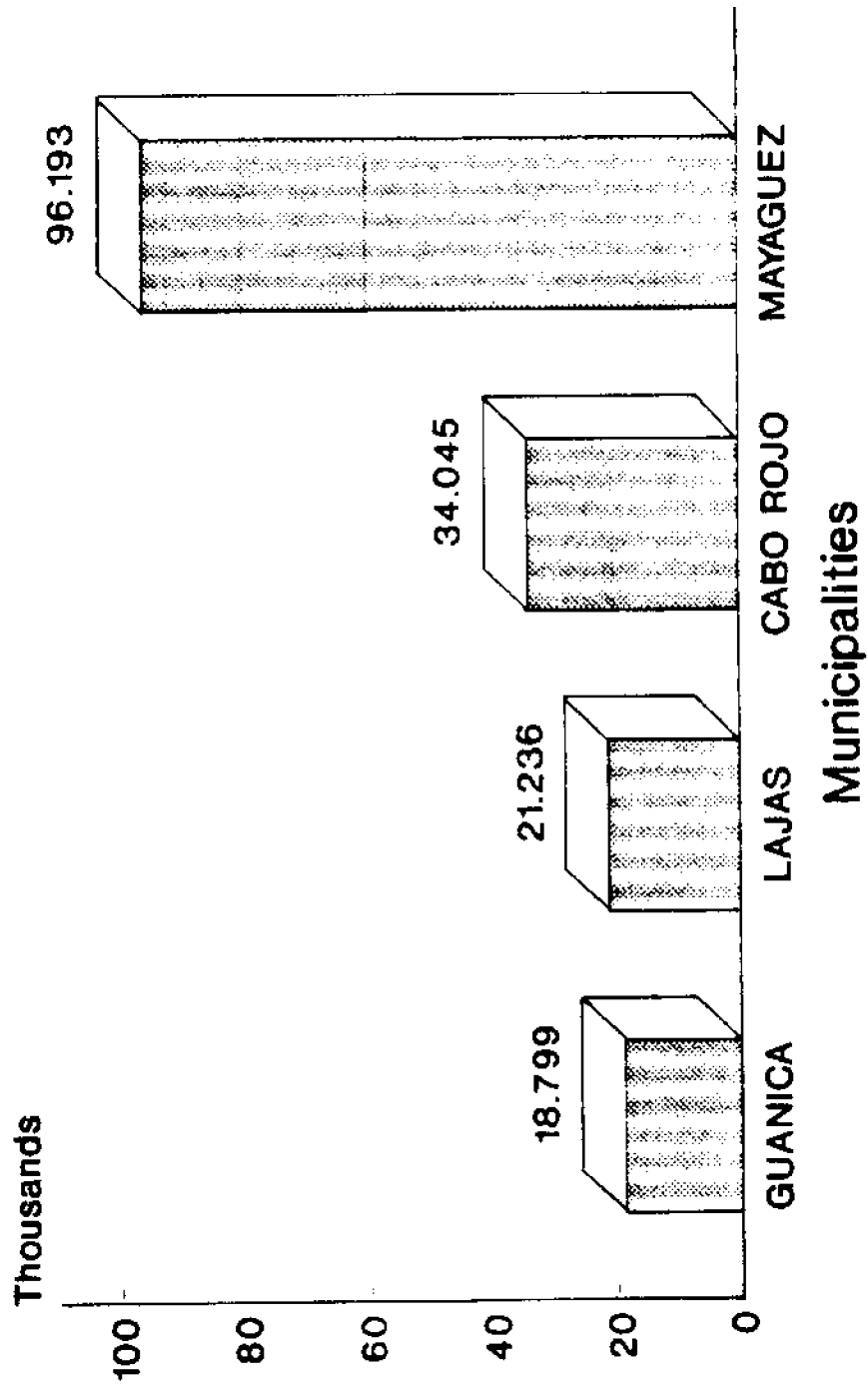
Small-scale and subsistence fishing is an essential part of the regional economy. The western coast and the insular shelf, with a total extension of 124,347 hectares, is considered the most productive area in Puerto Rico. The combined yearly catch of the municipalities represents almost 40% of the entire island's catch. Cabo Rojo, specifically the landing centers at Puerto Real, are the most productive centers in Puerto Rico and the U.S Virgin Islands. In terms of actual physical fishery capabilities, the region is a major producer of shellfish (mangrove oysters -- Cassostrea rizhophorae -- conch and spiny lobster). The region is also accountable for the largest landings of deep water snappers and groupers, which are caught in the waters of the Mona Passage and in other Caribbean fishing banks.

(See map #8 and The Southwest/Cabo Rojo Region Coastal Demography)

Since the 18th century, the southwest region was used by the settlers as a shipping enclave. Harbors operated in Ensenada (Guánica), La Parguera (Lajas), Boquerón and Puerto Real (Cabo Rojo) and Mayagüez Bay. All these sites are located in the well-protected mangrove estuaries of the region. These safe havens of calm waters provided favorable conditions for the development of a shipping-commercial-military infrastructure in the southwest region (Ramos-Ramírez and Acosta 1985, Cardona Bonet 1986).



# THE SOUTHWEST / CABO ROJO REGION COASTAL DEMOGRAPHY



(1980 U.S. CENSUS)

Maritime commerce and smuggling between towns was a common part of the scene until recently (Valdés-Pizzini 1985). These conditions, added to the beauty of the sea and landscape, provided the elements for development of a tourist and recreational infrastructure. This region, particularly Cabo Rojo, Lajas and Guánica, in that order, enjoy the constant flux of internal (Puerto Rican) tourists and visitors all year long, with summertime being the peak season. A small number of North American tourists visit the area.

In general terms, the region has a high number of inns, motels, guest houses, private beach resorts and cabanas, seafood restaurants, government owned resorts (Boquerón Beach) and beaches (including islets controlled by the DNR). Water sports such as windsurfing (Playita Rosada in Lajas), jet/waterskiing, sailing, boat racing (El Combate, Boquerón, Puerto Real) and swimming are popular here. Summer beach festivals are common in the region. In July, fishermen throughout the region celebrate the Virgen del Carmen Festivity, devoted to their Patron Saint. The Fishermen's Festival of Puerto Real (March) and the Oyster Festival in Boquerón (June) are popular activities that attract thousands of people from the entire island. Coastal festivals are becoming popular as a strategy to attract tourists to the region.

The charterboat industry, at formal and informal levels, is developed at a middle range. Every municipality has more than one scuba-diving shop offering boat rides for a variety of underwater activities. Local fishermen offer, on an informal basis, trips to the islands of Mona and Desecheo for hunting, fishing and scuba-diving expeditions. A few sailboat captains offer charter trips in the nearby coastal waters. Trips to the local islets and bioluminescent bays are offered by formally organized boat tour operators.

With tourism and marine recreation becoming essential economic activities, the pattern of land utilization has changed in the last decade. Sugar cane fields and pastures are now in the realm of real estate development along the coast. The number of vacation homes and plots have increased in the last five years. This growth in the construction and real estate sectors has stimulated the parcelling of large landholdings. Such activity creates problems of access to the shoreline, affecting MRF and commercial fishermen as well. Some properties are used as camping grounds, cabanas and private parking areas serving as access to beaches. However, this pattern of land utilization is geared toward the recreational/tourist sector, rather than for local community members.

As tourism and marine recreation develops, the region also undergoes an increased presence of services directly related to marine recreation. Along with scuba-diving and windsurfing shops, boat repair and related marine shops also increased in number.

### Marine Recreational Fishing: Infrastructure and Services

The southwest region is important in presenting MRF conditions and potential development. A pilot survey carried by the MAS component of UPRSGP in the region revealed that anglers here belong to all socio-economic segments. A high percentage of fishermen interviewed had no boats or had small boats for reef fishing in the insular shelf. Environmental conditions have favored the existence of recreational fishermen with small, locally made or imported crafts.

Surf fishing is common along the coast, but in terms of physical structures, the Star Kist Pier and the Guanajibo River Bridge in Mayagüez are commonly used for fishing. The area near the Cabo Rojo lighthouse is also a preferred spot for surf fishing but there are no facilities there.

### Marinas and Yacht Clubs (Clubs Náuticos)

Except for Guánica, all the municipalities have some facilities and organizations related to recreational and sportfishing. Mayagüez has The Mayagüez Diving Club at El Seco, and the Mayagüez Fishing Club in Guanajibo (Los Locos Adams). Both organizations have facilities. The Mayagüez Fishing Club has a small pier, and a ramp in such poor condition that it can not be safely used at this moment. The area of the Mayagüez Diving Club has a ramp used by local boaters. The villas pesqueras of El Seco and El Doki provide bait to the recreational fishermen of the area. The Fishing Club sponsors a blue marlin sportfishing tournament.

Cabo Rojo has two condo-marinas: El Club Deportivo del Oeste in Joyuda and the Villa Taña in Boquerón. El Club Deportivo organizes sportfishing tournaments, often jointly with the Mayagüez Fishing Club. These form part of the yearly tournament schedule of the Puerto Rico Sportfishing Association. Both facilities have ramps and slips for the exclusive use of its members and residents.

The Yacht Clubs or Clubs Náuticos in Boquerón and Lajas (La Parguera) both serve the boaters and recreational anglers in the area, have a few yearly tournaments, and also sponsor educational and sports activities. There is one fishing club in Guánica, in the area known as Los Homos. This is a back country area surrounded by salt ponds and pastures. The club house is a small wooden structure with a tin roof.

MRF charterboats as exist in San Juan (eg. Mike Benítez Fishing) are non-existent in this region. However some fishermen and boaters do provide those services on an informal basis, in crafts ranging from small yolas to fiber-glass boats.

Small-scale commercial fishing is active and highly productive in this region, enhancing commonalities. For the recreational and sportfishermen bait is easily available at most sites. Bait may be bought in the fish-houses, villas pesqueras or by commissioning a fishermen to fish the specific and needed bait. Some localities of "traditional" fishermen already provide services to anglers and boaters. The most outstanding example is the community of Puerto Real.

The privately owned "fish-houses" or pescaderías are indeed bait and tackle shops, also selling fuel and ice. By contract and agreement with the owners, boats can be accommodated in their piers for short periods of time. Engine repair services are offered in situ, by employees of these firms or by local mechanics and skilled fishermen.

Cabo Rojo's government-built villa pesquera is the home of the local fishermen's association. However, by means of a concession, the facility is operated as a boatyard. The villa pesquera has two ramps for the hauling of boats and sailboats by lifter. Haul repair and painting services are offered there. In addition, a boatbuilder in the community often builds yolas for recreational anglers. Local grocery stores, restaurants and proximity to town make this location ideal for servicing the MRF clientele. Similar services (although not to this extent) are offered in La Parguera, Boquerón and Guánica. All municipalities in this region offer almost all types of services and businesses catering to the MRF and boating clientele. Marine shops, scuba shops, boat and parts retail stores, camping grounds and boat and trailer parks can also be found.

#### Development Plans

The municipality of Cabo Rojo is planning to build a ramp at the Boquerón Public Beach. This location's former ramp was obstructed and left useless by the construction of a small passive recreation park. The Club Náutico's ramp is for free use (with a responsibility disclaimer) for the public. However, a narrow road, weekend traffic and pedestrian jams, and the lack of parking, pier, running water and other facilities limit its full utilization. The new ramp would be a welcome addition to this area, if built with access and facilities in mind. Several businesses in La Parguera are looking to expand their operation with the construction of marina facilities. This is also a welcome development.

#### Marine Recreational Fishing: Recommendations for Potential Development

The southwest region seems to have the infrastructure and services in place to sustain the development of MRF, or at least to meet the current demand. Basically, three areas need attention.

1. Recreational anglers here seem to rely on the launching of their own boats for access to fishing sites. As all over the island, slip space is limited at all sites. Ramps are needed in different locations. In Guánica and Lajas various "natural" ramps are used. These should be rehabilitated or new ones should be built at key locations. Again the issue of access (to facilities and to the shoreline) is critical in the planning of MRF facilities. Potential locations for public ramps are: Boquerón, Puerto Real, Combate, La Parguera, Los Homos, and Guanajibo, near the Mayagüez Fishing Club.
2. Mayagüez could start planning for waterfront development in the southern part of the municipality, which is already used for passive recreation and surf fishing.



Projects similar to the ones in Arecibo and Ponce should be examined, and social and environmental impact assessments should be made to examine the true potential of waterfront development in this city. In terms of recreation and MRF, UPRSGMAS believes that such a project could be carried out with minimal environmental destruction, and with the utilization of existing infrastructures. A fishing pier anywhere in the area between the Guanajibo Bridge and the Baseball Stadium would be a major asset to the numerous fishermen who enjoy the productivity of the bay and Guanajibo estuary.

3. The development of charterboat businesses has a bright future in this region. As mentioned earlier, these services are offered on an informal basis by commercial fishermen, who have the navigation and angling skills, but fail to comply with U.S. Coast Guard regulations and insurance for public responsibility. In some cases, skippers are hired as mates or captains in sportfishing boats. Party boats are an ideal type of business suitable for these waters and clientele. Based on this need and potential, UPRSGP MAS will soon develop programs to accelerate the introduction of various skippers, with skills and vessels, into the recreational charterboat businesses. Extension services here are limited to educational programs on aspects of business management, development, interaction with the public, advertisement, services and compliance with government requirements. Various agencies such as the Public Service Commission and CODREMAR have been contacted for planning projects and eliminating red tape. UPRSGPMAS is part of the Committee for Fisheries Development of the Commonwealth Senate. The report Improvements to Fishermen's Lifestyles to be submitted to Senator Gilberto Rivera Ortiz (PDP-Humacao) includes a section on the importance of job and income alternatives for the commercial fishermen via the MRF industry.

## The Western/Aguadilla Region

### Regional Characteristics

The western Aguadilla region is composed of the municipalities of Añasco, Rincón, Aguada and Aguadilla. This region is characterized by its sugar cane fields, seafood restaurants, artesanal (tuna) fishing and its surfing beaches. In this region, marine recreational fishing services and facilities are concentrated in the municipalities of Rincón and Aguadilla.

Aguadilla is a town situated by the bay of that same name, on the banks of the Culebrinas River. Aguadilla's open and very deep-water port enables ships to anchor near the coast. In fact, Christopher Columbus landed here when he discovered the island in 1493. Ramey's Air Force Base was once the axis of Aguadilla's economy, but in the late 70's the Air Force removed a big part of its military personnel and gave most of its land and existing structures to the government of Puerto Rico. These included more than 500 houses, schools, a hospital, a hotel, sports facilities, office buildings, coastal lands, an airport and industrial buildings. Since the departure of the military forced an economic change, the municipality is now looking at coastal tourism, marine recreation, commercial fishing and high technology industries as alternative providers of employment in Aguadilla. The airport at Ramey (once part of the air force base) has one of the best and largest runways in the Caribbean, and the commonwealth's Ports Authority has plans to make an international airport here. Other "left over" buildings and structures are also being used for tourism, recreation, industrial, housing and educational purposes.

The 1988 World Surfing Championships were held in Aguadilla. This town is also well known for its commercial fishing, especially that of yellowfin tuna.

### Development Plans

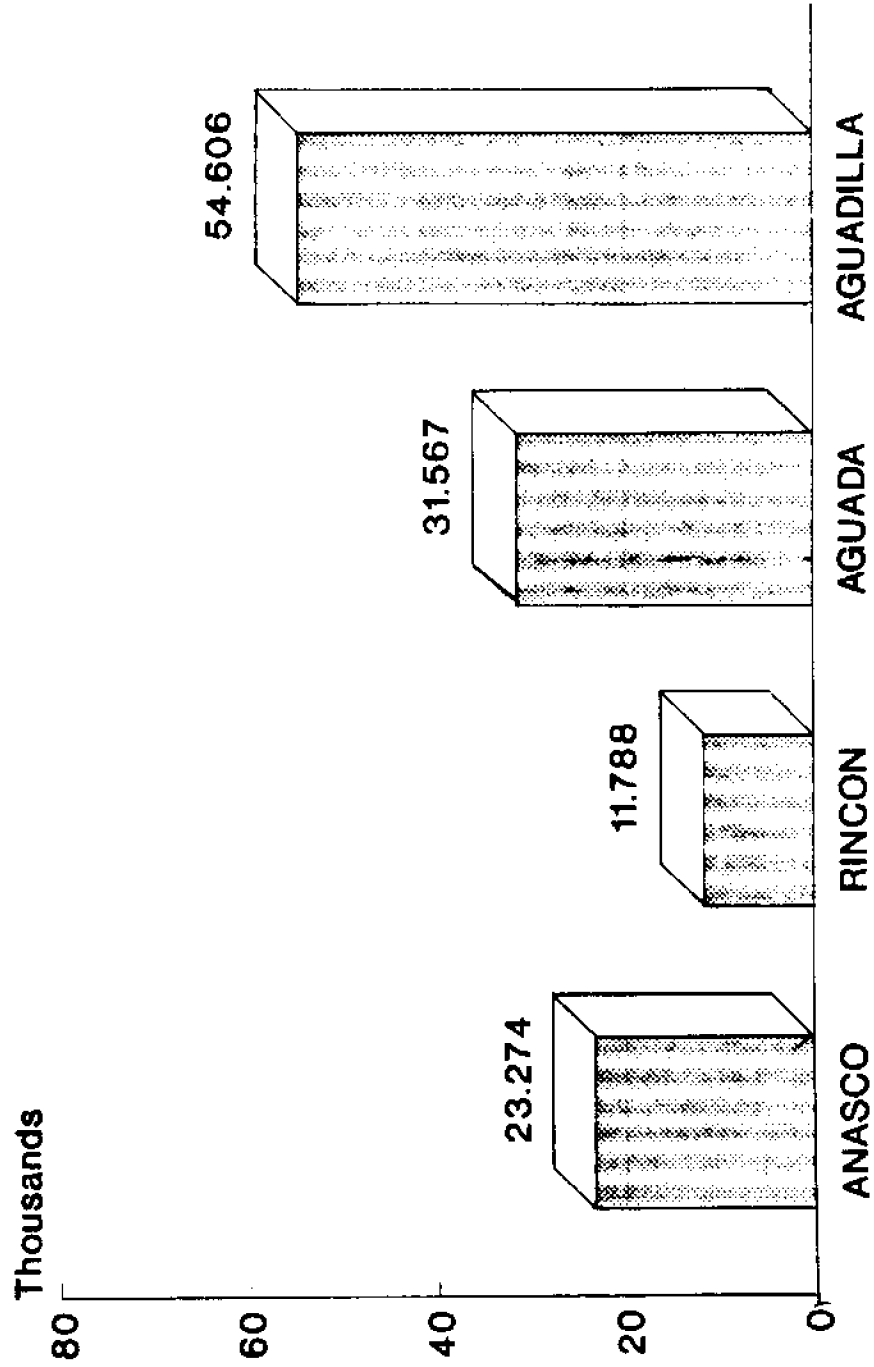
Aguadilla's active group of recreational fishermen (Club Náutico de Aguadilla) and several municipal officials are trying to make this municipality a center for marine recreation. Municipal plans designed to make Aguadilla the capital of marine recreation in P.R. include the building of a public marina, a boardwalk, a beach park, a jetty and a water park. All these facilities are either under construction or are newly built and are actually being used. In this same area the Club has a small kiosk and a ramp; these serve as headquarters for its annual billfish tournament.

(See map #9 and The Western-Aguadilla Region Demographic Portrait)

In terms of services, Aguadilla has several SCUBA shops that operate Fishing and SCUBA charters and sell bait and tackle. The commercial fishermen of the area also offer services (bait shops and engine and haul repairs) to recreational fishermen. Some of them also operate fishing and sightseeing charter operations. In addition to



# THE WESTERN-AGUADILLA REGION DEMOGRAPHIC PORTRAIT



(1980 U.S. CENSUS)

these services, Aguadilla offers a variety of lodging facilities.

Rincón is the other municipality of this region that has taken advantage of MRF development. Famous for its surfing beaches, surf shops, lodging facilities and restaurants, Rincón is now being known as an MRF center. Although the facilities of the Club Náutico de Rincón are limited to a club house, the Club already sponsors a billfish fishing tournament and organizes other social and sport activities. A private marina in front of the Club's property has slips, dry storage facilities and a ramp. Several fishing and SCUBA charters also operate in this municipality.

#### Marine Recreational Fishing: Recommendations on Potential Development

This region is one of the most promising potential centers for MRF development, since part of the necessary infrastructure is already in place.

1. Aguadilla's pier at "Crash Boat" beach is being used informally by recreational fishermen, and could be converted into a fishing pier with minimal investment. The need for this type of sea access is reflected by the number of recreational fishermen who risk their lives fishing from unsafe structures.

2. In order to take advantage of the opportunities offered by MRF, the municipalities of Añasco and Aguada need to build facilities (ramps, fishing piers, dry storage) that can serve the MRF clientele of the area.

## The North/Arecibo-Vega Baja Region

### Regional Characteristics

This region contains the municipalities of Isabela, Quebradillas, Camuy, Hatillo, Arecibo, Barceloneta, Manatí, Vega Baja, Vega Alta, Dorado and Toa Baja, from west to east. This rather large region may be economically divided into areas east and west of Arecibo. The western part of this region is characterized by cattle ranching and dairy industries. Isabela and Quebradillas attract local tourism through a network of motels, cabanas for rent and government sponsored inns (paradores). Marine recreational activities in this area are varied. Strong winds and wave patterns are ideal for windsurfing, body-surfing, and traditional surfing. Beach areas protected by reefs are used for swimming, sunbathing, paddleball and other recreational activities. Scuba diving (spear-fishing) and snorkeling are also popular activities in this region. Sand dune formations along this coast are "ideal" for off-road vehicles. An increase in such activities and competitions has triggered various user conflicts and has threatened the vegetation which protects the area from erosion.

Other recreational activities include beach festivals and sport competitions. Local popular festivities such as the "Masked Cavalcades" attract hundreds of visitors into each municipality.

Fishermen in this area appear to be few in number. However, trolling for tuna, mackerel and other pelagic species is common. It is significant that none of the government-built villas pesqueras are located in the shoreline. Most are located across the street from the shore or near a river mouth. The reason for this may lie in the strong wave activity and the lack of havens and protected areas characteristic of this region. For that same reason the construction and utilization of ramps and other MRF facilities have been constrained.

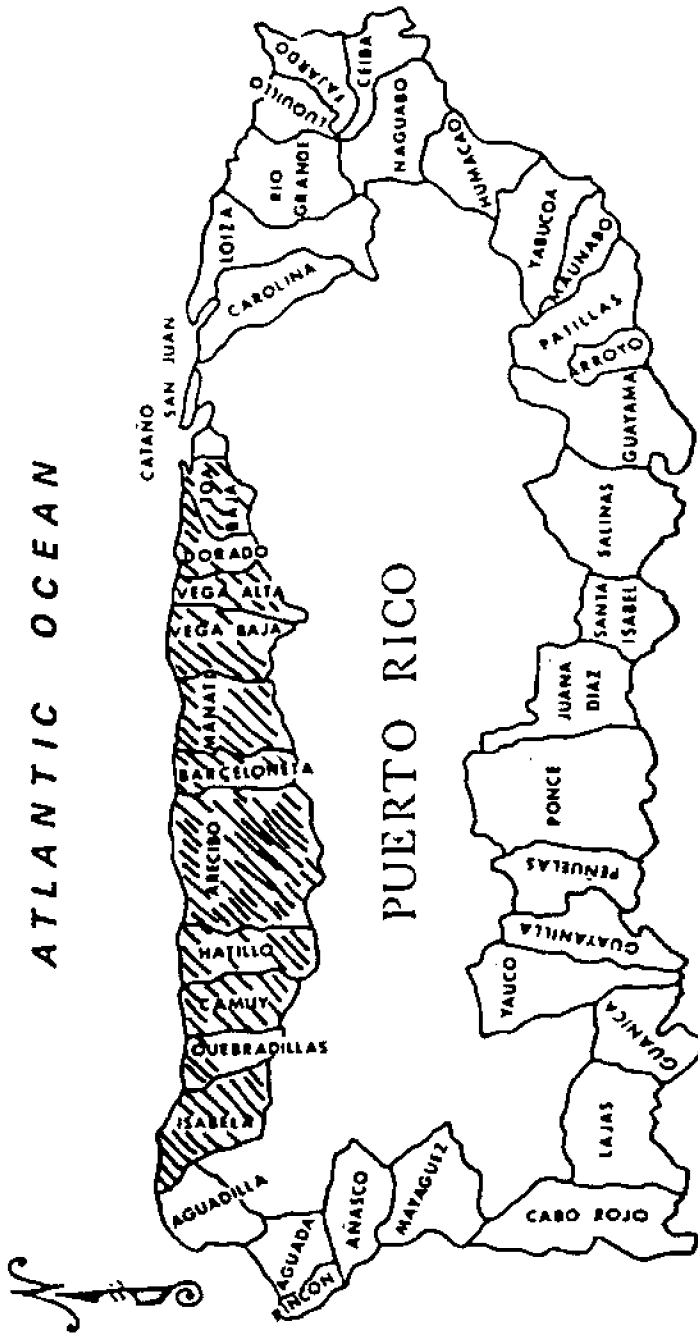
Local anglers and boaters travel to Arecibo or Aguadilla to use the existing infrastructure in those municipalities. This may represent a forty minute drive, or the utilization of scant dry-storage facilities. Areas protected by reefs have been used as small-scale harbors and landing centers since the eighteenth century (eg. Puerto Hermina in Quebradillas, and Sardinera in Isabela); these could be rehabilitated. However, the prevailing north winds during the winter season make the area a difficult one even for the operation of small crafts. This may limit the infrastructure potential of the area.

(See map #10 and The North Arecibo-Toa Baja Region Coastal Demography)

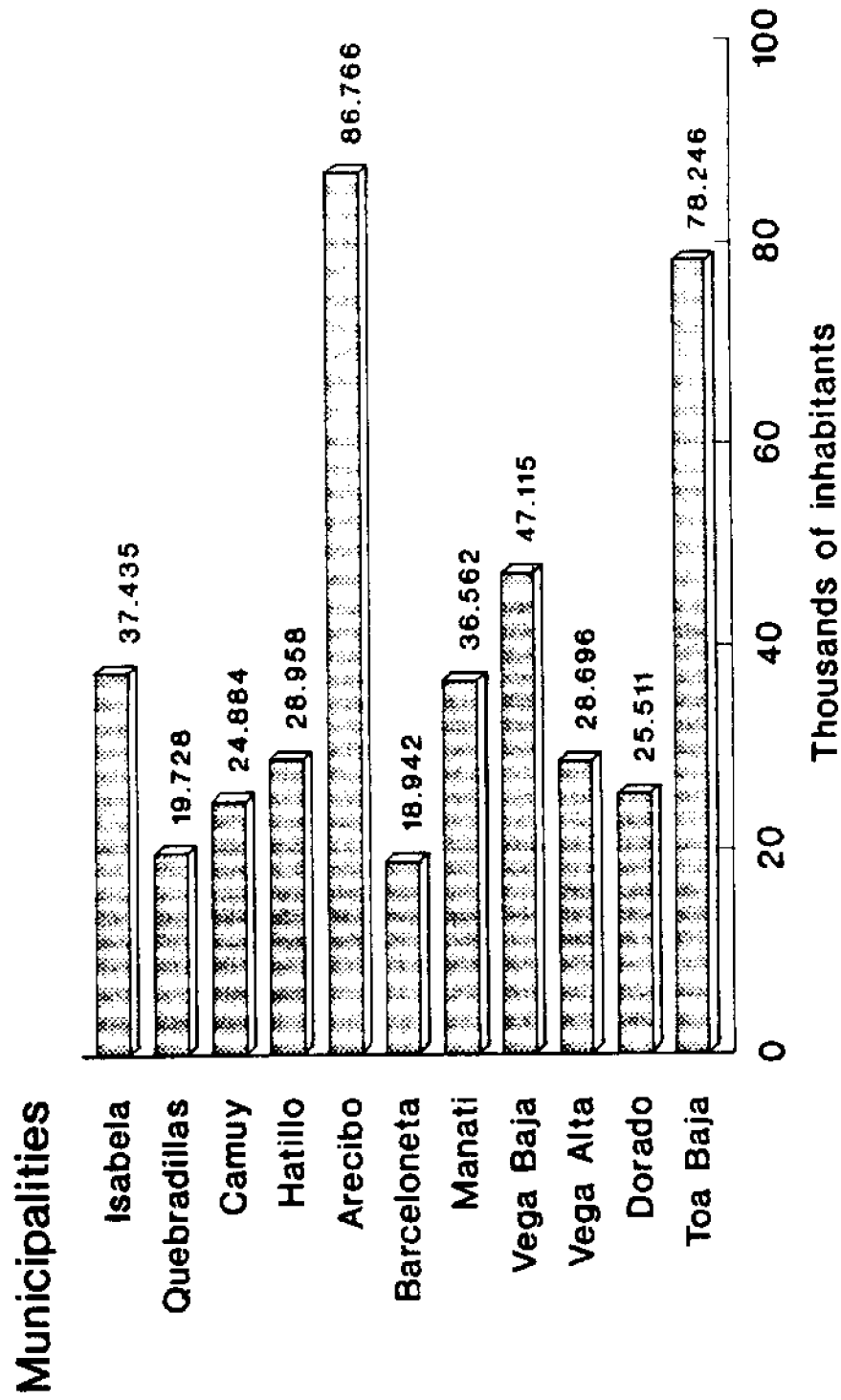
The eastern portion of this region is composed of the municipalities of Arecibo, Barceloneta, Manatí, Vega Baja, Dorado and Toa Baja. Its economy is characterized by sugar cane cultivation and central milling factories in the alluvial coastal plains. In the karstic (limestone formation) coastal fringe, agro-businesses cultivating pineapples, mushrooms and other crops are dominant in the landscape. Both ecosystems are now

MAP NUMBER 10

THE ARECIBO REGION



# THE NORTH ARECIBO-TOA BAJA REGION COASTAL DEMOGRAPHY



(1980 U.S. CENSUS)



home to the core of food processing, high tech, and pharmaceutical industries in Puerto Rico. Along both sides of Route 2, these municipalities show an increasing number of service industries and businesses including fast food restaurants, shopping malls, and private health centers.

The coastal zone remains rural, except for various pockets of real estate development and tourist facilities. Dorado, for example, is the home of the two largest luxury hotels in the island: the Cerromar, and Dorado Beach Hotel. Beaches extending from Manatí to Vega Baja attract a large number of visitors, and thus stimulate the development of small food businesses, hotels/motels, and the parcelation of agricultural properties for the construction of beach houses and vacation homes close to the highly valued beaches of Mar Chiquita and Cerro Gordo.

### Marine Recreational Fishing: Infrastructure and Services

In terms of marine recreational fishing, Arecibo is the hub of activity and development. In Arecibo (as well as in the rest of the municipalities in this region) the insular shelf ends abruptly at 2 miles from shore, thus exposing sport fishermen to highly prized pelagic species at a short distance from port.

Arecibo has a Club Náutico, where most of the upper-middle and upper class individuals organize sportfishing activities, including various tournaments. The facilities of this organization are located in the calm and protected waters of the Tiburones Channel. The Club Náutico regularly dredges the entrance of Tiburones for the benefit of its members. This entrance is also used by commercial fishermen and other boaters to reach the facilities of the villa pesquera of Jarealitos.

Arecibo also has a Fishing Club, which functions as an alternative for those who can not join the Club Náutico. This Fishing Club uses the cafeteria and area of the Arecibo Pier (under the jurisdiction of the Ports Authority) for fishing and meetings. That area, as described in this report, has a seawall protecting the harbor and a small jetty protecting the entrance of the Tiburones channel. This forms a small protected "bay" contiguous to the mouth of the Río Grande of Arecibo.

Nutrients from the river, and the estuarine ecology of the surrounding area serve as a natural hatchery and haven for various reef species. The Víctor Rojas Bridge and the seawall are used for recreational and subsistence fishing. A small shack on the beach is used by small-scale fishermen who often sell bait to the recreational anglers using the facilities. As part of this socio-economic unit, a ramp also serves the needs of the anglers who own or use a boat. From the bridge, as well as from the seawall, rod and reel for "spinning" and reel-on-the-hand technique are the basic fishing methods. Reef snappers, jacks, and other species are caught in this area, which appears to be well served by a number of businesses and individuals. The angler visiting this area is able to find ramps, diving shops, boat and motor repair shops, bait and tackle stores (even a travelling one), and bait (from the local small-scale fishermen in Jarealitos and the beach).

On the fringes of the municipality, maybe ten to fifteen minutes from Arecibo, there are several camping and trailer (cabañas) grounds. The area boasts a great number of fast food restaurants as well as restaurants serving typical Puerto Rican food. Nearby, there is a small beach area with a cafeteria. This is not a remarkable beach area, but anglers and tourists may find two or three spots for a swim. Other major attractions in the region are: the Arecibo Ionospheric Radar (Cornell) Observatory and the Camuy Caves and Caverns.

The area near the Ports Authority pier and bridge harbors four ramps. The ramps at the Jarealitos landing center and the Rio Grande are mostly used by commercial fishermen. The Club Náutico has a ramp for the exclusive use of its members. Another ramp close to the pier is used by recreational boaters and fishermen. This area has a large space used for parking, picnicking, and maneuvering with vehicles and trailers with boats. The DNR has allocated an area, marked off by buoys, for swimming. The area east of the pier has a secluded beach area served by a small food and beverage business.

The municipal government of Arecibo has a revitalization plan for the waterfront. It recently inaugurated a waterfront structure which includes a jogging trail, lights, rest rooms, 24-hour security, a boardwalk, a sight-seeing platform, benches, and a small fishing pier. This facility is highly used by visitors and locals alike. In the afternoons, joggers, anglers, walkers and sightseers use the facilities. In terms of access, lack of parking is a limitation. Also, during strong January winds and wave action, the boardwalk on top of the cement pier was partially destroyed, and the lower level of the structure was filled with sand, rocks and debris. This required special maintenance.

The rest of the municipalities in this region have a minimal infrastructure and offer almost no services for the MRF industry. Barceloneta has three ramps: a natural ramp, another in asphalt, and a third in compacted limestone. Ramps are used all year long by local fishermen, but in the summer they are used with greater intensity by local people. The asphalt ramp used by local anglers is close to a concrete pier that was used for the export of sugar. This particular area is a safe haven due to a tract of land (Isla Roque islet) separated by a channel, which provides calm waters in the surrounding area.

### Development Plans

There is a need for another marina in the region, and members of the Club Náutico of Vega Baja are struggling to construct one in the river near their clubhouse. Those plans have encountered opposing plans by CODREMAR to build a ramp in the same site for "six small scale fishermen" as the member of the club have expressed. The ramp is needed, and so is the marina. There is room for extension work and mediation in this area to maintain good relations between commercial and recreational fishermen.

### Marine Recreational Fishing: Recommendations on Potential Development

1. With a little effort in the form of brochures and other forms of public information, Arecibo may be able to attract some small/medium-scale anglers to visit their area, while improving the participation of local anglers. Extension work with the local Fishing Club, as well as with the Club Náutico may yield some positive results. The municipal government is already building a concrete boardwalk for passive recreation, as well as for fishing. If successful, it may serve as an example of coastal-urban planning with the anglers in mind, and a definite plus to MRF development. Small investments can be made by the municipal or commonwealth government: re-construction of the ramp in the beach area, construction of anglers' facilities (a pier, for example) that would separate them from the commercial pier area, if that is desirable for the Ports Authority. (Otherwise, the situation is acceptable "as is").

Surf fishing may be a welcome alternative for the anglers, since the area seems to be suitable for that purpose. As we observed on several occasions, and accordingly to the tournament records, spinning catches are generally quite small. Release and conservation techniques should be stressed in order to maintain optimum levels of resources. Extension publications can address that problem and help to change attitudes and practices among these anglers.

Rough weather conditions may preclude the development of a charter boat business, but looking at the number of anglers interested, party boats may be a solution. Notwithstanding, conditions here are not as favorable as along the southwest coast.

2. Waterfront revitalization as described may serve as an example for other municipalities developing marine recreation and fishing. On the south coast, Ponce has a similar development strategy.

3. According to our observations and the MRF clientele, this area needs a marina, and ramps are needed to the west of Arecibo. Arecibo is the center of MRF, yet boaters and anglers have to travel to Aguadilla and Rincón in order to launch their boats. Slip and dry-storage space is almost non-existent. That problem should be addressed, especially when there is private capital available for such development.

## The Island-Municipalities: Vieques and Culebra

### Regional Characteristics

Vieques and Culebra are island-municipalities of the Commonwealth, located northeast of the island of Puerto Rico. The island of Vieques has been an economic and military bastion disputed by the colonial powers of the Caribbean. Sugar cane cultivation, small-scale farming, fishing, and cattle ranching dominated the local economy.

With the American occupation in 1898, both these islands became military enclaves. Presently, the central portion of the island of Vieques (including the town of Isabel Segunda on the north shore, La Esperanza on the south shore, and the central barrios) is the only civilian-populated portion of the island. The east and western portions are occupied by the U.S. Navy, which uses the island as a base and training ground for infantry and vessel target shooting. Navigation in those waters is restricted by the shooting practices of the Navy. The presence of the U.S. Navy in Vieques has been a critical and controversial issue. Since the late 1970s, the fishermen have opposed the utilization of coastal waters used by the U.S. (and invited foreign) fleets for their shooting practices. But the movement to expel the U.S. Navy has been countered by the organization of community development programs sponsored by the Defense Department. These programs have alleviated tension, primarily by offering jobs and economic alternatives to a poor rural municipality ridden by unemployment. Jointly with the Navy, the Commonwealth government has put forth development plans for the revitalization of the island. At present, the issue of the military presence in Vieques is not settled, and public opinion is divided, with each group claiming majority. Like Vieques today, Culebra was also occupied by the U.S. Navy, and thus, most of its economy depended upon the presence of the military.

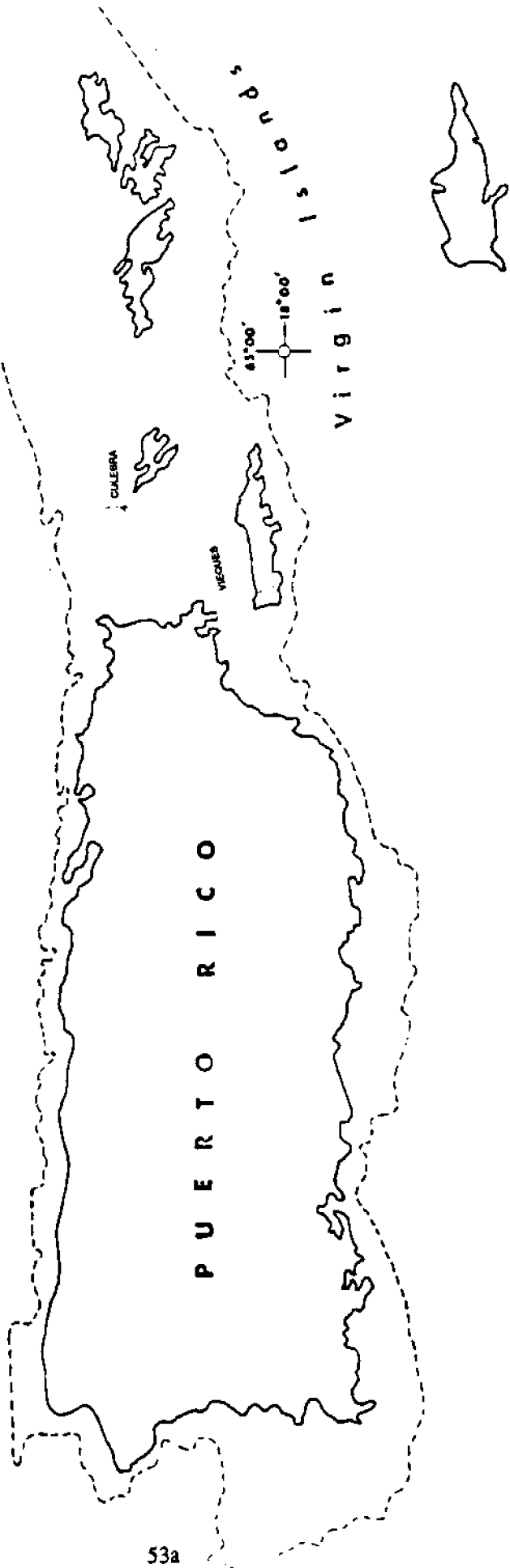
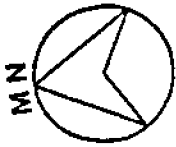
Both islands are involved in a process of economic diversification and mobilization toward service industries. At the present time, public services (with the local and federal government), small businesses and services, and tourism are the strengths of these island-communities. Each island's small airport and ferry harbor, are operated by the Commonwealth Ports Authority. Culebra has a bank, and a Travenol pharmaceutical plant employs a good number of culebrenses. Vieques is more like a regular municipality, and thus offers most needed services.

(See map #11 and The Island-Municipalities Demographic Portrait)

Fishing, once the keystone of the islands' economy is now a "secondary" activity, due to migration and employment opportunities in other sectors. There are two fishermen associations in Vieques: Pescadores Unidos (north shore) and Asociación de Pescadores (south shore). In Vieques, traps, hand-lines and scuba diving are fishermen's main gears and methods. The facilities of La Esperanza on the south shore were almost abandoned and in poor conditions during our visit; no fishermen could be contacted at the Asociación de Pescadores facilities. On the north shore, the

MAP NUMBER 11

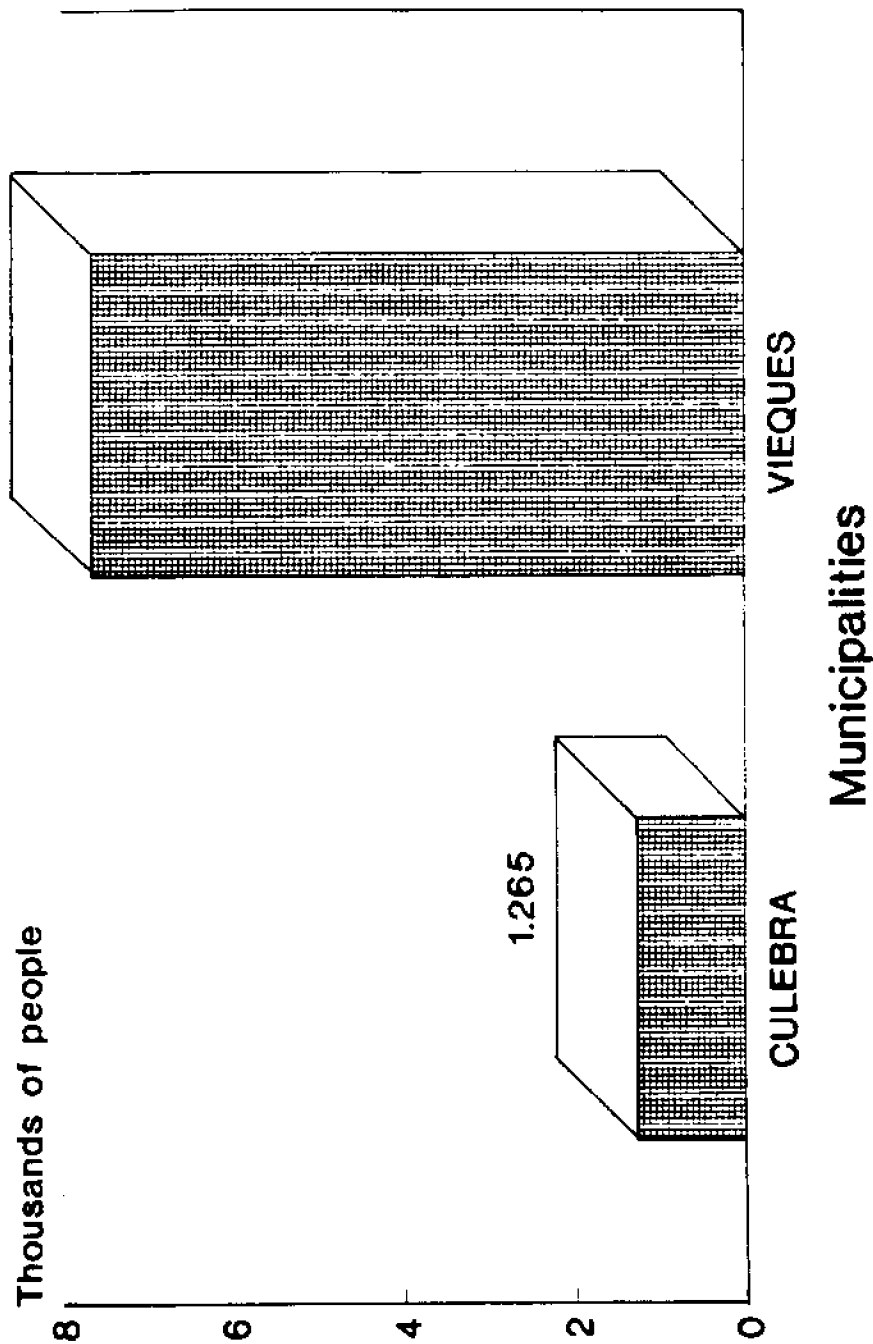
THE VIEQUES / CULEBRA REGION



# THE ISLAND-MUNICIPALITIES

## DEMOGRAPHIC PORTRAIT

7.662



(1980 U.S. CENSUS)

Pescadores Unidos association operated their facilities to sell fish and fill scuba tanks with oxygen. During our visit, fishermen from both associations were using these facilities as their main landing center.

In Culebra there is one fishermen's landing center in full operation. Fishermen here fish with traps and handline, and by scuba diving. This facility provides goods and services for both the commercial and recreational fishermen, as well as for boaters. Ice, gasoline and fish are sold in the premises. Fuel comprises the highest sales volume for that villa pesquera. There are 20 active members, fishermen all. In Culebra, Travenol and government service have lured many fishermen into the assembly line and service jobs.

MRF in Culebra bears a closer resemblance to the industry in Saint Thomas, than with Puerto Rico. Comparatively speaking, we've listed the differences in order of magnitude. First of all, in cultural and social terms the people of Culebra and Vieques maintain more direct contact and interaction with the people of the USVI than with the people of Puerto Rico. Most have lived or worked in one of the USVIs, or travel often to the islands for amusement (cockfights) or business. It is worth mentioning here that St. Croix received a large influx of Puerto Rican agricultural workers at the turn of this century in order to meet its demand for labor in the sugar cane fields.

Second, Culebra has a population of approximately 1,200 to 2,000 people. Of this, nearly 200 are North-Americans. This "ethnic minority" is becoming quite powerful in the tourism business. They own most of the hotels and guest houses, a good number of restaurants and almost all the MRF related business, including tourist shops and other stores as well.

This small group, an overwhelming presence in the business community in Culebra, is essential in the future development of MRF and tourism in the island. This "business gentrification", if we may apply such a term, has accelerated dramatically since 1983, when we last visited the island for the purpose of researching small-scale fishermen and their associations (cf. Gutiérrez 1985, and Gutiérrez, McCay and Valdés-Pizzini 1986).

Tourism is becoming increasingly active in Culebra. Summer is the season for Puerto Rican tourists; the patron saint "fiestas" in July attract many islanders. Thanksgiving to April is the tourist season for North American visitors. The rest of the time, it is rather slow. Visitors come by the ferry that leaves from Fajardo, or by plane from Fajardo or San Juan.

There are nearly six hotels/guest houses, and about nine houses/apartments/rooms for rent. Prices range from \$25 to \$75 for rooms daily, and \$200 to \$500 per week for apartments. According to most of the people that we interviewed, Culebra has "almost" all the tourism it can handle, due to infrastructural constraints such as water and transportation. The axis of these islands' tourism development is essentially based upon water sports such as swimming (beach-camping), scuba-diving, sailing, deep sea fishing, and windsurfing (in that order of prominence).

Tourism also plays an important role in the economy of Vieques. Thousands of tourists arrive on its shores to enjoy the beaches (Sun Bay Public Beach), historic monuments (the Fort), and the scenery. Camping is very popular in these islands. Vieques' carnival in July attracts thousands of visitors from the isla grande (the big island, Puerto Rico). Isabel Segunda has two hotels and various guest houses, and there is a parador in La Esperanza. Following the pattern of small tropical islands, marine resources are the key to tourism in Vieques and Culebra.

#### Marine Recreational Fishing: Infrastructure and Services

Culebra and Vieques are islands of contradictions. Water and space present paradoxes in planning. While both are abundant, they are also elusive and almost prohibitive to use. Culebra residents depend on wells for their aqueduct system. A desalinization plant seldom works at capacity, and thus it often leaves the island without fresh water. Water "saving" and frugality is a way of life on that island. There are plans to initiate construction of a water pipe from Vieques (which in turn receives water from Puerto Rico) that would supply all the water needed in Culebra. Almost every person we interviewed in town, including the mayor, pointed at the water problem as the main deterrent to tourism development and, for that matter, to MRF industry.

While these islands are surrounded by beautiful beaches, havens, lagoons and small islets, access and utilization of coastal land by the public is curtailed by several factors. Culebra, for example, is considered to be a "mostly sensitive habitat area" (except Ensenada Honda and Bahía de Sardinias) for subtropical dry forest flora and fauna, mangrove forests, birds and sea turtles (mainly Playa Resaca and Playa Brava), by the Fish and Wildlife Service (FWS).

The Fish and Wildlife Service has jurisdiction and property rights over 1,480 acres, including 23 islets, as part of the National Refuge for Wildlife of Culebra. The island of Cayo Luis Peña, and Culebrita can be used by the public as temporary mooring and harboring site, but only on a one-day basis. Each island has a concrete pier. A few areas are accesible, but most are difficult to reach. Most of the beach areas controlled by the FWS are nesting sites for hawksbill, green and leatherback turtles, and thus are regullary monitored and protected. For the general public, access to most beaches (except Flamenco on the north coast) is difficult by road since most end up being dirt paths that are difficult to navigate even in jeeps or similar vehicles; others do not even reach the coastal areas. Privatization of coastal areas by property owners also make access difficult by land.

The Department of Natural Resources of the Commonwealth of Puerto Rico (DNR) has joined with the municipality to develop a public corporation for the protection of the environment: the Authority for the Conservation and Development of Culebra (ACDC). The corporation functions as the representative of the DNR, and as such regulates use, access, the planning of resources and construction of facilities on that island.



The ACDC has an executive director, and its board of directors includes the mayor, the director of the FWS and the private sector. Development of infrastructure for MRF, such as marinas, fishing piers, ship yards, and ramps must take place under the limitations (almost no coastal land is available) and restrictions set forth by the FWS and the ACDC.

In addition to that, the relatively massive influx of North Americans and Puerto Ricans looking for coastal lands has created a high-priced real estate market in which the price for a cuerdá (a little less than an acre) oscillates between 25 and 40 thousand dollars. Puerto Ricans are looking for land suitable for the construction of vacation and summer homes. North Americans are looking for land suitable for leisure homes that could serve as a base for MRF and coastal businesses in general.

According to some of our informants, the situation creates unfavorable market conditions for the culebrenses, most of whom cannot afford such prices or, due to their poverty level and economic precariousness, are forced to sell their coastal property. Often, no legal papers document the sale of properties. Thus, many coastal properties are actually illegally appropriated public lands. These appropriations are called "invasiones."

The process of coastal gentrification appears to be generalized and well patterned in Puerto Rico. In Culebra, as in the principal island, once the "invasion" is in effect, the government provides basic services such as electricity and water. In Culebra the highly gentrified area is the shoreline of the Ensenada Honda, where the main harbor is located. (The Ports Authority Ferry once operated from this harbor.) Other gentrified zones are found near the bay, in Playa and Bahía Sardinias, where the ferry pier is now located.

Most coastal properties have piers and ramps (which are connected to house garages), for their boats. The position of the ACDC is that all piers are public, due to the fact that there are no permits for private docks, and an individual with a permit to build one does so with the understanding that it is for public use. However, the properties are fenced and protected against entry; thus there is no public access to such docks and ramps by land.

In Vieques the situation is slightly different. The western and eastern portions of the island are occupied by the U.S. Navy, which uses those lands as a target practice field, often involving other nations' fleets. Only the middle section of this elongated island may be used for economic and recreational activities. Sailing around the island is curtailed by the schedule of shooting practices, and mooring and landing at the Navy grounds is prohibited. The north and south shore have MRF potential, but only to the extent allowed by this pattern of coastal land utilization.

In Vieques, MRF facilities are currently limited to the Parador Villa Esperanza, a marina-hotel (inn) with a "fishing" pier and various slips for overnight visitors. This inn uses the old facilities of a sugar cane hacienda, and its pier. Like other socio-

economic infrastructures throughout the islands, the demise of sugar cane production offers coastal space and structures for the growth of new economic sectors, leisure activities being a significant one.

The Mosquito Pier, a U.S. Navy mile-long pier and jetty, is another facility used for MRF. Anglers use this facility to fish snappers and sharks with hand lines and fishing poles. This large structure also has a ramp in good conditions. However access is a major problem. We were informed that access by car required a permit by the officer in charge (OIC) of the facilities. (The area is controlled by a gate, and local security guards). But according to various anglers from Vieques, access was seldom given to cars, which have to be parked outside the area. We observed various anglers using the facilities during the daytime.

The jetty has created a protected area to the east of the structure. Local fishermen, both commercial and recreational use the area for trolling in small boats in the reef areas east and north of Mosquito, and in the protected area as well. Water is accessed by a natural ramp with metal rails for traction. A local businessman is willing to donate materials for the construction of a new ramp. According to a local community leader interviewed, the existing ramp, as well as the area, is heavily used. There is a concrete ramp in Isabel Segunda, by the side of the Ports Authority pier and the Fishermen's landing center. Traffic, and lack of space for maneuvering, restrict the use of this ramp to large (20 footers and up) boats. The landing center at La Esperanza (southshore) has a ramp, but it is broken and covered by sand. Recreational fishermen who favor the spearfishing method find scuba-diving shops and services in both the north and south shore. Local commercial fishermen operate two services in the north, while a North American operates a scuba-diving shop in La Esperanza.

#### Development Plans

The ACDC is planning at this moment to recommend the construction of "community ramp and pier" for a heavily used area near Playa Sardinas. A similar concept, but expanded, may be a solution.

The Municipality of Culebra has plans to construct a jetty for the area of Bahía de Sardinas. The jetty will be of 125 feet long, containing 9,000 cubic feet of rock, at a cost of \$125,000. The jetty would become a fishing area. At present, fishing is done at the old Ports Authority pier, a concrete structure less than 15 feet long.

The municipality, along with the villa pesquera is planning to build a ramp and a small shipyard at the fishermen facilities. The Culebra fishing club has donated some funds, and City Hall must provide the remaining funds for construction of the facilities, as well as for buying a "travel lift" for the boats. Along with the jetty, the facilities of the villa pesquera will meet the needs of recreational anglers at the present level of interest.

The Vieques Community Development Corporation (VEDC), headed by Mr. Luis Herrero, is a corporation funded and developed by the U.S. Navy to improve economic

opportunities in that island. In the late seventies, opposition to the Navy bases grew as their socio-cultural and economic impact on the island was harshly questioned. As a result, the VEDC provided mechanisms for local economic development in aquaculture, agriculture and cottage industries. According to Mr. Herrero, a recreational angler himself, in Vieques "potential is great" for the development of the industry, since there is only one "marina" (Parador Villa Esperanza), and fishing is adequate in the area. The VEDC is looking forward to also promote MRF tournaments as economic and tourist attractions for Vieques. Sailfish, in the drop-off, is a MRF resource to be considered for further development in both Vieques and Culebra. Culebra has sponsored sailfish tournaments for many years.

#### Marine Recreational Fishing: Recommendations for Potential Development in Culebra

The MRF industry is developing in Culebra at a fast rate. Two charter boats take people out for deep sea and recreational fishing in the inshore areas. There are also facilities and services for scuba diving and spearfishing, but most dive masters prefer not to do spearfishing. The ACD and the FWS have two ramps, both located at their facilities, for the exclusive use of those agencies. However, in case of emergency, the pier and the ramps are available. The other "public" ramps are natural ramps used by locals; all are located along the shoreline of Ensenada Honda.

In the same body of water, in the area of Dewey (the town) there is a public (municipal) dock for mooring dinghies and small crafts for a short period of time. Most of the crafts are moored in the bay or tied to their "private" docks in the waterfront. Thus, in terms of infrastructure for MRF, there are some limitations. The lack of a marina or dock for fishing boats is a deterrent for anglers visiting from PR/USVI. The local villa pesquera located in the channel between Ensenada Honda and Bahía de Sardinias provides fuel, oil, ice and parts for outboard motors.

In terms of human resources, Culebra had a sportfishing club until recently. In 1974 a group of friends founded the Club Náutico de Culebra, which organized annual sailfish tournaments. According to the club members, the Club invested large sums of money, time and effort in the tournaments, which greatly benefitted the community. The tournaments were sponsored by Puerto Rican beer and rum companies, and also received support from other sportfishing clubs from San Juan. The fishing club is presently inactive. This fishing club never had facilities of its own for meetings, social activities or for members' boats. The lack of such facilities contributed to a gradual lack of enthusiasm about belonging and participating in the club, and is often seen as the cause of its demise.

During our interviews, members of the club expressed that Culebra needs facilities and infrastructure for local and visiting recreational anglers. Fishing areas could be developed in close range of the island by constructing fish aggregation devices (FADS). Decline in sailfish populations, as perceived by members, was ascribed to the presence of longliners (the major complaint of sportfishermen in PR and the USVI).

MRF and marine recreational businesses in general are growing in Culebra, mostly by the hand of North American entrepreneurs with skills, knowledge of the trade, and capital to invest. However, participation of the locals in the industry as leisure participants, or in the realm of business, is limited indeed. An increase in such participation is both desirable and needed.

1. Public Marina and/or Related Facilities. The almost total absence of public (or private for that matter) facilities for mooring, boat launching and services is a genuine problem in this municipality. City Hall, the FWS and the ACDC have turned down petitions for the construction of private marinas in Ensenada Honda, in the belief that it will contribute to pollution in that body of water. A government controlled, energy/pollution efficient marina (or harbor facilities with docks, piers and ramps) should be considered as a solution to the problem of boats that anchor in the bay, and other users who need such facilities. Since our visit, the ACDC is interested in examining technical information on construction and management of marinas. Information has already been provided by our Marine Advisory Service. This recommendation has the endorsement of the local recreational anglers.

2. Development of Fishing Clubs and Organizations. Not only of infrastructure does MRF live, but also of the social forces that make it possible. Reorganization of a recreational fishermen's club may provide Culebra's MRF industry with sufficient political leverage for the establishment of government and private facilities. The fishing club or association will be able to organize tournaments, fund raising drives and educational activities, while serving as a community force for conservation of the resources and healthy development of the industry. Fishing clubs have served in these ways in the past, bringing revenues to that poverty-stricken municipality. This time, the formation of that organization needs new blood, young fishing aficionados. It also needs to include the North Americans, who have a personal and professional interest in this industry. Local sponsors could probably include the Travenol Co., or the Banco Central y Economías. MAS has already taken the first step in recommending that both North Americans and locals unite in such an organization. MAS personnel sees in Culebra a fertile area for "coastal community development" projects, with MRF as the axis for this development.

The United States Virgin Islands:  
St. Thomas, St. John and St. Croix

Regional Characteristics

The United States Virgin Islands (USVI) are composed of the islands of St. Thomas, St. Croix and St. John. Once a Danish colony, the U.S. obtained these islands through a purchase in 1917. During Danish rule, these islands, and specifically St. Thomas, had a free port status that "created trading opportunities for individuals, companies, and nations during times of political tensions" (Johnston 1987:34). St. Thomas was the hub of port activities as well as international commercial and banking transactions. Harbor infrastructure, shipping activities and maritime occupations were an integral part of Charlotte Amalie, the principal town in St. Thomas.

In keeping with the pattern of Caribbean economies, the USVI were dominated by a plantation economy with the use of an African slave labor force. In the early years of Danish colonization, the islands produced cotton, indigo and tobacco. Late in the 17th century, sugar cane cultivation dominated much of the landscape of the islands. St. Croix became a major producer of sugar cane; in fact, in the early 1900's, this island had to import laborers from Puerto Rico, in order to continue its production.

The ethnic composition and economy of the USVI has changed dramatically since 1917. Federal programs for economic revitalization have improved the per-capita income and availability of wage labor in the islands. These processes, similar to those of the Commonwealth of Puerto Rico, included tax exemption plans for U.S. and foreign investments, and the collection of revenues from liquor of federal income taxes. A combination of federal and local programs aimed at developing of the tourist base started to show progress. From 1960 (the decline of Cuba's tourist market) to 1987 the USVI have become one of the most important tourist destinations in the Caribbean.

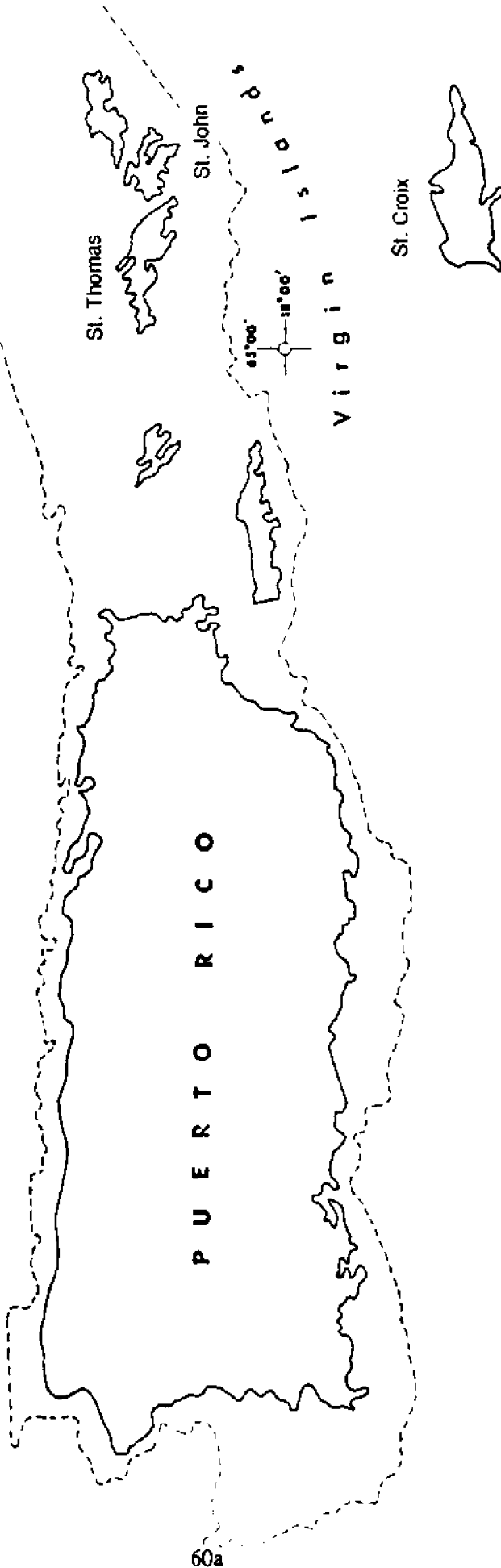
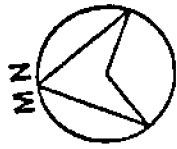
The islands' tropical weather, clean beaches, free port, aggressive advertisement and pacific political climate under the U.S. flag started to attract a large number of tourists by plane and cruise ships. The bottom line is that the core of that tourism is dependent upon its coastal and marine resources as used in marine recreational activities and tourism attractions (Peter 1987). As the figures show, the number of visitors, rooms available and construction permits has increased rapidly since 1960.

(See map #12 and The U.S. Virgin Islands-Region Coastal Demography)

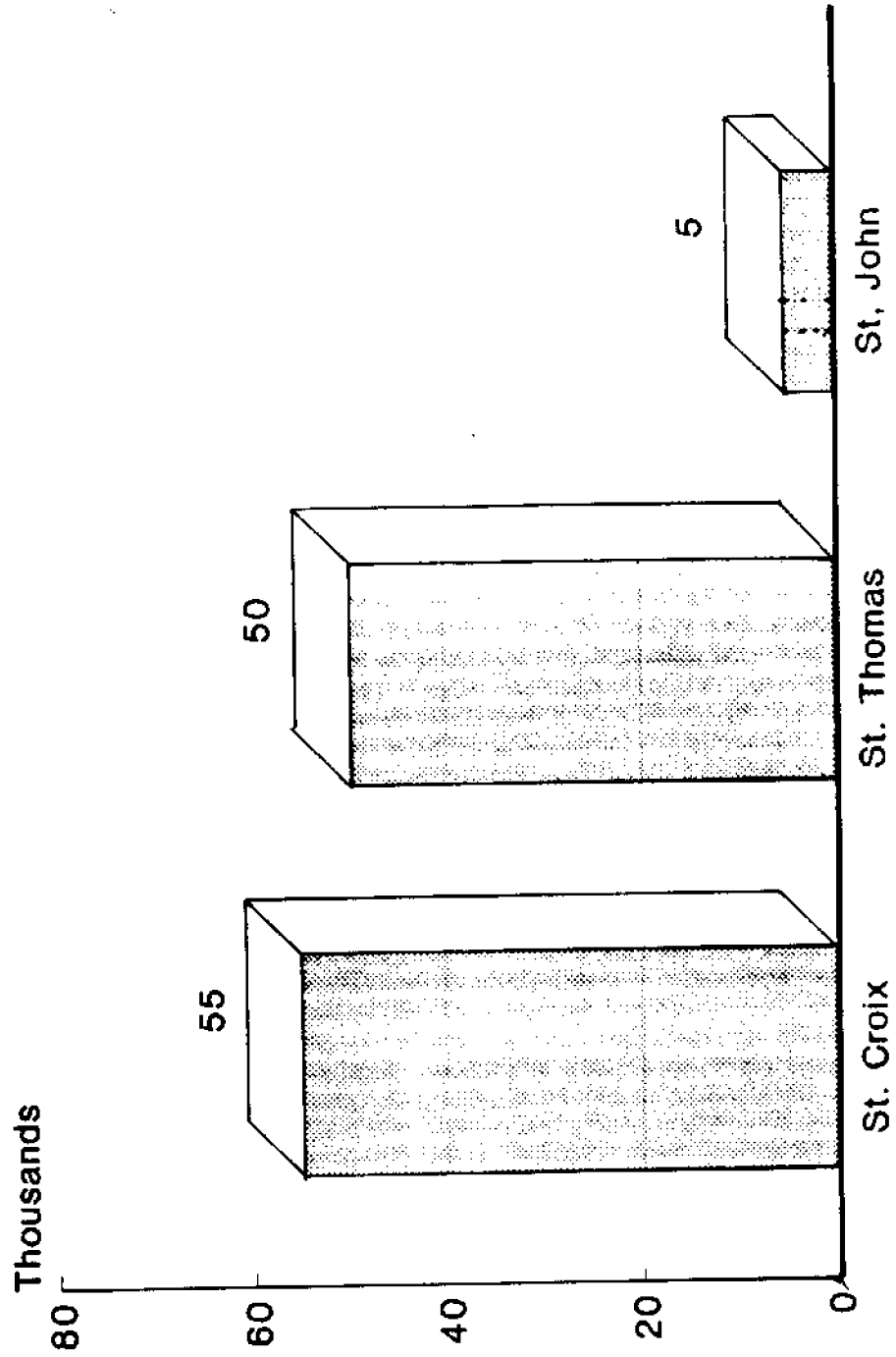
The labor force in the USVI was absorbed by government employment, the service sector and the tourist industry, while agricultural activities, both subsistence and for market started to decrease (cf. Koester 1985). The first outstanding effect of that economic change has been the per capita income of the USVI, which is the highest in the Caribbean (of course, Bermuda is not included in the list).

MAP NUMBER 12

THE UNITED STATES VIRGIN ISLANDS



# THE U.S. VIRGIN ISLANDS-REGION COASTAL DEMOGRAPHY



Along with tourist growth, the ethnic composition of the USVI has changed. Initial U.S. military contact in 1917 brought a contingent of U.S. military personnel and other North Americans (here called "continentals") to govern and live on the island; some stayed and settled there. Immigration processes and laws also allowed for an influx of West Indians (mainly from the British Virgin Islands), Puerto Ricans, East Indians, and non-military continentals. The result has been a population increase of non-natives in the USVI, from 26% in 1950 to 56.6% in 1980. This is one of the islands' most critical political and social issues (Johnston 1987).

Tourism development here is viewed as a cause of increases in the cost of food, the cost of and access to land, and access to the shoreline. Thus it has changed the "resource relations" in the islands, a fact also evidenced in the Stephen Koester study on the fishermen of St. John (Koester 1985). In a recent workshop on Public Access to the Shoreline (November, 1987, St. Croix) sponsored by the Virgin Islands Marine Advisory Services (part of UPRSGP), the issue was addressed by local people including Senator Virdin Brown and Attorney General Godfrey de Castro. The bottom line is that most island properties preclude local people's access to the shoreline, and the bulk of marine recreational businesses and large hotels (more than 50 rooms) belong to continentals. A similar situation appears to have arisen in the Island of Culebra, as described in this report. The issue has triggered social tensions, conflicts and political movements. (A popular mural in Saint Thomas presents the message of "Save the Beachdem.") In the development of MRF, or any other marine recreational activities, this issue should be considered and analyzed.

Marine recreation in the USVI, controlled almost exclusively by continentals, is a profitable and important sector of their economy. Incidentally, North Americans working in these activities are known by the name of "yachties," configuring what is almost a closed circuit of people. (See Griffith 1987 for insights on this issue.)

Sailing is a major island water sport. Clearinghouses provide contract services with a wide range of charter operations that offer these services. About twenty businesses offer bareboats for hire, most of which are located in Saint Thomas. There are more than sixty-four operations for day charters, and twenty-three "term" charters. As the figure shows, the number of businesses catering to the marine recreational activities in the USVI are many and varied, and the highest concentration is to be found in the island of Saint Thomas. According to Nathalie Peter's Directory, the islands boast of a total of 18 marinas. However, field observations assure us that most are composed of limited physical structures that form part of charterboat operations, which also rents limited space. If, in order to determine the definition of a marina we use the criteria of "the capacity of space rental" at businesses and private piers, the number of marinas found in Puerto Rico ought to be around 400 mark.

The USVI boating sector benefits from the large number of U.S. sailboats using the island as a base for their Caribbean sailing operations and activities. U.S. residents also leave their boats in marinas and dry-stack most of the year, until the summer time when they travel south to use their crafts. Puerto Ricans have had their boats registered and moored in the USVI, in order to profit from cheaper registration fees.



One significant aspect of marine recreation here is the existence of various associations of resource users and marine business people. There are associations for boaters and charters, underwater sports, game fishing and marine-related industries.

Despite recent efforts to document USVI fishing activities, these remain an ill-understood topic. USVI fishermen groups are composed of French and native West Indians who migrated from the island of Saint Bart in 1870 and settled in the Northside and in Frenchtown. Both groups have followed the Caribbean "occupational multiplicity" pattern of fishing and farming as subsistence and market strategies (Stoffle 1986, after Comitas 1960). The waters of P.R., the USVI and the BVI have traditionally been used as a shared resource (Valdés-Pizzini 1985, Koester 1985, Johnston 1987, Torres 1969). For the most part, methods remain traditional, (seines, cast nets traps and hand-line) while navigation technology (fiber-glass boats, outboard gasoline motors) has changed. Pot or trap fishing is the most important method. According to Adams, "professional fishermen" use 8 to 12 traps, while part-time fishers use a set of 2 to 3 (Adams 1983:228). Another change is the use of scuba diving equipment to spear valuable reef fish and to collect conch and lobster (Adams 1983).

During the 1980's, the number of fishermen in St. Thomas has been close to 255. Of this number, according to the 1980 census, 86 were full-time fishermen. Fishing in St. John is practiced by about 15 individuals. In addition to fishermen using the traditional methods, there are various divers, two of whom are continentals "fishing" for conch and lobster, but this is a less common method (Koester 1986:3). No information is available for St. Croix. The total number of fishermen for the USVI must be close to 425, basically the same amount reported in 1932 (Adams 1983: 227).

#### Marine Recreational Fishing: Infrastructure and Services

The USVI are a Mecca for organized game fishing charterboat operations. A core of businesses is located on the islands, while a large, undetermined number of boats are of a transient nature. A decline in jobs and cash in the oil belt of the southeast U.S. has pushed many charterboat operators to the USVI to "see how it goes." Most of these charterboats are operated from expensive sportfishing boats (eg. Chris Craft, Hatteras, Bertram); only one or two go for reef and estuarine fish (jacks and tarpon). Peter lists sixteen operations based in St. Thomas; most are operated by continentals. In season, nearly 50 transient charterboats operate from Red Hook, American Yacht Harbor and the other marinas.

Participation of USVI natives in recreational fishing is limited. In contrast with Puerto Rico, local MRF is almost non-existent. The bulk of the participants in MRF are recreational and sportfishermen who use the islands' charterboat services. In St. Thomas and St. John, where most local driving time is spent traversing sloping terrain, maneuvering with a vehicle and a trailer with a boat is rather difficult. St. John has a small marina close to the ferry pier, where boats are moored in slips. In St. Thomas we found various ramps used by the locals. There is a "natural" ramp close to the Division of Fish and Wildlife of the USVI, on the road to Red Hook. Magens Bay

also has a ramp, most used by local commercial fishermen. In St. Croix the situation is different, with a large number of MRF participants from the island.

#### Marine Recreational Fishing: Recommendations for Potential Development

The team that worked on this project is hesitant to make thorough recommendations for the USVI, since we are officials (employees) of the Commonwealth of Puerto Rico (the University of Puerto Rico) with no direct responsibility over fishery resources in those islands. However, the team has observed that in an environment of keen competition for space and resources, the intromission of outsiders is a critical issue for the USVI, and especially for the development of tourism opportunities. Any plans for the development of MRF potential in the islands should consider the area's over-crowding, the large amount of charter fishing boat operations, and the presence of longliners in nearby waters. In a general, un-committed manner, this team only recommends that the local USVI people integrate themselves into the MRF in a more active way. This industry is currently controlled by continentals and outsiders; local recreational anglers appear to be scant in the USVI, except in St. Croix.

The people of the USVI, if it is their choice to do so, could benefit from fishery resources such as fishing piers, launching ramps and party boats. But in all cases, the problem of limited shoreline access should be addressed.

## CONCLUSIONS

The most important conclusion gleaned from the findings of this project is that MRF infrastructure supply can not cope with the current demand for facilities. Slips and dry-storage spaces are totally occupied, marinas have long waiting lists, and yachting and fishing clubs are either not accepting members or are accepting them with under the condition of "no-space available". Field observations of makeshift, informal marinas, private homes with piers offering space for friends, long lines at ramps, traffic obstruction by trailers and boats, and makeshift ramps are indicators of the high demand for facilities. Services themselves appear to be: increasing in number, well located throughout the islands and satisfying consumer demands. Skills aside, it is easier to start a marine-oriented business than to develop a marina or any water-based facility and service.

MRF is an economic activity of significant importance to many coastal communities and municipalities in the areas studied. Since MRF activities are growing at a fast rate in Puerto Rico and the U.S. Virgin Islands, it represents an important source of employment and provides varied opportunities for entering the MRF industry. MRF is alive and well in PR and the USVI, but efforts from the government and private sector could enhance services and facilities. Throughout the report, and especially in the second part of the FINDINGS section, we presented our conclusions, assessments and recommendations for development at each specific region. This section presents the recommendations and conclusions by areas of need.

### Scuba Diving and Spearfishing as Recreational Fishing

According to the findings of this project, scuba diving and spearfishing are key elements in the configuration of recreational fishing in PR and the USVI. Over the past ten years, scuba diving has grown both as a leisure activity and as a business. Industry representatives assure us that the number of divers in the region may be in the range of 20,000. Throughout this report there is no single recommendation for the enhancement of spearfishing as recreational fishing. This is due to the fact that local fishery management agencies are considering management alternatives for the control of scuba diving as part of the commercial fisheries component, specifically with the management of conch resources (see Valdés-Pizzini 1987, for a socio-economic profile of the sector).

### Participation of Small-Scale Fishermen in the MRF Industry

Participation of local fishermen in the MRF industry appears to be limited to some informal incursions. With the exception of two villas pesqueras, the rest of the government-controlled landing centers have limited interaction with the sport fishermen, and in some cases, conflicts. Fishermen operate under the assumption that using the facilities for purposes other than commercial fishing is prohibited by law, or will damage their relationship with CODREMAR. This fallacy must be dispelled. A recent study commissioned by that agency, and quoted in this report, points toward the

need for commercial diversification in order to ensure the economic survival and profitability of the landing centers. One recommendation was the opening of facilities and services to the MRF clientele. Charter fishing operations represent one such service that could be developed. The Cabo Rojo, Salinas and Vieques/Culebra regions are viewed as appropriate for that development.

#### MRF Facilities Development: Trends and Future Options

This project, with NMFS funding, came at an appropriate time. The Commonwealth of Puerto Rico DNR and the USVI Office of Planning, Division of Fish and Wildlife, plus legislators and community groups are seriously looking into the problem of a lack of facilities that provide access to the shoreline, and at the same time, have the capacity to stimulate the participation of local residents in the recreational utilization of coastal resources.

The DNR is presently developing a strategy for the development of facilities that would provide anglers and boaters with access to fishing sites. The DNR is considering the development of a "marina district" in the area of Fajardo, which is already crowded with that type of facilities. A healthy alternative would be to provide permits for other areas as well. In this report we have seen the need for marinas (as diversified units that include a variety of services) in the Cabo Rojo, Salinas, Vieques/Culebra and Arecibo regions.

It is essential to stress the need for a holistic approach in planning, construction and operation of a municipal, state or private marina. As the data in this report shows, in order to remain in operation (economically speaking) marinas are adding services and facilities such as fuel, repairs, retail sales, charterboats, restaurants, lodging, dry storage, slip space and sports facilities. In addition to these, marinas and private organizations also depend on the social and sports activities they host at their locale, namely domino competitions, tennis tournaments, dances or sportfishing tournaments. For many yacht and fishing clubs, yearly fishing tournaments represent economic survival. Marinas and fishing and yachting clubs are not simply facilities, they are also cultural, social and economic (business) enclaves. Assessment for their planning and construction should take these variables into consideration.

Marina construction is not the only way of meeting demands for access and space. Ramps are needed at almost all regions and locations. The existence of makeshift ramps throughout the island reflects that need. However, a ramp does not solely consist of a concrete structure for launching boats. Planning and construction of ramps must also include lighting, pier, space for trailer maneuver, parking space and protection. In "association" with concrete and regular ramps, certain businesses offer marine equipment retail, parking space for trailers and cars, and dry-storage for boats if needed. This "adaptation" to the lack of slip space and marinas can be seen in the municipalities of Lajas (La Parguera), Guánica, and Fajardo. In various cases camping grounds on the coast also served that purpose.

Ideally, such an adaptation could consist of a ramp (access to the shoreline) and, close to the ramp, a boat and trailer park for storage and protection of property. A store (marine shop, bait and tackle shop, or simply a provisions store) could be a profitable addition to the complex. This "complex" could require a reduced (concentrated) area of sea access, thus cutting down on conflict and competition for access. Development of this ramp-boat park area should be planned in those areas in which there are marine oriented services nearby. This "complex" alternative can be developed by the municipality, the central government, or the private sector.

New facilities can not be left unmanaged, and holistic development requires comprehensive management skills. Development of marinas, ramps, ramp-boat parking complexes and other structures recommended in this report should proceed in tandem with the training of government employees in marina or MRF facilities management. Municipal and central governments should, with the help of the DNR, MAS and other programs, train their personnel to attend the needs of the users, and to maintain all facilities properly. Otherwise, the facilities should be operated by concessionaires trained in the proper techniques for MRF facilities and marina management.

MRF enhances the quality of life of individuals in all economic and social levels. In addition to marinas, ramps and boat parks and storage areas there is a need for facilities, service and infrastructure to provide people who don't have boats with access to the water. Such facilities include fishing piers, jetties, waterfronts and charterboats services. As mentioned in this report, certain areas are already being used by shore or surf recreational fishermen. There is a trend towards the revitalization of waterfront areas, which include areas for anglers. The municipalities of Ponce and Arecibo are examples of this. In areas meriting facilities for recreational fisherman, future planning of waterfront municipal structures should take into consideration access for the local angling constituency. The USVI region should seriously consider this type of development, since participation of local USVI people in recreational fishing appears to be limited. Planning and development of facilities and services (eg. party boats) for shore, surf and open sea fishermen could enhance local participation (if desired by the fishery management agencies) in leisure and commerce currently dominated by North Americans and tourists.

#### What further works needs to be done?

This project posed many questions and opened up several areas for further research, all related with the management of fishery resources, as compatible with MRF development. As a result:

1. Inventory and assessment of infrastructure for MRF development should continue on a periodical basis. Future planning and development actions by government agencies and the private sector must be evaluated (using the parameters and recommendations established in this report) in order to assess their success, as well as this project's limitations. MAS plans to continue up-dating the information, but that

is an expensive, labor intensive task. Funding for further evaluation and up-dating is recommended.

2. The economic impact and opportunities provided by the MRF service sector must be assessed. Income, jobs generated directly and indirectly, sales volume, and multiplier effects in the regional and state economies are key variables to measure. Special attention and consideration should be given to the economic and technical aspects of the charter fishing boat industry and to the economic importance of sportfishing tournaments. That information is currently non-existent. The MRF constituency considers this information critical for its survival and growth in terms of political force and lobbying power. Precise information on the economic impact of the MRF industry should be translated into a stronger governmental commitment for the industry.

3. Now that this project has been able to establish the infrastructural and service parameters of the MRF industry, a logical step forward is to identify in a precise manner the universe of MRF resource users in PR and the USVI. The Caribbean Fisheries Management Council, the Department of Natural Resources and CODREMAR have identified this as a major project for Puerto Rico. The lack of such information has curtailed the proper establishment of management strategies. This is a long-range, multi-agency, expensive agenda. Associated with this issue, the feasibility of a MRF license system should be assessed in detail.

4. A socio-economic study of the impact of scuba-diving and spearfishing as part of the recreational fishing complex deserves some examination. Scuba shops and their associated services are increasing in both number and importance in the coastal recreational scenario. Information is needed on the extent of this activity, its impact in the fishery, and its organizational traits and network (socio-political linkages) patterns.

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