APPENDIX I

SOCIO-ECONOMIC DOCUMENTATION OF THE PUERTO RICAN FISHERMEN (DIVERS) FOR THE CONCH FISHERY MANAGEMENT PLAN

PREPARED FOR THE
CARIBBEAN FISHERY MANAGEMENT COUNCIL
BY

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INTRODUCTION

This document presents socio-economic information on the fishermen of Puerto Rico and the U.S. Virgin Islands as related to the utilization of conch fishery resources in those waters. The status of the information on the fishermen population has increased notably during the past five years. Various research projects sponsored by the University of Puerto Rico Sea Grant Program (UPRSGP) have yielded an impressive amount of data on the social parameters of the fishermen. However, as new FMPs are recommended and established, the need for new and specialized information tends to surpass current efforts and databases. The Conch FMP will have to rely on the information gathered by Clapp and Mayne Inc. (1982) for items such as family income. But information from recent surveys and studies by UPRSGP (Gutierrez 1985, Gutierrez et al 1986) and CODREMAR (Romaguera et al 1987) will be used to describe the general characteristics of the target population.

This particular fishery management plan is specifically related to one type of fishermen: the divers. Current sources of socio-economic data describe the general characteristics of the population, but do not

analyze a particular group of gear and resource users. In order to provide an adequate portrait of the divers in Puerto Rico I gathered information from two fishermen surveys done in 1983, and field notes and observations made during my fieldwork. The main survey was done by Jaime Gutierrez as part of a Sea Grant Research Project (R/SE-20-1). The Gutierrez study selected a sample of landing centers from all the coastal municipalities in Puerto Rico. For that purpose, fishermen were interviewed in the municipalities of Isabela, Humacao (Punta Santiago), Fajardo (Puerto Real), Aguadilla (Tamarindo, Playuela), Aguada (Guaniquilla), Guánica (Salinas Providencia), Lajas (La Parguera, Papayo), Mayaguez (Mani, El Seco), Maunabo (El Faro), Yabucoa, San Juan, and Culebra. I supervised the fieldwork process in most municipalities, and personally conducted a large number of interviews. Selection methods stressed the interest of including municipalities and landing centers representative of most fisheries (Gutierrez 1985:1-2).

Cabo Rojo was not selected because it was the object of an ethnographic project (community fieldwork, and participant observation) and a survey of all fishing communities (cf. Valdés-Pizzini 1985). For the purpose of this particular FMP, I have added the survey results from Cabo Rojo to the general survey conducted by Gutierrez. A

word of caution is needed here. For Cabo Rojo all communities were visited and a "snowball sample" of fishermen were interviewed. The questionnaires utilized were different, however both were prepared in accordance to an original form designed by the social scientists that worked in both projects. One problem that such situation poses is that in various items the data is not complete (questions were absent in some questionnaires) and description of the variable is based on a handful of interviews. In that case, the text indicates the number of cases for that particular variable. Overall, 54 cases are included in the analysis. (These cases were extracted from two sets of interviews containing more than 300 cases. Each set was reviewed twice).

The inclusion of Cabo Rojo, an important area for spear-fishing efforts, adds weight of the overall sample toward the southwestern portion of the island. But, what is lost on sampling 'beauty' is gained in representativeness of important sites of diving operations. Nevertheless, interpretation of the data should always consider these factors. For this reason I am recommending for future FMPs, specific information on the particular group of resource users should be obtained. In this case, the characteristics of the divers are more significant than those of the general population of

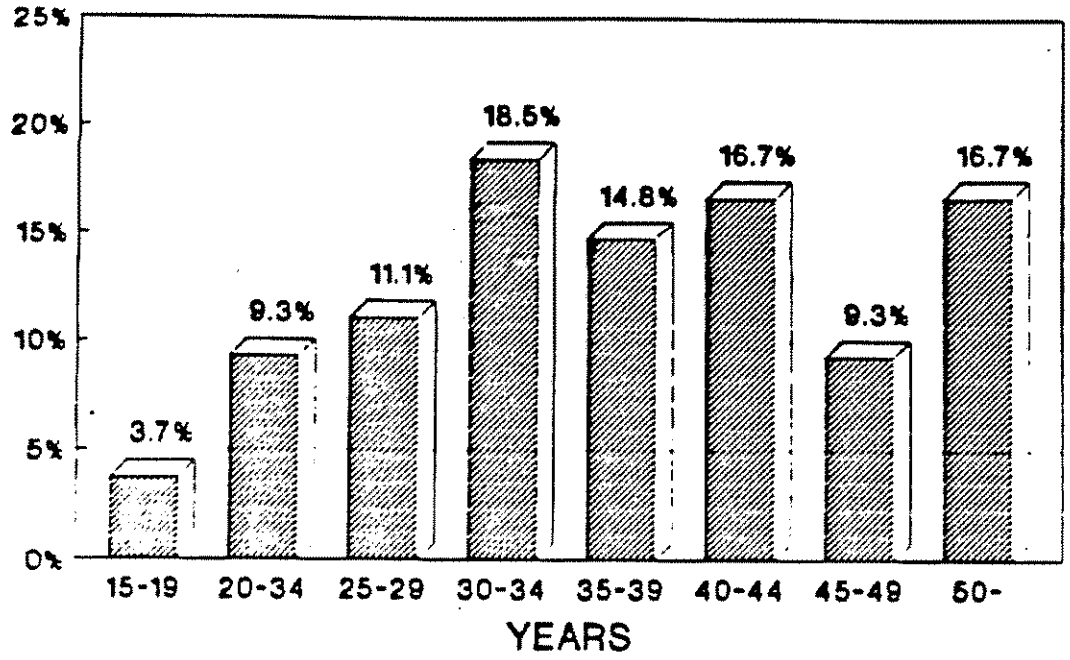
fishermen since divers are a group of fishers with different patterns of gear utilization and target species. In terms of socio-economic and cultural characteristics, I will establish a comparison between both groups in order to provide a social background of the segment examined.

DESCRIPTION OF SOCIAL AND CULTURAL FRAMEWORK OF DOMESTIC FISHERMEN AND THEIR COMMUNITY

Socio-economic Characteristics of the Commercial Fishermen in Puerto Rico

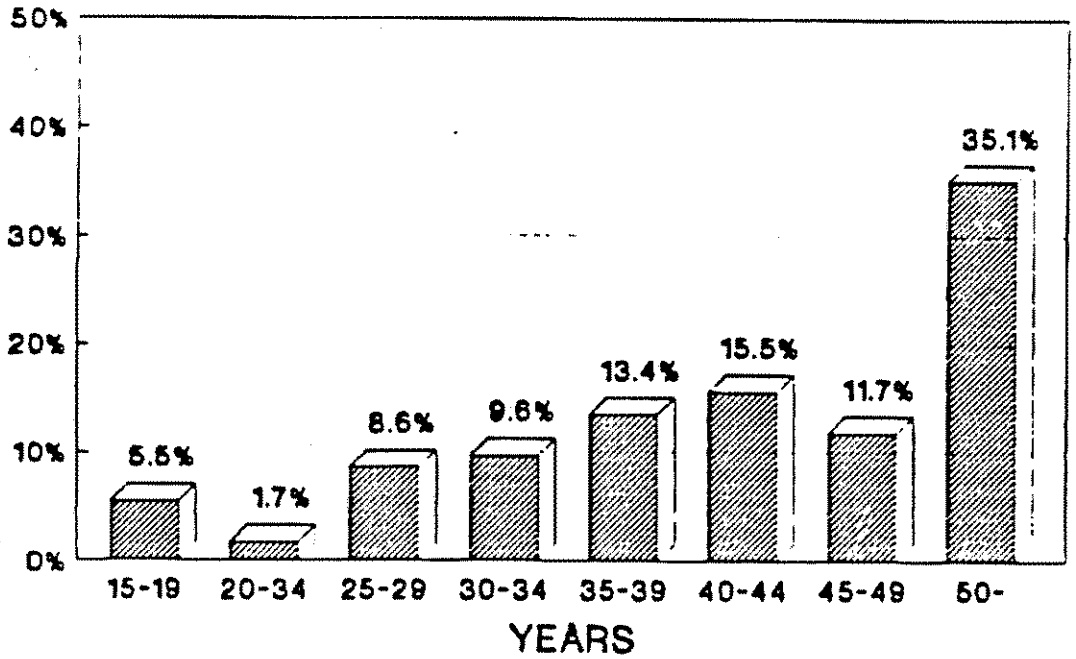
AGE The fishermen population of Puerto Rico finds the majority of the age cohorts in those groups that exceed the 35 year mark. Clapp and Mayne Inc. (1982) and Gutierrez (1985) found that 81% and 87% of the fishermen interviewed are located in those cohorts, thus no significant difference was found for both surveys. However, the divers sub-group presents a different age structure (see figure number one). Only 57.5% of the divers are located in the age groups over 35 years. This is understandable in terms of the physical requirements of diving, as compared to other gear. Diving appears to be "recruiting" among the younger cohorts of the fishermen population. Compared with the Gutierrez findings (see figure number two), the age cohorts indicate that the overall age structure of the fishermen maintains a low profile in the categories between 15 and 34 years old, while the divers are increasingly adding fishers to those

AGE COHORTS OF DIVERS
IN PUERTO RICO



(Figure Number One)

AGE COHORTS OF FISHERMEN
IN PUERTO RICO

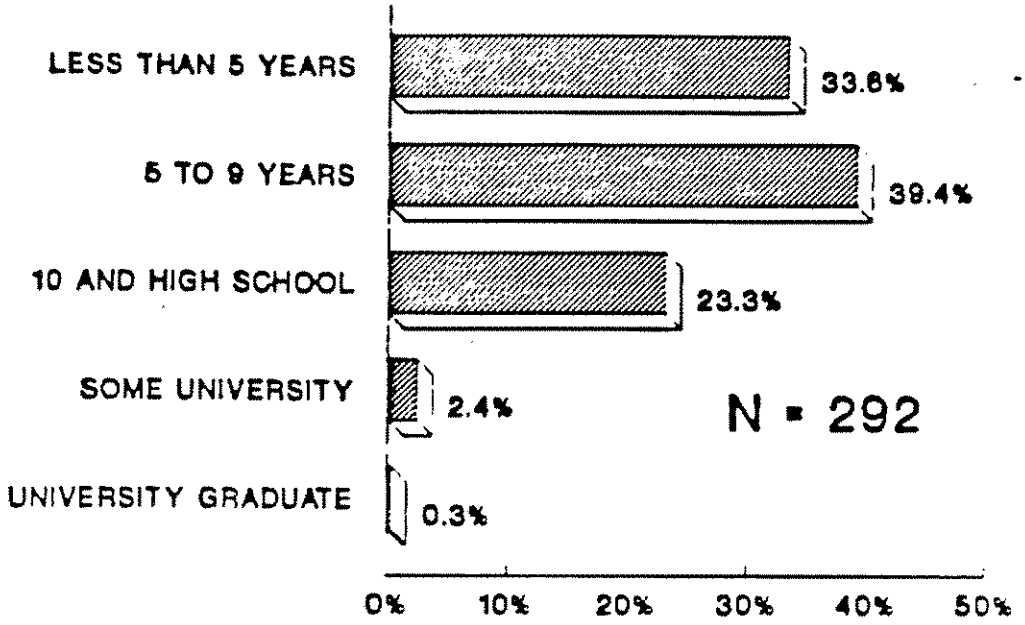


(Figure Number Two)

cohorts. In terms of demographic dynamics, the divers sector is, in general terms, more effective attracting the new breed of fishermen to the rank and file. Despite those figures, an impressive fact remains that 26% of the divers are in the upper age groups.

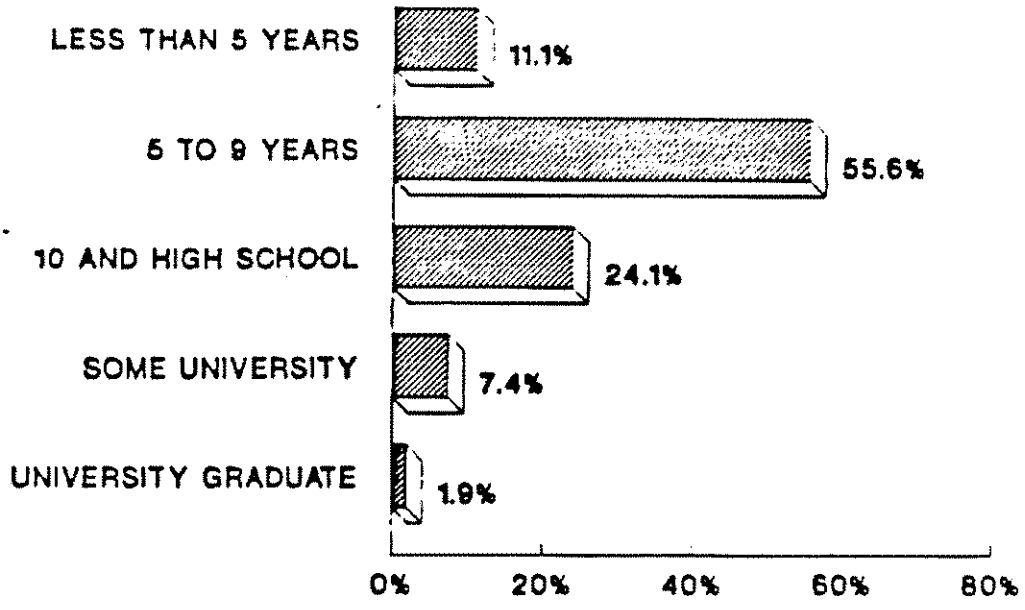
EDUCATION Educational levels of the Puerto Rican fishermen have been a major concern of those agencies involved in fisheries development and technology transfer. The "low" levels of education and academic skills have been the culprit of the fishermen resilience to adopt new techniques. Impressionistic statements by fishery managers and extension personnel always indicate such "low" levels as liable for the low developmental trends in the fishermen acceptance of new technology. Survey data tends to corroborate those assertions. The available data shows that 73% of the fishermen have an education lower that 10th grade (Gutierrez-Sanchez 1985). Clapp and Mayne report indicate that "slightly over one-half of the commercial fishermen had less than six years of schooling" (Clapp and Mayne 1982). Twenty-three percent of those fishermen had schooling between 10th grade and high school diploma, and 3.7% had received education on the college level (see figure number three). The pattern is repeated among the divers (see figure number four). Among this group, 66.7% have an education lower than 10th grade.

EDUCATION
FISHERMEN IN PUERTO RICO



(Figure Number Three)

EDUCATION
DIVERS IN PUERTO RICO



(Figure Number Four)

Although the difference is of merely 7.3%, the difference becomes significant in the echelon with less than 5 years of schooling. The difference here is of 22.5% less than the fishermen population. At the high school level the divers present a small increase of .8%, and at the university level the increase is of 4.6%.

The differences in educational levels ought to be explained by generational differences and schooling opportunities. Forty years ago the inhabitants of rural areas (such as the coastal zone) were content to achieve 6 to 8 years of schooling, and be able to perform well in an economic setting in which education was secondary to manual skills and hard labor. Industrial development under Operation Bootstrap began to change the living expectations and the educational requirements of the labor force. Presently, reading and writting skills, along with knowledge of the English language, high school diploma and even some years of college are the basic requirements for working at most factories of this industrial generation. These observations are corroborated through cross tabulation of the variables age and education. Gutierrez found that age was inversely correlated with educational levels (Gutierrez-Sanchez 1985:). The higher the age cohort, the lower the educational level. This is also true for the divers. All those with an educational level

lower than 6th grade are found in the age cohorts from 35 to over 50 years. While most divers with college education are found in the cohorts lower than 34 years. However, in the middle levels (5th grade to high school) the gross of the fishermen appear to be in those upper age groups. (see table number one).

FAMILY INCOME Information on family income was not requested and was not made available through the questionnaires. Information on this matter needs to be obtained from CODREMAR and from the Clapp and Mayne Inc. 1982 report. Nevertheless, other information related to domestic welfare and economic activities was collected. The literature on the social and economic aspects of the Caribbean fishermen have stressed the fact that fishermen engage in other economic or productive strategies in order to provide sufficient subsistence to their households. This work patterns is known as occupational multiplicity (see Stoffle 1986 for a recent discussion on the topic). That strategy is also part of the work patterns of the Puerto Rican fishermen. Sociological observations have indicated that the Island fishermen usually held other jobs occupations in order to support their families. (Abgrall 1975, Blay 1972, Poggie 1978). Recent studies have corroborated the presence of occupational multiplicity among the fishermen. Gutierrez has found

Table Number One
Age Cohorts and Educational Level of Divers in Puerto Rico

AGE COHORTS (In Percentages)

YEARS OF SCHOOLING	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-
Less than 5	0	0	0	0	1.9%	3.7%	1.9%	3.7%
5 to 9 Years	0	5.6%	7.4%	14.8%	11.1%	7.4%	1.9%	7.4%
10 to High School	3.7%	1.9%	0	1.9%	1.9%	5.6%	5.6%	3.7%
Some University	0	1.9%	1.9%	1.9%	0	0	0	1.9%
College Graduate	0	0	1.9	0	0	0	0	0

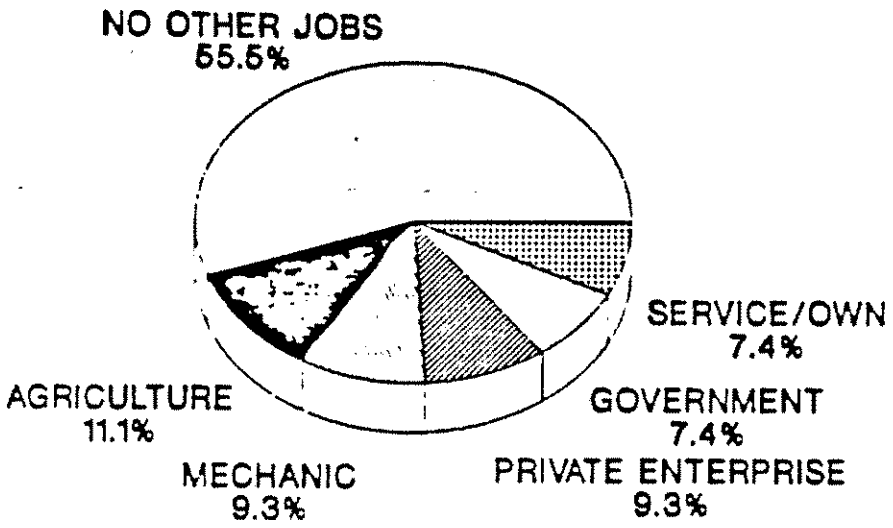
that 49.8% of the fishermen had other jobs (Gutierrez-Sanchez 1985:), and CODREMAR found that 50% had other occupations (Romaguera et al 1987:14). This item must be considered to be under-reported by most fishermen. This phenomenon is understandable since fishing license and other benefits (boat license) are dependent upon the exclusive participation of the person in the fishing industry. (This is one major problem that forces the fishermen to exert more pressure upon the resources. Fishermen cannot use their vessels -legally- for chartering or other economic activities, if they are bona-fide fishers and want to remain in that status. If other alternatives will be developed for the fishermen, the government should start by opening the opportunities to engage - legally - in other productive activities).

Another strategy that precludes fishers from reporting other jobs, is their use of state welfare programs to empatar la pelea (to break even economically). Also, it may be that 50% hold other jobs or occupations, but an additional amount must be estimated to account for those that are engage in minor economic activities to earn income. Those economic incursions are often regarded as part of the ill-understood informal economy, what Puerto Ricans call chiripear.

Divers also share those strategies, since 45% that

have other jobs or perform other economic / productive activities. From that group 7.4% are on their own providing services for their communities, and 9.3% perform auto and outboard mechanical services. The rest is employed by the municipalities, private firms or work in agriculture (see figure number five). In this context, one aspect that deserves a thorough analysis in future socio-economic research is the "extent of division of labor, degrees of capital and labor intensity, seasonal variations in economic activities" (Vanderpool 1986). A project funded by NSF to David Griffith and Manuel Valdés-Pizzini will study the patterns of wage labor and capital accumulation in the local fisheries. This study will clear some of the current conceptions of what the fishermen are and do with their time, and where they locate their personal and productive priorities. A basic knowledge of these issues will provide management agencies with information on how do work relations affect resource management and utilization, in the context of how fisheries absorb surplus labor from other economic sectors. (cf. Bailey et al 1986:125, Harris 1986:6). FMPs should weight the importance of fishing as an economic activity in those communities affected by the future implementation of the plans (Munro and Smith 1983).
An akward question we probed with the fishermen is the

OCCUPATIONAL MULTIPLICITY
DIVERS IN PUERTO RICO

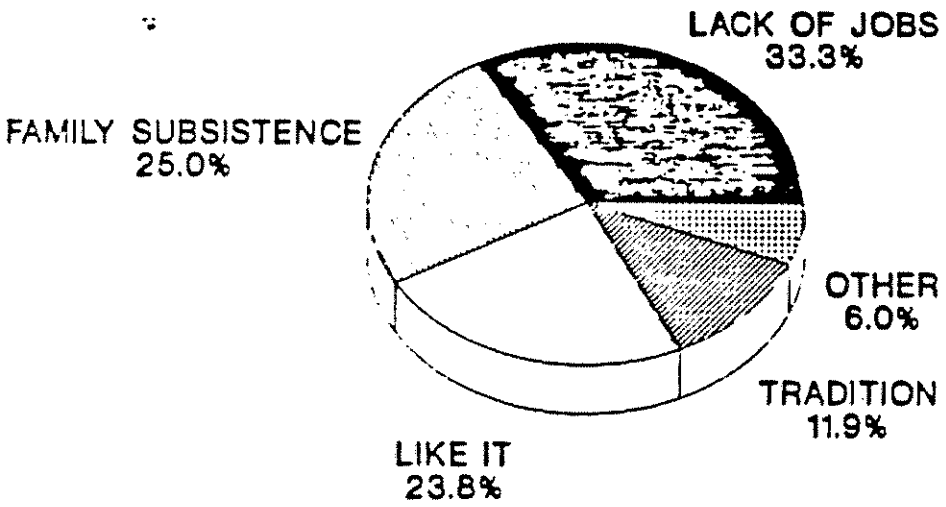


(Figure Number Five)

reasons they have to engage in fishing as a livelihood. However, the answer to that question has been fruitful in indicating major concerns and strategies of the fishermen. Throughout the Caribbean, fishermen fish because they like it. It is a major qualitative change in the scheduling, supervision, hard work and remuneration, than those generated in the agricultural (sugar cane) fields. In Puerto Rico (Blay 1972, Gutierrez-Sanchez 1985, as well as in other Caribbean islands people fish because they like it (better than the fields) and nurtures that special satisfaction derived from the man-nature contact. Bluntly, it is better to fish than to cut cane in the fields, as many fishermen usually express. In Puerto Rico 38% fish because (the obvious) it provides family subsistence (Gutierrez-Sanchez 1985). Motivation for fishing is similar (25%) but the main reason for fishing refers to "the lack of jobs" in the industrial and agriculture sector of the economy (see figure number six). The lack of formal education impoverishes their opportunities of competing with the vast number of high school and college graduate that enter into the industrial labor force.

Tradition was accounted for 11.9% of the responses. But what is tradition? Gutierrez has defined tradition as the input of the domestic unit in the training and

FISHING AS A LIVELIHOOD
MAIN REASONS



(Figure Number Six)

development of groups of fishermen. In the primary (traditional) sectors of the economy family and kinship provide the people with the necessary skills to earn a living. Fishing communities performs that duty well through the kinship system. (Gutierrez 1985, Valdés-Pizzini 1982, 1985). But tradition also refers to the lack of skills, interest and strength to cope with new situations, such as changes in the labor structure and the new recruiting requirement. In probing "tradition", and examining other responses to that question one understands that tradition refers to the "lack of skills and schooling" needed to get other jobs, and to "the only thing I know how to do".

Fishing appears to be an economic activity that absorbs an undetermined portion of the unemployed population (cf. Munro and Smith 1983, Valdés-Pizzini 1985). For many, fishing alleviates the economic pressures felt as a by-product of the demise of traditional crops (such as sugar cane) of the coastal plains. In the case of the divers it is also true, since 11% are still working in agriculture, and 55% have worked in agriculture in the past. Agriculture and fishing in Puerto Rico are inclusive activities.

The divers, as well as the rest of their fishing counterparts in the Island have participated in other

sectors of the economy. For example, 60.4% of the divers have worked in the United States in industrial work (43.8%), agriculture (37.5%) and service (19.8).

DIVING OPERATIONS (This section replaces "Boat Ownership" in the original MPs of the Council, but the information provided in that section may also be included). This section provides information on the diving operations as made available in the examined sub-group of divers. In addition, the report draws excerpts from Valdés-Pizzini (1985) dissertation on Puerto Real, Cabo Rojo.

Diving operations for the gathering, harvesting and hunting of underwater species in the inshore, as a consistent economic activity was practically unknown in Puerto Rico until recently. During our research in Puerto Real this was an sporadic activity, performed by few individuals. In the summer of 1984 we revisited the community and diving was then a growing economic activity, the pillar of an incipient nevera (fish-house) and their production units formed 16 percent of the total of active units in the community, and as for the rest of the island, the source of controversy and competition for the trap fishermen.

Boat Ownership Boat ownership is a major trait of the Puerto Rican fisheries, except in those areas where

capital investment is high and private firms take precedence over fishermen associations, such as in Puerto Real, Cabo Rojo. Recent surveys indicate that 96.5% (Clapp and Mayne Inc. 1982) and 85.7% (Gutierrez-Sanchez 1985) of the fishermen own their vessels. I suspect that true figures must be slightly lower due to over-reporting. Content analisys of fishermen interviews show that they tend to report boat ownership eventhough it is referred to as a past event, not a present situation. Also boat ownership tends to over-emphasize the "bona-fide" status of the fishermen. The analysis indicates that fishers often ascribe their partners and relatives' boats to their property. That qualitative analysis provides evidence to question the figures, but no quantitative measurement to weight the numbers. Therefore, comparisons have to abide to the present, known figures. In Puerto Rico, 61% of the divers own fishing boats. It is felt that the bulk of the 39% of non-owners are boat pilots, rather than actual divers.

Diving and Boat and Gear Utilization The vessels employed by the divers are yolas or fiber-glass boats ranging from 15 to 21 feet, and outboard motor from 40 to 125 hp. The gear used by the divers is the standard type of underwater equipment, composed by the scuba or air tanks, watches for time and depth measurements, fins and a

mask. The gear employed by the divers consists of gloves, knives, spearguns, gaffs, meshed sacks and hooks and line for trolling during their trips. Recently, we have received complaints and un-requested comments on the use of chemicals such as chloride and detergents in fishing for octopus.

Divers work either alone or in pairs, but the most common type of operation consists of a diver and a pilot for the vessel. The pilot is in charge of the navigation, localization of the sites, the hauling of the catch, and the protection of the divers. The diver is solely in charge of the highly selective fishing operations they perform.

In Puerto Real the diver is either the owner of the vessel, the scuba equipment, or both; and the pilot is usually a hired hand employed by the diver. The pilots and the divers are exclusively devoted to fishing, since their operations are performed, with good weather allowing it, almost everyday. Some pilots however do some part-time work, doing sporadic tasks and chores in other people's houses or business.

Divers, working in depths that range from 4 to 20 fathoms, use their hands for the capture of lobsters and conchs, gaffs for octopuses and lobsters, and spearguns for reef fishes, and occasionally for lobsters. When

capturing lobsters, or conchs, the diver collects them in the meshed sack, which is tied by a rope to the skiff; when the sack is full the diver and the pilot haul it to the craft. Current methods for handling of conch include to break the shell underwater. Lobsters are taken entirely to the market, while the shell of the conch is broken and thrown away, only keeping the meat. A good number of reef fishes are also captured, by the use of the speargun, by the divers. At their return to the harbor the divers and the pilot use troll line, to catch barracudas, mackerel and jacks. (Valdés-Pizzini 1985)

In Puerto Rico, 85.2% of the divers use or operate other gear as well. Most notably are the lines (45%). Other gear employed are gillnets and beach seines (24%), traps (19%), cast nets and reel-line (6.4% each).

Divers, as the rest of their peers in the Island, fish every day if the weather conditions allow it. On the average, divers go fishing almost 5 days per week. However, since they also operate other gear, not all days are devoted to diving. A sub-group of divers with information on time specifically devoted to each gear (n=11) show that these fishermen devote almost 3 days to diving operations. Better estimates of divers fishing effort are needed. There is reason to believe that the high competition in diving operations, and the high

fishing effort has had a negative impact in the overall divers health. Dive shop owners and operators unoficially report that divers carry and use from 5 to 7 air tanks per diving outing. Signs of narcosis (bends) are becoming a familiar sight in many fishing communities. (Bruce Taggart and George Mitcheson, Personal Communication). In September 16, 1987 lobster diver Heriberto Sosa made four consecutive dives to 120 feet, 90 feet, 120 feet, and 150 feet. That day he also arrived to a hospital in St. Thomas suffering from decompression sickness, thus becoming paralized in all his extremities (Peter 1987:12). At the hyperbaric chamber in St. Thomas the diving accident profiles shows a greater number of commercial divers (fishermen) with more accute bend symptom due to table violations (Ibid:13).

Entering into the fishery as a diver is rather easy. Diving operations require a relatively small investment in crafts and gears. The scuba equipment is often rented at the scuba-diving shops throughout the island, thus facilitating the divers the access to the necessary technology and implements of their trade. Divers shops are replacing the "landing centers" or villas pesqueras as main providers of services and gears to these fishermen.

Another incentive of diving is that the divers are able to avoid investing efforts in the capture of low paid

species, thus selecting those who have a high ex-vessel value in the market. In fact, lobster, conch, octopus, and reef fishes such as groupers, snappers, trunkfish and hogfish are among the species with the highest value, all which comprise the gross of the divers landings. Most divers (63%) belong to fishermen associations, but only 39% of all divers sell the catch to that organization. Restaurants are the main source of demand for their catch, and also one of the buyers offering the best ex-vessel price per pound (cf. Corredor 1985, Valdés-Pizzini 1985).

Shares Information on the general patterns of shares among divers is not available. In Puerto Real in 1984, the share among those units was different from the rest of the fishing operations. Divers, as owners of the vessels and gear, pay the pilots, after all the expenses have been calculated and subtracted, a 25 or a 30 percent of the profits from the sale. A good trip may bring an earning of approximately ninety dollars for the diver, and thirty dollars for the pilot (Valdés-Pizzini 1985).

Ethnic and Cultural Characteristics

One critical issue expounded by government officials and council members (both departed) in regards to divers was the questioning of their ethnic and cultural (occupational) background. In the highly competitive fisheries environs, divers are considered a major threat,

specially by trap fishermen who constantly point at them as the culprit of species depletion, poaching and gear sabotage (Valdés-Pizzini 1985). By the same token they have been "accused" of being from Dominican Republic, and newcomers (aliens may be appropriate) to the fishery, thus feeling free to act irresponsible in the conservation of fishery resources. Indeed, since 1984 we have observed various divers that are from Dominican Republic, but the ominous presence of "divers" from that country has not been documented, not measured. However, field experience suggests that it does not seem to account for a large number of divers. In the cited surveys and research projects, nationality was not probed.

Divers are not, as a whole, newcomers into the Island fisheries. Available data shows that divers have an average of 18 years of fishing experience (n=26), with a range from 6 to 40 years. The vast majority of divers (80%) have "close relatives" sharing fishing as a livelihood. This suggest that divers have been raised and educated in the midts of the fishing tradition of the coastal communities, rather than being aliens to that economic activity. Indeed, for most of them, their fathers were also fishermen. Operations and dexterity with other gear suggests experience and tradition in the use of the existing range of traditional fishing methods.

They average 4 years of migration experience in the United States (n=9). This suggest a short separation from the fishing environs. In some cases, the experience was relegated to agriculture migrant work, which is of a seasonal nature. That pattern is more accute for divers in the east coast. In Puerto Real divers worked originally hauling traps in their fathers' boats, and in the reel-line boats used in the snapper/grouper fishery. After their beginning in those operations, divers decided to change gears due to lack of opportunities, low catches, and poor working conditions. I suspect that the pattern repeats itself throughout the island.

Divers Perceptions In assessing a fishery and its economic agents it is an obliged step to evaluate the perceptions and expectations of those affected by policies, better yet, include them in the decision making process through public participation (Munro and Smith 1983, Stoffle 1986). Unfortunately, that information is not available for the divers. However, during the survey conducted in 1983, both teams asked the fishermen to comment on the most important problems that affected fishing in their area. This information may serve as indicator of some of the divers perceptions of those difficulties encountered in fishing.

Most fishermen (divers) agreed that the main problem pertains to the lack of access (facilities) that facilitate fishing operations. For most fishermen and divers, lack of piers, ramps, and storage areas are of significant importance. Although the need for facilities is critical in numerous areas, this issue is often blown out of proportions by the interviewees. This is due to the presence of the interviewer, always perceived as a liaison and herald to government agencies (and indeed we are). Therefore, the event is viewed as an opportunity to request the improvement of facilities. However, in most cases there are valid needs for infrastructure. Lack of government help and loans was mentioned a total of 6% times. This answer was mostly related to the difficulty in obtaining loans and monetary help to buy outboard motors.

Bad weather conditions precluding divers to fish was also considered a major problem. Similar to the rest of their peers, pollution (7.6% times mentioned) was a critical issue for divers.

As most fishermen everywhere, enforcement was becoming a nuisance for them (9.7%). It is noted here that the case of the La Parguera Marine Sanctuary was in its algid state during the interviewing period, and therefore most people referring to enforcement, did so by

means of arguing against the sanctuary.

Competition was an important problem mentioned by the divers with a total of 13% combined. Divers were then feeling the pressure of the unrestricted use of gear (such as seines and gillnets), recreational users (divers, boat propellers and recreational anglers). It is suspected that recreational divers are extreme competitors with the commercial counterparts. In a pilot survey of the southwest coast of Puerto Rico we found that 13.1% of all recreational anglers interviewed mentioned diving as their main activity.

Competition from divers from other geographical areas was also mentioned as problematic. According to my experience Puerto Rican fishermen do not show the accute types of territoriality on fishing grounds that other fishermen around the world display (cf. Valdés-Pizzini 1987, see annex). The important issue is access to the beach, facilities, and entry, but seldom, in terms of great siginificance, territoriality. Trap fishermen often complain about the location of other fishermen traps, almost fishing "on top" of theirs. But access to the area is repected as a right every fisherman has. (However, we have documented territorial disputes among beach seine operators and trollers in the west coast). With the divers, we are looking at the territorial possession of

fishing grounds, guarding them against divers from other communities. In other surveys and research projects the issue of competition among peers (operators of similar gear) was never expressed as a problem. Maybe figuratively under the rubric of "lack of fish". This issue of territoriality should be studied carefully in the future, as competition and catch per unit effort increases.

Another dimension of competition and conflict between divers and other fishermen relate to composition of the fishermen associations. Trap fishermen have always despised the presence of divers as unfair competitors, and most trappers we have interviewed, formally and informally, have petitioned the prohibition of diving as part of commercial fishing. Such dichotomy has even affected the "gear" composition of fishermen associations. In various cases we studied the associations avoided either divers or trap fishermen, and only represented one of the groups (Gutierrez, McCay and Valdés-Pizzini 1986)

Socio-Economic Characteristics of the Commercial Fishermen in the USVI

As mentioned in previous FMPs, there is practically no data sources on the socio-economic parameters of the comercial fishermen population of the U.S. Virgin Islands. Observations indicate that the fishermen population is

ethnically composed by blacks, Puerto Ricans (St. Croix) and locals of french origin, known as "the frenchies". The existence of this particular group is not exclusive of the USVI, also existing in other Caribbean island. Most of the fishermen appear to use traps, hand-line, cast nets and gillnets as the main fishing gear. There is no information available on diving as a commercial / fishing operation.

A recent study of economic activities associated with the utilization of the Virgin Islands Biosphere Reserve Area (Koester 1986) describes the fishing activities, cultural patterns and perceptions of the fishermen of St. John. Fishing in that island is done for subsistence and for market distribution. According to Koester "the most common techniques include the use of fish pots or traps to capture reef species including lobster, and various hook and line methods to catch both pelagic and demersal fish" (Koester 1986:3). Diving operations "for conch and lobster is a less commonly practice method" (Ibid). Interviewed divers mentioned that they will fish underwater 5 to 6 times per month. In addition, two continentals are commercial divers seeking lobster and conch for the market.

Similar to their counterparts in the Islands, the fishermen of St. John also devote time to other economic

activities such sport fishing charter operations, government (public service), and tourism related chores. However, fishing is always mentioned as their foremost occupation.

Tourism is a major industry in the USVI providing "directly and indirectly more than one half of the gross territorial product and 75% of the private sector jobs" (Peter 1987). Central to the development of that industry are marine recreational activities. Marine and coastal resources are the main natural attractor for the tourist population. Tourism has also changed many of the socio-economic parameters of the traditional users of the fishery resources. That seems to be a widespread trend throughout the Caribbean region (Goodwin 1985, Valdés-Pizzini 1982, 1985, 1986). In St. John, for example, tourism affected the economic and social value of land, local utilization of fields for cattle grazing (where the Park is now located), wage jobs replacing multiple occupational strategies, and featured new pressures on the existing resources (Koester 1986:9).

Fishermen in St. John expressed that in recent times conch and lobster were "available at several locations around the island by free diving" (Ibid). For these fishermen tourism has increased the demand for conch and lobster, as their economic value has also risen. Goodwin

explains that in the Lesser Antillean fisheries, "local demand for 'luxury' fishery products is also high; hotel and restaurant managers frequently complain of shortages of spiny lobster and conch" (Goodwin 1985:7). St. John fishermen accuse tourists of use and abuse of marine resources and predation.

These are cultural perceptions of the fishermen, as they see the use of "their" environment by the tourist population that visit the island, and by those scuba-divers who also fish. But, as it was discussed for the case of Puerto Rico, these divers (recreational) are also involved in underwater "extractive" operations, thus becoming an essential part of the resource utilization patterns, and critical in the establishment of a FMP. The Olsen report on recreational fishing and boating activities in USVI confirms this assertion. Olsen found that 10% of those interviewed listed "extractive use of the marine resources as their preferred activity" (Olsen 1979:13). Spearfishing was the second most common activity with a 7.6 %, however, in terms of ranking, lobster and conch diving were the most preferred activities (Ibid). Conch was among the most frequently caught species. Recreational extraction of both lobster and conch was regarded as high in the report. For 1967-68, landings of conch were estimated at 20,000 lbs. by

Dammann. Olsen concludes that "if current landings are similar, then recreational landings may nearly double the total" (Ibid:17).

These findings corroborate the perceptions and testimony of the St. John fishermen in terms of the competition for shellfish resources in the USVI. In the case of St. John such competition and pressure is more accute due to the existing regulations for the utilization of fishery and land resources in the area of the Biosphere. Regulations limit the possesion of conch, lobsters and whelks, among other species, thus the fishermen find these limitations as un-sympathetic, to say the least. Presently, there is a case in court where the regulation (conchs must be taken by hand, no person shall take more than two conchs or one gallon per day, or have in possession more than two day limit) is being tested (Koester 1986:16). For the fishermen there is a conflict of what they perceive as "over-regulation" of an area which they use with traditional methods of subsistence for years. Bluntly, the fishers "resent what they view as the National Park Service's emphasis on regulation and enforcement" (Ibid). Comparisons, with their Puerto Rican peers, in relation to similar processes (to be specific: The Marine Sanctuary of La Parguera) are almost forced upon the analysis.

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