NOAA Technical Memorandum NMFS-SEFSC-556

NOAA Series on U.S. Caribbean Fishing Communities

Entangled Communities: Socioeconomic Profiles of Fishers, their Communities and their Responses to Marine Protective Measures in Puerto Rico (Volume 3: Regional Profiles, Appendices and References)

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Southern Rural Region I:

Guayama

We place Guayama into its own region because it is unique among its neighbors for being home to some of the most successful and knowledgeable fishers in Puerto Rico and to one of the most fishery dependent place-based communities, that of Pozuelo. Pozuelo is also unique for its status as a place where fishers specialize in trap fishing to a degree that is uncommon in the islands' fisheries, given the recent change from trap fishing to SCUBA diving seen in the Puerto Rican fisher census materials.

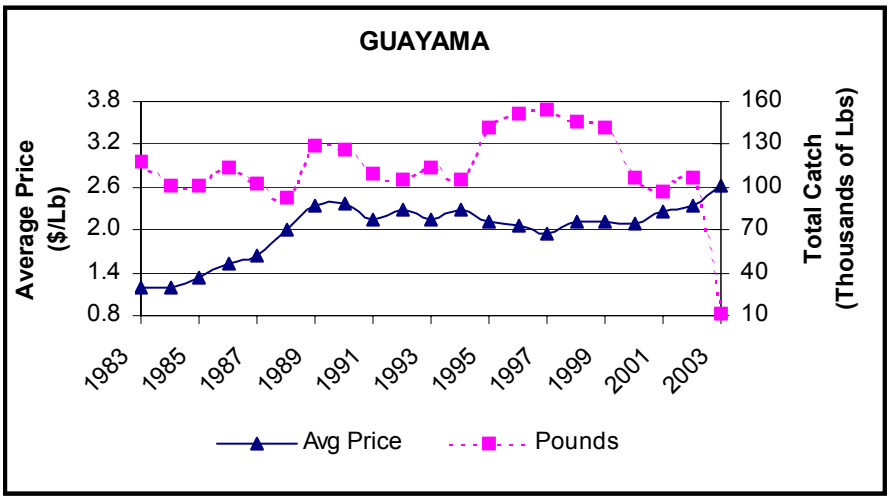
Table SR.1. Guayama Census Data

GUAYAMA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	32,807	33,678	36,249	40,183	41,588	44,301
Civilian Labor Force (CLF) [2]	8,599	7,952	8,161	9,843	12,679	12,266
CLF - Employed	8,154	7,412	7,737	7,250	8,688	8,897
CLF - Unemployed	445	540	424	2,593	3,991	3,369
Percent of unemployed persons	5.18	6.79	5.20	26.34	31.48	27.47
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		2,212	867	339	246	90
Construction		424	1,103	526	672	800
Manufacturing		1,464	1,991	1,521	1,752	1,553
Retail trade		864	1,138	919	1,354	1,060
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	23.9	19.8	23.6
Persons who work in area of residence [6]		6,136	5,831	5,254	7,263	6,565
Per capita Income (dollars) [7]			838	1,685	3,207	7,326
Median Household Income (dollars) [8]		950	2,459	4,451	7,122	12,112
Individuals below poverty level [9]			25,162	29,038	27,913	22,569
Percent of Individuals below poverty level			69.41	72.26	67.12	50.94

Census data from Guayama show that its economic situation improved slightly from 1990 to 2000, although fully half of its people remain below the poverty line and over a quarter of those seeking employment are unemployed. This is in line with many other parts of Puerto Rico, of course, although perhaps it should not be. Guayama has experienced a great deal of development over the past few decades as a center for energy, pharmaceuticals, and medical supply production, shifting its economic profile from one based primarily on agriculture and commercial trade to manufacturing.

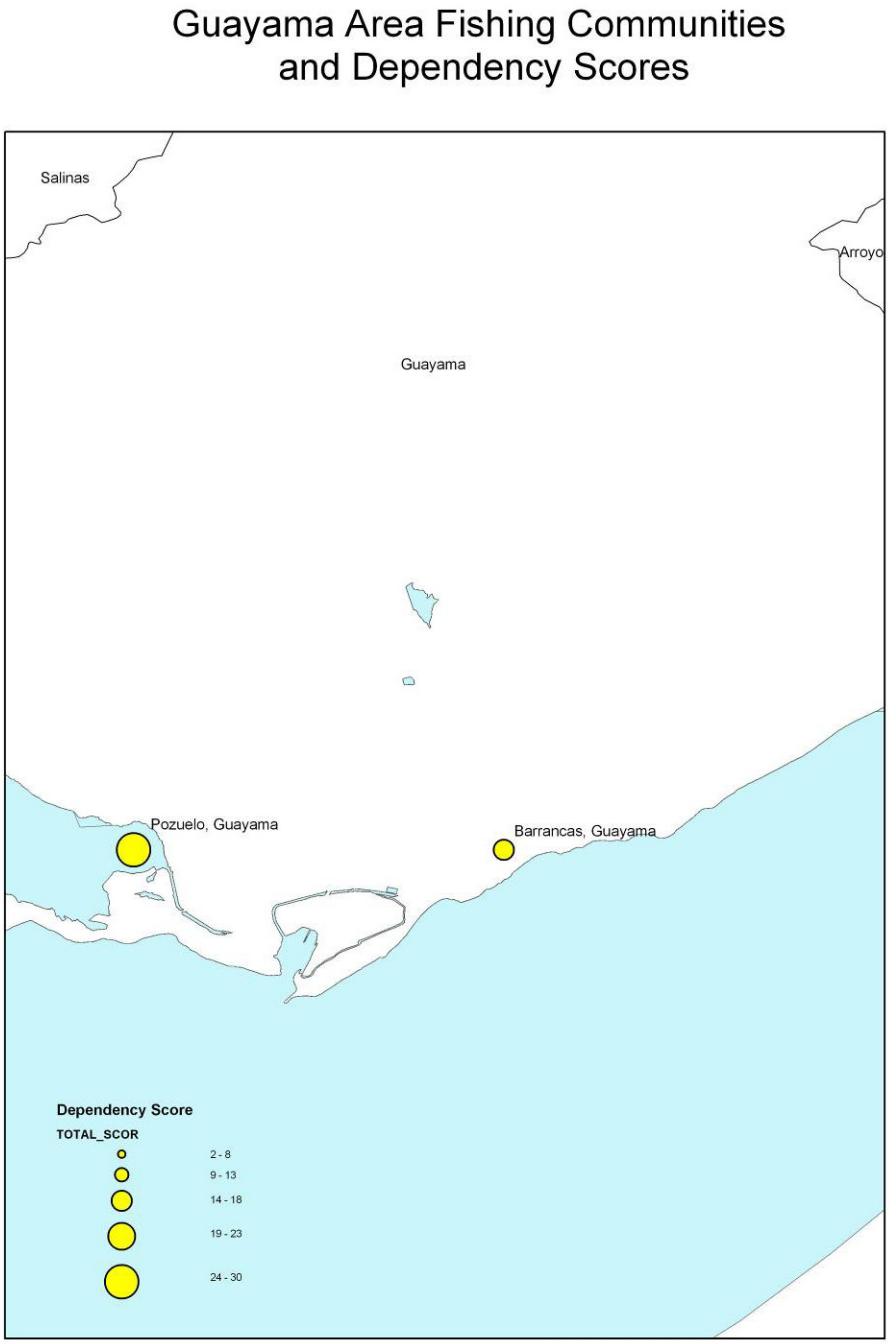
Landings in Guayama, although dropping to below 12,000 pounds from nearly ten times that during the last two years for which we have data, have placed Guayama 11th in the landings data, just below Ponce and above San Juan. Of its three landing centers, Jobos has consistently supplied the least amount of data (and, we assume, fish), Pozuelo the most, and Barrancas in between; non fishers from Jobos participated in the census and fishing there has dropped to casual employment levels.

Figure SR.1. Guayama Landings Data, 1983-2003



During the years from 1999-2002, landings in Guayama are on par with those of Rincón or Juana Díaz. Even with the drop in landings, 5-year revenues topped one million, generating $200,000 annually for the estimated 50 to 60 serious commercial fishers fishing from the municipality. Prices rose steadily through the last half of the 1990s and into the 21st century, though not in tandem with supply (correlation coefficient = -.1435).

Map SR.1. Southern Rural Region



Guayama History

Guayama is among the longest settled municipalities in Puerto Rico. Archaeological evidence suggests that native Caribbean peoples inhabited the region for several centuries prior to the colonial period and was named after a cacique called Guamaní (Torres Sugrañes 1995: 163). The Spanish continued the tradition of lengthy settlement, by founding the earliest city on the southeast coast here in 1736. Over the

next forty years the pueblo grew to over 4,500 inhabitants whose more than 200 houses surrounded a large, cleared plaza that eventually became a recreational center for the community.

Like most of Puerto Rico's municipalities, Guayama experienced various connections and disconnections with surrounding municipalities. Originally including neighboring Arroyo and Patillas, it lost the latter in 1811 and the former in 1855 as they became incorporated as their own municipalities. For a time during the early 19th century, as its territory was being cut, Guayama was under the administrative authority of Humacao. By this time its population had grown to over 10,000, about 20% of whom were slaves.

The slave population, in concert with the resident free citizens of Guayama, developed what was to become one of Guayama's principal claims to fame: following a devastating fire in 1822, the main city of the pueblo was rebuilt so well that it came to be known as one of the most beautiful colonial cities in the Caribbean. At the same time, of course, the slaves and free citizen developed agriculture and a brisk commercial trade. Shipping from Guayama was busy as early as 1830, when its port received 202 ships from more than a dozen countries, exporting livestock, coffee, tobacco, grain, root crops, vegetables, and of course sugar and rum. Here again sugar marginalized many of the other crops along the coast, remaining a principal force in the economy until the 1960s.

Since then, the petrochemical, pharmaceutical, and medical supply industries have established 16 manufacturing plants in Guayama, rearranging much of the coast and assisting, as sugar did earlier, in marginalizing fishing as a way of life. This has been particularly true of energy production in Guayama. Fishers from Barrancas had to relocate their lauching and landing facilities when the large petrochemical plant was built.

Fishing in Guayama

We noted earlier that several fishers in Pozuelo, Guayama specialize in trap fishing. This is not well reflected in the fishery census data for the total muncipality, which shows that only about half those participating in the census use fish pots. However, the lack of SCUBA divers in the region might reflect the trap fishing specialty. During our ethnographic work we heard a story of a young fisher who preferred diving to trap fishing but that his father and uncles—fishers all—pressured him to give up diving because of the historical rifts between divers and fishers across Puerto Rico. Census figures also suggest that most fishing is done on the continental shelf, which would be in line with trap fishing, and that the targeting of pelagics is low in this area as well.

Table SR.2. Fishing Locations and Styles, Guayama (n= 31)

Variable	Percent
Shore	9.7
Continental Shelf	96.8
Shelf Edge	3.2
Oceanic	12.9
Reef Fishes	100
SCUBA Diving	0
Skin Diving	22.6
Pelagic	16.1
Bait	41.9
Deep Water Snappers	12.9

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

Pozuelo, Guayama was among the principal sites where Griffith and Valdés Pizzini conducted field work for their book (2002: Chapter 5). In that text, they report on a dispute within the community that led to the founding of an independent fisher association (which may sound like an oxymoron). This dispute emerged over the issue of access to association facilities, slip space, and control over the market. As with most disputes within fishing populations, the control over the market was particularly troubling, Despite that this alternative association still exists, along with the other, only a little more than one-third of the fishers reported that they belonged to the association, and only around one in five report selling to an association. When examining only the Pozuelo respondents, the figure rise to just over half—still low in comparison with other communities.

Table SR.3. Selected Guayama Fisher Characteristics (n=31)

Variable	Response
Association Member	35.5
Hours used for Fishing	
< 20 hours	29
20 – 30 hours	45.2
31 – 39 hours	6.5
40 hours	19.4
> 40 hours	0
Mean hours	24.55
Standard Deviation	11.144
Minimum hours	0
Maximum hours	40

Source: Puerto Rican Census of Fishers, 2002

Table SR.4. Gear Used by Guayama Fishers (n=31)

Variable	Percent
Beach Seine	6.5
Trammel Net	0
Long Line	9.7
Troll Line	41.9
Fish Trap	48.4
Gill Net	77.4
Cast Net	74.2
Hand Line	90.3
Rod and Reel	41.9
Lobster trap	12.9
Snapper Reel	0
Winch	6.5
Skin	0
Spear	19.4
Lace	0
SCUBA	0
Gaff	93.5
Basket	0

Part of this may be due to the problems with associations in general in Pozuelo, reflected in the dispute mentioned in Griffith and Valdés Pizzini's (2002). Yet it may be attributed, too, to the many, many alternative markets in Pozuelo—the many seafood restaurants and private fish merchants that line the roads of the town. In addition, the community is well-known enough that people routinely visit the community when they want to buy seafood.

Table SR.5. Guayama Fishers' Marketing Behaviors

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	22.6
Private	0
Association	0
Street vending	64.5
Restaurant	12.9
None	6.5
Sell fish gutted	67.7
Keep fish on ice	80.6

Source: Puerto Rican Census of Fishers, 2002.

It is not surprising that, of the two-thirds of Guayama fishers who believe that fishery resources are worse today than before, most cite pollution as the cause. Certainly thermal pollution from the energy plant pictured above has threatened water quality. This threat has been all the more directly felt by the fishers of Barrancas.

Table SR.6. Opinions of Guayama Fishers about Fishery Resources

Opinion	Percent reporting
Status of Fishery Resources	
Better	0
The same	32.3
Worse	64.5
Reasons for problems in fisheries	
Pollution	48.4
Habitat Destruction	19.4
Overfishing	6.5
Laws, regulations, and licensing	3.2
Crowding	6.4
Seasonal factors	0

Source: Puerto Rican Census of Fishers, 2002

Barrancas

This community, a parcela of around 180 households, contains several fishers who fish part-time with their own boats and equipment and a handful of *proeles* (crew). As noted earlier, the community—and especially its fishers—has been marginalized to some degree by the large-scale industrial development that has taken place nearby. Even the road to Barrancas is currently in a state of disrepair, at one point a single lane dirt road over a river/creek where bulldozers are moving earth either to build up the bridge or as a temporary measure.

There is no formal association, and one fisher interviewed reported that most fish independently, and no one who responded to the census here reported belonging to any association in another community. The fishers need to trailer their vessels to a distant location to launch them, which seems to have cut into the lifestyle. The launching location is beyond the large petro-chemical (Chevron)/pharmaceutical (Wyeth) complex, over 5 km away, down a run-down, rutted, muddy road that would be difficult to traverse after a heavy rain.

Yet there is no doubt that Barrancas is a fishing community, being coastal barrio consisting of six streets lined with houses, located on the water to the east of the Phillips petroleum refinery, which dominates the landscape. Fishers here fish with traps primarily and secondarily with gill nets, targeting species close to

shore along the continental shelf. When one drives around Barrancas one can see commercial yolas and lanchas in trailers, and the community is dotted with small fishermen workshops: a shed, sometimes just a palm frond roof, a few tools, a workbench, and fishing traps, in various states of construction or restoration. There are two local restaurants, two pescaderias (Brisas and Los Veteranos), and a small beach from which some small yolas take to the water; the beach has high surf, however, and larger vessels cannot leave from there.

From the layout of Barrancas' streets its obvious that this was planned residential community , but the houses more resemble 'barrio' houses rather than 'urbanization' houses. This is because Barrancas, in fact, is a barrio that was made to fit into a couple of streets of shoreside property. The original coastal community was then called 'Las Mareas', and it was divided into two sectors: Matuyas and Barrancas. Matuyas residents were forced to relocate because developers decided that the area where Matuyas people lived was the ideal place to build a big monster of a Petroleum Refinery, the Phillips/Sun Oil complex. Matuyas was a fishing/sugarcane laboring community located in the mangrove tidal flats, and it had arisen there, in part, because the mangrove-protected inlet was a good place to launch and tie fishing boats. Barrancas was the beach, high surf area.

After the Phillips development, assisted by the local government, expropriated the low-lying tidal flat areas in Matuyas, the whole community had to move to prefab houses where Barrancas is presently located. People in Barrancas are still bitter by this move, which happened 20 years ago, especially fishers, because not only they got uprooted and moved away, but also they got moved from a mangrove-protected inlet to the high-surf zone, where the larger yolas cannot be launched without considerable danger to property and body alike. Because of this move, a community of fishers that used to be able to go from the landing area to their homes fairly easily, and could almost always leave their boats in the water, now have to trailer their boats one mile over rough terrain to the mangroves, where they can launch their boats. Every night they have to bring their boats back home, for fear of burglary and vandalism. Their workdays are much longer, expensive, and difficult now. A fisher from Barrancas had this to say about the move:

> "I was born where the Phillips' big ships dock now. Where the big ships come to deliver and take oil. There was a 'barrio' there. Its name was 'Matuyas' and 'Las Mareas'. That is where we lived. When the Phillips came, they expropriated us and sent us over here. They swore that they were going to build a breakwater for us, that they were going to condition the beach area for us, but it was all empty promises. Before, we had our boats near to where now the tugboats are kept. They got us out of there and now we have to go to this far away place. So, that's where they harmed us fishermen, where they did us an evil, you understand? The Phillips promised a breakwater, and they never did it. Poor people, the poor are always the ones who suffer in these things! Then, we were far away, but at least we had a dry land passage without saltwater and we could take our trailers there. But then the Coal plant (the Coal Electric Plant) came and bam! they closed that road too. They sued to say, yes, we will keep the roads open, we will maintain them so you can get to the water, they said yes to everything until they got the permits. Then they just went back on their word. Then, one day, I'm going with my trailer, my boat, all loaded with 'nasas', and when I make my turn into the road, there it is, a fence and a closed gate. I had to turn around. This is all private now, and any day they will also close the area where we launch our boats now, and then we wont be able to fish anymore. The road we have to take now has salty water and that damages our vehicles. But any day they'll close that road too. And we just can't launch from Barrancas, because it is dangerous and our boats are big. They also promised, the Phillips would employ the people of Barrancas. But that also was not true. The Phillips employees come from all over the place. "

In short, even though when the Matuyas fishers were relocated they got new prefab houses, and land, they were left at a disadvantage. Whereas before they lived where they fished, now they have to spend an extra hour each way everyday just trailing and launching their boats when they leave, and getting their boats

back to the trailer and trailing it back home when they come back. This means investment in trailers, gasoline, increased wear and tear in vehicles and equipment, and a general feeling of displacement. Also, according to two fishermen, by the destruction of mangrove flats as well as with the relocation, the people of Matuyas lost access to land crabs, which where an important source of protein as well as an occasional source of supplementary income.

Where Barrancas is located now is vulnerable to flashfloods from the creek that separates the community form the main road, and during our fieldwork storms washed away the bridge twice. Barrancas and the neighboring community of Pozuelo are the center for *nasa* (fish trap) activity in the southeast. Of the 13 fishers in Puerto Rico that are registered as having more than 100 traps, 6 come from Guayama and 3 from Barrancas. Many others have between 40 and 100 traps. The boats trailed at Barranca homes are sturdy fiberglass and wood yolas, as well as some imported lanchas, all obviously designed and built for hauling fish traps, and most equipped with electric winches for bringing the traps aboard. Barrancas and Pozuelo are similar in their approach to fishing, and they also have close social ties. Many fishers from Barrrancas visit Pozuelo frequently and vice versa. Fishers from both communities repeatedly said that "*Pozuelo and Barrancas are friends*"

One fisher, Luis (pseudonym), the son of sugarcane laborers/fishers and a sugarcane laborer/fisher himself for many years, described his family's long relationship with trap fishing as follows:

> "I started fishing since when I was a little kid. Because, my old man raised us by fishing, he raised 16 children from the sea. There are 12 alive, still. We kept ourselves alive through fishing. Since I was 10, 12 years old I would go out to sea with him, to fish, but that fishing was completely different fishing. Now one needs a lot of traps. Back in those days, I would go out and fish 10-12 traps and I would catch 60,70 pounds of fish, fishing very near, one mile offshore. And it was enough to live. My old man also worked in the sugarcane, but he was a fisherman"

According to Luis and other Barrancas fishers, there are 15-20 boat owners who fish in Barrancas, and about the same number of 'proeles' or 'ayudantes.' The families of these fishermen also work selling fish or helping out with cleaning and marketing. The two pescaderias buy fish from fishers in Barrancas, but, as noted earlier, there is no association. Most fishermen also market their catch themselves, to restaurants and to private buyers. A conservative estimate would be that 100 people in Barrancas (about a fourth of the population) depend at least partially on fishing as a source of income.

Some Barrancas' fishermen land quite a lot of fish. According to Luis, "In Barrancas fishers are independent people, we are similar to Pozuelo in that, too." Two of the fishermen I talked to in Barrancas said that the indiscriminate licensing of fishermen by the Department of Agriculture really hurts trap fishermen like the ones in Barrancas the most, because whenever there is compensation for lost equipment due to a hurricane or storm, all the non-fishers who have licenses come out of the woodwork and make bogus claims of lost equipment, diluting the funds available for those who actually lost equipment during the storm. According to a Barrancas trap fisherman, "In *that* we need more regulation, but all they do is give us tickets for not having the lifejackets and flares?"

Pozuelo

The same cannot be said of Pozuelo. Distinct from Barrancas, Pozuelo is Guayama's best known fishing community as well as Guayama's best know maritime-oriented community. At least 10 full-time restaurants, all dedicated to seafood and representing all types, operate in the area, among at least the same amount on more temporary seafood-vending facilities. There are also two fishing associations (Asociacion de Pescadores de Barrio Pozuelo and Asociaciond de Pescadores Independiented de Barrio Pozuelo), which have, according the local informants, at least 50 fishermen between the two.

Pozuelo is also a focus of recreational fishing and boating (of the luxury boat sort), since the Club Nautico de Guayama is located on territory stolen from the mangroves in Pozuelo. Pozuelo also has Guayama's premier surfing beach and only good place to take a swim (even though the waters on Pozuelo's seaward coast it is notorious for drowning unsuspecting visitors). The maritime police and the FURA (Fuerzas Unidas de Rapida Accion, Puerto Rican police's elite anti drug-smuggling unit, equipped with high-speed motor boats and helicopters) are also located in Pozuelo, near the Club Nautico.

It is obvious that life in Pozuelo revolves around ocean-related activities. Its status as a fishing community is apparent form the number of nets, fish traps in various stages of construction, *yolas* in backyards and in the water (from 20-25 on any given visit to the area). Yet it is also a fishing community that is heavily involved with recreational water activities and where vacation homes are a considerable part of the landscape.

Pozuelo is actually located on a peninsula that stretches into the sea from the Bay of Jobos (the maritime sector is known as Boca Sabater, the mangrove sector is known as Las Mareas). Boating and fish landing facilities, along with several private docks, line the calm bay side of the peninsula. On the seaward side are the '*balneario*' (public beach) and the surfing beaches. Although mired by problems related to pollution, mangrove destruction, and dramatic socioeconomic differences between full-time, traditional residents, and those who own marina boats/vacation homes, Pozuelo is a truly beautiful spot on the southeastern coast of Puerto Rico.

Figure SR.2. Boats Tied to Mangroves, Pozuelo, Guayama

The most obvious link between fishing and other economic activities in Pozuelo is the restaurant business, with seafood restaurants ranging from small to large (>200 seats) and from humble to very luxurious and pricey. A partial list of the restaurants located in Pozuelo (gathered during various visits) is:

- Costa Brava
- El Arcoiris
- El Nuevo Trapiche
- La Casa de los Pastelillos
- EL Sabor de Mi Tierra
- El Surfing
- El Oasis
- El Puerto
- El Mofongo
- Esquina Familiar
- El Playero

One of the fishing associations, too, sells cooked seafood. However, according to informants, many of the most luxurious restaurants on this list don't belong to Pozuelo natives, but the smaller ones do belong to locals.

The Asociacion de Pescadores Independientes de Pozuelo formed after disagreement with the larger Association over the use of resources and boats belonging to the association, just discussed. Along with its two associations and numerous seafood restaurants and markets, several other physical remnants of a vibrant fishing history dot the streets. At least three to four large fishing boats, of the type used for multi-day deepwater trap fishing trips, have been abandoned in the community; they look to have been abandoned for quite a while. According to local informants, those boats are a good example of a communal or association activity gone wrong: in this case, people wanted to use them, but nobody wanted to maintain or repair them. As such, they exist as the remains of another failed attempt at modernizing Puerto Rico's fisheries (Pérez 2005). The focus of the association that broke away from the Department of Agriculture-sanctioned one lies in the word 'Independientes' (independent): specifically, they are loosely associated and they don't own communal boats or gear. Some fishermen, especially the 'naseros' (trap fishers), prefer it that way. There are two yola docking facilities in Pozuelo, one used by the Independientes, the other used by the Villa Pesquera. Other fishers tie their yolas to mangroves in the channels or trailer them. However, the Independientes dock doesn't appear to have strict ownership, and most Pozuelo fishers can use the dock and the fish-cleaning table there during the day, but docking overnight is more restricted.

Figure SR.3. Independent Pozuelo Association Dock

In repeated visits to the home Fernando Esperanza (*pseudonym*), of one of the most respected fishers in Pozuelo who owns his own fish market, we had the opportunity to see his whole family (wife, kids, son-in-law, nephew, who is also his proel) involved in the fish cleaning/preparing/vending and 'nasa' building/repairing. A productive family, not only Fernando but his family work nearly round the clock. Fernando and his nephew, together, using an assembly line like process, can construct 7 to 10 fish traps at a time.

It should come as no surprise, then, that the first thing Fernando ever told us about fishing was that it requires dedication. "There are fish in the sea," he said, "but this is hard work and requires a lot of dedication." Fernando, at 56, has been fishing all his life. He claims to have learned to fish 'por herencia' (by heritage) and when asked: 'From your parents?" he replied "Yes, but also by the heritage of being from Pozuelo." He later said that older fishermen besides his father were also very important in his education as a fisher, adding that, "Fishing is a job and a therapy. One has a good time and one makes money. And you meet a lot of people because a lot of people want to meet you, if you are a good fisherman. So you get to meet many interesting characters."

Fernando said that his parents, as well as most fishers in Pozuleo, were sugarcane workers and that they were mostly *invernazo* fishers, fishing during dead time in the cane. "Everybody around here that fished did it that way," he said. He was one of the few ones that transitioned to a full-time fisher and since 1975 (after working abroad for a while, including a term in the military), he became a full-time fisherman and has been doing that since.

When asked about fishing regulations, Fernando said that lobster fishermen—those with '*respeto*' (respect), the 'true ones'—have been engaging in lobster conservation measures since long before the DRNA and NOAA implemented any measures. These local conservation measures were explicitly geared towards allowing the lobster to reproduce, and that the rules they followed had mainly to do with the treatment of gravid lobsters (lobsters with eggs). According to Fernando, the practice he learned was always that the gravid lobster remains in the trap, so that it can release the eggs with out being eaten (it is not released from the boat because they believe that surely a predatory fish will eat it on the way down the water column). Only after releasing the eggs they would get it out of the trap and eat it.

Until recently, much lobster was consumed locally because it wasn't a high priced species until after refrigeration became common. In Fernando's words "A pregnant lobster has millions of eggs. If you leave it in the trap, in the water, one-fourth of them will become small lobsters. If you take it out, nothing survives." He also said that another advantage of doing this is this way that if you left the gravid female in the trap, that would in turn attract more lobsters for the next time. Also, lobsters left in a trap will spend time 'cleaning' the trap with their small claws while eating algae and small barnacles, so they provide the extra service of trap maintenance.

Such practices, Fernando believes, should be sifted into the regulations. He says that he knows many DRNA people, and that while he believes they mean well, they sometimes do more wrong than harm. He added that most of the problem derives from the fact that the 'true fishermen, the commercial fishermen' are excluded from the management process:

> "Only the true fisherman, the commercial fisherman, protects the fishery resources. But they don't recognize that, they regulate *us*. But, tell me something: whenever there is a oil or gasoline spill, here, (from the Phillips), or when somebody fills up the mangroves: who are the first ones to cry out? *We* are! But, they regulate us!
>
> "Then, they say they want us to participate… they invite me to meetings, but they are always in San Juan, in a hotel, or In St. Croix, or St. Thomas. And these meetings are '*convenciones*,' (conventions) that last 3-4 days. I would go, but what about my job? Who is going to go lift my traps?"

Fernando also reports that he has, at one time or another, used all kinds of fishing gear, but that now traps occupy all his time—in part due to the problems with the resource. He used to own a beach seine, for example, but he says, "That was a long time ago. Now there are no fish that close to the beach, after the Phillips (petrochemical) got here."

Fernando reported to be a supporter of the fishery statistics program, adding that those fishermen that oppose it they miss out on benefits such as the tax exemptions, etc. He attributes this to the distrust that exists between fishermen and the government. He says, that he has tried to educate other fishermen about participating and filling out landing reports, but that many of them think that that will be used against them some day, so many, many fishers don't ever report catches or report them inaccurately on purpose. Because of this, based on his experience, he believes the landings data are suspect, however much he tries to educate his fellows that it is in their own best economic interests to complete them accurately.

Southern Rural Region II:

Guánica, Guayanilla, Yauco, Peñuelas

Regional History

Sugar dominated the economy of this region of the coast through much of its colonial history, though this is not unique to this region. Ponce de Leon landed here, in Guánica, in 1508, after hundreds of years of Taíno control. Close to San German, it was under its jurisdiction through the early years of European settlement. Guánica, which was later home to a large sugar mill prior to the decline of Puerto Rican sugar production, served as an important port for San German during early years of European settlement, when Caribs and Tainos routinely attacked from the north. Guánica didn't separate from San German until 1875, at which time it was affiliated with Yauco, not achieving municipality status until 1914. Guayanilla was the place where the cacique Agüeybaná lived when Ponce de Leon landed and, like Guánica, was a part of first San German and then Yauco, splitting from the former in 1833 and the latter in 1875, when it received authorization to allow foreign vessels into its port. Peñuelas, too, had a port, Tallaboa, which was important as early as the 18th century.

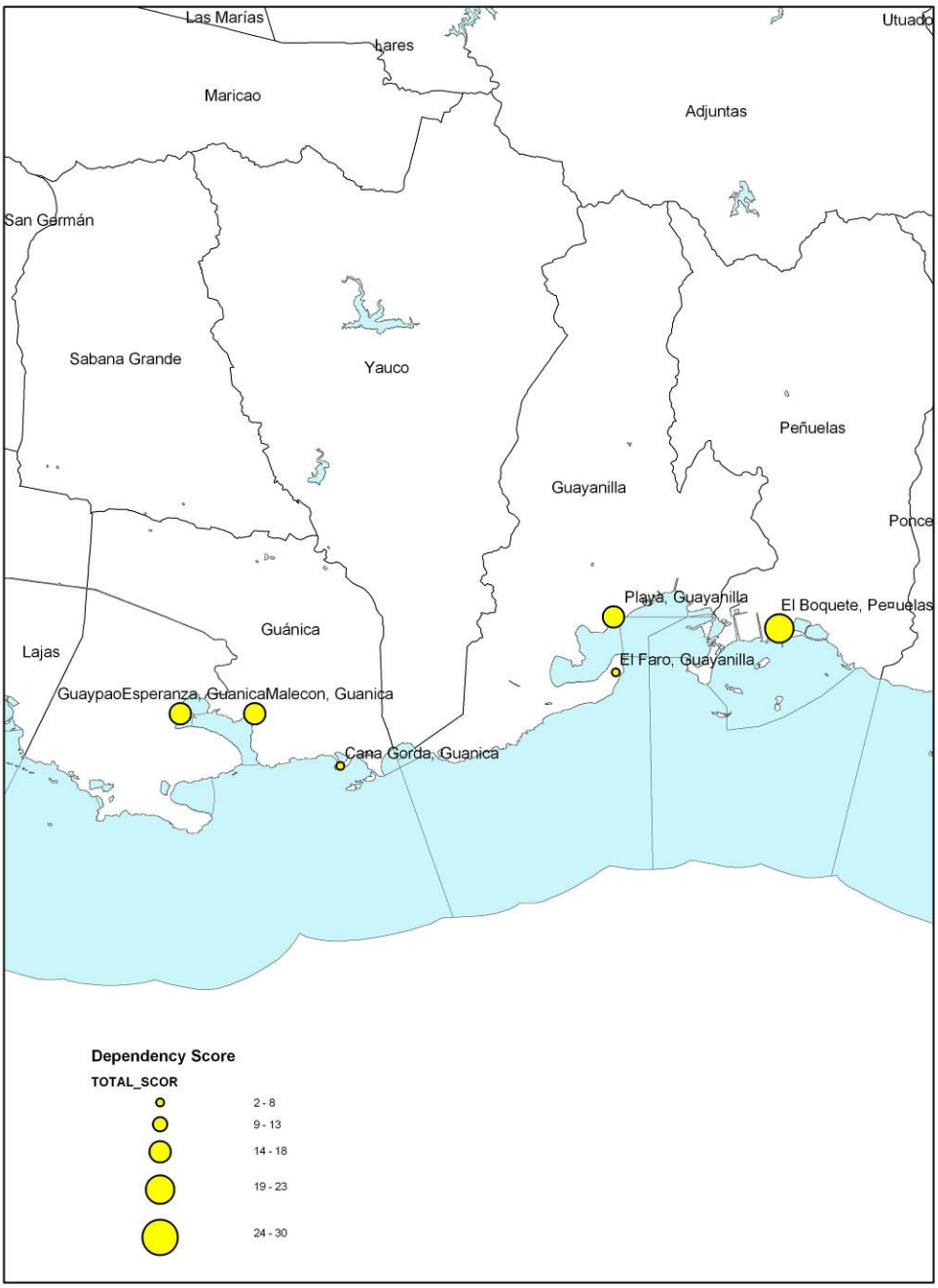
This region's ports made it an early target for attacks from pirates and privateers, as well as a region where contraband trade and smuggling flourished. Like Ponce and other southern ports, it was an early target during the Spanish-American war. The region has also suffered great economic setbacks from hurricanes and other coastal hazards, including some that have so debilitated one or another of the municipalities that it had to be annexed by another.

Clearly, however, the most powerful force shaping its economic and social profile during the 19th and much of the 20th century was sugar production. With several mills across the region and a wealth of port facilities, company towns sprung up across its coastal plain to house the sugar workers. Material remnants of the industry are scattered throughout the region today.

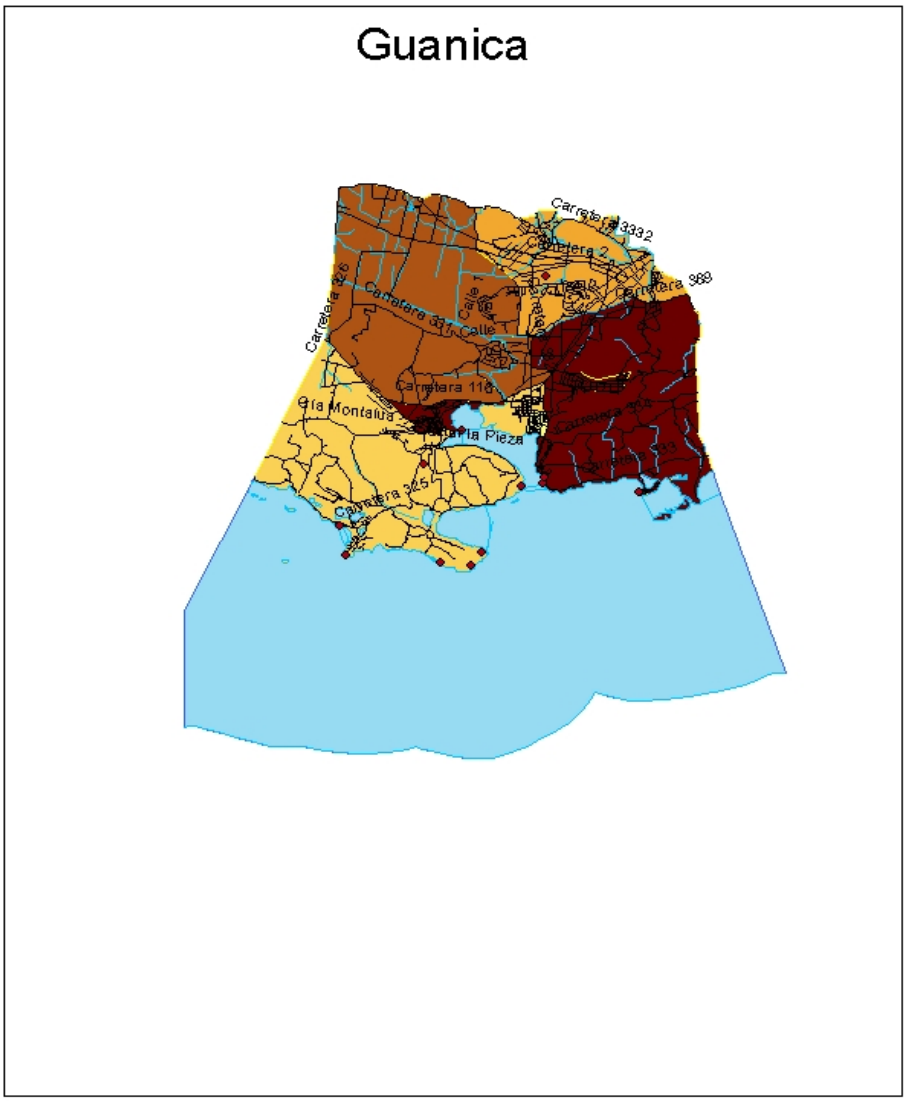
While several attempts have been made to increase tourism in the region after the demise of sugar, they have met with marginal success. Some of this has been due to the industrial development that has taken place along this region's coast, particularly the petrochemical plants in Guayanilla. Despite this, the fishing site and community profiles that follow show that the tourism in the region, now at least thirty years old, remains in an incipient state of development.

Map SRII.1. Southern Rural Region II

Guánica, Yauco, Guayanilla and Peñuelas Area Fishing Communities and Dependency Scores



Map SRII.2. Guánica's Large, Sheltered Bays



Legend

Census Tracts

Median Income

- 7868.00
- 7868.01 - 8566.00
- 8566.01 - 9425.00
- 9425.01 - 9702.00
- 9702.01 - 12699.00

Guánica

Situated on the south coast of Puerto Rico, Guánica includes fishing and recreational sites that create active waterfronts, especially on weekends. This is important, in that the local economic picture has not been positive in recent decades. Despite its history, sugar production accounts for virtually no employment in the municipality, and the decline in workers engaged in agriculture, forestry, fishing, and mining from 664 in 1960 to 117 in 2000 probably reflects an increasing ratio of fishers in Guánica to agricultural workers.

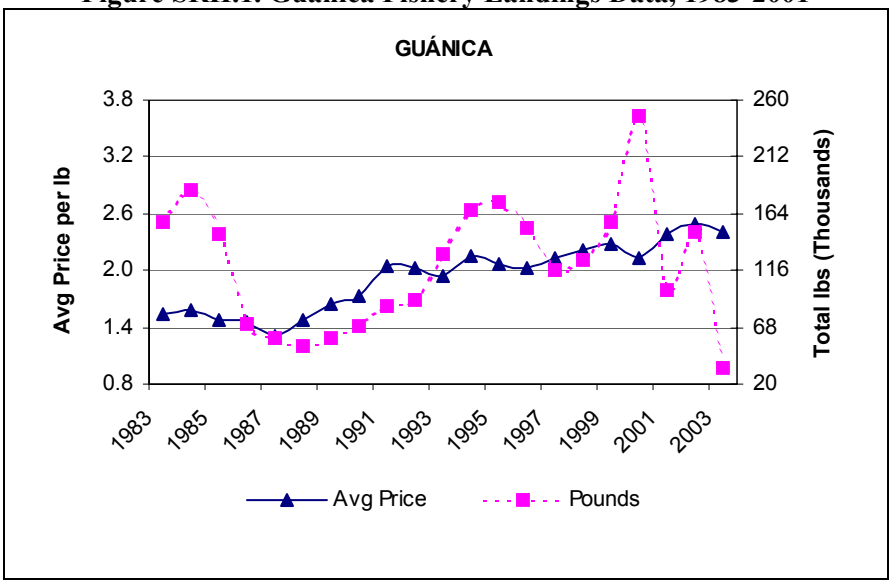
Table SRII.1. Guánica Demographic Data

GUÁNICA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	15,630	13,767	14,889	18,799	19,984	21,888
Civilian Labor Force (CLF) [2]	3,514	3,056	3,626	4,407	5,826	6,076
CLF - Employed	3,379	2,836	3,487	3,849	3,592	3,909
CLF - Unemployed	135	220	139	558	2,234	2,167
Percent of unemployed persons	3.84	7.20	3.83	12.66	38.35	35.66
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		664	390	247	189	117
Construction		252	871	429	375	619
Manufacturing		940	1,034	1,200	606	710
Retail trade		248	280	357	594	454
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	N/A	20.1	29.2
Persons who work in area of residence [6]		2,436	1,905	2,055	1,934	1,832
Per capita Income (dollars) [7]			745	1,293	2,575	5,204
Median Household Income (dollars) [8]		938	2,107	3,216	6,379	9,721
Individuals below poverty level [9]			10,789	14,049	15,087	13,897
Percent of Individuals below poverty level			72.46	74.73	75.50	63.49

With the exception of construction and slight gains in manufacturing, employment in Guánica has fallen. As a result, Guánica's 2000 unemployment rate, though down slightly from 1990, is the highest of all the coastal municipalities, as is its percentage of people below the poverty line. Per capita incomes are lower than most of the coastal municipalities we focus on in this report, on par with some of the inland municipalities that have not benefited as heavily as coastal municipalities from tourism and construction.

Fishing from 1999 to 2003 in Guánica ranked 5th of all the municipalities, slightly below Aguadilla in landings yet higher in revenue, indicating that the fishers here land more highly valued species. The census counted only 32 fishers here, fewer than what emerged from our ethnographic interviews, which placed the number of fishers at more than twice that, estimated at between 70 and 80. Many of those, however, are part-time fishers, and the full-time fishers may be closer to around 40 or 50.

Figure SRII.1. Guánica Fishery Landings Data, 1983-2001



Prices for fish have risen gradually in Guánica, despite some sharp fluctuations in landings (correlation coefficient = .2244). This seems to be common in municipalities where there the mix of fishers includes a number of casual and part-time fishers along with full-time fishers. Fishers in Guánica have access to several sheltered locations to store and launch vessels, and these have given rise to fishing associations as well as opportunities for commercial fishing and leisure capital interests to converge.

On the edge of the main town of Guánica is a Villa Pesquera, El Malecon, one of at least four significant sites where fishers gather. Others are in or near Playa Santa/ Ensenada, and Guaypao/ Esperanza, west of the main town, and Bahía Ballena, to the east. Two of these areas—Playa Santa and Ballena—combine commercial fishing with providing services to recreational visitors, while the others are primarily commercial fishing locations. The commercial fishing location in Bahía Ballena, which is off the beaten track, has a restaurant and a sightseeing/ pleasure vessel that takes tourists to outlying islands and to other nearby locations, including the phosphorescent bay in neighboring Lajas. In Playa Santa, a large condominium complex, built primarily for government employees to enjoy the beach, sits across from a fishing association where one of the fishers operates a tour boat for visitors to the beach. These connections are somewhat distinct from relations between commercial fishers and the tourist/ recreational sector in other parts of the island, where problems have arisen over slip space and coastal development or the relations are indirect (as in seafood dealers linking commercial fishers with tourist restaurants). Instead, they seem more symbiotic in nature, representing one model in which fishers may look to as they consider ways to enhance their incomes.

El Malecon, Villa Pesquera de Guánica

Sitting directly on Guánica Bay on the edge of the town's waterfront, this association fishers includes a pier, an area for boat repairs, and other facilities associated with a *Villa Pesquera.* At least 37 fishing vessels moor in the small bay near shore and attached to the muelle, and the facility has the standard pescaderia, small cleaning station, and 28 storage lockers. There isn't a Department of Agriculture sign on the facility, however, and one of the administrators said of the association, "We are incorporated as an association but we aren't functioning" [*"Tenemos una asociación incorporada pero n está funcionando."]*.

Figure SRII.2. Malecon, Guanica with Commercial Vessels (discharge pipes in background)

Reports of numbers of members ranged from 22 and 30, but only half that many fish full time, and they have experienced problems agreeing on the ways to use the facility, particularly in terms of what is one of an association's most important features: its market. The association is comprised of divers, net fishers, and trap fishers—primarily divers, everyone agreed, but during the time of year that *sierra* (kingfish, or king mackerel) run, many of the divers switch to hand lines to target them. Although all the vessels look to be in good condition, one of the divers' boats was wider and longer than the others (perhaps 25' instead of 18') and in slightly better, newer condition. Still, all the boats are in good condition and obviously working vessels. Three-fourths of the fishers who fish out of here use fiberglass vessels. A boat repair facility adjoins the main area of lockers and the pescadería, and they have running water (for cleaning fish) as well as light.

The pescaderia takes up less space than Crash Boat, in Aguadilla: around the same size as the pescaderia in Aguada. What these fishers have going for them is an extremely sheltered location with easy access to the southern and western waters and a ready market in the seafood restaurants lining the road along the waterfront. At the end of the road beyond the association is a small ramp. There is also a state facility at the end of that road.

The problems in the association, according to the administrator, derive from the divers' attitude toward the market. Their catch—primarily lobster, conch, snapper, and grouper—is in high demand and hence they are able to sell directly to restaurants rather than to the association. The market will, however, always buy all the fish from the members if they want to sell there, but they cannot offer competitive prices, saying that, "Fish run in groups," and that when the supplies are high they are high throughout Puerto Rico and they end up having to store too many of the same kind of fish in their freezers for too long, which depresses fish quality. Occasionally their freezers fill up with kingfish, which the restaurants desire less than mahi mahi and other species, creating an opportunity cost. As with the seafood dealers from Puerto Real, the administrator claimed that the only way they could compete with other areas, imports, and other markets is to focus on a quality product: *"Podemos cometir por la diferencia en calidad."* ["We can compete by the difference in quality."] The most highly prized species they sell are mahi mahi, lobster, conch, trunkfish, and snapper. Other fishers here, however, agreed that *sierra* were the most important species for the fishers of Guánica, despite that they are less highly prized than other species.

They catch most of these species between 4 and 15 miles from shore, sailing as far away as Cabo Rojo, but the administrator said that no one here fishes either Bajo de Sico or around Boya 6. They have been negatively impacted, however, by the close season for conch, a closure the administrator questioned, saying that they was no scientific information proving they their populations were declining and that no one knows exactly what time of year they reproduce. Another fisher reported that those who fish with handlines generally fish to the west, between Guánica and La Parguera, while others fish around the small nearby keys in the region.

Their seasons vary both by species they catch and by the difficulty they have selling fish. During the fall months, from September to November, seafood sales are off, but they pick up during the Christmas season. During the Spring, in part thanks to Lent, seafood sales tend to be robust, and during the summer is when they sell the most lobster and other first class species (e.g. snapper).

Through the market they are tied into an island-wide network, selling to local restaurants and fish buyers as well as dealers as far away as Vieques (off the east coast of the main island), Fajardo and San Juan (also in eastern Puerto Rico), and Aguadilla, Quebradillas, and Rincón. Nearby municipalities they sell to include Yauco and Ponce. They mentioned specifically selling to 12 restaurants and 5 fish dealers in these locations. Because the market is robust, the fishery has been attracting new recruits lately. This is part due to the fact that one can make money relatively quickly, on a daily basis, from fishing, even though it is hard work. It is also due, of course, to the high rate of unemployment in Guánica.

One of the most pressing issues facing the association today is the municipality's threat to displace them from their current location, moving them further away from the bay and further from their homes. This would be devastating, they believe, because their current location gives them a great deal of exposure to the public, especially on weekends. They are in full view of a large parking area that often fills during the weekends, and they feel that the move would undercut their market. The move would also make them less secure, they believe, and they wouldn't be able to keep any gear in their lockers. The municipality has attempted this twice before, but both times the fishers were able to rally against this.

Guaypao-Esperanza

"As one approaches Guanica going on route 16 from east to west, towards Guaypao/Canna Gorda, one can see the abandoned remains of the old Central Azucarera (sugar mill) right between the road and the coast. The main building looks like a cross between a old hangar and an oversized barn. There are some smaller replicas of that building besides it and two large chimney towers a little farther towards the coast. Right on the coast there are two large docks, now abandoned. One is your regular large, low-lying cement dock, the kind of dock used for embarking or disembarking miscellaneous goods or people. The other dock doesn't have a low-lying cement platform, but a scaffolding-like construction consisting of aerial ramps, conveyor belts, and tubes used to fill the holds of outgoing vessels with sugar…. All this is now abandoned, but when you look around it you see coastal settlements where people now live. When you approach one of these settlements you start to see the unequivocal signs of a community that is dependent on fishing to some degree: yolas (on the water or in the yards of houses), nets or fish traps piled up on a driveway, 'hay pescado' signs, etc.

"The above description is taken from fieldnotes detailing observations of the landscape that I made as I approached Canna Gorda in Guanica for an interview; but in reality the exact same description of landscape features could be used to describe an approach leading to many coastal communities through the east, south, and west coasts of Puerto Rico. These communities are relics of settlements that used to depend on a seasonal mix of salaried sugarcane labor and fishing and that after the gradual but brutal collapse of the Puerto Rican sugarcane industry were basically left

to fend for themselves and have struggled to find other sources of income. While reviewing some early notes, I found a quote calling Aguirre (in Salinas) an example of a community which was historically dependent on "pesca de invernazo" ("invernazo fishing"), or fishing that mostly took place during the 'winter closures' of sugarcane central operations." (Carlos García-Quijano field notes, 2004).

Sidney Mintz's chapter in The People of Puerto Rico noted the phenomenon of *invernazo* fishing that García-Quijano, here, places into its material context for Guánica. It points to a well-documented practice of Puerto Rican fishers: moving among different occupations during different times of the year (Griffith and Valdés Pizzini 2002). Yet it also raises the question of the importance of fishing in municipalities, such as Guánica, where sugar was once so dominant a part of the coastal landscape. According to informants in Guaypao, fishing, once primarily a supplemental source of income and protein, today is extremely important to the local economy. According to one informant, in addition to fishing, now, the most common other jobs/economic opportunities in the area are carpentry, construction work, or masonry (mostly *chiripas*, or odd jobs):

> "Twenty-five years ago," he added, "everybody around here worked in the Sugar Central (Central Guanica). Since the Central closed this is a dead town. I worked in the Central 27 years, and would fish the 'invernazo.' The closure of the Central sent everybody to the sea (to fishing) and affected the fishing resource. Before, one would catch 80 pounds of octopus in a couple of hours. Very big lobsters, you could catch them just walking along the reefs at low tide, at night with a resin torch (*jacho*)".

Guaypao is a small community outside of the capitol city of Guánica, on the road to Playa Santa and Ensenada. The part of the neighborhood facing its small sheltered bay forms a semi-circle facing the bay. At least two piers provide space for the vessels of around 15 independent fishers, 5 to 6 of whom fish as far away as Cabo Rojo. In addition to these fishers, all of whom own vessels, there are additional members of the communities who sign on as crew; crew, however, in the words of a local fisher, "come and go." This same fisher distinguished between the bona fide fishers of Guaypao and those who are learning to fish just for sport or recreational purposes.

Figure SRII.3. Celebratory Fishing Vessel in Guaypao

The above photograph forms part of the evidence that fishers in Guaypao consider themselves an occupational community, distinct in their craft. One of the fishers from the community said that, if he were taking photos of important symbols of fishing in Guaypao, this would be the first photograph he would take. One of the in-depth interviews we conducted was with a fisher who had fished in the area for 47 years, a man we refer to as Alfredo; as such, he had detailed information on changes in fishing practices, in the resource, and in other dimensions of life in Guaypao, offering suggestions for better management of the resource.

Currently, fishers from this region fish primarily for *sama* (mutton snapper) and *sierra* (king mackerel or kingfish), using primarily long lines and other hook and line rigs. They also fish for bait with gill nets, and the search for baitfish has become one of the key issues facing Guaypao fishers. Formerly they used more traps, including deepwater traps and the wooden lobster traps, but with the increase in divers in the region, trap theft and theft of fish from traps has increased, and many fishers have switched to alternative gear.

> Alfredo's comments concerning kingfish were interesting in light of the comments by fishers/ fish dealers in the association near downtown Guánica, where fishers claimed that filling freezers with kingfish at times prevented them from landing more highly desired species, such as Dorado. Instead of considering kingfish an opportunity cost, he reported that sierras were the single most important species for Guaypao fishers. Fishers in neighboring Malecon targeted sierras heavily as well, yet in Playa Santa, also in Guánica, sierras were not listed among important species.

These distinctions may reflect larger trends brought on by market forces. Others in Guaypao, along with this fisher, mentioned that fishers had been shifting from second to first class species over time, and that new entrants to the fishery, young men who were mostly divers, were targeting the highly prized first class species such as lobster, conch, snappers, and octopus. Other first class fish listed were yellowtail snapper, mutton snapper, grouper, and sierras. "Before," Alfredo said, "they would go for second class fish. Not anymore." He added that driftnets for parrotfish used to be commonplace, but have declined.

Most fishers in Guaypao market their fish themselves, either directly from their homes or to restaurants in the areas, if the catch is first class. There are many species of fish, however, that fishers viewed as important to household consumption and as food fish in the community: gray triggerfish, for example, and a few species of jacks, which are not in high demand in the market.

Certain gear types, coming from outside the community of Guaypao, have caused conflicts between local residents and outsiders. For example, fishers using beach seines used to come to Guánica from as far away as San Juan and Aguada and engage in what locals considered extremely destructive fishing practices. They were coming primarily for baitfish, but they would drag the bottom, taking everything, and the fish they didn't keep they would leave to waste. Guaypao and Malecon fishers united against them, engaging in a number of tactics to prevent further destruction. They planted hangs of various types in the areas where they fished (e.g. barbed wire traps), as well as confronted them directly and told them to leave. Evidently, as reported in three similar accounts, these tactics were successful.

Recently, however, another destructive fishing practice has emerged, this one particularly destructive, Guaypao fishers believe, to coral reefs: *filetitos,* or little gill nets, which are short gill nets that fishers drag over as opposed to alongside coral reefs. Alfredo said that these damage the reefs and catch small fish and shellfish that hide near the reef crest area, adding, "The *filetitos* are a problem because they are cast just on top of the reef. It is people from outside using these *filetitos*, people who are not true pescadores, that do not fish for a living"

A more recent problem has been with jet-skis. Previously, the bay in Guaypao used to be a prime spot for catching baitfish (e.g. *mijua/ anchoa hepsetus; arencon or herring*), but jet-skis and other recreational vessels, according to local fishers, have led to declines in baitfish in Guánica: "Jet-skiers," Alfredo said, "they like to speed a lot, and they scare baitfish away from the coast and the bays. At the whole island-level, wherever there are jet-skiers and fishermen there is the same problem. They make the fishermen have to go farther and farther away to catch baitfish to be able to fish larger game. They have scared all the baitfish away from these bays (Guanica, Guaypao), now we have to go to remote bays for baitfish." This, of course, is the negative dimension to the problem of tourist development in close proximity with commercial fishers, despite the opportunities such development sometimes provides. The bay in Gauypao, only 10 feet deep from the mangrove line to the shore, dropping to 18 feet beyond the mangroves, was a particularly productive nursery and baitfish location prior to the growth of the jet-skiiing and other recreational boating population.

Other problems derive from pollution. Living near the bay, Alfredo and his son have noticed that, following flooding, the bay becomes rancid with runoff water, smelling for days. They added that this was a recent problem. It may be related to the phenomenon noted earlier, in Aguada, where the decline of the sugar industry led to a concomitant decline in maintenance of irrigation systems, altering the character and quality of surface groundwater.

Given their deep attachment to marine resources, fishers in Guaypao reported being for closures. However, they did suggest revisions to these regulations based on their own knowledge of the resource, a knowledge that they add to and revise daily. Fishers in Guaypao offered similar recommendations for revisions to the area and seasonal closures: closing fishing during only during part of the aggregation period, and relying on fishers' knowledge about which areas to close and closing areas on a rotating basis. In both cases, fishers could continue to fish (during a part of the aggregation or in some open areas, where they knew stocks were healthy), but fish would also be protected. Again, in Alfredo's words:

> "If they are going to close areas, areas of mutton snappers, red hind, etc., they should leave one month for the fishermen, two months for the fish. We (the fishermen) know that *samas* aggregate for three moths of each year, so if for one month of those we could go and fish, take advantage, then two months could be for the fish to reproduce. *Samas* and red hinds, they have their 'places' (aggregation locations), and we know them, or some of them."

Currently, fishermen are reluctant to cooperate with DRNA personnel, however, because they believe that their knowledge might be used against them. That is, they could point out aggregation locations of which the DRNA were unaware, and the DRNA might then close those areas in ways that didn't mesh with fishers' understandings of resource dynamics. Alfredo believed that the conch closures had been effective, and in fact advocated for shorter closures for octopus and lobster, while his son advocated for rotating management areas for octopus.

Jacinto/Gulligan's Island

In 1988, as part of an inventory of marine recreational infrastructure, researchers visited this place and were struck by, among other things, the number of mangy dogs roaming around the property. Today, the dogs are less mangy than in 1988, and Jacinto/Gulligan's Island has changed in other ways as well. Researchers in 1988 called it a nascent recreational site, but now it has become more elaborate, cleaner, and is interesting because it combines commercial fishing with water-based recreational activities (taking a guide boat to Gulligan's Island, off the coast of Guánica). As such, it is a location that is both a fishing center (although not, apparently, an association) and a link to the tourist sector.

The fishers who fish out of here fish with nasas, said the man who drives the guide boat, and they land primarily lobster during the winter months. He lamented the poor lobster, saying that everything is preying on them now: octopus, several species of fish, fishers. Evidently, however, the lobster is plentiful, he said, because the restaurants have stopped buying them and the pescaderías' freezers are filling up.

Figure SRII.4. Jacinto Association, Guanica

Figure SRII.5. Jacinto Association, Showing Tour Boat at the End of the Dock

Playa Santa & Ensenada

These are fascinating, out-of-the-way places where fishers currently primarily sell seafood out of their homes. This was once one of the most popular beach locations on the island, and now has a large clientele for recreational activities, which the commercial fishers are taking advantage of. A commercial fisherman owns the small tour boat in the photo below, for example:

Figure SRII.6. Pinos Tour Boat, Playa Santa, Guanica

Figure SRII.7. Playa Santa Association Muelle, Showing the Beach and Big Government Condominium in the Background, as well as the New Government Boats

The condominium building depicted in the above photo was built by the government and state employees have first crack at renting it by the weekend, the week, or the month. After that, members of the general public can rent it. Though it has been supplanted by other places now, Playa Santa remains popular, particularly among internal, Puerto Rican tourists.

Table SRII.2. Association Membership and Hours Spent Fishing, Guánica (n=32)

Variable	Response
Percent Affiliated to Association	46.9
Hours engaged in fishing activity	
0 – 20	18.8
21 – 30	21.8
31 – 39	6.3
40	40.6
> 40	12.5
Mean hours	33.81 (sd = 11.78)
Minimum	0
Maximum	63

Sea Grant officials reported that the new boats may be part of the season of political campaigning, and that the whole association may have benefited from their timing. These are new facilities, though still used by some older fishers and older vessels. Other informants in Playa Santa said that the facilities were built simply as a way of garnering funds from the government, and that the association organized for this purpose alone, disbanding after the association facilities were completed. Our information on Playa Santa and Ensenada, however, is second hand, and should be considered in light of the other information from Guánica. Table SRII.2 presents the statistics from the census on Guánica fishers.

One of the interesting details about Guánica fishers is that they fish, on average, about as much as the professional fishers of Cabo Rojo, with more fishers clustered around the average. These figures indicate

a dedicated fishing population in Guánica, corresponding to our respondents' views that fishing is, indeed, important to the local economy of this former sugar municipality. Table SRII.3 shows the distribution of fishers over territories and types of fishing, showing the importance of baitfish in this region.

Table SRII.3. Fishing Locations and Styles, Guanica (n=32)

Variable	Value
Shore	3.1
Continental Shelf	93.8
Shelf Edge	34.4
Oceanic	21.9
Reef Fishes	93.8
SCUBA Diving	34.4
Skin Diving	31.3
Pelagic	37.5
Bait	40.6
Deep Water Snappers	18.8

Table SRII.4. Gear Utilized in Guanica (n=32)

Variable	Percent
Beach Seine	3.1
Trammel Net	6.2
Long Line	3.1
Troll Line	25.0
Fish Trap	9.3
Gill Net	21.9
Cast Net	78.1
Hand Line	75.0
Rod and Reel	53.1
Lobster trap	0.0
Snapper Reel	3.1
Winch	12.5
Spear	41.9
Lace	40.6
SCUBA	31.2
Gaff	87.5
Basket	0.0

As with table SRII.4, these figures support our ethnographic observations, which suggest that divers make up an important part of the Guánica fishery, followed by fishing with lines and, for bait, with nets (primarily cast nets). One of the fishers we interviewed at Malecon was a specialized net fisher, somewhat of a throwback to an earlier era, fishing for parrotfish with a trammel net. He may account for most of the 6.2% in table SRII.4.

Finally, regarding fish marketing, the following table illustrates the importance of a range of marketing outlets in Guánica. It resonates, too, with the complaint of the administer of Malecon who said that often the divers didn't sell to the association, instead selling directly to restaurants. That over forty percent reported being affiliated to an association, yet only 34.4% reported selling to an association, may reflect this complaint.

Table SRII.5. Marketing Behaviors in Guanica (n=32)

Variable	Percent
Private	0.0
Fish Buyer	28.1
Association	34.4
Walking	15.6
Restaurant	12.5
Own Business	12.5
Gutted	50.0
Ice	40.6
None	28.1

Table SRII.6. Opinions of Guánica Fishers (n=32)

Variable	Percent
Status of Fishery Resources	
Better	12.4
The same	31.3
Worse	56.3
Reasons for problems in fisheries	
Pollution	15.6
Habitat Destruction	6.3
Overfishing	28.1
A lot of vessels/boats/fishers	9.4
Laws and restrictions	3.1
Jet Skis/ noise	12.4
Currents	3.1

Guayanilla

"Fishing holds together the lives of the fishermen in southern Puerto Rico as nothing else could."
—Ricardo Pérez (2000)

Pérez's observations about the glue of commercial fishing derive from several months of field work in Guayanilla, Puerto Rico, during the last years of the 20th century. Guayanilla, like its neighbors to the east (Ponce) and west (Peñuelas, Guánica, and Lajas), was once a significant sugar producing area in which fishing provided a critical buffer against hunger and idleness during periods of seasonal unemployment. During the time of sugar, official statistics suggest, unemployment was low while poverty was extremely high. We see a similar inverse correlation occurring today, with significantly higher unemployment figures associated with declining (though still high) levels of poverty.

Table SRII.7. Guayanilla Demographic Data

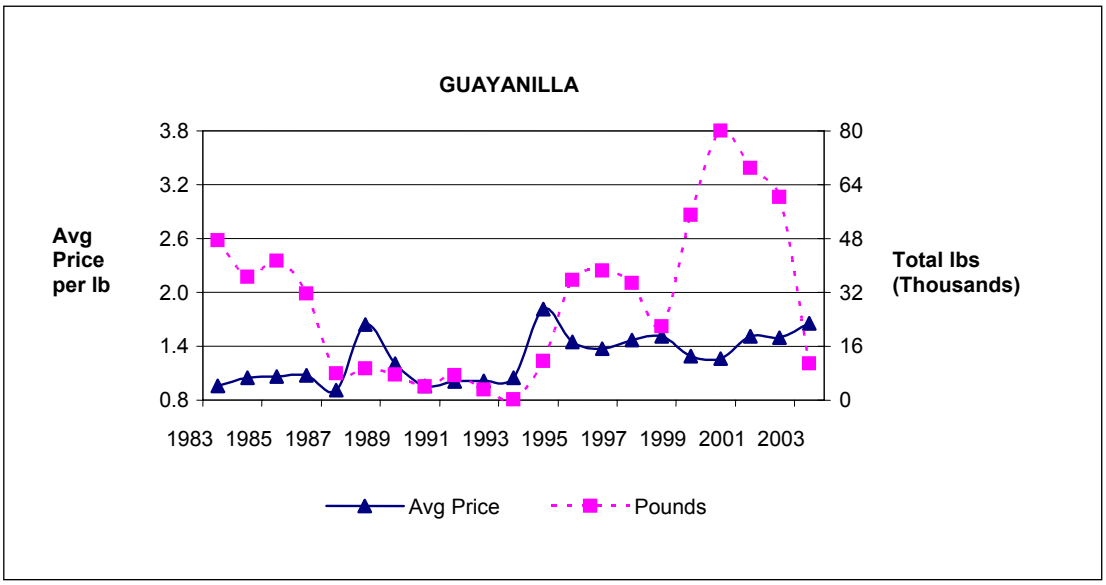
GUAYANILLA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	17,402	17,396	18,144	21,050	21,581	23,072
Civilian Labor Force (CLF) [2]	4,339	3,780	3,949	5,281	6,221	5,817
CLF - Employed	4,234	3,604	3,744	4,186	4,444	4,230
CLF - Unemployed	105	176	205	1,095	1,777	1,587
Percent of unemployed persons	2.42	4.66	5.19	20.73	28.56	27.28
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,548	449	232	197	123
Construction		140	1,022	433	513	613
Manufacturing		720	801	889	541	476
Retail trade		372	407	544	639	406
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	N/A	24.8	31.3
Persons who work in area of residence [6]		2,924	1,630	1,941	2,005	1,479
Per capita Income (dollars) [7]			731	1,548	2,711	5,954
Median Household Income (dollars) [8]		636	2,303	4,014	7,017	11,361
Individuals below poverty level [9]			12,720	15,229	14,965	13,137
Percent of Individuals below poverty level			70.11	72.35	69.34	56.94

During the 1960s and 1970s, like much of the southern coast, as sugar production declined, Guayanilla experienced the development of an expansive petrochemical sector that reshaped much of the coast. Currently fluctuating between complete disuse and limited production capacity, the petrochemical plants that dot Puerto Rico's southern coast continue to cause problems for fishing families and recreational visitors to Guayanilla. The development of the petrochemical industry is what accounts for the spike in construction employment during the 1970s in Guayanilla, an employment opportunity that fishers in the municipality no doubt took advantage of, just as an earlier generation of fishers combined field work in sugar with fishing. Despite whatever short-term prosperity these constructions jobs, the long term problems the petrochemical industry brought to Puerto Rico's south coast—thermal pollution, displacement of fishers' houses and neighborhoods, destruction of wetlands, and reduced access to fishery resources—far outweigh the employment opportunities of thirty to forty years ago.

Though fishing provides a much needed source of income and employment in Guayanilla, Pérez reports that the most successful fishers there discourage their children from entering the fishery: "While fishing is the only activity Don Luis has mastered, he also stressed the fact that fishing involves too much suffering. The fact that approximately half the fishermen I interviewed argued that they would not like their sons to become fishermen clearly indicates their ambivalence about fishing as an occupation" (2000: 5). Only one of the three fishing centers in the municipality seems to be a robust, thriving fishing community, while the others seem to be traveling along the path forged by the wishes of men like Don Luis.

The ambivalence toward fishing may be associated with the high fluctuations in landings in Guayanilla that are reflected in the official statistics. Like nearby Guánica, Guayanilla's landings data shows similar sharp increases during the middle 1990s after a period of relative stability, and from 1998 to 2000, followed by steep recent declines. Also like its neighbor, prices have not responded to supplies predictably (correlation coefficient = .1517). Guayanilla ranked 18th for 1999-2003, although during the late 1990s and early 2000s its catches were nearly as high as some of the most productive landing centers.

Figure SRII.8. Guayanilla Fishery Landings Data



As noted above, Guayanilla has three fishing centers, though they differ radically in terms of their fishers' attachments to fishing: El Faro, a small peninsula, almost an island, south east of the municipio; Playa de Guayanilla, the beach in front of the main town, near the road to the refineries; and Encarnación, the only functioning Villa Pesquera, to the east of Playa de Guayanilla.

El Faro

An interesting barrio, El Faro sits on a spit of land away from the main part of Guayanilla, with no Faro (lighthouse) anywhere in sight. Nevertheless, this is a relatively enclosed community where around 15 to 20 households may engage in fishing, though Pérez reports that the fishers of El Faro are dependent on other sources of income, principally retirement income and social security, rather than fishing. It would seem that this is more of a "fishery engaged" community, with only a handful of families making part of their living from the sea, primarily supplementing other income.

An old man we interviewed was working on three boats, and these were three of only around 15 on the beach. He was applying a grainy, fiberglass-like material to the seams of a vessel that he had just painted with fiberglass paint. He said that most of the fishers here sell to the association in Guayanilla, Encarnación, or a fish dealer in Playa de Guayanilla. They also have their own freezers when the association or merchant won't buy their seafood. Along Guayanilla's bay are several large, pricey seafood restaurants, and a number of smaller places that sell *empanadillas* and other seafood items. Even this far off the beaten track, however, there are a few *colmados* (small grocery stores) and a waterfront bar, where fishers may sell their catch.

The old man we interviewed uses a *chinchorro* (beach seine), fishing close to the shore like most of the other fishers in El Faro. According to Pérez, most of the fishers there are elderly, retired, and fish the near-shore waters from small wooden-and-fiberglass vessels. The most common gear types are hand lines and traps, although traps seem to be in decline and used only sporadically among the fishers of El Faro and Playa de Guayanilla.

Although perhaps only marginally related to fishing, two other things distinguished this community from others, indicated in the two photographs below, showing two dimensions of Puerto Rico one sees predominantly in fairly isolated settings like El Faro: the one of parakeets in cages, which suggest a cottage industry of selling exotic birds, and the other of the Santa Maria alter, with the head of Chucky (the doll from the horror movies) and another, African-American doll on a pile of wood (symbolizing burning at the stake) in front of a mirror: a Santa Maria altar.

Figure SRII.9. El Faro Parakeets

Figure SRII.10. El Faro Santa Maria Altar

Considering place-based and non-place-based communities, too, El Faro is a case, perhaps, of a link between the two. On the one hand, fishers based in the actual place, El Faro, the parcelas, contribute to the welfare of the community through their fish landings, supporting local restaurants, providing a few *proele* (crew) positions, etc. (obviously enough to provide the old man repairing the vessel with some employment). On the other hand, the fishers of El Faro are linked to an association in Guayanilla, if loosely; through them, they are tied into to a broader coalition of fishers across the municipality and the island.

Playa de Guayanilla

Looming to the east of the Playa de Guayanilla are the highly industrialized petrochemical facilities, lending the shallow waters of the bay a kind of wasteland appearance. The first time we visited the area, it was dead quiet. A man lay in his hammock behind the closed pescaderia in the photo. He reported that most of the fishers who fish out of this area are independent divers who dive for *langosta* (lobster) and grunts along the bay. This information conforms to Pérez's information about Guayanilla, but not this area of the municipality. Instead, he reports that the fishers of Playa de Guayanilla fish primarily with hand lines and more casually than the fishers of Encarnación. Like the fishers of El Faro, a few own traps and most fish the near shore waters of the bay, the neighboring mangrove forests, and other near-shore environments. Pérez reports that some of the more destitute fishers in this region set traps for land crabs, and that most of the fishers here rely on government assistance to supplement their fishing.

He also reports that the fishers here used to have an association, but it has since been disbanded. The facilities are no longer in use and fishers now sell to a variety of markets, including seafood dealers/ private fish markets, to people directly from their houses and along the streets, and to local restaurants. Pérez documented 11 different marketing outlets in use by fishers of this area, with the most common being selling from one's house, street vending, selling to a fish house, and selling to the association.

Of both El Faro and Playa de Guayanilla, he reports that they "exploit more than one fising location, the most important being the mangrove forests nets to Punta Verraco, coral reefs, and various sandy cays such as Cayo María Langa, Cayo Caribe, Cayo La Mata, and Cayo Palomas. These as well as smaller cays and islets are located a short distance from the coasts along Guayanilla, Peñuelas, and Ponce and can be easily reached using small wooden vessels" (2004: 195).

Since the decline of the fishing association in Playa de Guayanilla, the fishers no longer keep their gear in association lockers, a development that has led to a somewhat unique practice in the municipality: the use of wooden carts to carry gear and catch between fishers houses and the beach where they moor their vessels. Along with the high number of seafood restaurants (some famous across Puerto Rico), bars, and smaller establishments that sell *empanadillas* and *pinchos*, the practice of carting gear and fish into and out of the parcelas of Guayanilla lends the municipality's waterfront an interesting cultural dimension that reflects the community's engagement with the sea.

Encarnación

This is the fishing association in Guayanilla and the part of the fishery that is most dependent on fishing, most productive, and comprised of younger fishers who are primarily divers. Unlike the other two groups of fishers in Guayanilla, these fishers have larger, more powerful vessels, their own SCUBA equipment, snorkels, masks, harpoons, and spears, and they fish as far off-shore as Caja de Muerto, an island surrounded by rich fishing grounds off the coast of Ponce. This area is a favorite among recreational fishers of Ponce as well. Encarnación fishers primary target species are lobster, queen conch, grouper, and snapper—all 1st class species that sell for top dollar.

These are the most successful fishers of Guayanilla and the least likely to combine fishing with government assistance, as in the other areas. They have been successful in receiving government aid in the form of an association that is fully functional. This not only provides a ready market for members' catch, it also provides Christmas bonuses and some financial assistance to cover fishers when they are ill.

Summary

Only 20 fishers responded to the Puerto Rican census of fishers. This is less than half the number of fishing households included in Pérez's study (n=50), and Pérez's work was a sample drawn from a larger universe, although he doesn't venture an estimate of the total. From these data, Guayanilla appears to be principally a part-time fishers' municipality, with nearly two-thirds of those included in the census fishing fewer than 40 hours and none fishing more than 40 hours.

Table SRII.8. Selected Fisher Characteristics, Guayanilla (n=20)

Variable	Response
Association Member	70%
Hours used for Fishing	
< 20 hours	20%
20 – 30 hours	35%
31 – 39 hours	10%
40 hours	35%
> 40 hours	0
Mean hours	28.95
Standard Deviation	11.958
Minimum hours	0
Maximum hours	40

Source: Puerto Rican Census of Fishers, 2002

Tables SRII.9 and SRII.10 show fishing locations, styles, and gear, supporting the contention that many of the fishers there fish the near-shore environments and that hand lines are the most common gear, followed by gill nets. This is in line with areas that have high ratios of subsistence or casual fishers to full-time commercial fishers, and the 50% of those in the census who reported having no marketing strategy (table SRII.11) suggest a high proportion of subsistence fishers. It is interesting that no fishers included in the census reported selling to the association, in that Pérez reports (and our interviews in the area found) that there is an effective fishing association in the area, and that 70% reported begin affiliated with an association. This could indicate, of course, a flawed sampling approach in the census.

Table SRII.9. Fishing Territories and Styles in Guayanilla (n=20)

Variable	Percent
Shore	10.0
Continental Shelf	75.0
Shelf Edge	25.0
Oceanic	30.0
Reef Fishes	75.0
SCUBA Diving	5.0
Skin Diving	10.0
Pelagic	15.0
Bait	30.0
Deep Water Snappers	45.0

Table SRII.10. Gear utilized in Guayanilla (n=20)

Variable	Percent
Beach Seine	0.0
Trammel Net	10.0
Long Line	20.0
Troll Line	10.0
Fish Trap	30.0
Gill Net	60.0
Cast Net	55.0
Hand Line	65.0
Rod and Reel	20.0
Lobster trap	10.0
Snapper Reel	0.0
Winch	5.0
Skin	0.0
Spear	10.0
Lace	0.0
SCUBA	5.0
Gaff	60.0
Basket	0.0

Table SRII.11. Marketing Behaviors in Guayanilla (n=20)

Variable	Percent
Private	0.0
Fish Buyer	35.0
Association	0.0
Walking	60.0
Restaurant	0.0
Own Business	0.0
Gutted	35.0
Ice	50.0
None	50.0

While the fishers of Encarnación may have been adversely affected by the marine protective measures, their reports of fishing to the east and south of Guayanilla, towards Ponce, instead of toward the east, suggest that they the impacts of these measures have been minimal in this municipality. The fishers of El Faro and the Guayanilla waterfront tend to fish close to shore and thus also are unlikely to have been adversely affected. Table SRII.12. shows the opinions of Guayanilla fishers regarding the problems with the resource, which reinforce the view, commonly given in the area, that pollution from petrochemical plants is most responsible for problems with the fisheries. By contrast, under half of those who see pollution as a problem cite regulations as a problem.

Table SRII.12. Guayanilla Fishers' Opinions of Fishery Resources (n=20)

Variable	Percent
Status of the Fishery Resources: same	20.0
Status of the Fishery Resources: worse	80.0
Pollution	45.0
Habitat Destruction	20.0
Overfishing	10.0
Regulations	20.0
Jet skis	15.0
Weather	10.0

Peñuelas

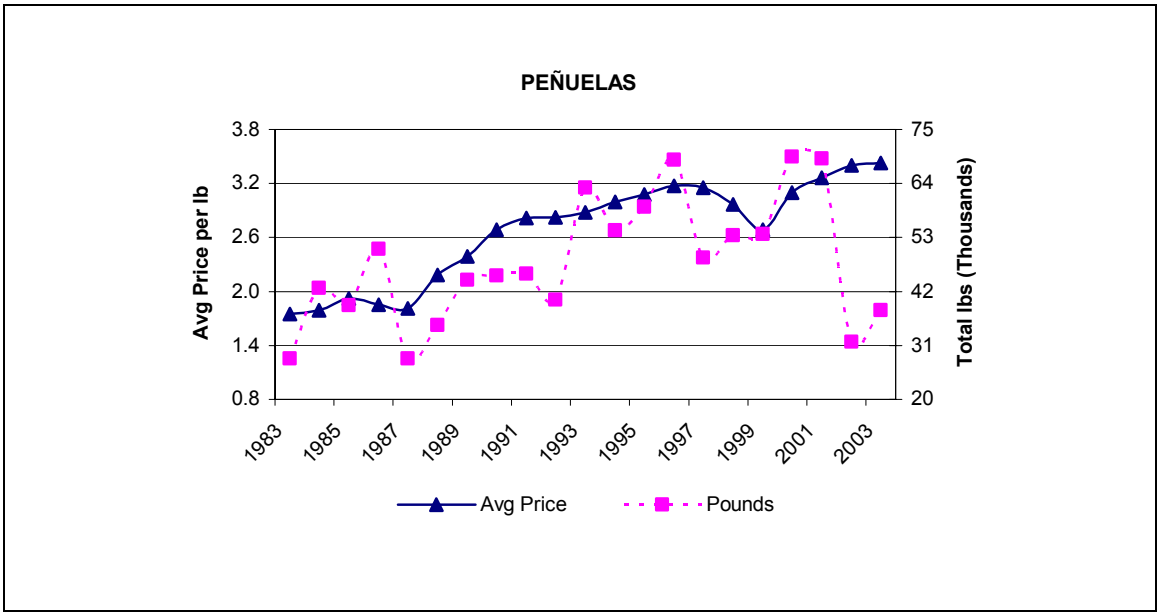
Peñuelas, a small coastal municipality, is Yauco's neighbor and serves as a fishing center for residents of both municipalities, in part because Yauco has but a few hundred feet of shoreline and lacks a landing center. Like its neighbors, Peñuelas was formerly a predominantly agricultural municipality, but suffered from the decline of sugar production. Those employed in agriculture, fisheries, and forestry/ mining have declined nearly 17 fold in the past forty years, and most of the 82 who remain are very likely either small farmers or fishers.

Table SRII.13. Peñuelas Demographic Data

PEÑUELAS	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	14,931	14,887	15,973	19,116	22,515	26,719
Civilian Labor Force (CLF) [2]	3,534	3,076	2,597	3,974	6,275	7,051
CLF - Employed	3,359	2,892	2,455	3,238	4,591	5,196
CLF - Unemployed	175	184	142	736	1,684	1,855
Percent of unemployed persons	4.95	5.98	5.47	18.52	26.84	26.31
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,376	249	130	137	82
Construction		152	663	431	529	863
Manufacturing		448	531	760	991	701
Retail trade		260	311	446	395	547
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	N/A	24.6	31.1
Persons who work in area of residence [6]		2,260	1,589	2,118	2,271	2,125
Per capita Income (dollars) [7]			534	1,255	2,669	5,096
Median Household Income (dollars) [8]		810	1,361	4,220	8,020	12,194
Individuals below poverty level [9]			12,349	15,002	16,121	15,951
Percent of Individuals below poverty level			77.31	78.48	71.60	59.70

Peñuelas's rates of unemployment and poverty are in line with other former sugar municipalities, the former rising and the latter falling. Fishing plays a modest role in the economy, generating an estimated $131,000 in income (out of a total of more that $136,000,000), yet its landings rank just above Guanica's, or 8th out of 15. At the same time, Peñuelas fishers receive somewhat higher prices for the fish they catch than other municipalities, though prices do not reflect supplies here any more than they do in many other municipalities (correlation coefficient = .5106). In 2003, for example, their average price of $3.34 per pound was the highest received in the west, with the next highest average just over $2.94 per pound in Añasco. This may derive from the Peñuelas fishing being dominated by divers, who are often highly selective in their fishing, landing only species that they know will bring top dollar. It may be their ability to sell high value fish that led one of the fishery managers we interviewed to place Peñuelas among the top three associations on the island in terms of its organization, although he may have been referring to an earlier time period. The municipality's one functioning association, El Boquete, was recently reconstituted, after suffering an corruption scandal in the 1990s. In addition, Peñuelas used to have an additional fishing center and association, located in the Sector Playita Alegre, west of Tallaboa (where the current functioning association is located), but this association is closed. According to one of the informants in El Boquete, a Japanese person or company bought the operation or the rights to administer the association in the 90's, but then closed it permanently.

Figure SRII.11. Peñuelas Fishery Landings Data, 1983-2001



El Boquete/ Tallaboa

The one active association in Peñuelas is officially called Association de Pescadores de El Boquete. According to members our field team interviewed, this association is member-maintained and administered. They emphasize avoiding centralization, which stems directly from a corruption scandal in which the former association (with the same physical facilities but with a different constituency) was involved in the late 90's.

Figure SRII.12. Inside the Association, Peñuelas

This association has 20 full-time members, and they are young, compared to the membership of other associations. Divers predominate, though as is common in other associations, all types of gear are used. The fisherman currently in charge of accounting reported that the most important species are Red hind (*Epinephelus guttatus*), parrotfishes (*Sparidae* family, *Sparisoma* and *Scarus* sp.), spanish hogfish (*Lachnolaimus maximus*), octopus , and queen conch. Altough strong ties to tourism are not as readily observable as for example in La Guancha, Ponce, or La Parguera, there is a designated "Manatee Watching Area" and three restaurants located right in the vicinity of the association, including one directly across the small street that leads to the water. There are close relationships between the three seafood restaurants in the vicinity, and the association's administrator said that the restaurants buy their fish on a regular basis and that they are preferred costumers. There is also a marine and commercial fishing equipment dealer (Franchesi Marine) located near the association, with close ties as well to the members.

One feature of this association is that it is composed of people from Peñuelas and the nearby municipalities of Ponce, Guayanilla, and Yauco. The mixed crowd derives from their practice of giving the opportunity to come and fish to anyone that wants to do it. This is in part because under the current administration it is very new, and might be trying to boost membership to be able to compete as a marketing center.

From the interviews with Boquete fishers, one acquires the sense that its members find the association particularly strong for mutual benefit, cooperation, the pooling together of resources, and the creation of a communal space for fishing-related activities. Their facilities include storage areas for fishing equipment, docking space, ramp access, repair and maintenance services with communally-owned shop tools (specially an expensive acetylene torch and an electric soldering machine), and a communal freezer for catch storage and marketing. As would seem to be logical following a corruption scandal, they might be trying to avoid too much concentration of financial/administrative power to keep the organization flexible. In terms of its "fishing community," while physically centralized in an association, the geographic origin of members is wider and that, at least for now, there is a premium on independence and voluntary cooperation rather than on exclusivity and compulsory duties.

According to one of the informants, who also volunteers as a fireman at the local fire station, the members of this association might be young, but they live "100% exclusively from fishing" and the majority come from families that have been fishing for several generations. According to both of the informants, the majority of the fishing is conducted in the vast shallow grounds between Ponce and Caja de Muertos. They constrasted their type of fishing with the fishing done in other areas of the island, such as the east, where the shelf-edge is very close to shore. From the information of members of other, more affluent associations, that also relative affluence of the fishers might play a part in whether they spend more fuel and go farther out to the shelf edge or stay in the shallows. Of course, gear (divers tend to stay closer), personal preferences, and historical territoriality/ territorial resource patterns of the different fishing communities might play a large part in this as well.

Unfortunately, no fishers from Peñuelas were included in the fishery census, perhaps due to the period of disorientation within the fishery; hence, we have no census data to report here.

Northern Metropolitan Region:

San Juan, Cataño, Toa Baja

The northern metropolitan region requires little introduction, as it has long been the seat of power in Puerto Rico and a center for tourism, shipping, commerce, and, less visible, commercial and recreational fishing. We include three municipalities in the northern metropolitan region primarily because they all surround San Juan harbor. As such, their fishing facilities are part of Puerto Rico's most active port and most densely populated area.

Regional History

San Juan is an historical city, with many of its most heavily visited tourist attractions highlighting the colonial period, and its has long dominated all of the municipalities surrounding San Juan Harbor, including Cataño and Toa Baja. The entire western coastal area of the metropolis, from the Condado Lagoon to the point, is known as Old San Juan—a region whose colonial architecture dates to the early 16th century. Ponce de Leon founded a city called Caparra, southeast of San Juan Harbor, in 1508, and priests from this region began moving to San Juan in 1519, after Ponce de Leon left for Florida. The Padres Jerónimos founded the municipality in 1521, with 200 residents living in around 80 houses, most of which were of wood. Original plans for the city followed those common throughout the Spanish empire, with the city center devoted to a church and king's house and the rest of the city gradually assuming the character of a fortified enclosure.

During its first 50 years of existence, San Juan's population increased five times, and by 1586 they had experienced assaults from Caribs[1] and other Europeans that they applied to the crown for funding for fortifications. This was to be a massive public works project, funded with gold and silver from Mexico and Peru, resulting in the construction of fortifications around and throughout the city. Security and commerce seem to have continued attracting people. During the first decades of the 17th century the population increased by another 60%, reaching 1,600 inhabitants by 1644. Historical accounts of the city at this time suggest that already San Juan had developed a marginalized sector, or an underclass—one of the enduring legacies of urban life. Nearly 1,000 blacks, either slaves or freed slaves, weren't counted in the 1644 census, and the roster of housing included 120 huts or shacks (Toro Sugrañes 1995: 358). Many of these, no doubt, exploited the vast fishing and land crab resources of the San Juan Harbor.

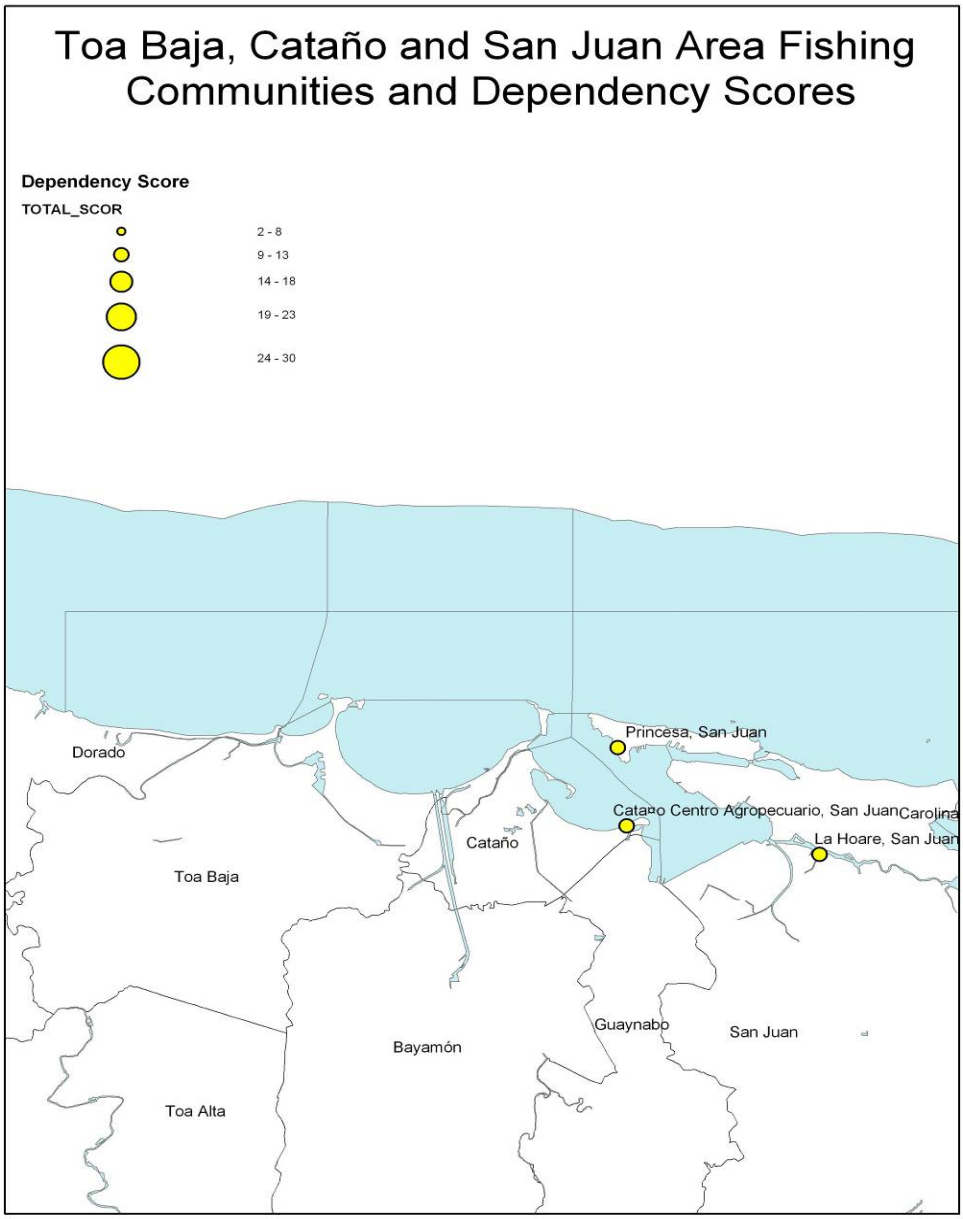
In addition to fishing, San Juan harbor and neighboring waters have their own brisk tourist trade of historical sites, cruise ships, and casinos and hotels that have influenced the quality and quantity of habitat within the confines of the metropolitan area. To the east, the metropolis joins the highly developed tourist region of Isla Verde, in Carolina, near the principal airport. To the west, across the mouth of San Juan Harbor from Old San Juan, stand much of the city's industry, including the Barcadi rum plant and the large power plant.

Important fisheries habitat within the city are the MPA Condado Lagoon, which adjoins San Juan's active tourist district, San Juan Bay, Ensenada de Bocal Viejo (just west of the mouth of San Juan harbor), Los Corozos Lagoon, San José Lagoon, and the Martin Peña canal, connecting the Condado and San José

[1] The distinction between Carib and Taino natives of the Caribbean has been a point of dispute in Caribbean ethnohistory. Some scholars claim that any hostile natives were labeled Carib, while those that were complicit with Spanish policy were labeled Taino, claiming that rather than being distinct ethnic groups they were simply more or less resistant members of the same group.

Lagoons. Generally, these bodies of water separate the tourist and shipping centers of the city from the more commercial, educational, and financial districts of Hato Rey, Río Piedras, and other areas.

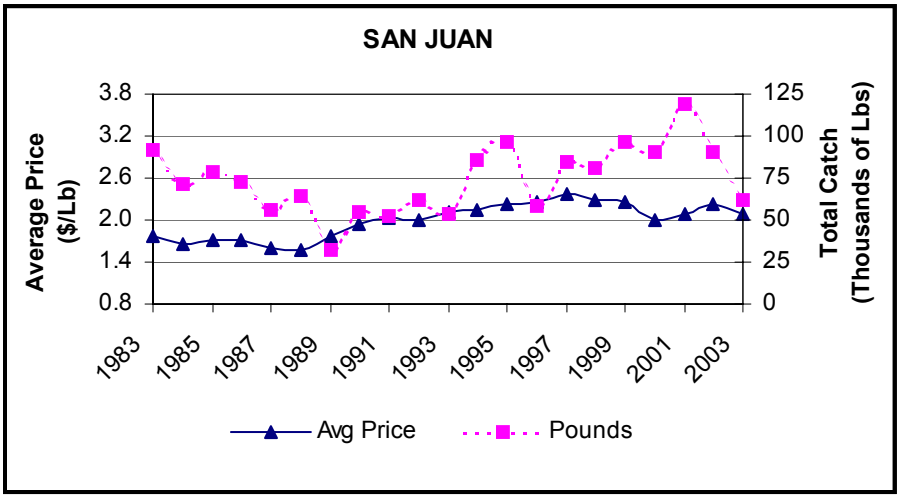
Map NM.1. Northern Metropolitan Region



San Juan

Puerto Rico's most metropolitan municipality is by no means a fishing community. Its two principal *Villa Pesqueras*—La Princesa and La Hoare—both suffer from problems associated with fishing from an urban environment and have been, over time, marginalized in favor of more politically powerful interests such as cruise lines and cargo ships. Nevertheless, their ability to hang on to coastal property in the midst of urban growth, as well as to land as many thousands of pounds of fish as they have, testifies to the resilience of these urban-based fishers. In terms of landings data, over the 1999 - 2003 period, San Juan fishers ranked 12th out of 41 municipalities reporting. This was true even after three years of declining catches, as the figure NM.1 shows.

Figure NM.1. San Juan Landings Data, 1983 - 2003



San Juan's robust, diverse economy services not only the metropolitan area's residents but also a continual influx of business travelers from around the islands and tourists from the mainland and other parts of Latin America. Unemployment here, though high by North American standards, is low for Puerto Rico, more than half the rate of unemployment in many of the other coastal municipalities. This presents fishers and their family members in the area with opportunities to move between fishing and other work as well as with opportunities to provide fresh fish to a dynamic population. Although many of the luxury tourist hotels rely on imported seafood, fishers in San Juan have little difficulty finding a market for their catch.

Table NM.1. San Juan Census Data

SAN JUAN	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	368,756	451,658	463,242	434,849	437,745	434,374
Civilian Labor Force (CLF) [2]	113,584	137,840	140,677	137,736	160,485	150,180
CLF - Employed	103,574	129,984	133,768	122,367	135,664	129,630
CLF – Unemployed	10010	7856	6,909	15,369	24,821	20,550
Percent of unemployed persons	8.81	5.70	4.91	11.16	15.47	13.68
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,884	1,092	795	1,180	398
Construction		12,196	11,850	6,331	8,155	9,949
Manufacturing		18,120	15,978	10,843	8,756	6,500
Retail trade		21,900	23,757	20,103	21,977	12,925
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	25.1	25.9	26.7
Persons who work in area of residence [6]		114,224	93,417	76,822	107,839	94,890
Per capita Income (dollars) [7]			1,593	3,383	6,383	12,437
Median Household Income (dollars) [8]		1,990	3,469	6,838	10,539	17,367
Individuals below poverty level [9]			219,646	203,384	208,319	173,528
Percent of Individuals below poverty level			47.41	46.77	47.59	39.95

Fishing from San Juan

The landings data and the fisher census data agree that line rigs—targeting both pelagic and deep water species—are the most common among fishers in San Juan. Some additions to this are noted in the following narrative, but line rigs remain the most common. Other data from the census indicate high levels of association membership with over half fishing 40 hours per week or more, indicating a mix of those who are dedicated to fishing full-time and those who combine fishing with other pursuits. In the two associations we visited in the San Juan area, we did find varying levels of commitment to fishing, with one association dominated by part-time fishers and the other having a balance between full-time, bona fide fishers and part-timers.

Table NM.2. Fishing Locations and Styles, San Juan (n= 41)

Variable	Percent
Shore	0
Continental Shelf	84
Shelf Edge	0
Oceanic	73.2
Reef Fishes	80.5
SCUBA Diving	7.3
Skin Diving	7.3
Pelagic	56.1
Bait	61
Deep Water Snappers	68.3

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

Table NM. 3. Selected San Juan Fisher Characteristics

Variable	Response
Association Member	97.6
Hours used for Fishing	
< 20 hours	4.9
20 – 30 hours	31.7
31 – 39 hours	9.8
40 hours	39
> 40 hours	14.6
Mean hours	34.8
Standard Deviation	10.3
Minimum hours	0
Maximum hours	54

Source: Puerto Rican Census of Fishers, 2002.

Table NM.4. Gear Used by San Juan Fishers

Variable	Percent
Beach Seine	0
Trammel Net	0
Long Line	24.4
Troll Line	26.8
Fish Trap	9.8
Gill Net	17.1
Cast Net	85.4
Hand Line	92.7
Rod and Reel	56.1
Lobster trap	2.4
Snapper Reel	4.9
Winch	14.6
Skin	0
Spear	9.8
Lace	2.4
SCUBA	4.9
Gaff	87.8
Basket	0

While association membership is high in this region, they engage in a high degree of street vending, perhaps responding to the brisk urban traffic along the streets. Norman Jarvis would be pleased to see that, today, in contrast to the 1930s, use of ice is nearly universal among these fishers. The relatively low level of private marketing outlets, including restaurants, conflicts slightly with the ethnographic interviews. Again, however, the urban location may allow for buyers from restaurants and other seafood locations to buy directly from the association.

Table NM.5. Marketing Behaviors of San Juan Fishers

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	9.8
Private	0
Association	73.2
Street vending	39
Restaurant	0
None	2.4
Sell fish gutted	9.8
Keep fish on ice	92.7

Source: Puerto Rican Census of Fishers, 2002

Finally, in terms of their views of marine resources, the importance of pollution as a source of problem is not surprising, given the high levels of shipping traffic passing through San Juan Harbor. What is surprising, for the same reason, is the low frequency with which crowding was listed as a problem. In the following section, in which we present information on two sites in San Juan, fishers report experiencing changes in catch and sources of pollution, but also report that some mangrove forests and other critical fish and shellfish habitats remain in the face of steady urbanization.

Table NM.6. Opinions of San Juan Fishers Regarding Marine Resources

Opinion	Percent reporting
Status of Fishery Resources	
Better	0
The same	36.6
Worse	61
Reasons for problems in fisheries	
Pollution	48.8
Habitat Destruction	12.2
Overfishing	7.3
Laws, regulations, and licensing	2.4
Crowding	0
Seasonal factors	4.8

Princesa-Puntilla

Known as both the Villa Pesquera La Princesa and the Villa Pesquera La Puntilla, this landing center sits in the heart of Old San Juan, very nearly in the shadows of the U.S. Coast Guard Station, the *Compania de Turismo*, and the dock where the cruise ships embark and disembark. Of between 35 and 45 fishers who fish from this location, between 20 and 30 of them are part-time fishers; 15 are full-time fishers in the bona fide program. Those interviewed said that they are passing fishing along in their families, and that it is a family enterprise. We encountered women and children assisting fishers at the facility. As is

evident from the photograph below, the facilities are long and narrow, squeezed in between the organizations listed above and cluttered with gear and equipment.

Figure NM.2. La Puntilla *Villa Pesquera,* Old San Juan

Despite that fish pots were not listed among the top three gear types in the landings data, the fishers interviewed here during the ethnographic phase of the research listed fish pots, nets, and *palangre* (hook-and-line rigs) as their three most important gear varieties. They claim that today the principal species they catch are several varieties of snapper (in line with the landings data), which they catch usually around two miles off shore. Previously they caught conch, but because of the seasonal closure and declines in the conch population, now those still target conch have to travel to Fajardo: "There is no conch," one fisher said. "It is prohibited, it is scarce, and to get to it you have to travel to Fajardo." Before, he went on, fishers from La Princesa used to fill 14' vessels with conch at a place they called "The Conch Hotel," a nearby location where conch congregated. Similarly, he said, "Twenty five years ago, we used to catch up to 185 pounds of king mackerel in 23 fathoms (138 feet) of water. But now at the same depth we catch only three to four pounds."

Table NM.2 shows that more than half of San Juan fishers still target pelagic species like *sierra,* despite lower catches, but that reef and deep water species still make up the majority of the catch. Another statistic on the above table that coincides with the ethnographic work is the relative lack of divers in San Juan. Those interviewed at La Princesa mentioned that diving used to be more common; perhaps it has fallen in popularity with the perceived decline in conch populations.

Despite their urban location, fishers here do not have larger vessels than those in other parts of the island. To reach these species they travel in vessels ranging from 18' to 22', often plying waters next to

commercial shipping and tourist traffic. The *Villa Pesquera's* pier faces one of the main shipping channels in San Juan harbor, as the photograph below shows.

Figure NM.3. Near the La Princesa Pier, the Vessel "Therapy" Faces a Passing Cargo Ship[2]

La Princesa fishers sell their catch not only to locals in the municipality, each fisher maintaining their own freezer, but also to the Tourism Agency, the Municipality of San Juan, and to government employees that work around their facilities. Demand from these sectors is primarily for snapper and grouper species. Most of these species they catch with live bait, claiming that lures do not work. They fish for bait nearby their facility, mentioning that many of the mangrove forests are still healthy in Cataño, Hato Rey, and near the Bacardí rum plant.

La Princesa fishers, though small in number, are hanging on to artisanal fishing techniques in the midst of the most highly developed waters of Puerto Rico and the Caribbean. This is not merely quaint, but constitutes an interesting incidence of resistance against several forces that have been working against them. It also speaks to their importance to the many powerful agencies that surround them.

Centro Pesquero La Hoare

The municipality owns the land on which this *Villa Pesquera* is located. Six years ago, in 1999, La Hoare fishers moved here from a location nearer to the Club Nautico de San Juan and the San Juan Bay Marina after bridge construction. The facility adjoins a recreational complex known as Parque Central, and its south-southwest side has access to the Bay of San Juan. It is a well-secured facility with substantial concrete dock space for mooring vessels, indoor lockers, and, now under construction, a large combination market and seafood restaurant. Combined with the fact that many of the members received

[2] This fishing vessel's name is interesting, given the extended theoretical discussion in Griffith and Valdés Pizzini regarding the importance of fishing as therapy to occupational injury from other jobs (2002).

their vessels from a government program, the appearance of this association implies that among its membership are those with important political connections and the ability to use those connections for material ends. The vessels provided through the program are not of the low, *yola* type of vessel that the boat builders of Crashboat, in Aguadilla, build, but more like recreational fishing vessels—20' to 23' in length and made of fiberglass in factories, with 75hp motors. One vessel, which fishes as far away as St. Thomas, is 30' long and equipped with a diesel engine.

Of the 25 to 30 fishers at La Hoare, only 5 are full-time, bona fide fishers. The others fish part time. In addition, this is an aging fishing association, with its youngest members in their 40s and most over 50. Youth in San Juan, members say, have little incentive to become involved in fisheries, in that the volume of the catch has dropped by around one third, on average, over the past few years. Landings data concur that landings have declined recently, though this trend followed one of increased landings through most of the 1990s. They point to several sources of pollution responsible, in part, for the decline:

1. Discharge from water treatment plants into rivers feeding into the sea along the north coast, including the Río Dorado (to the west) and Río Loíza (to the east).
2. Sewage treatment at Isla de Cabra and Miramar, which contaminates the Condado Lagoon (and at times smells of human excrement).
3. The dredging of the bay and the dumping of dredge waste fewer than three miles off shore.
4. Run-off from construction around the Bay.
5. Run-off from agricultural pesticides.
6. A municipal dump, El Vertedero, leaking into nearby waters.

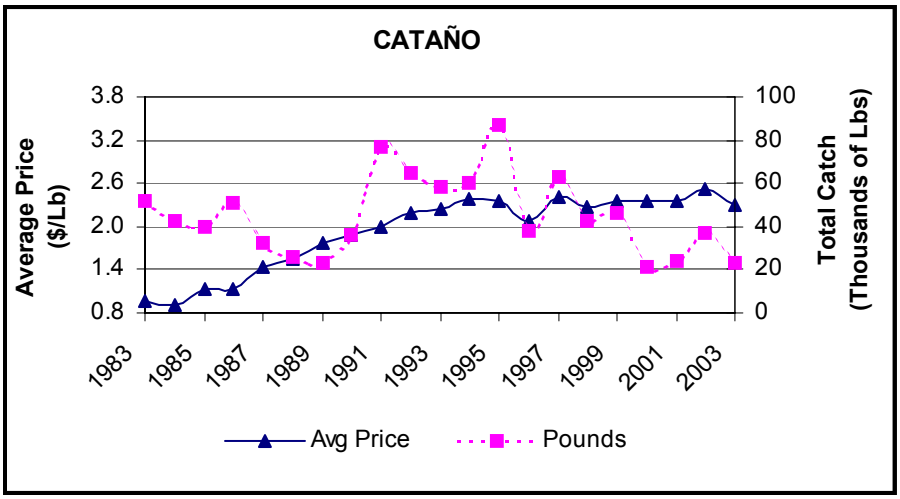
Fishers at La Hoare have phased back to part-time fishing, despite their evident strong political connections with those who can provide them support. They continue to expand the facility, with the restaurant already underway along with a second project: getting a fuel dispensing facility on the pier. They have an ice machine for use by members, and they claim that the ice this produces is superior to that you can buy elsewhere. In addition, they have freezers and do a fairly brisk business in seafood sales. The association buys most of the catch, allowing members to keep some for themselves for their own home consumption; however, because their seafood sales are so brisk, they press members to sell as much as possible through the association. They are situated on the outskirts of Old San Juan, where many of those leaving the old city at the end of the day pass and stop to buy seafood. Around 90% of their catch is sold directly from the on-site market; at times of high demand, such as Lent, they import frozen fish from other *Villas Pesqueras* around the island.

They fish primarily up and down the north coast, from Dorado to Río Grande, with one fisher fishing as far away as St. Thomas. These territories suggest that most of them have not been adversely affected by the MPAs and spawning aggregation closures off the east coast of the main island (Culebra, St. Thomas, etc.), however much they may disagree with other regulations. Like fishers elsewhere, the fishers from La Hoare do not like the size limits on deep water snapper, observing, like their fellows, that fish pulled from the deep die from the lack of pressure. They catch red snapper, for example, at depths of around 200 fathoms, which makes it impossible not to waste fish.

Cataño

Part of the San Juan metropolitan area, most of Cataño's fishing activity takes place along a strip of land across the harbor from the La Princesa in San Juan. An active *Villa Pesquera* and a less active Club Nautico stand near one another near a public park and the municipality's municipal offices, including its police and fire stations and a few public schools. Landings data from Cataño show fluctuating landings accompanied by a slow, steady rise in prices through the 1980s but remaining more or less level through the 1990s and into the 21st century. In comparison with other municipalities, Cataño is 28th out of the 41 municipalities reporting landings—a ranking that one might find strange in light of the sophisticated look of the fishing facilities here, which appear highly developed.

Figure NM.4. Cataño Landings Data, 1983-2003



Proximity to seats of power, however, does not carry privileges for everyone. Cataño's fishing facilities may be apparently well funded, but census data show that Cataño benefits less from being within the metropolitan area than does San Juan, with a higher unemployment rate and nearly half its people below the poverty line. It is a small municipality in terms of territory, resulting in a high population density (Toro Sugrañes 1995: 99). Despite that this is a heavily urbanized area, those lucky enough to have jobs still travel an average of a little over 30 minutes to get to work. Employment in all the economic sectors usually relevant to fishers has been falling in Cataño, indicating a less than robust local economy.

Table NM.7. Cataño Census Data

CATAÑO	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	19,865	25,208	26,459	26,243	34,587	30,071
Civilian Labor Force (CLF) [2]	4,850	6,196	6,242	6,992	10,587	8,134
CLF - Employed	4,299	5,768	5,825	5,583	8,707	6,432
CLF - Unemployed	551	428	417	1,409	1,880	1,702
Percent of unemployed persons	11.36	6.91	6.68	20.15	17.76	20.92
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		172	68	11	63	65
Construction		820	786	424	685	490
Manufacturing		1,444	1,431	963	1,026	559
Retail trade		816	798	718	1,268	795
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	29.4	29.4	31.0
Persons who work in area of residence [6]		1,784	1,544	1,411	1,613	1,545
Per capita Income (dollars) [7]			740	1,664	4,644	8,369
Median Household Income (dollars) [8]		1,490	2,404	4,348	8,212	12,852
Individuals below poverty level [9]			18,668	18,174	20,160	15,030
Percent of Individuals below poverty level			70.55	69.25	58.29	49.98

Cataño History

Formerly a part of neighboring Bayamón, early on Cataño earned a reputation as a municipality that people pass through, embarking and disembarking first from ships and later from railroads other connecting infrastructure. During the 1880s, Cataño was known principally as a port for unloading cargo and people, with thick stands of mangrove forests along much of its coast and, among these, fishing villages whose fishers supplied the growing metropolis of San Juan. In 1883, when the railroad was extended from San Juan to Bayamón, Cataño's commercial traffic benefited and more and more people began settling in the area. By 1890 there were between 2,700 and 3,000 people living in Cataño.

In the 1920s, the people of the municipality (which was still part of Bayamón) embarked on a major effort to develop the economy beyond a mere transfer point for shipping for Bayamón, finally achieving political autonomy in 1927. After breaking from Bayamón, population increased through the 20th century and Cataño began attracting industry, including the large Bacardi rum plant along with 40 other manufacturing plants; its port continued to witness brisk traffic.

One important dimension of its economic growth has been tourism. The municipality has constructed a pyramid that, like Seattle's space needle, was constructed primarily as a tourist attraction; Toro Sugrañes reports that it is heavily visited (1995: 100). "*La Pirámide*," as it is called, actually sits beside the fishing area that includes the (currently defunct) Club Nautico and the *Villa Pesquera de Cataño.* Annually the Bacardi rum plant has thousands of visitors, and its Christmas festival is one of the most well known and widely attended in Puerto Rico. The Cataño tourist trade has highlighted its ties to the sea, with several restaurants specializing in Puerto Rican cuisine in which seafood plays the central role. These developments have had advantages and disadvantages for fishers, of course, providing a market for their catch while altering their access to the sea and contaminating the waters in which they fish and work.

Fishing in Cataño

Centro Agropecuario de Cataño

We mentioned earlier that the Cataño *Villa Pesquera* seems to benefit from its proximity to San Juan. Its facilities are modern and some of its vessels have been provided by the state for its use. The association has occupied the same site for 40 years, but in the past three have renovated and remodeled the facility to make it into the new, complex structure one sees there today. In addition to the typical facilities one finds at *Villas Pesqueras* (storage lockers, freezers, piers, etc.), Cataño fishers maintain 4 kiosks for selling seafood to those who work in the municipal offices, enhancing their ties to the local government.

Thirty fishers belong to the facility, but slightly more than half fish only part time or are more or less inactive, with 14 fishing full-time. Like the fishers of La Hoare, in San Juan, this is an aging membership, with the youngest members in their early 30s and the oldest nearly 60. They share their facilities with a private fish market known as *Pescadería Cundá,* with whom they compete.

Figure NM.5. Cataño Fishing Association

The above photo, taken from a tourists' walkway out over the harbor, shows not only the new condition of the facility but, on the pier, what the landings data suggest is one of the most commonly used gear by the fishers of Cataño: the gill net. Members combine gill nets with hook-and-line rigs and with SCUBA diving. While they have freezers to provide ice for fishers, they have no on-site location to fill tanks, perhaps because only three of the 14 full-timers specialize in SCUBA.

Figure NM.6. Sea Hawks Provided by the State to Cataño Fishers

Their vessels are not large, only 18 to 20 feet, with even the Sea Hawks that the state provides them being only 20 feet in length. There are six of these and they sit inside the facility grounds, protected by its security. They were acquired through joint funding from the municipality of Cataño, the Puerto Rican Legislature, and the Department of Agriculture, indicating strong ties to the state. They do not build boats on the grounds, and most of their gear (as well as the air for tanks) is purchased in San Juan.

Recently, the price of gas has eaten into their profits. This has cut into the distance they travel, which confines their fishing to the waters just to the east and west along the north coast—only as far west as Dorado and east to Luquillo. They occasionally fish the waters off Culebra, primarily for conch, but the rise in gas prices combined with the MPA in Culebra and the seasonal closures for conch have stemmed much fishing in this territory. The table below shows that, in 2002, most of the fishing was done for reef fish and off the continental shelf, which coincides with what fishers told us in interviews.

Table NM.8. Fishing Locations and Styles, Cataño (n= 25)

Variable	Percent
Shore	28
Continental Shelf	64
Shelf Edge	40
Oceanic	56
Reef Fishes	88
SCUBA Diving	28
Skin Diving	20
Pelagic	24
Bait	68
Deep Water Snappers	56

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

Evidently, by the fishing census data, the association, although powerful, does not dominate the municipality's fishery entirely, with around three-fourths belonging. Belonging to the association involves a commitment to its market. They reported allowing fishers to keep only 1% to 2% of their catch, but there are obviously (e.g. *Pescaderia Cundá*) alternative markets for fishers who wish to sell

their catch by alternative means. While over 75% interviewed in the census reported belonging to the association, 15% fewer reported selling to the association.

Table NM.9. Selected Cataño Fisher Characteristics

Variable	Response
Association Member	76
Hours used for Fishing	
< 20 hours	20
20 – 30 hours	44
31 – 39 hours	16
40 hours	4
> 40 hours	16
Mean hours	30.16
Standard Deviation	15.99
Minimum hours	0
Maximum hours	72

Source: Puerto Rican Census of Fishers, 2002

Census data also agree somewhat with our ethnographic interviews in terms of the ratio of full-time to part-time fishers. From both sources we understand that part-time fishers outnumber full-time, but the census data show that 80% are part-time, while ethnographic interviews suggest that between 60 and 65% are part-time.

Table NM.10. Gear Used by Cataño Fishers

Variable	Percent
Beach Seine	4
Trammel Net	4
Long Line	32
Troll Line	32
Fish Trap	44
Gill Net	56
Cast Net	64
Hand Line	79.2
Rod and Reel	56
Lobster trap	0
Snapper Reel	16
Winch	8
Skin	0
Spear	28
Lace	32
SCUBA	24
Gaff	20
Basket	0

Table NM.11. Marketing Behaviors of Cataño Fishers

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	20
Private	4
Association	60
Street vending	44
Restaurant	4
None	12
Sell fish gutted	16
Keep fish on ice	68

Source: Puerto Rican Census of Fishers, 2002

Table NM.12. Cataño Fishers' Opinions of Marine Resources

Opinion	Percent reporting
Status of Fishery Resources	
Better	36
The same	12
Worse	44
Reasons for problems in fisheries	
Pollution	40
Habitat Destruction	16
Overfishing	20
Laws, regulations, and licensing	0
Crowding	0
Seasonal factors	0

Like San Juan fishers, many Cataño fishers view pollution as a major problem for marine resources, yet nearly the same proportion view the resource as improving. While we cannot know exactly what kind of time frame fishers use to respond to a question about improvements in fisheries, we have heard from other fishers in the east that the fisheries have improved in recent years from five to ten years ago because Hurricane Hugo, in 1999, hit eastern Puerto Rico particularly hard, causing problems with fisheries that have recovered since. Clearly, not all Cataño fishers share the view that the resource has been improving. Specific complaints include discharge from a supermarket into the bay and dredging.

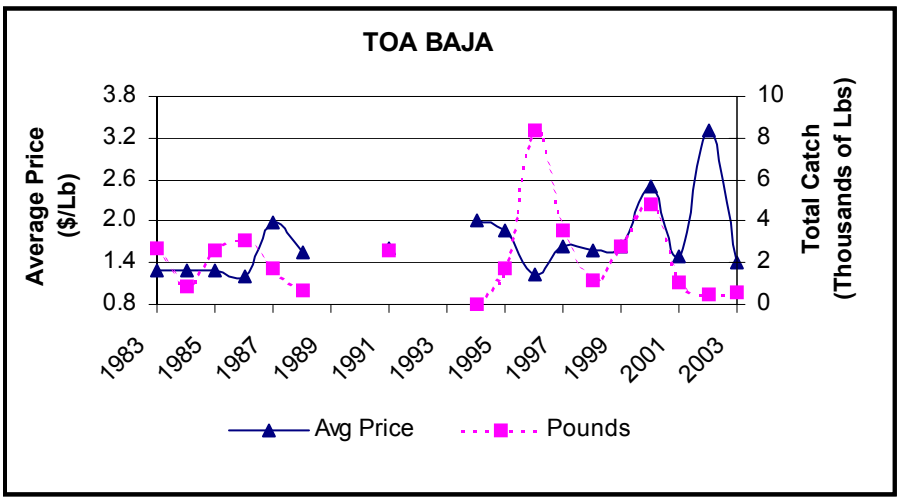
The latter is particularly important to this report because fishers claim that dredging activity has deposited sludge atop coral reefs, suffocating them. They claim the coral reefs where the dredging work deposited its waste have been dead for between 12 and 15 years, and that when they attempted to wipe away the sludge to allow the coral to breathe, they experienced a strange, itching sensation on their skin.

Cataño fishers recognize that there are important nursery grounds within the San Juan bay area that are being threatened by pollution from a variety of sources. They listed four species that used to be in the bay but are now absent from it: El Frances, La Vieja, El Barbú, and Sardina Española (a sardine they used to use for bait). Despite perceived problems with the resource, fishers in Cataño are somewhat optimistic regarding the future of fisheries. This is evident in an outreach program that they are planning to put in place: educating youth about the opportunities and importance of fishing and marine resources in the neighboring schools.

Toa Baja

Two pieces of evidence underlie the lack of importance of fisheries to Toa Baja. First, landings data show that fishing has declined to nearly zero since 2000, placing them 41st out of 41 municipalities reporting landings. Second, no fishers from Toa Baja responded to the fisher census. Repeated visits to the municipality yielded no interviews with commercial fishers, despite that association facilities neighbor an active strip of well-known seafood restaurants—some of them famous throughout the metropolitan area.

Figure NM.7. Toa Baja Landings Data, 1983-2003



The relatively low unemployment rate (compared to Cataño) may explain the recent decline in fisheries. Construction employment remained relatively stable through the 1990s, and this, combined with the data on travel time and the construction employment figures from neighboring Dorado (which increased slightly from 1990 to 2000), may account for some of the drop in landings. We deduce this based on observations, interviews, and other work that suggests that construction booms often draw fishers from fishing temporarily, in line with the typical fisher behavior of moving between fishing and wage work on and off during the course of one's life (Griffith and Valdés Pizzini 2002). Our observations in Dorado suggest that construction has not slowed in Dorado since 2000. Visits there revealed several new developments that are pictured in the Dorado municipality study.

Table NM.13. Toa Baja Census Data

TOA BAJA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	15,761	19,698	46,384	78,246	89,454	94,085
Civilian Labor Force (CLF) [2]	4,014	5,036	11,440	22,957	32,485	30,722
CLF - Employed	3,815	4,700	10,921	19,729	27,881	26,094
CLF - Unemployed	199	336	519	3,228	4,604	4,628
Percent of unemployed persons	4.96	6.67	4.54	14.06	14.17	15.06
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,020	266	165	270	74
Construction		636	1,655	1,533	2,165	2,024
Manufacturing		1,024	2,229	3,325	2,838	2,309
Retail trade		460	1,558	2,603	4,285	3,135
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	31.1	30.9	35.2
Persons who work in area of residence [6]		2,412	2,986	4,053	6,420	6,484
Per capita Income (dollars) [7]			1,098	2,273	4,293	8,666
Median Household Income (dollars) [8]		1,537	3,524	6,822	11,086	18,331
Individuals below poverty level [9]			25,992	41,944	44,487	37,091
Percent of Individuals below poverty level			56.04	53.61	49.73	39.42

Fishing in Toa Baja

Toa Baja does have an active *Villa Pesquera*, as the photograph below shows, but it was closed every time we visited. Instead, we interviewed people at the nearby Alero Boat Yard, which is a recreational boat storage and fishing site with some links to seafood sales. The owner of the boat yard reported that fishing in Toa Baja has declined because, like the fishers of San Juan and Cataño, many commercial fishers in the municipality have become too old.

Alero Boat Yard

Sitting on the same road as the Toa Baja *Villa Pesquera*, among a string of restaurants, the Alero Boat Yard has seen stable business over the past six years, since 1999, when it was founded, and the owner expects business to continue that way in the future. They have very little turnover in their boat storage, reflecting the high value of properties for storing vessels in the metropolitan area.

Alero currently stores 22 vessels and their trailers, with the vessels ranging from 15 to 27 feet in length. Between two-thirds and three-fourths of the vessels stored there are used for recreational fishing; the owner reported that those who fish consume all their own catch. These fishers live in Toa Baja and the nearby municipalities of San Juan, Bayamón, Corozal, Naranjito, and Vega Baja.

Figure NM.8. Toa Baja Fishing Association

They tend to fish in fairly distant waters typically, unless they are targeting big game fish, traveling as far away as Salinas and Parguera (on the southwest coast) to fish, as well as to Culebra. In these waters they fish for red and yellowtail snapper and other food fish. When they target big game fish such as Marlin they fish the deep trench off the north coast. Despite that none of the recreational fishers sell their catch, the boat yard is involved in retail sales of frozen and prepared (cooked) fish. The boat yard runs a cafeteria that employs one person, and they sell fish from their freezers to people passing.

While the owner did say that many of the older fishers in Toa Baja had grown too old for fishing, he also reported that many young people, aged 10 to 20, fish from the shore in Toa Baja (something we witnessed ourselves). He also said that there were a handful of youth, from 10 to 15, who were learning from the elderly commercial fishing the arts of fishing, suggesting that there is an effort, as in Cataño, to reproduce the fishery.

Postscript: Northern Metro's Aging Fishing Population

In three of the four fishing sites reported on in this region, those interviewed reported that the commercial fishers who used the facilities were growing old, yet in two of these three sites they also noted that there were active efforts to recruit new, young fishers to the fishery. On the one hand, this is a simple sign that fishers perceive the value of their labor in the sea, reaffirming the sense that it is a moral effort that *should* be passed on to younger members of society. On the other, these efforts suggest that young members of fishers' families are not entering the fishery, perhaps familiar with the difficult work of this occupation and less sanguine about its morality as a productive activity.

While sentiments probably lie somewhere between these two extremes, that young audience exists for the learning of the "arts" of fishing indicates a wider appreciation of fishing in a heavily urbanized environment. The continued investment of municipality and state funds in fishing infrastructure in this region would support this wider appreciation as well. A cynic might view such investment as merely

another instance of funding local ways of life in return for political patronage (a common exchange in Puerto Rico), yet municipality leaders must still establish the legitimacy of such investment in Puerto Rico's most important political and economic center, and the reproduction of a core of fishers in the San Juan metropolitan area provides one support for that legitimacy.

It is interesting that the *Villas Pesqueras* of the metropolitan area have not become tourist attractions or mere sentimental facades for an earlier, more traditional way of life, but remain components of working waterfronts that continue to provide high quality seafood to the city's residents. They also continue to remind residents that sound alternatives to wage work and other common urban pursuits exist—alternatives, as well, to drug dealing, crime, and the less desirable pastimes that youth often migrate toward. In this sense, apprenticing youth to fishing reproduces the social value of fishing against a background that often falls short of fulfilling the hopes and dreams of youth.

Southern Rural Region III:

Santa Isabel & Salinas

Regional History

Among anthropologists, this region of Puerto Rico's coast is best known as the site of Sidney Mintz's classic work on sugar production, including a community profile of a sugar plantation given the fictitious name of Cañemelar (1952) and the life history of a sugar worker, Worker in the Cane (1957). In both of those works, we learn of the dominance of the sugar corporation over the lives of the rural populations of the southern coast during the middle part of the 20th century, as well as the highly seasonal nature of work in the cane. As we noted in the historical section and with others elsewhere (Griffith and Valdés Pizzini 2002; Guitsi 1994; Pérez 2005), the seasonal dimension to sugar cane encouraged part-time fishing during the months that work in the cane was scarce (usually beginning in mid-summer and lasting through the fall). In his profile of Cañemelar, Mintz mentions that there were at least a half dozen professional fishers, adding that their efforts were well rewarded in the community for providing high quality protein to otherwise marginally nourished rural workers.

One legacy of the sugar era is a coastal company town that bears the same name as the Central Mill, Aguirre, whose houses resemble those of plantation managers and workers across the tropics, wooden with corrugated roofs, painted dark red, presumably to cut down the glare of the sun. The ghost mill dominates the town's coastline—closed in 1962, its rusted, crumbling infrastructure matches, despair for despair, the tangles of former sugar fields now left largely uncultivated. Not all of the land is fallow. Bananas and papaya still grow in large acreages once dominated by sugar, and new concrete suburbs are growing along highway #3, which parallels the coastal southern plain from Maunabo to Salinas. In place of the mill, Aguirre now has a large thermoelectrical plant dominating its shoreline, which the local fishers accuse of polluting the local waters.

Figure SRIII.1. Thermoelectrical Plant in Aguirre, Salinas, With Fishing *Yola* in Foreground

Map SRIII.1. Southern Rural Region III

Santa Isabel

Although it experiences high rates of poverty and unemployment, Santa Isabel lost significant employment in one only sector from 1990 to 2000: agriculture, forestry and fisheries. About half of the employed labor force works in the municipality, and the rest, very likely, commute to Ponce or other larger towns along the south coast. In this environment, fishing has not emerged as a sector that absorbs many individuals, although it is nonetheless important in specific local areas.

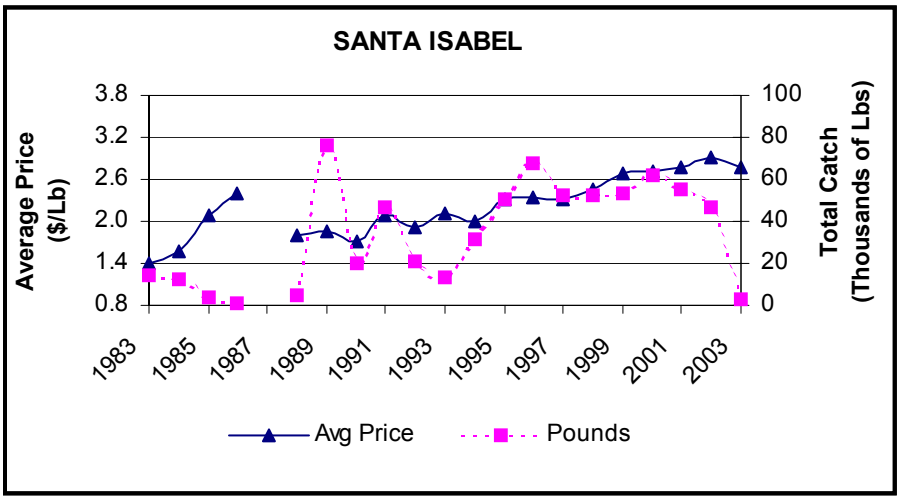
Table SRIII.1. Santa Isabel Census Data

SANTA ISABEL	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	13,478	14,542	16,056	19,854	19,318	21,665
Civilian Labor Force (CLF) [2]	3,152	3,224	3,802	4,744	5,574	6,084
CLF - Employed	3,086	3,040	3,562	3,895	4,180	4,628
CLF - Unemployed	66	184	240	849	1,394	1,456
Percent of unemployed persons	2.09	5.71	6.31	17.90	25.01	23.93
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,540	998	491	553	371
Construction		108	364	221	262	335
Manufacturing		508	891	966	748	1,014
Retail trade		216	289	384	387	382
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	23.9	21.0	27.3
Persons who work in area of residence [6]		2,464	2,175	2,276	2,653	2,395
Per capita Income (dollars) [7]			674	1,357	2,602	5,903
Median Household Income (dollars) [8]		775	2,176	4,250	6,765	11,895
Individuals below poverty level [9]			11,430	15,358	13,789	12,395
Percent of Individuals below poverty level			71.19	77.35	71.38	57.21

Fishing in Santa Isabel

Of the two municipalities in this region, Santa Isabel lands fewer pounds of fish, on average, than Salinas, and ranks 20th among the 41 coastal municipalities, although they have seen a gradual increase in price through the 1990s, perhaps due to increasing catches of high value species such as lobster.

Figure SRIII.2. Santa Isabel Landings Data, 1983-2003



Most commonly, according to census data, fishers from Santa Isabel fish the continental shelf and its reefs off the south coast, leaving from the fishing association at La Playa and a few other locations. We will see, however, that at times the census data, landings data, and our ethnographic work do not exactly coincide.

Table SRIII.2. Fishing Locations and Styles, Santa Isabel (n= 32)

Variable	Percent
Shore	9.4
Continental Shelf	100
Shelf Edge	0
Oceanic	37.5
Reef Fishes	100
SCUBA Diving	18.8
Skin Diving	28.1
Pelagic	34.4
Bait	3.1
Deep Water Snappers	34.4

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

While the majority of fishers who responded to the census were members of the association, and the association does seem to be a powerful force in the community and across the southern region, our ethnographic work revealed that some of the most highly regarded fishers in this region do not belong to the association. This may be due to the ambivalent relationship between the principal *Villa Pesquera* in La Playa and a powerful *pescadería* there, which share the same building and many of the same concerns about fishing and marine resources. We discuss this further below.

Table SRIII.3. Selected Santa Isabel Fisher Characteristics

Variable	Response
Association Member	93.8
Hours used for Fishing	
< 20 hours	3.1
20 – 30 hours	53.1
31 – 39 hours	3.1
40 hours	34.4
> 40 hours	6.3
Mean hours	30.53
Standard Deviation	10.299
Minimum hours	8
Maximum hours	50

Source: Puerto Rican Census of Fishers, 2002

Line-based fishing seems to dominate the fishery in Santa Isabel, despite that the landings data suggested that fish pots were more extensively used than lines. The high use of gill nets reported in the census, however, coincides with landings data.

Table SRIII.4. Gear Used by Santa Isabel Fishers

Variable	Percent
Beach Seine	6.3
Trammel Net	3.1
Long Line	46.9
Troll Line	34.4
Fish Trap	12.5
Gill Net	75
Cast Net	50
Hand Line	84.4
Rod and Reel	31.3
Lobster trap	3.1
Snapper Reel	0
Winch	0
Skin	0
Spear	21.9
Lace	6.3
SCUBA	18.8
Gaff	87.5
Basket	0

We will see below that one of the more interesting aspects of the Santa Isabel region is the central role that the Association and Pescadería that share the main fishers' building play in mobilizing political activity. In the light of this, it is interesting that so many fishers interviewed in the census use neither a fish dealer/ pescaderia, nor the association as a marketing outlet, instead selling fish themselves.

Table SRIII.5. Marketing Behaviors of Santa Isabel Fishers

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	3.1
Private	3.1
Association	0
Street vending	93.8
Restaurant	0
None	37.5
Sell fish gutted	0
Keep fish on ice	62.5

Source: Puerto Rican Census of Fishers, 2002.

Table SRIII.6. Opinions of Santa Isabel Fishers Regarding Marine Resources

Opinion	Percent reporting
Status of Fishery Resources	
Better	0
The same	21.9
Worse	78.1
Reasons for problems in fisheries	
Pollution	75
Habitat Destruction	65.6
Overfishing	3.1
Laws, regulations, and licensing	3.1
Crowding	0
Seasonal factors	3.1

The census data regarding opinions of fishers about marine resources are not dissimilar from others living along the southern coast. Pollution and habitat destruction have been major forces in the region with industrial development by the petrochemical and pharmaceutical industries. These industries have reorganized coastlines and caused problems relating to water quality throughout the region. In addition, the decline of the sugar industry has altered the local ecology by reducing the amount of flushing that occurred when the sugar fields were planted and the mills operational. This is because the sugar industry used to maintain irrigation systems that would send fresh water into the sea regularly. As the irrigation canals become clogged, it alters local habitat.

Playa y Malecon

The center of fishing activity in Santa Isabel is the Pueblo-Playa-Malecon area (it is called by all these names). Geographically, it would be better explained as the inhabited coastline to the west of the Club Nautico de Santa Isabel and south of the Santa Isabel Town Center. The main fishers association and pescaderia grounds (Asociacion de Pescadores Jose "Cheo" Tejero and Pescaderia Sotomayor) are located there.

Figure SRIII.3. La Playa Facilities, Santa Isabel

Approaching the Asociacion-Pescaderia (see photo), the first thing one is likely to notice is how large the building is, yet how underused it seems, calling to mind Ricardo Pérez' work on modernization and how state investment in fisheries without follow-up can leave behind these big, underused buildings. The two-story building had about 20 lockers for fishermen, of which 10 seemed to be currently used. A rather large gas-pumping station, no longer in use, stands by the water, near a solid-looking t-shaped cement dock that could easily dock a 50-foot vessel. A large workshop area for boat building and three smaller wooden docks complete the facility. Interviews here revealed that the three docks are semi-communal: technically, they belonged to a couple of private fishermen who lived on the coastline right next to the pescaderia, but they as a rule allowed other fishers to use their docks by virtue of belonging to the same association, being friends, or merely being fellow labor group members.

Figure SRIII.4. Association's Concrete Dock (important octopus grounds are just beyond)

The impression that the facility is underused, however, is exactly that: an impression from casual observation. Repeated visits to the association and interviews with members reveal that the fishing activity from this association is considerable, with about 35 active fishermen using the installations to various degrees on a regular basis. In line with the landings data, which show long-lines to be one of the most commonly used gear, many of them are longliners (*palangreros*); this is arguably the most labor intensive and time-at-sea intensive of the fishing arts practiced in the region, and it means that the fishers spent a lot of time at sea.

Cultural Significance of Fishers' Space in Santa Isabel

Besides setting the stage for fishing and marketing, other activity goes on at the association as well. The workshop-boatyard area is an important center of activity, where *yolas*, fiberglass boats, and *chalana* sailboats are being constructed or repaired. The building is evidently the center of social and 'political' activity related to fisheries in Santa Isabel. As we noted in our work on Puerto Rican fishing communities, as fishing communities become less and less place based, some specific coastal locations begin to assume more importance in the lives of fishers. Sometimes place-based communities within regions that also include several network-based communities become centers for the exchange of fishing knowledge and information and for other forms of interaction and expression.

La Playa, Santa Isabel, is a place-based fishing community, where several fishing families live together near the coast and fish out of the same association. Yet it is something more as well: the association's building and its surrounding environs provide an important cultural space for the expression of occupational identity. Any sort of meeting that involves fishers from two or more fishing centers of Santa Isabel is likely to take place at this building. This building is where one can meet most of the fishers from Santa Isabel, regardless of the community, and it is a shared space between fishing communities. The largest population of fishing families living close to one another lives in La Playa, yet fishers from Cortada and the area east of the Club Nautico also spent quite some time there. The building is also a center of fish marketing. Even fishers who have their own freezers sell surplus fish, as well as buying ballyhoo and sardines for bait. Finally, and significantly for the changes taking place in fishing today, the building, and docks area around it, is also a communal recreational space, with kids and families diving and swimming from the cement dock and older fishers teaching young children how to fish.

Figure SRIII.5. Private Docks Used by Recreational Fishers with Commercial Longlining Vessel in Foreground, Santa Isabel

The association also operates a restaurant, mostly on weekends, and it evidently forms part of a trio of weekend coastal recreation places (the other two being private restaurant/nightclubs); the three businesses benefit by sharing and attracting costumers. While not nearly as active as La Guancha, in Ponce (see Southern Metro Region Report), this region does suggest that an incipient La Guancha-like phenomenon may be forming there. As in many areas, the activity varies by days of the week. During the week, La Playa gives the impression of a sleepy coastal village with a couple of semi-empty seaside restaurants. On weekends, you would get a festive recreational activity locus, especially at night. As in La Guancha, the administrators of the *pescaderia* have recognized the business potential of being close to a center of weekend recreational activity, and they have been trying very hard to take advantage of it.

Figure SRIII.6. Sign Honoring Accomplished Fisher on Side of Association, Santa Isabel

The association and its environs in Santa Isabel are all the more interesting because they serve multiple purposes, addressing the needs of commercial and recreational fishers—or, more generally, of work and leisure—and in the process the area has become a somewhat contested space. Santa Isabel is a very good example of how a constructed physical space (the building) is shared, but also appropriated and contested by different social institutions for different purposes. In Santa Isabel-Playa it is particularly striking because when one gets there, and looks at the building from the parking lot, on two opposite sides of the same wall there are two signs that show two different names for the same structure.

One of them shows the name of the 'Pescaderia'—named after the family that manages the building's fish selling, processing, and restaurant activities. The sign on the opposing side of the 'Pescaderia' sign shows the name of the Fishing Association itself, Pescaderia Jose 'Cheo' Tejero. The fisher portrayed in the portrait in this other sign is a well-known fisher in the region, with vast ecological knowledge of the waters between Santa Isabel and Caja de Muertos and the deep water banks beyond. The caption below this fisher's portrait reads *"Obrero del Mar"* ("Laborer of the Sea"). The title *"Obrero del Mar"* points out that this well known fisher embodies the dedicated, serious, blue collar working class spirit of fishing in the area, where most fishers have also been real 'obreros' in the strictly proletarian sense as cane workers (Mintz 1957). This particular fisher is a recognized teacher of other fishers and one of the most widely regarded expert fishermen, not only in Santa Isabel, but from Salinas to Juana Diaz. Ironically, this particular fisher is not is not a currently a member if the association, despite that it is named after him. When asked about this, he said: "In business dealings, you can only trust your family."

The Pescaderia and Association are two separate institutions that share the same building and that also share some of their functions. Until recently, the same man was the acting president-administrator of the association and the administrator of the Pescaderia. This was a symbiotic relationship: a percentage of the proceeds of the Pescaderia would ultimately go to the Association and the Pescaderia benefited by having

the opportunity to market catch from there as well as to use the second floor as a weekend seafood vending area. The Pescadería pays rent to the association for the space and sells mostly the catch from association members. The Pescaderia administration seemed to be in charge of maintaining the building as a communal space, hosting fisher meetings and political events related to discussing and ultimately resisting the new fishing regulations; they also resisted meetings called by well-meaning DRNA field officials who wanted to discuss the regulations.

Regarding the relationship between the Pescadería and Association, one fisher said: "*Not everybody is happy with this but, above all, we know that what we don't use will be taken by the Mayor and being given to somebody who isn't related to fishing and that would be a loss for everybody.*"

Salinas

The economic picture that Salinas faces is somewhat less heartening than its sister municipality in this region, but on the whole the two municipalities are similar. Salinas has seen a drop in its unemployment rate from 1990 to 2000, as well as a dramatic reduction in its poverty, but it has still lost employment in all of the industrial sectors listed here. This may indicate that, as opposed to working in the formal economy, formerly unemployed individuals have merely given up looking for employment, and hence do not show up in the statistics.

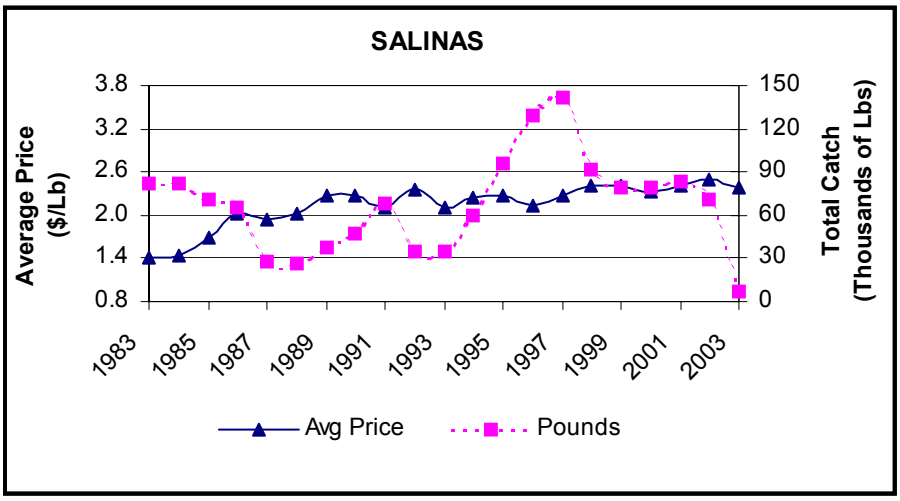
Table SRIII.7. Salinas Census Data

SALINAS	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	23,435	23,133	21,837	26,438	28,335	31,113
Civilian Labor Force (CLF) [2]	5,837	4,924	4,893	5,981	8,779	7,967
CLF – Employed	5,611	4,644	4,470	4,896	6,062	5,751
CLF – Unemployed	226	280	423	1,085	2,717	2,216
Percent of unemployed persons	3.87	5.69	8.65	18.14	30.95	27.81
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,940	825	626	362	222
Construction		216	532	314	558	616
Manufacturing		940	1,425	1,263	1,069	991
Retail trade		460	409	508	793	664
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	19.7	21.7	33.5
Persons who work in area of residence [6]		4,036	2,726	3,166	3,760	2,868
Per capita Income (dollars) [7]			628	1,391	3,033	6,133
Median Household Income (dollars) [8]		842	1,801	3,681	7,128	11,391
Individuals below poverty level [9]			16,301	20,062	19,944	18,095
Percent of Individuals below poverty level			74.65	75.88	70.39	58.16

Fishing in Salinas

Ranked slightly higher than Santa Isabel in the landings data, 17th out of 41, Salinas witnessed dramatic increases in its fisheries during the early to mid-1990s, only to drop back to low levels early in the 21st century.

Figure SRIII.7. Salinas Landings Data, 1983-2003



The coastal plain of Salinas was a major area of cane cultivation, with Central Aguirre being the largest cane operation in the area. As with places around the South Coast, Coastal Salinas communities are very evidently the remnants of the sugarcane past, and fishing is very evidently tied to the *invernazo* fishing (fishing during dead time in the cane) that was the rule for many years. Salinas' coastal communities are as a rule working-class, and have their share of social problems related to poverty, crime, smuggling, unemployment and poor infrastructure. Similarly to Ponce and Santa Isabel, each of the coastal communities of Salinas is a 'landing site' or a fishery dependent community separate from the others, and they each have their own community of local fishermen. These coastal communities are Playa, Playita, Las Mareas, and Aguirre. Each community also, has their 'own embayment'—that is, each has a bay associated with their community, although most of Aguirre's is taken up by the abandoned sugar mill. As noted earlier, the town has the distinct markings of a company plantation town.

Figure SRIII.8. Former Company Housing, Aguirre, Salinas

Figure SRIII.9. Abandoned Sugar Mill, Salinas

Salinas is very much oriented towards the sea, with fishing, internal tourism, and recreational boating being important activities all up and down its coastline, which is blessed with 4 beautiful bays surrounded by mangroves and hundreds of mangrove channels (locally called Caños) that zig-zag between and around the bays. It is, truly, a small-scale boater's dream. Whenever hurricanes approach, boaters from nearby coasts flock to the mangrove channels of Salinas to tie their boats under the protection of mangroves. Ironically, those same mangroves that give Salinas its charm for tourism and protect boaters for miles around also have been the recipients of a continued assault by all kinds of actors, including Public Health agents fighting malaria, developers, marina builders, a city Mayor designating a coastal lagoon as a landfill, and others.

Playa has the Bay of Salinas, Playita has an associated smaller bay to the east, Las Mareas has the seaward sector of the Bay of Jobos, and Aguirre has the deep sector of the bay of Jobos. If you are traveling trough Salinas through road # 3, you will very quickly pass from one to the other. However, except for Playita and Playa (which connect in a way that it can be hard to tell when you left one and entered the other), these coastal communities are surprisingly remote from each other, geographically and socially.

Like fishers in Santa Isabel, most from Salinas fish the reefs on the continental shelf, using multiple gear varieties and targeting primarily snappers, white grunt, and lobster. Our ethnographic interviews, contrary to the census, suggests that much of the south central and southeastern part of the coast remains primarily a trap fishery, despite that traps have been losing ground to diving in recent years. An elderly fisher, Gabriel (*pseudonym*), the vice-president of the *Villa Pesquera* in Playa with extensive knowledge of the history of fishing in the area explained that different areas of the South-Southeast Coast have been known for their specialization in different kinds of fishing, and that in the last 30 years or so the distribution of specialization in fishing arts has become more even. Nevertheless, some areas are more known for a particular type of fishing arts than others.

According to Gabriel, Playa and Playita in Salinas, for example, is known for trap fishing, along with Guayama and some parts of Juana Diaz, while in nearby Aguirre, deeper in the estuary and close to the routes of 'sierra' and 'jurel' migrations in and out of the Bay of Jobos, fishers have specialized more on

net fishing. Santa Isabel is known for the use of *palangres* (long lines), and the towns more to the east, like Patillas and Arroyo, have traditionally used hook and line fishing, surface nets, and a lot of diving. Don Gabriel said, though, that in younger generations 'everybody dives' and that the surge in divers has created a lot of problems between fishing communities over stealing from traps.

Table SRIII.8. Fishing Locations and Styles, Salinas (n= 11)

Variable	Percent
Shore	18.2
Continental Shelf	90.9
Shelf Edge	9.1
Oceanic	18.2
Reef Fishes	86.4
SCUBA Diving	27.3
Skin Diving	27.3
Pelagic	40.9
Bait	54.5
Deep Water Snappers	18.2

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

Where the census data and ethnographic data seem to agree is in the area of association membership. In the ethnographic work, as discussed in more detail below, Salinas fishers expressed disappointment with the association and have even considered founding an alternative. In the census data, only around one-third of those responding to the census claimed association membership, and a smaller percentage admitted to selling to the association.

Table SRIII.9. Selected Salinas Fisher Characteristics

Variable	Response
Association Member	36.4
Hours used for Fishing	
< 20 hours	31.8
20 – 30 hours	18.2
31 – 39 hours	13.6
40 hours	36.4
> 40 hours	0
Mean hours	26.59
Standard Deviation	14.378
Minimum hours	0
Maximum hours	40

Source: Puerto Rican Census of Fishers, 2002

Table SRIII.10. Gear Used by Salinas Fishers

Variable	Percent
Beach Seine	4.5
Trammel Net	4.5
Long Line	31.8
Troll Line	31.8
Fish Trap	31.8
Gill Net	54.5
Cast Net	63.6
Hand Line	63.6
Rod and Reel	40.9
Lobster trap	27.3
Snapper Reel	13.6
Winch	13.6
Skin	0
Spear	18.2
Lace	13.6
SCUBA	18.2
Gaff	72.7
Basket	0

Table SRIII.11. Marketing Behaviors of Salinas Fishers

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	0
Private	9.1
Association	22.7
Street vending	50
Restaurant	18.2
None	9.1
Sell fish gutted	27.3
Keep fish on ice	63.6

Source: Puerto Rican Census of Fishers, 2002

Table SRIII.12. Opinions of Salinas Fishers Concerning Marine Resources

Opinion	Percent reporting
Status of Fishery Resources	
Better	4.5
The same	4.5
Worse	81.8
Reasons for problems in fisheries	
Pollution	72.7
Habitat Destruction	31.8
Overfishing	9.1
Laws, regulations, and licensing	4.5
Crowding	0
Seasonal factors	0

Finally, a high proportion of Salinas fishers view the condition of the region's fishery resources as worse today than before, with high numbers of fishers citing pollution and relatively low numbers seeing overfishing as a cause. This reflects, no doubt, the south coast's recent history of petrochemical, pharmaceutical, and other development.

Playita and Playa

Playa and Playita go together in part because of physical proximity, but also because they share many of the same issues. The two communities are continuous to one another on land, but when approached from the sea, they are distinctly separated by coastal topography, each with its own bay. For fishers, thus, they are separate, and each community has its own *Villa Pesquera* (Asociacion de Pescadores de la Playa de Salinas—also known as Pescaderia Don Piche), and Asociacion de Pescadores de La Playita de Salinas). According to various reports, between 60-100 fishers live in Playa and Playita de Salinas; even in the fisher census these communities comprise most of those interviewed.

The best way to get to Playa and Playita is to go straight south from where the Salinas town hall and plaza is. A truly remarkable maze of streets and roads will soon appear, signaling that the coastal community is near. When one starts seeing one restaurant every 10-15 houses, one is there. Salinas, (especially Playita and Playa) are a focal point of the seafood restaurant 'scene' in the area, many people travel to Playa and Playita for the restaurants there. Linkages between fishing and other sectors of society are very much observable there. More than 40 restaurants, all focused on seafood, dot the area, a couple of the large ones associated with Marinas and small hotels, but mostly they are small restaurants owned by fishermen and the families/relatives of fishermen. 'Jueyes' (Land Crab, *Cardisoma guanhumi*) are an important resource in the area, and many of the restaurants specialize in Jueyes. Boating and recreational fishing are very important as well, and many of the fishermen in Playa and Playita double as captains, boat mechanics and charter operators for the recreational sector.

For all the economic activity in the area, infrastructure (especially roads) is incredibly limited. As a fisher from the area commented, 'Playita is always under construction!' Every time there is a significant rain in the area, Playa and Playita flood and a portion of the road is washed away. According to locals, this happens mainly because these communities were built essentially by "stealing terrain from the mangrove lagoons." They accept this as a fact of life living where they live, close to the water, but what they don't accept is the lack of dependability in other services, such as full-time electricity (which is ironic, they can see the huge Termoelectrica generator from their homes), sewage, and running water. However there is very little silent resignation here. Playa and Playita in Salinas are two places where civic organization and resistance are highly developed at the community level. In 2003, a street march against the municipal government protested living conditions and the abandonment of the area by municipal works. This was not an isolated incident, the community organizes rapidly to face various perceived threats/injustices to their living conditions. In two years of fieldwork in the area, Garcia-Quijano reported that he had never witnessed comparable organization anywhere else in his study region. Contrary to the Lonely Planet Guide for Puerto Rico, which described the coastal sector of Salinas as a 'stench of human misery,' Playa and Playita are two vibrant and active coastal communities, full of civic engagement and enterprise energy, which are fighting pretty steep odds.

This is reflected in the experiences of Don Ramos (*psuedonym*), a Salinas fisher who has belonged, at different times, to the two fishing associations in the area (he lives on the street that separates Playa from Playita). Ramos is one of the widely recognized expert fishers in the area, also a traditional sailboat builder and racer, a captain for recreational fishing trips, and a builder of 'nasas' and 'cajones de langosta'. He comes from a family of fishermen but his father was actually a fisherman from Vieques who rowed his boat to the mainland in the 1930's and settled in Salinas. Though recently retired, he is still a captain and a builder of traps. He is also an ardent critic of fishery policy and a good source of information about the problems that coastal Salinas faces. He believes that the lack of unity among fishers is one of their greatest problems, especially given that they disagree with the government. In his own words: "Here, for me, the gravest problem is unity. We don't have unity. Some throw in with one side and others with the other. We aren't… and the disagreement that we have with the government. Because some throw that way, and others that way, and others that way, and we can't reach [the point at

which] they say that in unity is strength. And that's the truth." ["*Aquí, para mi, el problema más grave es, éste, la unión. No tenemos unión. Unos tiran para un lado y otros para el otro. No estamos... y el desacuerdo que tenemos con el gobierno. Porque unos tiran por allá, y otros por allá, y otros por allá, y no llegamos dicen que en la unión está la fuerza. Y es la verdad.]*

According to Don Ramos, undermining fishers' ability to unite is what he views as corruption in the association's fish market: some of the more powerful members skim money from the market so they won't have to work. This gives the association a bad image, particularly among those who come from working class backgrounds and view hard work as an important activity. It also causes problems for fishers who would like to form an alternative association that functions well for their members. When Don Ramos tried to call a meeting to discuss forming another association, he got the cynical response, "For just the same? For just the same?"

Figure SRIII.10. Fisher Repairing Net, Salinas

The lack of unity was particularly troubling to Don Ramos because he views the problems with the resource as problems that require that fishers form a united front against the Department of Natural Resources, which he characterizes as a disappointment and an agency that harasses rather than helps fishers. They do nothing about pollution from coastal development and recreational sources, which he and Don Gabriel both cited as a problem. Fishers throughout the region mention pollution from industry

as a problem, but Gabriel also mentioned that the jet-ski problem is becoming more and more severe, to the extent that there are very few baitfish in the bay: between pollution and the jet-skis, there are no baitfish to be found, and that places a lot of constrains on fishermen who need bait to go out. They have had to start buying bait from other areas.

He also mentioned that he has noticed a rise in the utilization of detrimental and illegal practices from young, unschooled fishermen (mainly divers with few connections to old-timers), he mentioned the use of bleach to flush octopi out of their caves (the islands just south, outside, of the Bays in Salinas are widely regarded as primier octopus habitat and fishing grounds) and the taking of small lobster. He mentioned that some of the young fishermen know so little about fishing that they don't even know that a juvenile lobster (*langostin*) and an adult lobster are the same species. Thus they fish them, not knowing they are taking a juvenile. When asked if he thought their behavior was due to their lack of connection to older more expert fishers, Gabriel said definitely, that a son of his would never fish like that. His family has been fishing for at least 4 generations, and also they have been boat builders, specially '*nativo*' sailboat builders in the days before outboard engines.

He also mentioned that pollution coming from recreational yachts anchored inside the bays is an important source of environmental degradation. Some ways in which these yachts pollute, according to Gabriel, are by dumping used water and human waste, and also importantly, by leaking of engine oil, gasoline, transmission fluid, and other substance from boats that have been left there anchored (semi-abandoned) for long periods of time.

Fishers here, like fishers across the island, object to imported seafood undermining their market. Don Ramos said that some of the restaurants do bring economic activity to Salinas, but many of them, especially the largest ones, are more of a problem than an asset, mostly because they produce a lot of waste and compete with smaller restaurants without purchasing local fish: "Here, only two or three of the big restaurants," he said, "sell fish caught locally. The rest import it, a lot from Dominican Republic, Venezuela, or from the West."

As a highly vocal fisherman, Ramos has had many run-ins with DNR officials, despite that one of his most important sources of income has been being a captain for research boats, either federally- or DNR-funded. Even though he takes the jobs, he reports, he still thinks these agencies are not doing a good job protecting their resources. Playa and Playita In Salinas, along with Pozuelo and Barrancas in Guayama, are the strongholds of 'nasa' fishing in the Southeast. Playa and Playita, in Salinas are also a stronghold of fishing with 'cajones de langosta' (lobster traps), and Ramos builds and sells a lot of 'cajones', although he claims they are very easy for him to make.

Because Ramos has been a captain for research boats that have worked in ecological assessment in the area, he says that on multiple occasions he has seen first hand the results of research and then when he goes to a DNR hearing or reads a bulletin, he sees the same research with a completely different interpretation or even results that differ from what the field researchers themselves told him when he was with them in the field. An example of this that he gave me is when he was a captain for a group of biologists sampling the effects of the 'Termoelectrica' AEE Thermoelectric Power Plant, on local bottoms, and according to him he was there when the biologists confirmed the observation of himself and other fishers: that in an extended area, near the hot water outtake of the Power Plants' cooling system, there was no life other than algae. It was one of the 'dead zones' that fishermen in the Southeast frequently talk about. When he went to see a hearing of the AEE and the DRNA about that same research, he saw the same scientist saying that he had found no noticeable effects of the hot water out-take whatsoever.

According to Ramos and other fishermen, the Asociacion de Pescadores Don Piche (Playa) is highly organized, while the association in Playita is less so. Both are located close to restaurants and on multiple occasions fieldworkers witnessed fish being sold directly to restaurant people. Because there is no natural beach in the mangrove lagoons in the bay areas, one of the main benefits of being members of an association is to have access to the associations' ramps and docks (both of the associations have docks and ramps with controlled access in their installations).

Las Mareas

Despite being easily accessible from highway #3, Las Mareas seems isolated, cut off from the rest of Salinas by abandoned cane field and nestled in mangrove forests among lagoons that give its residents easy access to the sea. Fewer than a dozen roads connect its houses and few businesses, and it does not engage the tourist traffic to nearly the extent that Playa does. This may be in part due to the proximity of Playa to the main town of Salinas and the relative isolation of Las Mareas. Yet while Playa boasts all varieties of restaurants (elegant, casual, and kiosks), Las Mareas only has a few small places, similar to kiosks, that sell seafood empanadillas and other fruits of the sea.

Figure SRIII.11. Small Vessels among the Mangroves in Las Mareas (the one on the far left contains a gill net)

The fishing association in Las Mareas is small, clean, and shows few signs of being active. On an initial visit to the community there were no boats parked at the association's dock, but on a second there were two moored there. It is a new facility, even equipped with a handicap ramp, surrounded by a new chain link fence, and freshly painted. Its pier is also new, if apparently little used, with no gear strewn about or fish scales glistening along its boards as is typical of active association piers. A woman interviewed who lived near the facility said that the only *Villa Pesquera* in Salinas was in Playa, and there were neither people nor boats at the facility. However, an elderly fisher, 80 years old and fishing since he was a child, said that *casi todo* (nearly everyone) in the community were involved in fishing in some capacity. A third informant called Las Mareas a poor community and claimed that most of the fishers there were *proeles* (crew) on other boats.

Figure SRIII.12. Las Mareas Fishing Association

Southern Rural Region IV:

Arroyo and Patillas

This region of Puerto Rico, the fourth rural region along the main island's south coast, sits between Guayama and the Southeast region that extends from Maunabo to Naguabo. A former sugar, livestock, coffee, and tobacco growing area, where fishers typically moved between fishing and work in the cane, fishers in this region are primarily divers. This is significant, given that their neighbor to the west, Guayama, as well as their neighbor to the east, the region than includes Yabucoa, are two locations in Puerto Rico where fishers still remain tied to trap fishing. This has created one of the most persistent conflicts *within* Puerto Rican fisheries that we have encountered in this research: trap fishers accusing divers of stealing from their catches.

The conflict between divers and trap fishers dates back to the early use of SCUBA gear. Griffith and Valdés Pizzini learned of this during their first months of field work for Fishers at Work (2002), at that time with the story that Dominican divers had taught Puerto Rican divers how to steal from traps. This is likely continue to be an important issue in Puerto Rican fisheries as SCUBA diving—a favorite fishing technique of younger divers in particular—becomes more popular across the islands (as census data and landings data indicate—Matos 2000).

Map SRIV.1. Southern Rural Region IV

Arroyo

Over 20 years ago, Arroyo was the recipient of state funds for the improvement of its downtown marina, a development that consisted of dredging out the marina, adding a jetty and docks, and envisioning even more elaborate accomplishment in the future with a model under glass. The model still sits in the building where Arroyo's fishing association is located, but little more work has been done toward achieving the original goals. The model resembles more of a recreational boating marina than a commercial fishing one, but the association members there continue to believe that, once the development resumes, after a two-decade hiatus, they will occupy a central place along the municipality's downtown waterfront.

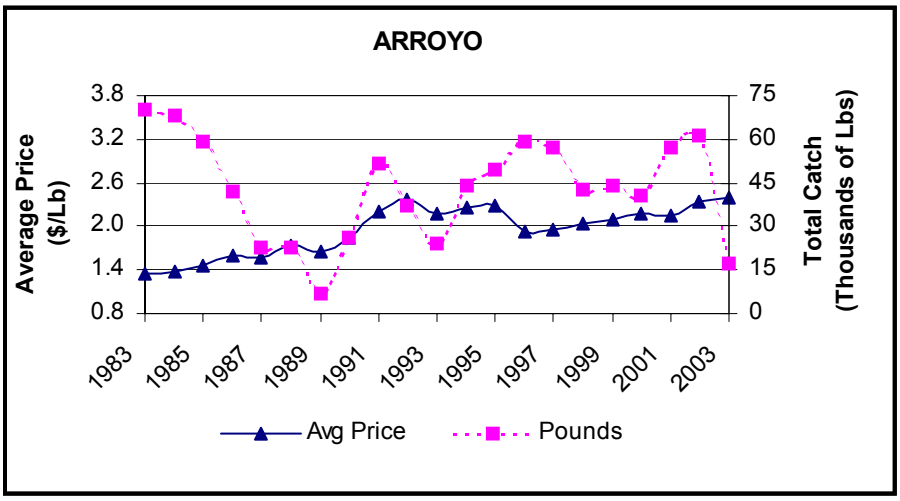
Table SRIV.1. Arroyo Census Data

ARROYO	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	12,936	13,315	13,033	17,014	18,910	19,117
Civilian Labor Force (CLF) [2]	3,350	2,836	2,715	4,024	5,521	5,196
CLF - Employed	2,963	2,716	2,357	3,111	4,047	3,463
CLF – Unemployed	387	120	358	913	1,474	1,733
Percent of unemployed persons	11.55	4.23	13.19	22.69	26.70	33.35
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,104	368	171	137	40
Construction		160	309	240	260	524
Manufacturing		492	530	526	775	459
Retail trade		204	278	348	425	381
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	20.0	21.4	30.5
Persons who work in area of residence [6]		2,056	1,286	1,318	1,847	1,404
Per capita Income (dollars) [7]			588	1,406	2,974	5,797
Median Household Income (dollars) [8]		716	1,379	4,401	7,101	11,484
Individuals below poverty level [9]			9,327	12,588	13,357	10,488
Percent of Individuals below poverty level			71.56	73.99	70.63	54.86

This may be, more than anything, wishful thinking, given Arroyo's relatively poor economic profile. Its levels of unemployment and poverty are slightly higher than most of the municipalities in this study, the former rising through the 1990s, as employment in most sectors declined. Commuting times have increased along with those working outside their communities.

During that same time period, by contrast, fishing experienced somewhat of a rise, if fluctuating, over time, with gradual price increases from 1997 onward (correlation coefficient = -.1511). Part of this may be due to one high value species that Arroyo fishers land. The landings data indicate that lobster is the second most common species they capture, accounting for around 10% of the total 1999-2003 catch (see table I.1), just behind parrotfish (which accounts for 15% of the total).

Figure SRIV.1. Arroyo Landings Data, 1983-2003



Arroyo History

> "His community is a dense cluster of homes in the central town of a rural municipality. The municipality itself is surrounded by sugarcane fields. Hector's barrio has house after house, one nearly on top of the other, each with a small concrete or dirt yard. One of his neighbors cooks tubers in a big pot and mashes them into a paste for sale on the street. From neighborhoods such as these come not only street vendors and others who enage in the informal economy but also public works employees, sugarcane workers, and those who find employment by joining the migration streams along the U.S. eastern seaboard" (Griffith and Valdés Pizzini 2002: 149).

In this passage, Griffith and Valdés Pizzini are describing the home of an Arroyo fisher who fishes part time and, for extra income, raises and fights fighting cocks: *gallos peleados,* as they are known in Spanish, which in Puerto Rico also connotes the downtrodden. This is a fitting passage for a section on Arroyo history. Although Spaniards settled the municipality as early as the late 18th century, it was part of Guayama until 1855 and even after achieving a measure of political autonomy remained dependent on its neighbor until 1898. At that time, taking advantage of its weakness and its port facilities, U.S. forces occupied Arroyo and used it to stage invasions into other parts of Puerto Rico during the Spanish American War. After this its port's economic importance grew, primarily dealing in sugar, which dominated the economy.

Sugar's dominance lasted into the 1970s, but in 1971 the last mill was closed. Arroyo's sugar history is somewhat unique from other coastal municipalities in that, in 1944, one of its largest sugar operations, Central Lafayette, was converted into a sugar cooperative for all of the small sugar cane farmers of the region. Lafayette mill handled sugar from Patillas and Maunabo as well as Arroyo.

Among the more important historical notes is that Arroyo has acquired a reputation for its Virgen del Carmen festival, which attracts thousands from across the island, indicating that fishing has been important to Arroyo residents throughout its history (Toro Sugrañes 1995: 51). They have been able to capitalize on the cultural significance of fishing through this annual performance. Yet many of the Arroyo fishers that Griffith and Valdés Pizzini interviewed during their work on Fishers at Work supplemented fishing incomes with complex occupational histories, including work in the informal economy (as with Hector in the above quote), migrating to the U.S. mainland, and working in the cane.

Fishing in Arroyo

Arroyo's fishing association, sitting on the waterfront downtown, is an impressive-looking facility, in an impressive location, whose members are obviously well connected to the state apparatus. In addition to the improvements to the marina, the association has managed to acquire 12 fiberglass vessels from the state for use by association members. They are around 30' in length, open, in good condition. This move increased the association's membership base, because members have access to these vessels, which may mean that the figures in the table below no longer apply.

Table SRIV.2. Fishing Locations and Styles, Arroyo (n= 21)

Variable	Percent
Shore	0
Continental Shelf	95.2
Shelf Edge	9.5
Oceanic	47.6
Reef Fishes	85.7
SCUBA Diving	57.1
Skin Diving	38.1
Pelagic	33.3
Bait	38.1
Deep Water Snappers	42.9

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

Table SRIV.3. Selected Arroyo Fisher Characteristics (n=21)

Variable	Response
Association Member	52.4
Hours used for Fishing	
< 20 hours	19
20 – 30 hours	57.1
31 – 39 hours	14.3
40 hours	4.8
> 40 hours	4.8
Mean hours	23.81
Standard Deviation	11.272
Minimum hours	0
Maximum hours	48

Source: Puerto Rican Census of Fishers, 2002

Table SRIV.4. Gear Used by Arroyo Fishers (n=21)

Variable	Percent
Beach Seine	0
Trammel Net	42.9
Long Line	4.8
Troll Line	38.1
Fish Trap	28.6
Gill Net	28.6
Cast Net	33.3
Hand Line	61.9
Rod and Reel	35
Lobster trap	4.8
Snapper Reel	0
Winch	14.3
Skin	0
Spear	47.6
Lace	4.8
SCUBA	23.8
Gaff	76.2
Basket	9.5

Source: Puerto Rican Census of Fishers, 2002

Table SRIV.5. Marketing Behaviors of Arroyo Fishers (n=21)

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	47.6
Private	4.8
Association	47.6
Street vending	4.8
Restaurant	4.8
None	42.9
Sell fish gutted	57.1
Keep fish on ice	47.6

Source: Puerto Rican Census of Fishers, 2002

Table SRIV.6. Opinions of Arroyo Fishers Regarding Fishery Resources (n=21)

Opinion	Percent reporting
Status of Fishery Resources	
Better	0
The same	66.7
Worse	33.3
Reasons for problems in fisheries	
Pollution	28.6
Habitat Destruction	4.8
Overfishing	9.5
Laws, regulations, and licensing	0
Crowding	0
Seasonal factors	19

Source: Puerto Rican Census of Fishers, 2002

Called the Coral Marine Fisher Association, Inc., the association is the only organized association in Arroyo and a very well-organized and cohesive group. One of its prominent members, Miguel, (pseudonym) is a good informant on the politics of fishing in Arroyo and in Puerto Rico, highly politically astute, and well aware that within the Arroyo fishing population are knowledge resources that could benefit fisheries management. When told we were conducting research on fisheries, he said:

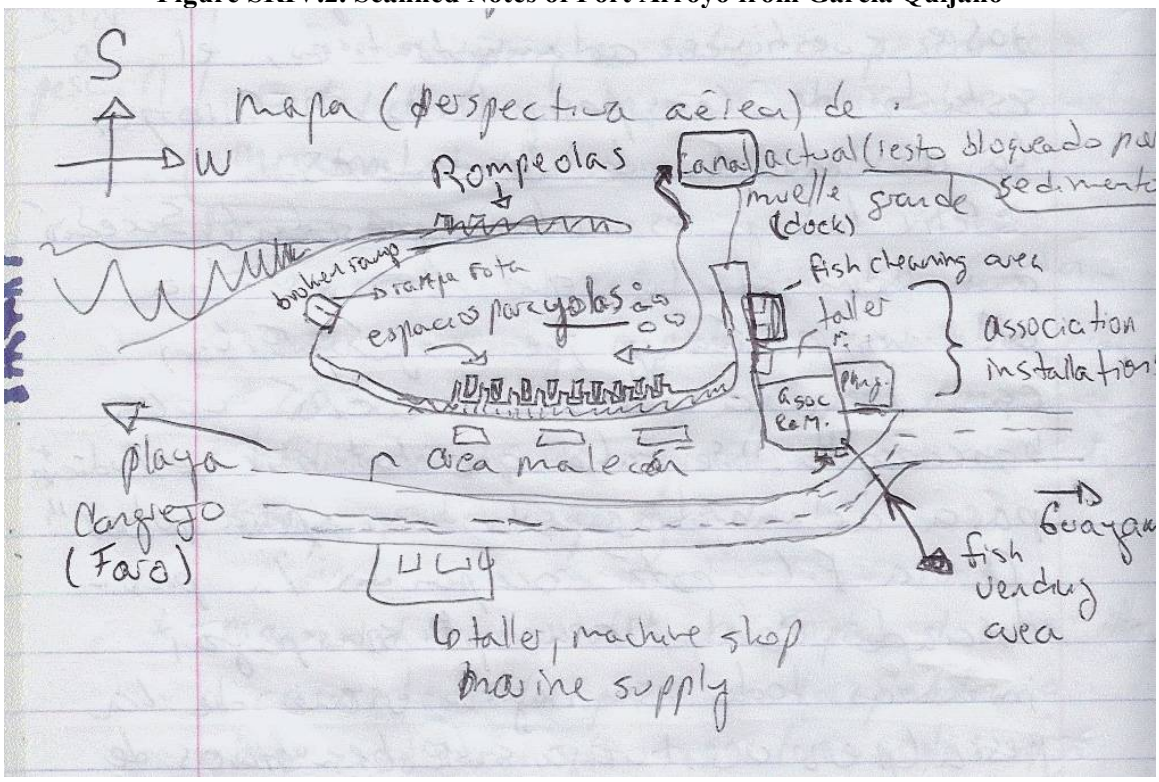
> "Well, you've come to the right place: If you want to find the person who will teach you about marine life and about fishing, from A to Z, the person you need to talk to is my uncle, Prudecio (pseudonym). And, my uncle is, besides an expert, the most non-assuming and honest person you will be able to find. He will tell you what he knows without exaggerating nor diminishing. You did right in coming to me, you got lucky. Because, a year ago some journalist came to write an article about fishing and he started asking around in the plaza, who was a fisherman that could talk to him, and some crazy guy had gone out to fish a couple of times came out and started telling him all kinds of fabrications, exaggerations, and plain lies about fishing. For example, he told the journalist that sardines are juveniles, and when they grow up, they turn into *sierras*! Can you believe that? And then the journalist repeated that on television. We knew and we were all watching the news. Can you believe that the guy just went and said on television that sardines are juvenile *sierras*? (laughs).

Prudencio was Miguel's teacher and mentor in fishing, and still is, again underscoring the family basis of much fishing in Puerto Rico. Miguel defers to Prudencio on all matters related to fishing, in part because the older man had, like many older fishermen in the area, experience in all kinds of fishing, from week-long trips to Anegada and other BVI's in the days before the EEZ's, to diving, trap fishing, nets of various kinds, trolley (silga) fishing, and even building and using land crab traps.

Miguel is very active politically in Arroyo's fishing association. Coral Marine is currently operating the Villa Pesquera installations in Arroyo's Malecon. They are very well equipped, with a large shop area, a large fish-selling area, and an air-conditioned business office. The association's 40 or so members have their own boats, but the association also has six lobster-type open SeaHawks with v-hulls and industrial Yamaha 85HP outboards. Coral Marine got those SeaHawks from the Department of Agriculture, much to the envy of fishers in other ports/communities, whom we heard complaining about it and wondering 'How did Arroyo get those boats?' We learned that it was by plain, yet astute, hard political work. Key members of the association are always on the go, if not fishing or going to meetings with other fishers, Agriculture agents, DRNA agents, then going to boat and equipment auctions and, most of all, dedicated to what was, according to association members, their 'biggest goal in all this": getting the permits and the funding to dredge the little bay in the Port of Arroyo, which had become clogged and very hard to get into and out from due to silting.

The Port of Arroyo is adjacent to the Malecon of Arroyo, and consists of a small embayment protected by a breakwater, about 30 small-boat slots used mostly by fishermen. On the entrance to the embayment, to the western side, are the Association grounds, (see scanned García Quijano notes (2003)).

Figure SRIV.2. Scanned Notes of Port Arroyo from García Quijano



Talking about his involvement in fishing politics, Miguel said that the monetary gain that he gets from his work with the association is that it allows him to have good equipment with which to fish. In general, he reports taking it upon himself to improve the association just because the other fishers are people he cares about, family members and friends.

> "Let me tell you that all of my money comes from fishing, because I don't charge a penny [for my work with Coral Marine]. Fishing is my livelihood, for me it's a hobby, a therapy, and **a cure** (in the junkie sense). Even better, going out with Prudencio, and learning from him, is great, you'll see! I live from this, and this is why Prudencio always taught us to conserve and protect the sea. Some other fishermen litter out there, but not us. WE are the garbage collectors of the sea! Every day we bring back with us garbage, plastic bags, that we find floating around. We let many fish go, when they are small. And we respect the closures. On the other hand, the people from the DRNA, if and when they get out form air conditioned offices –because they have a great attraction to air conditioning- to the sea, you never see them coming back with litter. Even if they see a plastic bag floating around, they wont pick it up. Even though their job is to protect the resources. I do this to protect my source of food, and my way of life. I have invited, many times, the government folks to come out to sea with me, so they can see the quality of person that a fisherman is. So they can make decisions based on what it is like out there, not based on what they think fishing is, or what they have been told. So they can make their decisions based on direct experience. They never go out, and one guy even told me once that my boat was no good, without ever seeing it!"

At one time the association had a professional administrator, but that ended shortly after it began, due to the cost and, as Griffith and Valdés learned during their work on Fishers at Work, because the administrator was using questionable accounting methods. Now all of the administration is voluntary

work done by Miguel, a paid secretary, and other members. The hired administrator "went to school and actually studied administration," yet he almost drove the association to bankruptcy, because "as people in the street know, those who study administration are really studying the best way to steal. We are never going to hire an administrator who is not a fisherman again." The association's grounds are clean, spacious, and well organized—an environment conducive to fish sales. Norman Jarvis would be proud. They have 8 freezers in working order, an office, a large dock and a smaller one, a fish cleaning/weighing area, a net reparation area, a SCUBA tank filling station, and a boat-engine repair shop. They are also a working boat ramp near the association and an out-of-order ramp on the far side of the embayment. In 2004, they began getting ready to open and operate a restaurant that would sell the association's catch, but it still wasn't completed in the Spring of 2005. They reported, however, that the opening of the restaurant was imminent as they were just waiting for the last restaurant operation permits.

The Sea Hawks were donated by a boat dealer in Arecibo, and the association got them through negotiating with the Department of Agriculture and enlisting the mayor for lobbying. The Sea Hawks have become an issue for fishers from other ports, who resent the success of Arroyo's association in securing the boats. One in Guayama said that the thought they were using those boats to steal from traps, and that they had given the boats to '*a bunch of kids that didn't know what they were doing*'. Our experience with the Arroyo fishers was quite contrary to that version of events, as each time we went to sea with Arroyo fishers, we witnessed obvious experts at work who were, above all, very conservation conscious and respectful. The assertion that divers steal from traps is widespread among trap fishers, although it is doubtful that all divers practice theft. Because Arroyo fishers are mostly divers, and some of them (but not all) are young, they are routinely accused of stealing from traps, and worse of all, of using the government-bought Sea Hawks. Of course, it is possible that these accusations are due to resentment because of the political success of the association in getting the boats and securing municipal help, as well as just plain mistrust between the old ways (trap fishing) and modern ways (SCUBA-assisted fishing), which requires less technical expertise.

Arroyo fishermen have been very successful in enlisting politicians at the local level as their benefactors. In a small, very strongly ocean-oriented town like Arroyo, the fishers association can use the possible electoral numbers of association members, as well as members' families and friends, as leverage to secure the mayor's and local representative's attention. At several meetings between association members, independent fishers who are friends of the association, as well as fishers from Patillas, who have very close social ties with 'Arroyano' fishers, and Arroyo's mayor candidates, fishers make it clear that they will vote for the candidate that does the most for the fishing community. Valdés Pizzini (1989) makes illustrates the use of local political power in his discussion of fishers' opposition to a marine sanctuary in Parguera during the 1980s.

Fishermen in Arroyo can be divided into two groups, based on whether they live on the beach or farther up the mountains. Fishers from both can be successful. For example, of two of the most widely known experts and master fishers in Arroyo, one is from the mountain barrios of Arroyo and the other from El Palmar barrio, located next to the town center, right on the beach. However, the fishers from the inland mountain barrios also identify themselves as farmers and most raise livestock and grow crops. Fishers from "el pueblo" (the coastal town) either only fished or combined fishing with a town-based job. Arroyo was also the base of a large sugar cane operation for a couple of centuries (Central Lafayette) and many fishers, both from 'campo' and 'pueblo' were sugar cane workers for many years.

Finally, one elderly fisher in Arroyo is an expert user of the three-layered cotton net (*trasmallo de tres mallas*), which is an old fishing art that is being lost but that can yield excellent fishing results when fishing around the reef for fishes of various sizes. Other expert fishers in Arroyo use these *trasmallos* as well, and they report that Arroyo is one of the few last strongholds of this fishing art in Puerto Rico, much in the same way that Santa Isabel is a stronghold of '*palangreros*' (longliners). These fishers and others

are involved in a program in Arroyo where they teach local public school kids about fishing, the sea, and local marine life, presenting fishing as a possible vocational career for Arroyo kids. Although there are not many other economic opportunities in Arroyo, the mere existence this program indicates the importance of fishing in Arroyo.

Patillas

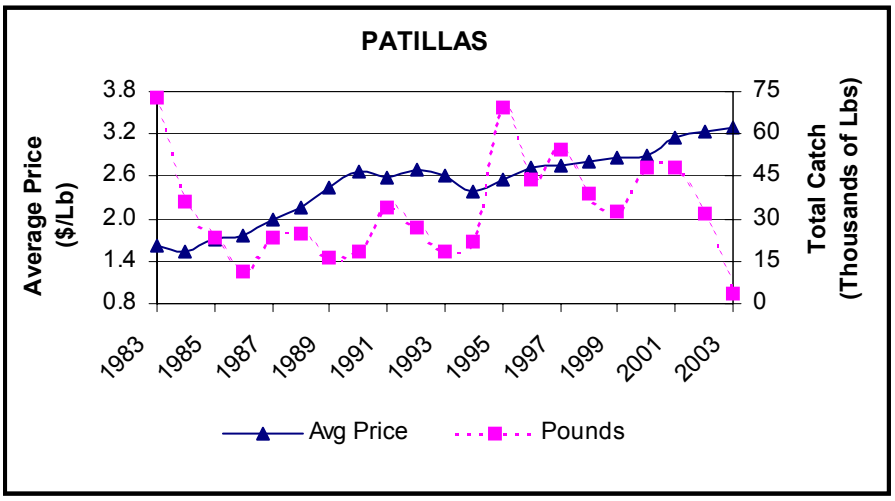
Neighboring Arroyo to the east, Patillas's economic profile is slightly better than its neighbor, with a lower rate of unemployment but similar levels of poverty. Nearly twice as large as Arroyo, it is less densely populated, with only around 1,000 more individuals. Like its neighbor, however, construction is the only sector we track where employment is rising, and the last few years for which we have landings data suggest that fishing is following the same route as the declining sectors.

Table SRIV.7. Patillas Census Data

PATILLAS	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	18,851	17,106	17,828	17,774	19,633	20,152
Civilian Labor Force (CLF) [2]	4,780	3,304	3,350	3,523	5,929	5,142
CLF - Employed	4,618	3,156	3,076	2,857	4,226	3,676
CLF - Unemployed	162	148	274	666	1,703	1,466
Percent of unemployed persons	3.39	4.48	8.18	18.90	28.72	28.51
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		2,036	658	167	184	66
Construction		176	425	283	434	506
Manufacturing		108	603	633	658	519
Retail trade		264	374	333	524	447
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	23.9	27.3	31.9
Persons who work in area of residence [6]		2,504	1,870	1,534	2,219	1,754
Per capita Income (dollars) [7]			544	1,136	2,619	5,950
Median Household Income (dollars) [8]		471	1,372	3,186	6,360	12,021
Individuals below poverty level [9]			14,736	14,193	14,479	10,998
Percent of Individuals below poverty level			82.66	79.85	73.75	54.58

Ranking 27th in 1999-2003 landings, compared to Arroyo's 22nd rank, there is little remarkable about the fluctuating landings (experienced or reported) over the 1983-2003 period. Their banner years appear to have been 1983 and 1996, when their catch would have placed them around 15th or 16th in the rankings. Though prices have risen more or less steadily, they have not responded to changing supplies (correlation coefficient = -.0316).

Figure SRIV.3. Patillas Landings Data, 1983-2003



Patillas History

Guayama's political reach extended beyond Arroyo to include Patillas until 1811, when Patillas incorporated as its own municipality, dedicated to agriculture and raising livestock. Patillas was rural from its earliest days as a municipality, its large and fertile territory sparsely settled. It became a well known as a destination for foreigners, especially Corsicans, and today several of its residents' last names can be traced to Corsica (Toro Sugrañes 1995: 305).

Early in the 19th century, sugar cane production took place primarily on small farms in Patillas, as did tobacco and coffee, its three principal products. In the mid-19th century, two large Haciendas—La Felicita and San Isidro—emerged to dominate agricultural production. They both shipped sugar and rum from the port at Jacaboa, where San Isidro was located, although some of the agricultural products produced in Patillas made their way to more distant mills in Arroyo and Guayama.

In addition to a known destination for foreigners, Patillas experienced piracy directly for many years early in its colonial history. From its experience with pirate attacks, the residents of Jacaboa, its principal port, built a battery protected by six cannons. Patillas remained primarily rural and agricultural into the 20th century, even continuing to produce tobacco and coffee after sugar's general demise. By the 1990s there had been little industrial development, with only two factories locating in the municipality. A local tourist industry developed during the last part of the 20th century, based primarily on guesthouses and the beaches at Guardarraya and el Bajo. The latter also happens to be the site of Patillas's only *Villa Pesquera*.

Fishing in Patillas

Table SRIV.8. Fishing Locations and Styles, Patillas (n= 10)

Variable	Percent
Shore	0
Continental Shelf	100
Shelf Edge	10
Oceanic	40
Reef Fishes	100
SCUBA Diving	80
Skin Diving	20
Pelagic	20
Bait	80
Deep Water Snappers	40

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

Table SRIV.9. Selected Patillas Fisher Characteristics (n=10)

Variable	Response
Association Member	70
Hours used for Fishing	
< 20 hours	0
20 – 30 hours	0
31 – 39 hours	30
40 hours	50
> 40 hours	20
Mean hours	40.3
Standard Deviation	5.143
Minimum hours	35
Maximum hours	50

Source: Puerto Rican Census of Fishers, 2002

Table SRIV.10. Gear Used by Patillas Fishers (n=10)

Variable	Percent
Beach Seine	20
Trammel Net	0
Long Line	10
Troll Line	20
Fish Trap	40
Gill Net	30
Cast Net	40
Hand Line	80
Rod and Reel	20
Lobster trap	0
Snapper Reel	0
Winch	20
Skin	0
Spear	80
Lace	50
SCUBA	60

Variable	Percent
Gaff	90
Basket	20

Table SRIV.11. Marketing Behaviors of Patillas Fishers (n=10)

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	0
Private	0
Association	90
Street vending	10
Restaurant	50
None	0
Sell fish gutted	100
Keep fish on ice	100

Source: Puerto Rican Census of Fishers, 2002.

Table SRIV.12. Opinions of Patillas Fishers Regarding Fishery Resources (n=10)

Opinion	Percent reporting
Status of Fishery Resources	
Better	0
The same	60
Worse	40
Reasons for problems in fisheries	
Pollution	10
Habitat Destruction	0
Overfishing	10
Laws, regulations, and licensing	10
Crowding	0
Seasonal factors	0

Like Arroyo, Patillas is a coastal town with a tradition of dependence on the sea. There are a few contrasts with nearby coastal towns, most of them related to the topography of Patillas. In fact, the changing topography between its two main coastal Barrios, 'El Bajo' and 'Guardarraya,' divides and differentiates them even today. El Bajo de Patillas is the first coastal barrio one encounters going on road #3, east, from Arroyo to Patillas, and is located on the same alluvial coastal plain as Arroyo. It is also located near the Former Central Lafayette, and has a strong history of dependence on sugarcane work for Central. In many ways, El Bajo de Patillas is closer to Arroyo than to the other coastal barrio of Patillas, even socially.

Guardarraya

The coast of Guardarraya, on the other hand, and especially the Malapascua sector, is comprised of a narrow strip of land between the tall mountains of the eastern end of the Cordillera Central of Puerto Rico, and the sea. The topography of Guardarraya's coast is very dramatic: between Guardarraya and Maunabo the Cordillera dives into the Caribbean Sea. People in Guardarraya, and this includes fishers, tend to be independent of others sectors, and in many occasions they have expressed to me that they are proud of it.

Guardarraya has a small but active group of fishers. Some of them, besides regular commercial fishing, appear to be running small-scale charter fishing as well. There is also a lot of subsistence (decidedly not luxury/recreational, but not commercial either) fishing by locals, compared with other nearby areas. It is very difficult to pass by he back reef areas close to the shore in Guardarraya without seeing people

involved in line, rod/cast, spear fishing, and collecting. The Guardarraya coastline differs from El Bajo to the West and Maunabo to the east in that the coral reefs are much closer to the shore in front of Guardarraya, especially in the Malapascua sector. This gives locals access to reef fish without having to deal with open/water long-distance navigation. Of course, the reefs, proximity to the shore make them vulnerable to siltation and pollution, but the coastline is rugged and rocky, as well as relatively unpopulated and undeveloped, which may cut down on potential damage to the reefs.

El Bajo

The largest group of fishers in Patillas operates out of El Bajo (The Shallows), and as the name implies, their coastal barrio fronts the extensive shallows that were formed by the combined action of a delta of the Río Patillas, the coastal mangroves, and the fringing coral reefs. All of this makes navigation tricky, but these factors also enhance biological productivity of coastal waters, and thus, historically, fishers from El Bajo have been able to fish relatively close to shore. El Bajo is very oriented towards the sea, and the public beach of Patillas is located there, as well as the only bay suitable for overnight anchorage of boats and sailboats. El Bajo is also, along with Santa Isabel and Salinas, one of the most important traditional ports for the *chalana* (native sailboat) regatta circuit. In late July, when the yearly El Bajo regatta takes place, the colorful *chalanas* with their large sails, racing up and down the beautiful bay is truly a sight to behold. The seafood restaurant scene of Patillas is also concentrated in El Bajo, and one of the most famous restaurants in the Southeast, "El Mar de la Tranquilidad,' is located there.

The Asociacion de Pescadores de El Bajo de Patillas has about 35-40 members, depending on the year, and is located right next to the Maritime Police Station and the Public Balneario of Patillas, as well as very near the large vacation houses of rich people from San Juan that are usually only occupied during holidays. In a way, it is pretty dramatic when you make your way towards the Balneario of Patillas area, how all the different and sometimes strongly competing stakeholders some together within meters of each other along a short length of coast. The installations of the Association itself are very spacious and well kept, and under the sea grape and *emajaguita* trees that fill the yard there, it was probably the most comfortable and just around nice and pleasant *Villa Pesquera* in Puerto Rico. The lockers, the freezer, and the weighing/selling station all look in very good condition and were evidently in regular use. The Association of El Bajo is located in a beach, and the water up to the association is very shallow, thus the association's dock is one of those slender, long docks commonly used in mangrove lagoons to provide maximum extension into deeper water. Compared to the nearby Coral Marine association in Arroyo, the El Bajo group seems to have fewer divers (although quite a few nonetheless), more trap fishermen and deepwater liners (at least 4 of the members fabricate traps, both traditional and plastic milk-crate), smaller yolas, and definitely less political activity, although this not to say they are not active. They do seem to be more active than the Guardarraya group. Few associations are as active politically as the Coral Marine in Arroyo.

According to association members, fishers from Patillas (and those from Arroyo and Maunabo as well) have, because of their location in the coastline, the opportunity to access the extensive shallows between Eastern Puerto Rico and the Islands of Vieques and Culebra, as well as the extensive shallows located to the west of Patillas, from Arroyo to Juana Diaz. Fishermen form these areas report fishing in places such as 'Caja de Muertos' and 'Berberia' to the east, 'Las Coronas' and 'Los Guajiles' to the south, and 'El Canal' and Vieques to the East, among other places. For day trip fishing, location is everything and they take advantage of it. A fisher hailing from Patillas or Arroyo is within three hours by sea of Caja de Muertos, and within three hours of Vieques. This broad range of operations may have something to do with the rumors by fishermen from Guayama and Salinas that Arroyanos and Patillenses are trap stealers and that they infringe on others' territories. They simply lack a small, defined territory when compared with Guayamenses, for example, and thus are viewed as not having and not respecting any territories at all. Also, like the association in Peñuelas, both Arroyo and Patillas tend to be more flexible in accepting

new membership and members who live elsewhere (two Dominican fishermen are members of El Bajo Association).

Many of the members of the El Bajo's Association actually live in Arroyo, and members commonly spend time and even land catches in both Patillas and Arroyo. They readily accept that the two associations are close, and even engage in cooperative activities: for example, El Bajo divers routinely go to the Arroyo Association to fill their SCUBA tanks. Also, the El Bajo fishers have been taking care of the larger boats that belong to the Arroyo Association, because the siltation problem in the Arroyo port temporarily made it impossible for the Arroyanos to keep those large boats there. An interesting phenomenon is that these two associations seem to 'share' a number of proeles that shift between fishing for an Arroyo fisher or a El Bajo fishers, depending on the day.

Many fishers in Patillas identify with fishers from southwest Puerto Rico or from Vieques and Culebra more than nearby regions such as Guayama, in part because of their long-distance, formerly transnational fishing excursions (to the British West Indies, The Dominican Republic, and elsewhere). Now Patillas fishers report that this way of fishing ceased to be available after the EEZ's went in place in the late 70's early 80's, since most of the fishing grounds they used to visit now fall under the jurisdiction of the British Virgin Islands. As one said to me "My life (in those times, before the EEZ's) was 7 months of the year fishing here (near shore in his yola, doing daytrips) and the rest I would spend fishing and living out of a boat."

Regarding fishery management in Puerto Rico, one Patillas fisher said that, in his view, then main problem with the state's style of management was that "there was a serious discrepancy between 'la Ley de la Pesca' y 'La Realidad de la Pesca' (the laws that govern fishing vs. the reality of fishing). According to him, the laws regarding fishing attempt to be so exact that they completely miss that the sea ecosystems in Puerto Rico are very complex, especially because of the patchiness of the resource.

This view resonates with others to suggest that Puerto Rican fishers' understanding of local ecosystems is more akin to advanced *ecosystem ecology* than to traditional population biology, which dominates the science used by agency-based fishery management (García Quijano, forthcoming; cf. Griffith 1999 for a similar case in Mid-Atlantic fisheries). To put in in simple terms, population biology (for example, a yield-per-recruit model) focuses on predictions of numbers that describe populations of fish, while ecosystem ecology focuses on attempting to understand the complexity inherent in the ecosystem and, from there, to think about what kinds of combinations of parameters might result in a ecosystem continuity and/or change.

In the words of the same Patillas fisher quoted above: "A fisher that doesn't have flexibility/room to operate cannot subsist from fishing." He added: "*Esta Ley esta fuera de control"* (This law is out of control), referring specifically to the size limits. Reporting that his favorite kind of fishing is deep-water fishing for groupers and deep-water snapper, because of the way that the size-limit regulations are enacted, he is forced to be wasteful, which causes him a lot of grief and puts lot of constraints on the time and effort he spends fishing. He added that regulations are making it so difficult, that most young fishers are turning into full-time divers, a type of fishing that he views as potentially more destructive if done carelessly, and that also, the knowledge of deep-water fishing is being lost.

Northern Municipalities I:

Carolina, Loíza, Río Grande, Luquillo

This area of Puerto Rico, between San Juan and Fajardo, is perhaps best known for its reputation as the heart of Puerto Rico's Afro-Caribbean tradition, a reputation that has been disputed and supported by scholars yet harnessed by local residents as a tourist attraction. Along a long, winding road between San Juan's main airport and the north coast, Carolina residents staff kiosks that sell traditional food and goods that trace their origins to Africa, and seasonal festivals in Loíza celebrate African dances and other traditions. Facing the rough north coast, sheltered bays and launching locations are at a premium, although *jueyeros* exploit the vast wetlands of the area, selling bundles of land crabs along the main road leading to Fajardo.

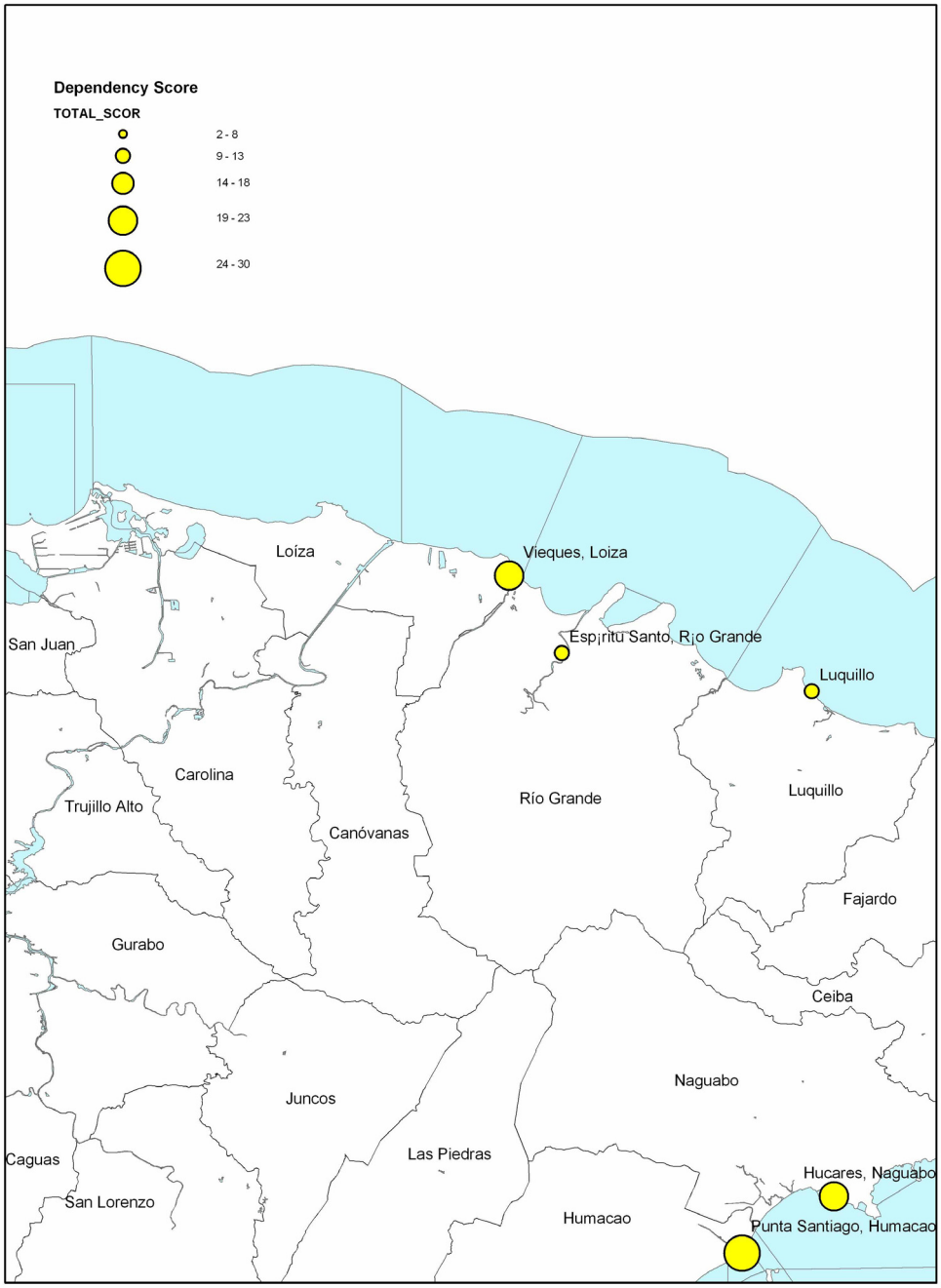
These activities serve to supplement and enhance the much larger luxury tourism in this region, best known for beach-oriented resort development in Carolina's Isla Verde and on several points between Carolina and Fajardo. Isla Verde is among the most highly developed tourist area in Puerto Rico, and current developments in Río Grande—particularly the Hotel Paradisus—rival those in Isla Verde. Luxury tourist development has been a point of contention in this region among fishers, given the tendency for such development to infringe upon fishing territories and, more importantly for fish stocks, destroy critical coastal habitat such as mangrove forests and wetlands.

This region was formerly the site of slave plantations that did, in fact, import large numbers of peoples of African descent, which led to some historians to contrast these regions with the *jíbaros* of the highlands. This latter designation generally called to mind the more independent, peasant farmers who grew coffee, tobacco, mixed vegetables, and other commodities, while the lowland plantation areas were cast as locations of widespread poverty and high seasonal unemployment. In his dissertation about the Piñones region of Loíza, as noted in part in the historical discussion, Giusti-Cordero disputes the idea that idle times on the sugar cane plantations were in fact idle times in the homes of rural workers. He suggests that harvesting marine resources, including land crabs, mussels, and fish, were important pursuits during those times of the year that the sugar mills and field employed skeleton crews.

All these municipalities, along with Fajardo and others, were at one time a single administrative unit called Loíza, which extended over much of eastern Puerto Rico. Later the Loíza region came to be known as the three municipalities of Carolina, Loíza, and Río Grande, which were united by similar economies and ecological characteristics. Of the latter, particularly important were its mangrove forests and coastal wetlands fed by a network of seven rivers. These both watered the rich alluvial plain of the coast, setting the stage for the development first of haciendas and peasant farms and later of slave plantations, and helped to create a littoral of wetlands and mangrove forests that provided critical habitat for larval and juvenile fish and land crabs.

Map NI.1. Western North Coast Municipalities

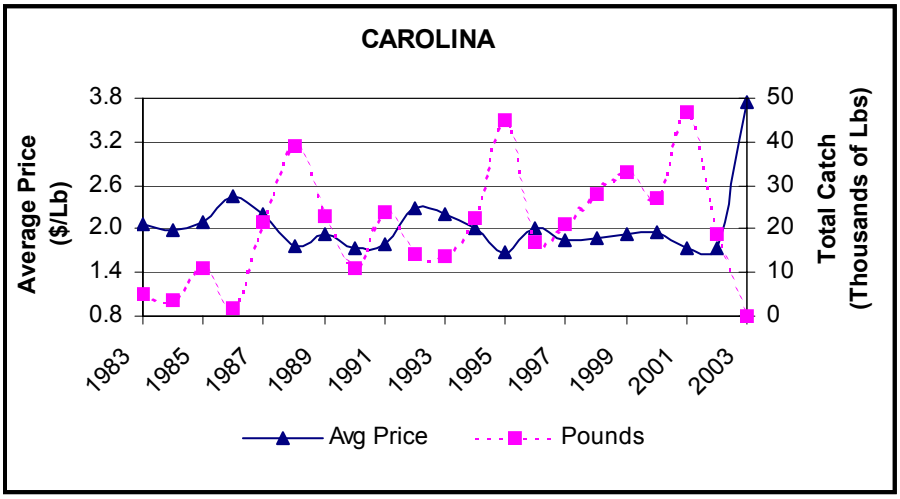
Carolina, Loíza, Rio Grande and Luquillo Area Fishing Communities and Dependency Scores



Carolina

Bordering eastern San Juan, Carolina is mostly metropolitan, only the northeastern part of this municipality is significant as a fishing site. Just east of the Luiz Muñoz airport in San Juan, along a narrow stretch of coastline leading to the neighboring municipality of Loíza, the public beach and kiosks that barbeque pork and other foods surround Carolina's sole landing center. It is called Torrecillas and is located near the Carolina-Loíza border. For the 1999-2003 period, Carolina ranked 30th among all coastal municipalities reporting landings, well below each of its neighboring municipalities. During the most recent year reported (see graph below), however, catch fell to nearly zero, beginning to plummet two years earlier, when landings approached 50,000 pounds. Prices in Carolina reflect, somewhat, these trends, with record highs of over $3.00 per pound in 2003, the year only 100 pounds were reported landed. This precipitous drop in landings may account for our own failure to encounter anyone at Torrecillas to interview; hence, the data presented on Carolina come exclusively from secondary sources.

Figure NI.1. Carolina Landings, 1983-2003



According to landings data from 1999 to 2003, the three most important species landed in Carolina are Jacks, Yellowtail Snapper, and White Mullet, and the three most important gear types are bottom lines, gill nets, and trolling lines. These species and gear varieties overlap with others from this region on the North Coast, particularly its neighbors to the east, Loíza and Río Grande. Yet Carolina's proximity to San Juan may have influenced its landings in recent years. The comparatively low unemployment rate in Carolina compared to many other coastal municipalities may indicate a more robust economy. Under such conditions, we know from historical and ethnographic work on Puerto Rican fisheries, fishers often leave fishing temporarily for wage work.

Table NI.1. Carolina Census Data

CAROLINA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	29,224	40,923	107,643	165,954	177,806	186,076
Civilian Labor Force (CLF) [2]	7,805	11,776	33,984	56,862	72,358	65,220
CLF – Employed	7,492	11,036	32,903	50,425	61,684	57,008
CLF – Unemployed	313	740	1,081	6,437	10,674	8,212
Percent of unemployed persons	4.01	6.28	3.18	11.32	14.75	12.59
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,556	401	317	428	209
Construction		1,528	3,100	2,690	3,605	3,163
Manufacturing		2,004	5,907	6,199	6,198	3,875
Retail trade		1,188	4,848	7,267	9,899	6,922
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	32.5	34.1	32.2
Persons who work in area of residence [6]		5,432	9,861	15,352	23,022	23,129
Per capita Income (dollars) [7]			1,472	2,916	5,524	10,511
Median Household Income (dollars) [8]		1,689	4,924	8,386	13,368	21,236
Individuals below poverty level [9]			42,589	74,439	73,952	62,496
Percent of Individuals below poverty level			39.57	44.86	41.59	33.59

Carolina History

Originally part of a much larger administrative unit of an economically depressed area known as Trujillo Bajo, across the Río Grande de Loíza from Río Piedras (currently a city in the San Juan metropolitan area, where the University of Puerto Rico's main campus is located), Carolina's earliest established town, San Fernando de Carolina, wasn't founded until the middle of the 19th century. While people had settled the region earlier, no official town had been founded until this time. This was fairly late in Puerto Rican colonial history, given that San Juan was among the earliest European cities founded on the main island, but was likely related to the region's geography. Carolina sat on the Río Grande, which routinely flooded and inundated surrounding areas, taking a long time for its water levels to fall and reinforcing the association between wetland/mangrove-forested environments and danger. To the east, Loíza's plantation economy dominated most of this region, while to the west the island's capitol city and metropolitan area's shipping and commerce overshadowed developments in Carolina. Shortly after its 1852 founding, Carolina suffered a devastating cholera epidemic (1855-56) and remained burdened by Trujillo Bajo's stagnant economy through the 1860s; not until 1873 did their economy become robust enough that they could fully annex the towns of Trujillo Bajo. That same year slavery was abolished, freeing hundreds of slaves. Five years later the municipality had nearly 10,000 inhabitants and 16 commercial establishments (Toro Sugrañes 1995: 94).

Early on the municipality became more associated with plantation agriculture and the raising of livestock than the shipping and commerce to its immediate west. Coastal residents of Carolina grew or worked primarily with coconuts and sugar cane, while others grew tobacco, rice, coffee, and other crops in the interior. Cattle ranching was also important to the municipality's 19th century economy, and ranching's importance, unlike many other economic sectors, grew throughout the 19th and 20th centuries even as sugar cane production dwarfed most other agricultural pursuits. Sugar production eventually founded 15

centers with the capacity to produce refined sugar and rum, but its economic importance declined through the 1950s. In the Carolina countryside, while sugar's importance in Carolina lasted around a century, cattle ranching remained an important economic force; by 1967 there were 27 "first class" cattle ranches in Carolina, though they fell to 20 through the 1970s.

Tourism has been important to Carolina through most of the 20th century, in part because of the proximity of the major airport, which now serves upwards of 6,000,0000 travelers annually. Neighboring the airport is Isla Verde, which has 15 luxury hotels and is considered at least as important a tourist destination as San Juan's Condado district. Since World War II, the population of Carolina has been more and more concentrated along its periphery with San Juan, becoming an important industrial, educational, and banking center for Puerto Rico. Under the 936 tax laws, over 150 factories located in Carolina, producing primarily pharmaceuticals, chemicals, and electronics. Against this robust background, commercial fishing has played a small, and apparently diminishing, part.

Fishing from Carolina

The following data from the fisher census comprise the bulk of our information on Carolina fishing. Only 14 fishers responded to the census, and over 90% of those were part-time fishers, with nearly 80% fishing fewer than 30 hours per week. Favored fishing locations are reefs and the continental shelf.

Table NI.2. Fishing Locations and Styles, Carolina (n= 14)

Variable	Percent
Shore	0
Continental Shelf	92.9
Shelf Edge	14.3
Oceanic	35.7
Reef Fishes	100
SCUBA Diving	7.1
Skin Diving	28.6
Pelagic	28.6
Bait	21.4
Deep Water Snappers	35.7

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

Table NI.3. Selected Fisher Characteristics, Carolina (n=14)

Variable	Response
Association Member	78.6
Hours used for Fishing	
< 20 hours	21.4
20 – 30 hours	57.1
31 – 39 hours	14.3
40 hours	0
> 40 hours	7.1
Mean hours	24.79
Standard Deviation	10.101
Minimum hours	10
Maximum hours	48

Source: Puerto Rican Census of Fishers, 2002

Gear varieties reported in the census are in line with those reported in the landings data, with lines the principal gear used, followed by gill nets. Gaffs are usually used in conjunction with lines. A discrepancy does exist between the two data sets, however, in that troll lines were the third most commonly cited gear in the landings data, but here are preferred by fewer than 10% of the fishers.

Table NI.4. Gear Used by Carolina Fishers

Variable	Percent
Beach Seine	0
Trammel Net	7.1
Long Line	14.3
Troll Line	7.1
Fish Trap	7.1
Gill Net	50
Cast Net	28.6
Hand Line	78.6
Rod and Reel	57.1
Lobster trap	0
Snapper Reel	0
Winch	28.6
Skin	7.1
Spear	21.4
Lace	7.1
SCUBA	0
Gaff	78.6
Basket	0

Despite that nearly 80% reported belonging to an association, the association is among the preferred marketing outlet by under 10% of fishers, with private buyers or dealers and street vending more popular. Again, the proximity of San Juan may make these alternatives more lucrative than in other areas.

Table NI.5. Carolina Fishers' Marketing Behaviors

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	85.7
Private	0
Association	7.1
Street vending	28.6
Restaurant	0
None	7.1
Sell fish gutted	0
Keep fish on ice	85.7

Source: Puerto Rican Census of Fishers, 2002

Finally, in line with other North Coast fishers, high percentages of the Carolina fishers reported pollution and habitat destruction principal problems affecting stocks. Pollution may derive from the proximity of the airport, which is extremely busy, and many fishers here probably attribute the problems with habitat destruction to coastal real estate and hotel development. This is clearly the case in Loíza and Río Grande, the two municipalities to the east of Carolina.

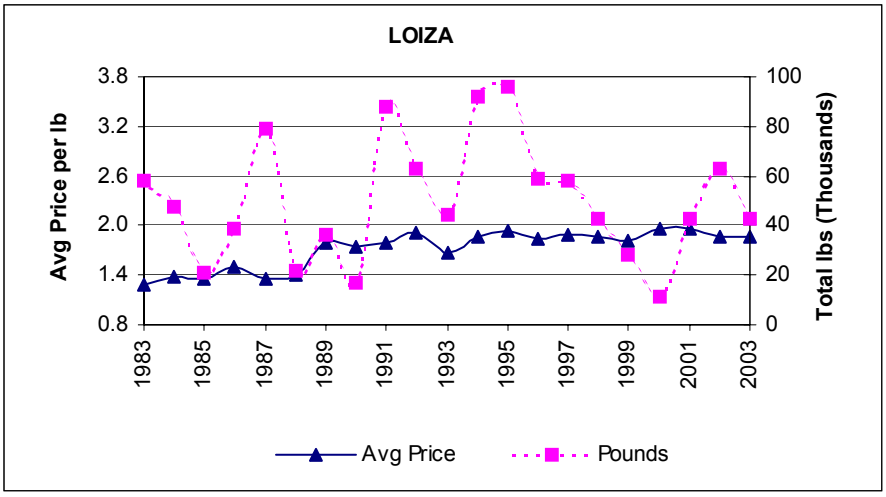
Table NI.6. Opinions of Carolina Fishers Regarding Resources

Opinion	Percent reporting
Status of Fishery Resources	
Better	0
The same	35.7
Worse	64.3
Reasons for problems in fisheries	
Pollution	57.1
Habitat Destruction	28.6
Overfishing	14.3
Laws, regulations, and licensing	21.4
Crowding	0
Seasonal factors	0

Loíza

With its name based on the name of a female cacique and its reputation one of a repository for African culture, Loíza possesses a mystique for many Puerto Ricans and visitors to the island that has become important to the local tourist trade and to the identities of its residents. Located between Carolina and Río Grande, Loíza's fishing is confined to a narrow sandy corridor that, like the coast of Carolina, adjoins areas known to tourists for its roadside stands and occasional festivals celebrating an African heritage.

Figure NI.2. Loíza Landings Data



The landings data seem to indicate that fishing in Loíza has fluctuated considerably over the decades between 1983 and 2003, from lows of around 20,000 pounds to highs near 100,000. Price has risen over the same period by around 60 cents per pound, with little relation to the supply (correlation coefficient = .1412). The landings data also indicate that, of formerly four sites reporting landings in Loíza, since 2000 only one site, a community called Vieques (the same name as the island), has reported any landings.

Census data also note a drop in people employed in the category containing fishers, although this is common across the island. Unemployment declined slightly through the 1990s, probably due to the municipality's proximity to San Juan. Commuting time increased over this same period. Recent declines in agricultural labor are especially significant, given Loíza's history. Giusti-Cordero's monumental doctoral dissertation, Labor, Ecology and History in a Caribbean Sugar Plantation Region: Piñones (Loíza), Puerto Rico: 1770-1950, documents a lengthy and complex history of agricultural production in which sugar only emerged as its principal commodity after the employment of slave labor in cassava and manioc production, most of it supplying San Juan.

Table NI.7. Loíza Census Data

LOÍZA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	24,755	28,131	39,062	20,867	29,307	32,537
Civilian Labor Force (CLF) [2]	5,482	6,704	9,739	5,546	9,731	8,163
CLF - Employed	5,311	6,260	9,129	4,522	6,890	5,972
CLF – Unemployed	171	444	610	1,024	2,841	2,191
Percent of unemployed persons	3.12	6.62	6.26	18.46	29.20	26.84
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		2,032	810	53	122	42
Construction		952	2,042	596	714	648
Manufacturing		1,196	2,412	665	839	313
Retail trade		496	900	438	817	684
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	35.9	36.0	39.2
Persons who work in area of residence [6]		3,916	3,453	1,429	1,584	1,202
Per capita Income (dollars) [7]			715	1,367	2,808	5,283
Median Household Income (dollars) [8]		951	2,530	4,726	8,319	11,200
Individuals below poverty level [9]			28,254	15,291	19,867	19,394
Percent of Individuals below poverty level			72.33	73.28	67.79	59.61

Loíza History

The early association with Loíza with the female cacique, Yuisa, indicates its importance as a Taino region prior to the Spanish. The arrival of the Spanish proved devastating to its namesake, however, as she married a Spaniard and was killed by her own people for it. Archaeological evidence supports the fact that this was an important region for the Taino. They used the Río Grande de Loíza to explore and utilize the interior.

Spanish settlement of the region occurred early; by the second half of the 16th century there were already several towns and people dedicated to manioc, cassava, and sugar production, with a number of grinding mills and processing centers. Livestock also became important early on. The town of Loíza had close to 1,200 inhabitants in 1776 living in more than 100 houses, making it one of the most important towns in Puerto Rico. By the 1830s this had increased to over 4,000, about 17% of whom were slaves.

Early in the 20th century, suffering economic difficulties after a devastating hurricane in 1902, the entire municipality was incorporated into Río Grande. It wasn't to regain its status as an autonomous municipality until 1990. As noted earlier, agriculture was the cornerstone of Loíza's economy from the very beginning of human settlement, given its fine soils. Among the crops produced were yucca, bananas, plantains, rice, corn, sugar cane, avocados, and, in its highlands, coffee. Livestock included horses, cows, pigs, sheep, and chickens. Fishing (in both marine and fresh water environments) and the gathering of land crabs has always been important as well.

Fishing in Loíza: Barrio Vieques

From four landing centers reporting catches up until the late 1990s, three of Loíza's landing centers stopped or severely cut the landings they reported before 1999, leaving only one functioning Fishermen Association of Loíza, Barrio Vieques. This association is closely aligned with the African traditions celebrated there. In the words of the association's president, "In Loíza, fishing and folk art go together." As a testament to this, part of the installations of the association's building have been converted into a workshop/gallery for some Vejigante mask-makers and painters who are also fishers, or fishers who are also mask-makers. Our visit to the association took place during Holy Week, so we were able to witness the dynamics of a day of unusually high demand for fish.

Figure NI.3. Photo of Fishing-Themed Art Inside Loíza Fishers Association

Figure NI.4. Yolas in the Ramp-Less Beachfront, Vieques, Loíza Fishers Association

As a predominantly Catholic people, the tradition still followed by many Puerto Ricans is not to eat red meat during Holy Week, and some maintain the tradition of not eating it at all during Lent, or at least on every Friday during Lent. Thus Lent is a period of high fish sales, and these are heightened during Semana Santa. During that time, if devout people don't assure themselves of a supply of fish, they might not have any animal protein to eat or to offer visitors, and visiting is an important activity, nearly always accompanied by food, during holidays in Puerto Rico.

During Lent, easily up to 50 or more people can visit at the association's grounds at any one time, all looking anxiously to the sea waiting for the last remaining yola to come back to land. Of two yolas fishing the Lent day we visited (the seas were relatively rough, with 6-8 swells and high winds), one had come back due to concerns about the weather and the other hadn't come back. As one of the fishermen later, Antonio, said, "A moment like this carries stakes for everyone." The customers really would like to have fish, the association makes money from fish bought there, and most important of all, fishers really like it when a crowd forms waiting for fish and there is a good catch to sell, so customers leave satisfied and return the next time they want to buy fish. This is in line with other fishers who claim, "We defend ourselves with fresh fish."

Eventually, the last yola, Los Compadres, arrived (see photos). They landed a good catch, having caught several kinds of deep water snappers. Immediately they were surrounded by customers yelling and fighting for a place in the line. Because fish is sold through the association, Antonio had to interrupt our conversation for about 30 minutes to go take care of incoming fish. He took the catch that has just arrived to the weighing and preparing room. People ran after him, pushing thought he door, all struggling to get in first. This was a group desperate for fish! Given such gold rush conditions, Antonio had to negotiate for a while to make sure that the catch was spread among the consumers and that nobody bought too much and left the other unhappy (the demand dramatically exceeded the offer). He set a per pound limit per person.

Figure NI.5. Customers Gathering at Loíza Association to Buy Fish during Lent

While this was happening a fish vendor from outside the association brought a pick-up truck full of fish and began selling it inside the association's grounds. This man was not related to the association. Antonio was made aware of this and quickly went and talked to the guy. After some negotiation, the fish seller was allowed to stay. Later, one of the other fisherman, talking about the man in the pick-up, told a costumer: "I am not sure who this guy is or if he has a big boat, but his fish are not fresh, they have been frozen for a few days. They are good fish, but they are not truly fresh."

According to Barrio Vieques president, the association has about 25 active members, but at one point in time they had more than 70 members. "There are many, many fishermen in Loíza," he said, "but most of them fish for themselves not with an association." The main reasons for the decline have been death and retirement. The association's ice maker is the most attractive part of the installations for fishermen, as well as its two large freezers, a communal fish preparation area, parking, and lockers for fishermen. As noted earlier, part of the association's ground is dedicated to and artisan workshop/gallery and small restaurant, not presently in use. This seems like standard equipment for an installation of its kind, with a glaring exception. There is no dock, ramp, channel, or installation of any kind that would facilitate going in or out of the water. There is only the beach (a high energy beach, by the way), right in from of the association. The fishermen have put in a couple of anchored moorings and tie their boats as well as they can. A makeshift ramp has been fashioned just by dumping pebbles and cobbles between the association's parking and the water, through the beach, but this erodes away every couple of months and accommodates only the lightest of trailers/boats. In general, fishers have to get our of their boats, engines, catch, everything, while still in the water, and then pull the yolas to shore by hand.

"Just like in the 1940's" the president said about this. He added that this brings about several moments of hazard when going off or coming to shore, because the fishermen have to lower gear, engines, and catch by hand from the boats into chest-deep water when the seas are rough. Many fishers from Loíza trailer their boats for half an hour to use the ramp of the fishers association of the Espiritu Santo River, in Río Grande. The president himself had a bandaged hand, which he explained came from lowering his outboard engine by hand, when the lever that holds the keel out of the water slipped and the motor

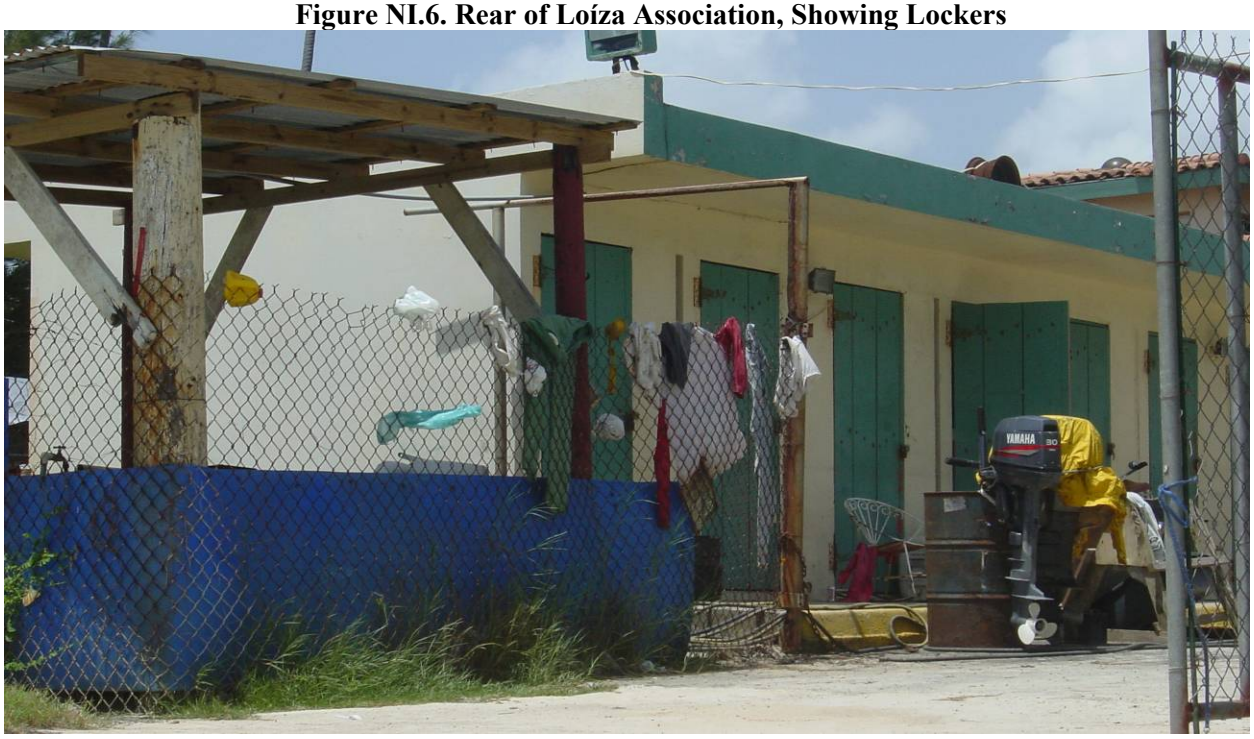
slammed down on Tomas' hand, pinning the hand between the engine and the boat's transom bar. The result was six stitches and a week unable to go out and fish.

Another fisher, also an artisan in the workshop/gallery, also told an occupational injury story, this one about one of the youngest and most productive fishers of the association, once a prospect for Major League Baseball; he was caught by an outboard propeller while getting gear from the boat in high waves. The propeller caught him in an arm, shoulder, chest, neck, and a leg. The accident almost killed him, and ruined his career as a baseball player. This man continues to be a highly productive fisherman, however.

In general, compared to other fisher association grounds, Loíza is among those who evidence the least investment and maintenance by the government, while being one of the highest in maintenance efforts and involvement by the fishers themselves, reflecting its importance in Barrio Vieques. When asked about this importance, the president said:

> "The poor people in Loíza live either from the sea or from popular art/crafts (masks, public art, etc.) From fishing and art, that's what we live from. From 100+ families in Barrio Vieques, 75 families fish. But most do not have members belonging to the association. They do their own thing. There is also an association on Barrio Toca and in Barrio Piñones. All my ancestors have been fishermen…The first gift I ever received in my life, when I was little, was a small *atarraya* (castnet), handmade by my grandfather. With that atarraya I started going to the mangrove channels near Cape Miquillo, to catch sardines to eat and sell. I would then put my catch in a *'dita'* [A container made from the local "higuera" plant. Its use dates form Taino times]"

Figure NI.6. Rear of Loíza Association, Showing Lockers



The importance of deep water snappers is shown in the census data from Loíza, with 65% saying that they target such species. The same proportion say they fish the continental shelf, while over half also reef fish. That the fishers of Loíza are dedicated to fishing as a way of life is suggested by the high percentage that belong to the association and that about one-third of those who fish do so 40 or more hours per week,

with one in five fishing more than 40 hours per week. The Association's power is reflected, moreover, in the observations above, that all of the catch is to be sold through the association, as well as in the census data, which show that over two-thirds use the association as their market.

Table NI.8. Fishing Locations and Styles, Loíza (n= 20)

Variable	Percent
Shore	50
Continental Shelf	65
Shelf Edge	10
Oceanic	50
Reef Fishes	55
SCUBA Diving	10
Skin Diving	5
Pelagic	20
Bait	40
Deep Water Snappers	65

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

Table NI.9. Selected Loíza Fisher Characteristics

Variable	Response
Association Member	95
Hours used for Fishing	
< 20 hours	25
20 – 30 hours	35
31 – 39 hours	10
40 hours	10
> 40 hours	20
Mean hours	27.7
Standard Deviation	14.651
Minimum hours	0
Maximum hours	48

Source: Puerto Rican Census of Fishers, 2002

The gear varieties listed below reflect the gear information from the landings data presented in the table in the introduction, yet show too that Loíza fishers employ a range of gear varieties. Although the several type of hook-and-line fishing predominate, and gill nets are also important, several other gear types supplement these principal gears. Over half of Loíza fishers use fish traps, for example, though this information was not reflected in the landings data.

Table NI.10. Gear Used by Loíza Fishers

Variable	Percent
Beach Seine	10
Trammel Net	5
Long Line	30
Troll Line	30
Fish Trap	60
Gill Net	65
Cast Net	55
Hand Line	80

Variable	Percent
Rod and Reel	20
Lobster trap	30
Snapper Reel	5
Winch	0
Skin	0
Spear	10
Lace	5
SCUBA	10
Gaff	50
Basket	20

Table NI.11. Marketing Behaviors of Loíza Fishers

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	15
Private	0
Association	70
Street vending	15
Restaurant	0
None	5
Sell fish gutted	0
Keep fish on ice	80

Source: Puerto Rican Census of Fishers, 2002

Table NI.12. Opinions of Loíza Fishers Regarding Fishery Resources

Opinion	Percent reporting
Status of Fishery Resources	
Better	0
The same	40
Worse	55
Reasons for problems in fisheries	
Pollution	60
Habitat Destruction	5
Overfishing	0
Laws, regulations, and licensing	0
Crowding	0
Seasonal factors	0

Source: Puerto Rican Census of Fishers, 2002

Loíza fishers, like many along the North coast or near metropolitan areas, were more likely to single out pollution as a principal cause of problems with fishery resources than others. It is interesting, however, that only 5% listed habitat destruction as a problem, given the current problems between fishers and the luxury resort hotels in this region, which involves the hotel's destruction of mangrove forests and wetlands to build two walkways. Discussed below, in the context of both Loíza and Río Grande fishing associations, this dispute has stirred up complaints about regulatory agencies in general. In Loíza, these have been buttressed by the historical association of this region's residents with their African past.

Loíza is Puerto Rico's black town, the center of all that is black in the island, and issues of marginality and race are very poignant. Citizens are very aware of this, and it was evidenced in one of the few opening statements of the Loiceño informant whom we interviewed. He said, "They want to force us out of fishing because we are Black and Poor!" (*"Nos quieren sacar de la pesca porque somos negros y*

pobres."). This echoes a common fisher's statement around the island: that agencies involved in conservation are quick to target small-scale fishermen because they are poor and thus easy targets, but here in Loíza the fishers add "Black" to the equation. Several others chimed in with similar themes: "If they are going to arrest us for fishing," one said, "they better start building larger jails, because we are going to keep on fishing."

Antonio added that: "Here, its harder and harder to fish. They want to end fishing as a way of life. 'EL reglamento,' they wrote it based on studies made near Miami, rather than based on studies made here in Puerto Rico. What they should do is make their studies here and then come and try to put a 'reglamento' based on what they get here, because this is not Miami. Puerto Rico is surrounded by water, but the fishsing grounds are not so large and the platform is much smaller here. In Puerto Rico there are no large commercial fishing boats owned by rich people. Why didn't they go out to the sea with us, to see how we fish, what is it that we do out there? We would have taken them if they had asked."

Just like many fishers throughout this study from other parts of the islands, Antonio resents that the meeting that the proponents of the 'reglamento' called was held on the swanky Tropi-Mar Hotel and Convention Center in Isla Verde, a place where the formally educated bureaucrats and fishery managers would have a "homecourt advantage," because they feel more at ease and more familiar with the place. According to Jose, holding the meeting in that "hotel in San Juan" ensured that the fishermen who went to the meeting would feel uncomfortable while the officials would feel at ease. In his own words, "The fishermen, many of whom do not have a school diploma, will be uncomfortable going into an hotel like that. It was an environment that was hostile to the fishermen but comfortable to the officials." Another added: "The fisherman from places like this (like Loíza) is not going to go to those hotels."

When asked what their main complaint was about the 'reglamento,' Antonio said: "That it is going to choke us to death… The *Loiceño* fisherman, like the majority of Puerto Rican fishermen, doesn't fish great quantities. We are not those great boats who fish to make a profit, who have great immense chinchorros or palangres (longlines) that extend for miles and miles. Fisheries here are still artisanal. We have modernized just a little, but it is still artisanal. If we were great boats of tons and tons, one of those that in times past we would see some to our waters and catch thousands of pounds of fish, well, then, it would make sense to regulate us so strongly. But the artisanal fisherman, like us , who goes out to catch 10, 20, 80 pounds of fish in one given day for daily sustenance, that is the one who gets jumped on by the government, (al que le van a caer encima), why? Because he is poor and he is an easy target!"

The informant (again, echoing statements issued by many fishers in other places) said that he has himself observed how supermarkets sell imported fish of the same species caught here, but which are smaller than local fishermen are allowed to catch, sizes that are illegal for them to catch. Specifically, he was referring to highly commercial deep water fishes such as *Chillo, Vesugo*, and *Colirrubia* (Silk Snapper, Vermillion Snapper, and Yellowtail Snapper). He has observed that these smaller-than-locally-legal fish routinely come from Costa Rica and Miami, among other places. "Those little fish," he said, "so little that if they catch me out at sea with one of them on my boat, I would be fined a hefty sum. Man, the only thing that I am asking for is that if those guys are allowed to sell those little fish, why aren't we allowed?"

The informant suspects (another repeated theme) that somebody must have won the political favor of importing those little fish, and they aren't regulated like fishers because they are powerful and have friends in the government. One advantage fishermen try to parlay is their position as suppliers of really fresh fish: "Thankfully, people still come to buy fish when they want fish that is fresh and that has not been frozen for 4-5 months."

Recently, as noted earlier, Loíza has been a battleground of coastal residents battling large tourism developments that are establishing themselves in beaches and mangrove wetlands. Residents of the

Mediania Alta and Piñones sectors of Loíza and Isla Verde in Carolina are fighting initiatives to develop wetland and beach areas and other initiatives to expand current developments such as the Radisson Hotel. Interviews at Loíza quickly turned to theme of the "large interests" of coastal developments and to bias of the state interacts vis-à-vis different stakeholders, arguing that developers are allowed to fill up large extensions of wetland and shallow reef habitats, while fishers are increasingly regulated by the state and, they commonly assert, harassed by DNR enforcement personnel. From the association grounds they showed me an immense construction, called the Hotel Paradisus, an all inclusive resort which built on Cape Miquillo, a peninsula located between the Loíza and Río Grande coasts; this is an area rich in mangrove wetlands, channels and estuarine waters and that traditionally has served as a place to fish for bait and an important nursery and rookery area. When I asked if Cape Miquillo was an important bait area, one fisher responded:

> "It is much more than just a bait area. From there (pointing to Cabo Miquillo), from Miquillo we made a living. As Miquillo goes, so do we. Miquillo is where we got our bait, [where] we fished for Jueyes (land crabs), fished for estuarine fish, gathered wood for wooden traps and boat building, and where we took our boats when bad weather was coming."

Figure NI.7. Internet Photo of Tourism Developments in Cape Miquillo

Figure NI.8. Photo of Hotel Paradisus Resort, Taken From the Association's Grounds

One informant commented on the irony that while now there is a closed season (La Veda) for land crabs and people are fined for catching a few of them out of season, the developers of Hotel Paradisus are

> "given the green light to destroy, on one swift stroke, more land crabs than what the inhabitants of both towns (Río Grande and Loíza) could ever fish to sell and eat to survive. On the same token, if we want to cut one mangrove stick for a trap, we get fined, but those people are allowed to destroy the whole mangrove foerest! The hotel name is Paradisus (paradise). But Paradisus for whom? Not for us! I would tell that agency [NOAA] that they are failing completely in protecting wetlands (*humedales*) and mangroves when they allowed this to happen."

Returning to the subject of current fishing regulations, Antonio says that the regulations themselves are evidence that the agency personnel never go out to fish. An example of this is the size-limits regulations for deep water species (red snappers, silk snappers, red hinds, etc.), which contradict local knowledge. Using a metaphor that has been also used by many other fishers throughout this study, Antonio pointed to an arrow-shaped "nasa chillera" (red snapper trap) and said:

> "If fish could read, I would put a little sign and the entrance of the trap that read: 'Small fish not allowed, please do not enter.' But, the fish, just like many of the fishermen, cannot read (*love the irony about the written word and traps, more below*). The nasa is a trap, so if it works at all, if the fish comes in, it is trapped. That is what a trap is supposed to do! It is just like Viet-Nam, when I went there, the Vietnamese made these huge traps, and if you fell in you would be impaled in wood spears, or you would remain there until somebody found you. Of course, if you know the trap is there you don't step on it, because that is what it is, a trap."[3]

In line with comments from other fishers around Puerto Rico, fishers from Loíza explained that when deep-water fish (the principal species targeted here) come to the surface, they are already dead, because

[3] Garcia-Quijano makes the point that alluding to the written word and traps may imply that written words (or technical language in Fishery Management plans or laws) can be the makings of a trap for those who don't read or write well or who have difficulty following technical language.

those fish are being pulled up to the surface from depths between 80-250 brazas (+/- a fathom); the sudden involuntary change in pressure kills them. This is wasteful activity to them, about which Antonio said:

> "And you are going to tell me that when those fish get to the surface, after pulling them 100 *brazas* by hand… we have to throw them back in the water? So that the birds can eat them? In the supermarkets they sell them *chiquitos e importados* (small and imported). That is a waste! The birds don't need them! We do! Even if to eat ourselves!
>
> "But, because that plan was written up in an office, because they never came here to go our to sea with us, to see *como es la cosa* (how things are) out there, what it is like for us, the amount of work that we have to do to bring those fishes to the boat….then this is the plan we get"

This diatribe expresses sentiments common across Puerto Rican fishing communities, whether place based or network based: that because small-scale fishing is a moral enterprise, productively using natural resources for beneficial ends, wasting small fish because of directives from a regulatory agency is highly offensive to them. During another part in the interview, Antonio pointed to the sea and said, "From there we have raised our families, and we have sent our kids to school. From there we have produced doctors, nurses, laywers, everything!" Because of the sea's extended productivity, producing not only seafood but families and professional, wasting small fish contradicts their own attempts to protect extremely small fish—that is, juvenile and larval sized fish—by joining ranks against developers who are destroying critical habitat.

When questioned about the initiatives for MPA's or closed areas, Antonio was also in disagreement, based on his experience in local ecosystems:

> "That doesn't work, because the fishes we fish here, they move around a lot. When one goes out fishing to the same places we have gone all of our lives, sometimes you find fish, sometimes you don't. If there are no fish, one just goes and tries somewhere else, because I am not going to be wasting my time. I just go somewhere else. How we cope with this is by talking. We communicate with each other, talk, and when the catch is going down in an area , we are not catching too much, we go somewhere else, we tell other fishers, and we go somewhere else. What we do is we give the fishing areas 'un break" a break to recuperate, you understand? That is why just closing one or another are won't do anything."

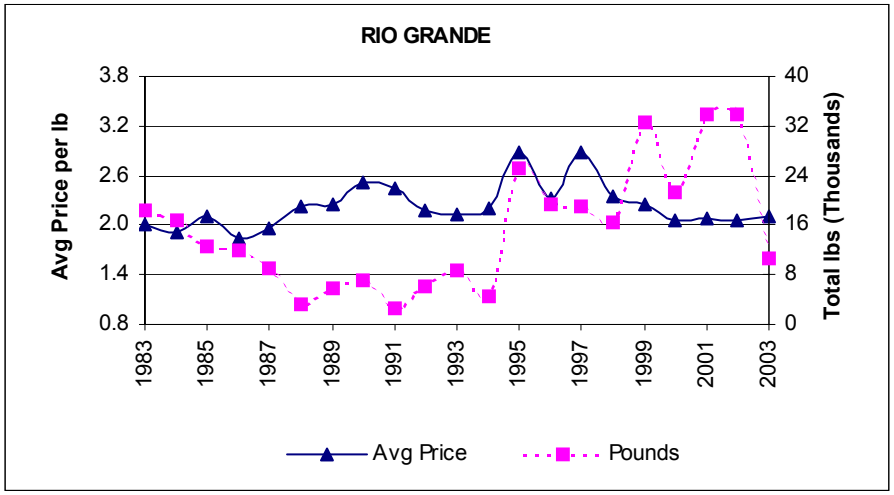
Antonio then gave an example similar to Ceiba fishers' comparison of fishing with farming: that of a rotating closed areas scheme that might work much better than permanently closed area. His reasoning was that rotating closed areas would be much more in tune with the actual movement of fish.

They also echoed fishers in other parts of the island with their comments about regulations surrounding licensing. Under the new regulations, if fishers don't submit statistics for a year or two, thye have to apply for a "Beginning Fisherman" license—even the most senior, highly experienced fishers in Loíza; by forcing some of the most respected fishermen to adopt the title of beginners, the whole management plan loses legitimacy.

Río Grande

Río Grande is best known for the tropical rainforest, El Yunque, which rises above the central town of Río Grande to the south, in the opposite direction from the main highway leading to the commercial and recreational fishing locations of the municipality. Tourism constitutes a large part of its economy, due not only to El Yunque but also to the resort development on or near three points that extend into the ocean: Punta Miquillo, Punta Picua, and Punta Percha. These resorts sit within the vast wetland that is fed by the Río el Espíritu Santo. Expansion of the resorts thus involves destruction of critical marine resources habitat, a fact that figures into the current problems facing the fishers of Río Grande. The following graph shows that, at their peak, Río Grande fishers were landing between 30,000 and 35,000 pounds annually, although landings in 2003 were less than this and in most years prior to 1995, landings data show far lower catches.

Figure NI.9. Río Grande Landings, 1983-2003



It appears that landings increased significantly in the mid-1990s and were sustained after through the remainder of the decade. This was a time of apparent economic stability in Río Grande, with unemployment rates changing little between 1990 and 2000. Some of this stability may be due to the proximity of Río Grande to the metropolitan area, most parts of which are accessible with around a half-hour commute.

Table NI.13. Río Grande Census Data

RÍO GRANDE	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	16,651	17,233	22,032	34,283	45,648	52,362
Civilian Labor Force (CLF) [2]	4,108	4,304	5,291	8,902	15,604	15,122
CLF - Employed	3,798	4,024	4,976	7,660	12,355	12,041
CLF – Unemployed	310	280	315	1,242	3,249	3,081
Percent of unemployed persons	7.55	6.51	5.95	13.95	20.82	20.37
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,264	239	144	324	94
Construction		536	983	758	1,318	1,185
Manufacturing		1,044	1,739	2,031	2,034	1,359
Retail trade		296	467	961	1,721	1,406
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	32.2	33.8	37.7
Persons who work in area of residence [6]		2,796	2,367	2,942	3,820	4,094
Per capita Income (dollars) [7]			754	1,772	3,529	7,347
Median Household Income (dollars) [8]		967	2,384	5,514	9,728	15,006
Individuals below poverty level [9]			14,565	21,858	26,740	24,130
Percent of Individuals below poverty level			66.11	63.76	58.58	46.08

Río Grande History

Río Grande's 17th and 18th centuries were characterized by large landowners (*hacendados*), most of whom were based in neighboring Loíza, and it wasn't until the early 19th century that residents began to contest the dependent, internal colonial status of the territory. They were successful in breaking free of Loíza's dominance in 1840, naming the municipality for a river that crossed through its territory.

Río Grande remained sparsely populated through the 19th century. Toro Sugrañes characterizes it as a "small town with only four streets around its plaza" (1995: 335). At the turn of the 20th century there were only around 10,000 residents, but by 1920 they were able to pave their streets and build an aquaduct. Though Toro Surgrañes contends that these developments extended the urban area "in all directions" (ibid. 336), large parts of Río Grande remained rural, used for raising livestock for the nearby market in San Juan, and, importantly for fishing, much of the rural area up and down the Río de Espíritu Santo was surrounded by wetlands. Current fishers contend the area extending from the coastal to El Yunque constitutes an ecological corridor that is protected by law.

Whether protected or not, Río Grande early on realized its potential as a tourist destination. Its fine beaches, its mountains and forests, and its proximity to San Juan tourism an important part of its economy during the second half of the 20th century. Río Mar Resort, Hotel Paradisus, Coco Beach Resort, and Bahía Beach Plantation are all within Río Grande's territory and all attract tourists from around the world. Despite their importance as sources of employment and revenue for the municipality, these developments have caused problems for the fishers of Río Grande as well as other municipalities of this region.

Fishing and Defending Fishing in Río Grande

The fishers of Río Grande's *Villa Pesquera,* known as Palmer on the list of landing centers, in conjunction with fishers from neighboring Loíza, are currently defending destruction of marine resources—principally the mangroves—against a large resort called the Hotel Paradisus. The *Villa's* facilities are expansive, opening up out of cattle land at the end of a narrow road, the first part of which is bumpy and the last part of which is paved. They share space with the marine patrol, have a nice restaurant and fenced in dry dock facility, and sit on a river, the *Río Espiritu Santo*. This location, on a river as opposed to near the sea, is somewhat unique among Puerto Rican *Villas Pesqueras*, and it may as well account for the association's vehement opposition to the Hotel's proposed development. Across the river is a vast wetland that, according to the association president, the Hotel Paradisus is currently destroying. On the window of the office opposite the seafood restaurant is taped newspaper coverage of the dispute, featuring the president.

Alzan su voz de protesta pescadores de Río Grande, *(Raising their voice in protest fishers of Río Grande)* the headline reads beneath a photo of a man holding a banner that reads, **NO A LA MANTAZA DE LA VIDA MARINA** *(No to the massacre of marine life)*. Their specific complaint is against two ornamental walkways that the Hotel is constructing in the wetlands, destroying the environment. A second article chronicles the development, showing a drawing of the proposed development.

Figure NI.10. Newspaper Article Taped to the Window of the Río Grande *Villa Pesquera*, Outlining Opposition to the Hotel Paradisus's Proposed Walkway

Bajo fuego dos tablados de Paradisus

Por Mildred Rivera Marrero
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RÍO GRANDE - La Asociación de Pescadores de este pueblo volvió ayer a levantar su voz de protesta contra una propuesta del hotel Paradisus para construir dos paseos tablados dentro del mar y emplazó al gobierno a cumplir con su función de proteger el ambiente.

El presidente de los pescadores, Bernard Rosario, recordó que ése es otro proyecto más que atenta contra los recursos naturales de la reserva natural conocida como el Corredor Ecológico del Este y que las agencias de gobierno aprueban alegando que son excepciones a la ley.

Rosario emplazó específicamente al secretario de Recursos Naturales y Ambientales, Luis Enrique Rodríguez, y al presidente de la Junta de Planificación, Angel Rodríguez. Ellos, señaló, no han contestado sus denuncias.

El peligro de la propuesta de Paradisus, propiedad del desarrollador Arturo Díaz, es que eliminaría cerca de 100 millas de la hierba marina conocida como thalasia, que sirve de alimento para especies como los manatíes, las langostas y el carrucho. Asimismo, mataría el área que sirve de vivero para esas y muchas otras especies, afirmaron Rosario y el especialista ambiental Mario Pérez.

"Son 250 pies (de madera) derechitos hacia el mar. Eso llega hasta el arrecife de coral. Dicen que es un paseo tablado, pero anticipo que eso es para ir armando el muelleo para que sea el muelle de Paradisus", declaró Pérez en entrevista telefónica con **El Nuevo Día**.

Pérez se refería a las dos estructuras de madera perpendiculares a la orilla y separadas por 1,000 pies entre sí para cuya construcción habría que dragar e hincar pilotes.

Ambas actividades matarían las hierbas marinas, y aquellas restantes, morirían a consecuencia de la sombra que le daría el paseo tablado, explicó el especialista. Pérez lamentó que es esa área, precisamente, la que mayor cantidad de hierbas marinas tiene puesto que éstas cubren entre 70% y 90% del fondo del mar.

El especialista expuso las objeciones al proyecto en una carta el 30 de septiembre enviada a Rodríguez y al presidente de la Junta de Calidad Ambiental, Esteban Mujica.

El proyecto también obstruiría el paso natural que tienen, entre la orilla y los arrecifes, los pescadores para ir a trabajar a mar abierto. Fue ese canal el que utilizó ayer Rosario para llegar hasta la playa frente al Paradisus y hacer una protesta.

Tanto él como los demás pescadores portaban pancartas en defensa del ambiente y pitos para llamar la atención de la administración del hotel y de los turistas.

EN CAMINO hacia la playa, Rosario mostró cómo el campo de golf de ese hotel llega justo hasta la orilla de la desembocadura del río Espíritu Santo, que tiene vegetación propia de un manglar. Ese hecho, afirmó, demuestra que toda esa zona era mangle y para hacer el desarrollo, se eliminó ese recurso natural y se rellenó el área.

"¿Quién puede sembrar un bosque de mangle? Nadie. Sólo Dios", declaró Rosario, quien luego explicó que la eliminación del mangle también afecta el proceso de anidaje de las tortugas y los tinglares.

"Las tortugas se desorientan con la claridad (que dejó la eliminación de la vegetación) y no pueden subir esas piedras (colocadas a la orilla de la playa)", denunció, señalando hacia las grandes rocas ubicada a todo lo largo de la costa que bordea el campo de golf de Paradisus.

El líder de cerca de 117 pescadores mostró mapas de la década del 70 en los que se muestra claramente cómo el área donde ubican Paradisus y la urbanización Coco Beach eran humedales. Ambos proyectos, ubicados en la península conocida como Punta Miquillo, son desarrollos de Arturo Díaz, según los pescadores.

Cuando se hizo la declaración de Reserva Natural en esa área en la década del 80, se cachoyó esa zona de Punta Miquillo, explicaron Rosario y Pérez.

Esa exclusión es inexplicable, manifestó Rosario, porque esa península cibue a su izquierda y a su derecha áreas que al son parte de la reserva natural.

PUNTA MIQUILLO "es igual que (la playa) La Selva, en Luquillo, y no hay nada distancia desde allá", afirmó Rosario para explicar lo inexplicable de la decisión de las agencias del gobierno.

"Vamos a hacer un estudio con nuestros asesores para ver cómo fue que se cachoyó", concluyó el líder de los pescadores.

El peligro de la propuesta de Paradisus es que eliminaría cerca de 100 millas de la hierba marina thalasia, que alimenta a especies como los manatíes, las langostas y el carrucho.

The fishers argue that this development is against the law protecting the area known as the *Corrededor Ecológico de Este* (Ecological Corridor of the East). The development will destroy critical habitat and feeding grounds for manates, lobster, and conch, yet the fishers claim that the government has allowed this exception to the law in this case, allowing the destruction of around 100 miles of critical habitat and the additional dumping of the 70% to 90% of the cut material in the bottom of the sea. This is doubly destructive to fish habitats, at once destroying nursery grounds, which fish stocks need to thrive, and substrates, which affect fish congregations and catch.

There are 72 members of the association; 32 were fishing the first time we visited the facilities. Sport fishers also use the facility, but the association president emphasized the difference between them and commercial fishers. The landings and census data conform to what those interviewed here reported, that bottom line and net fishing are the most common, yet some fishers also use diving equipment and traps. The following table draws on landings data to determine such things as predominant gears and species landed. While yellowtail snapper constitutes only a little more than 10% of the catch, this is a significant amount, making yellowtail snapper the most frequently caught fish in Río Grande, among more than 30 species. This is similar to other areas in the northern and eastern part of Puerto Rico.

Table NI.14. Principal Gears and Top-Listed Species Río Grande Landings, 1983-2003 (N=11880)

Gear & Species Type	Percent
Long lines for reef fish	65.8
Gill nets	15.2
Diving equipment	8.1
Pots & traps	3.6
Troll lines	2.2
Cast nets	2.1
Yellowtail Snapper (colirubia)	10.4

Source: Puerto Rican Landings Data

Table NI.15. Fishing Locations and Styles, Río Grande (n= 26)

Variable	Percent
Shore	50
Continental Shelf	80.8
Shelf Edge	3.8
Oceanic	76.9
Reef Fishes	96.2
SCUBA Diving	34.6
Skin Diving	34.6
Pelagic	7.7
Bait	61.5
Deep Water Snappers	69.2

Source: Puerto Rican Census of Fishers, 2002
Totals do not add up to 100% because fishers typically fish multiple locations

Table NI.16. Selected Río Grande Fisher Characteristics

Variable	Response
Association Member	92.3
Hours used for Fishing	
< 20 hours	23.1
20 – 30 hours	46.2
31 – 39 hours	19.2
40 hours	11.5
> 40 hours	0
Mean hours	24.88
Standard Deviation	9.066
Minimum hours	6
Maximum hours	40

Source: Puerto Rican Census of Fishers, 2002

Table NI.17. Gear Used by Río Grande Fishers

Variable	Percent
Beach Seine	11.5
Trammel Net	3.8
Long Line	15.4
Troll Line	50
Fish Trap	42.3
Gill Net	69.2
Cast Net	84.6
Hand Line	76.9
Rod and Reel	69.2
Lobster trap	0
Snapper Reel	19.2
Winch	11.5
Skin	0
Spear	46.2
Lace	38.5
SCUBA	23.1
Gaff	73.1
Basket	3.8

Table NI.18. Marketing Behaviors of Río Grande Fishers

Marketing Behaviors	Percent Reporting
Fish dealer/ buyer	3.8
Private	0
Association	96.2
Street vending	96.2
Restaurant	3.8
None	0
Sell fish gutted	26.9
Keep fish on ice	92.3

Source: Puerto Rican Census of Fishers, 2002

Table NI.19. Opinions of Río Grande Fishers Regarding Resources

Opinion	Percent reporting
Status of Fishery Resources	
Better	0
The same	0
Worse	96.2
Reasons for problems in fisheries	
Pollution	88.5
Habitat Destruction	80.8
Overfishing	3.8
Laws, regulations, and licensing	0
Crowding	0
Seasonal factors	0

Source: Puerto Rican Census of Fishers, 2002

Figure NI.11. Ramp at Río Grande (the sign says it prohibits Jet Skis)

Figure NI.12. Main Building of the Río Grande *Villa Pesquera* & Restaurant

Figure NI.13. Doorway into the "Nuevo" Restaurant, Showing Multiple Forms of Payment

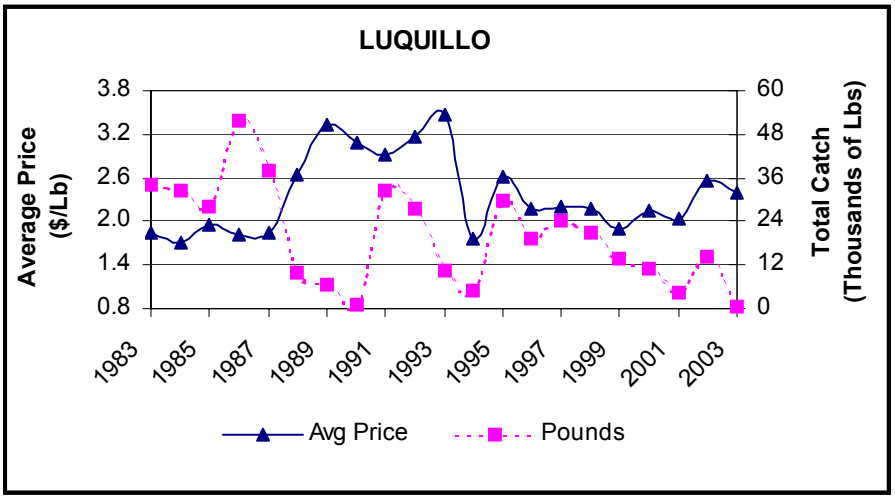
The members have been successful at garnering funds and using them to build up the association to where it can serve the public in at least three important ways: exercising their stewardship over the natural resources of the region, serving high quality seafood in both indoor and outdoor locations, in a riverfront setting, and offering storage for recreational fishers and boaters.

Figure NI.14. Traps and Boats at Río Grande

Luquillo

Between Fajardo and Río Grande, Luquillo's coastline is marked by extremely rough seas and no natural harbors that might make launching fishing vessels an easy task. As such, the association in Luquillo, *Asociación de Pescadores de Luquillo Pueblo, Inc.*, does not have facilities like those of other *Villas Pesqueras* across the islands and ranks fairly low in terms of landings, 38th out of the 41 coastal municipalities reporting landings. No fishers from Luquillo responded to the fisher census, despite that the association president claims to have 173 members, 42 of whom are full-time, bona fide fishers.

Figure NI.15. Luquillo Landings, 1983-2003



Landings data from Luquillo show a slow decline in landings through the last few years of the 20th century, dropping to nearly nothing in 2003. The census data reflect this, too, in that the extractive industries of agriculture, fisheries, and forestry account for but 30 individuals out of the more than 19,000 thousand municipality residents. During the 1980 to 2000 period, construction was the only sector (listed here) that saw steady increases in employment, although retail trade increased from 1980 to 1990, but dropping during the most recent decade recorded. This also reflects one comment made by the president of the Luquillo fishing association: "Ninety percent of the fishermen," he said, "are craftsmen."

Likely they value these characteristics against the otherwise gloomy background of Luquillo's overall economic profile. Nearly a quarter of the municipality's work force is unemployed, and over half of the population live below the poverty line. These rates are higher than either of its neighbors, with Río Grande's unemployment affecting only around one-fifth of the work force (still high by U.S. mainland standards) and lower rates in Fajardo.

Table NI.20. Luquillo Census Data

LUQUILLO	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	9,967	8,582	10,390	14,895	18,100	19,817
Civilian Labor Force (CLF) [2]	2,314	2,216	2,744	3,673	6,226	6,069
CLF - Employed	2,183	2,016	2,522	3,023	4,671	4,670
CLF - Unemployed	131	200	222	650	1,555	1,399
Percent of unemployed persons	5.66	9.03	8.09	17.70	24.98	23.05
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		540	136	56	136	30
Construction		396	581	303	403	469
Manufacturing		324	672	796	1,042	663
Retail trade		156	285	371	693	455
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	26.7	25.8	28.5
Persons who work in area of residence [6]		1,220	1,137	1,049	1,834	1,623
Per capita Income (dollars) [7]			861	1,633	3,795	7,529
Median Household Income (dollars) [8]		1,067	2,606	4,934	9,145	13,631
Individuals below poverty level [9]			7,021	10,246	10,692	10,203
Percent of Individuals below poverty level			67.57	68.79	59.07	51.49

Luquillo History

Although Luquillo is among the oldest of the municipalities in this region, several facets of its history suggest that it may have long been the victim of internal colonialism—in other words, under the domination of absentee owners in San Juan, Humacao, Fajardo, and other more powerful seats of government in Puerto Rico.[4] It was founded in 1797 and named after a Taino cacique called Yukiyú. The Taino influence didn't end with the founding of the municipality, however. Early in its history, Luquillo acquired a reputation as a dangerous municipality, home to many Native Americans who lived in the mountains of the interior (Toro Sugrañes 1995: 253). Because of this the coastal region developed more rapidly than its interior, and early on its relationship with San Juan was forged through maritime traffic.

By the 1820s Luquillo had grown to over 2,000 inhabitants, of whom 168 (around 7%) were slaves. In 1830 its port recorded the arrival of 63 ships from Spain; 65 left the port that same year, but Luquillo residents owned few of those that were logged in official documents. Like the other, neighboring municipalities, Luquillo's early economy depended on livestock and agriculture, including sugar but also mangoes, corn, yucca, and coconuts, once boasting 12 mills. However, as with shipping, interests from

[4] Internal colonialism is similar to enclave development in other parts of Latin America and North America, creating a situation in which dominating powers siphon off resources from distant regions without making investments in such things as education, democratic institutions, and other resources that might increase opportunities among those who live in the region. One of the classic North American cases of internal colonialism has been the relationship between Pittsburg and Philadelphia, with workers in the former serving powerful families in the latter in the context of the steel industry, but cases of internal colonialism have been documented throughout Latin America as well (Stavenhagen 1976).

other municipalities eventually became more important in handling the sugar and other commodities grown in Luquillo.

Fishing From Luquillo

We noted earlier that Luquillo, despite having large numbers of fishers (173 with 42 bona fide), has no association facilities. Instead, they meet in the city hall and, for lack of facilities, do not force their members to sell to the association. There are only 17 vessels in use from the fishery, ranging in length from 17' to 26' and traveling as far out as 20 miles. However, most of their fishing is done within three miles of the coast, under the jurisdiction of *Recursos Naturales*, along the north coast to San Juan and around the northeast coast to the waters off Fajardo. Only a few fishers from Luquillo travel to the waters off Culebra or into the deep waters north of the island.

Landings and interviews with fishers overlap to some degree: they both listed snappers and king mackerel as important species, with their principal gears being nets, lines, and traps. However, fishers we interviewed also mentioned lobster, tuna, and other species, and the landings data listed white grunt as their most commonly landed species; in addition, 14 of the members are divers—clearly a minority but in line with developments across the island.

They sell fish directly to people in the community, to area restaurants, but most of their lobster are sold to a resort in Fajardo. Most of their gear is either purchased in Fajardo or other parts of the island, yet there are interesting recent developments with gear in Luquillo. Specifically, a former government official, a woman, has become not only an active fisher but has also begun making fishing gear—nets, traps, and hook-and-line rigs—and teaching this craft to younger members of the community. Two of the association's members, in fact, are only 14, although most are older and the oldest is in his late 70s. The current association president, 68 years old, has been president for 15 years.

Luquillo fishers share with other fishers in the region a concern over land-based threats to marine resources. Although they are not directly involved in the dispute with Hotel Paradisus and other developments (and in fact benefit from luxury tourism in Fajardo, selling lobster to a luxury resort there), they are currently protesting contamination from construction and population growth and from a gas station. They claim to practice methods of conserving stocks, such as not setting traps in known spawning grounds when they know certain species are spawning, and they disagree the size limit regulation on yellowtail snapper, citing the death-from-great-depth argument. They also said that they have had problems with reporting their landings, which have been declining over the past three years but seem, they say, worse than they are because their statistics haven't been properly recorded.

In general, Luquillo is an interesting case of a predominantly part-time fishery whose members are, nevertheless, deeply attached to the resource, attempting to revive and keep alive old skills while defending the resource through protest and their own marine protective measures. Coming from a history of outside intervention/ domination, Luquillo fishers have been attempting to take hold of their own fates through their continued interaction with the sea.

Postscript: Lessons from the Conflict with Luxury Tourist Development

The attempt by fishers from this region to defend the mangrove forests and wetlands from the Hotel Pardisus's plan to construct walkways, the Radisson expansion, and other tourist development is a physical manifestation of what fishers mean when they say that they are "sacrificing" to live lives of fishers, protecting their livelihoods with significant inputs of time and energy. At the same time, these

protective efforts also draw upon attributes of the cultural setting in which fishers in this region takes place: specifically, by drawing on the African past—which is, ironically, central to the region's performance tourism—fishers have been able to marshal support for their cause as one of environmental racism or injustice.

Northern Municipalities II:

Arecibo, Hatillo, Camuy, Quebradillas, Isabela

We group the North Coast Municipalities together because of the region's relative lack of fishing activity. We discuss them in two parts, western and eastern groups, to make the presentation somewhat easier to follow and because the ethnographic information collected in the west was collected a year prior to similar information in the east. Despite this presentation strategy, we argue that all ten municipalities form one fishing region with similar fishing practices, constraints in fisheries development, and relatively low landings. None of the municipalities in this region are in the top half of the 41 that report landings, and 70% of them fall in the lowest quartile.

Primarily because of the heavy surf, rocks, currents, and few sheltered bays, commercial fishing operations along the North coast have been largely displaced by recreational activities: surfing, surf fishing, recreational boating, sportfishing (from Club Nauticos) and the general attraction of the beach on weekends. Not only do few commercial vessels hail from the north coast, but seafood restaurants and markets are not as ubiquitous here as along the western and southern coasts either. What is not present at these sites, that is, is just as important as what is. Statistics and landings data for these municipalities offer initial support for grouping them.

Arecibo, the largest and most urban of the five, and Isabela, are the only two municipalities in which fishing plays any role in the local economy. The above tables paint similar pictures as those of other Western Puerto Rican municipalities: rising and high rates of unemployment; falling yet continued high rates of people below the poverty line, and changing occupational structures from the extractive industries to construction, manufacturing, and retail trade. Landings data is non-existent for Quebradillas, and the other municipalities rank low relative to the others.

Tables NC.1 – NC.5. North Coast Demographic Data

ARECIBO	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	75,361	69,879	73,468	86,766	93,385	100,131
Civilian Labor Force (CLF) [2]	20,577	22,132	17,364	21,445	30,203	29,460
CLF - Employed	19,505	20,944	16,392	17,774	23,271	23,350
CLF - Unemployed	1072	1188	972	3,671	6,932	6,110
Percent of unemployed persons	5.21	5.37	5.60	17.12	22.95	20.74
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		5,608	1,874	889	642	509
Construction		932	1,398	987	1,489	1,894
Manufacturing		3,080	3,362	4,463	4,990	4,633
Retail trade		2,400	2,929	2,668	3,694	3,027
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	N/A	21.7	23.7
Persons who work in area of residence [6]		15,604	12,556	12,824	17,006	14,545
Per capita Income (dollars) [7]			840	1,860	3,652	7,290
Median Household Income (dollars) [8]		860	1,929	4,479	7,520	12,496
Individuals below poverty level [9]			52,001	57,276	58,954	50,256
Percent of Individuals below poverty level			70.78	66.01	63.13	50.19

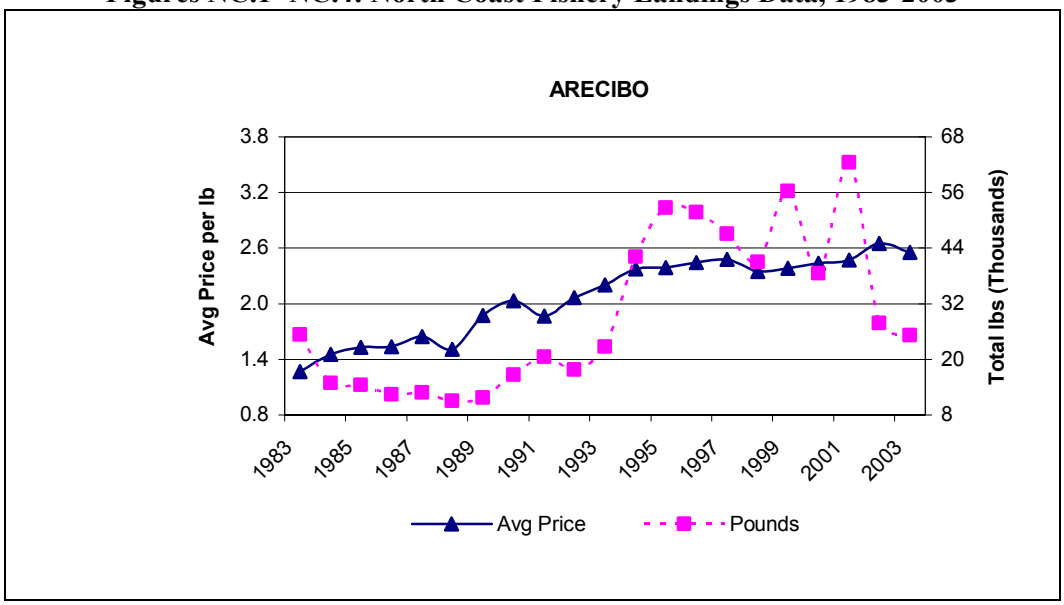
CAMUY	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	20,886	19,739	19,922	24,884	28,917	35,244
Civilian Labor Force (CLF) [2]	5,178	4,592	4,683	6,019	9,297	10,554
CLF - Employed	5,061	4,404	4,176	4,947	7,205	8,432
CLF - Unemployed	117	188	507	1,072	2,092	2,122
Percent of unemployed persons	2.26	4.09	10.83	17.81	22.50	20.11
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		2,264	904	342	451	380
Construction		184	484	488	480	666
Manufacturing		700	900	1,399	2,223	1,927
Retail trade		372	475	553	947	1,062
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	N/A	22.0	25.7
Persons who work in area of residence [6]		3,628	2,796	2,519	4,062	4,171
Per capita Income (dollars) [7]			620	1,568	3,181	6,380
Median Household Income (dollars) [8]		687	1,557	4,290	7,892	13,168
Individuals below poverty level [9]			15,480	17,862	19,065	18,258
Percent of Individuals below poverty level			77.70	71.78	65.93	51.80

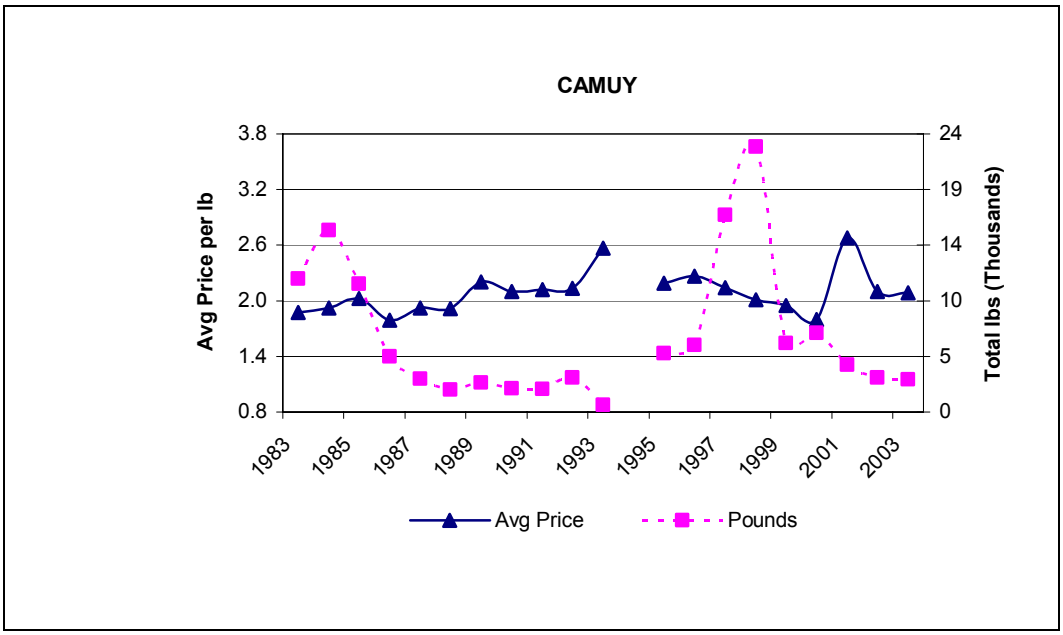
HATILLO	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	20,877	20,238	21,913	28,958	32,703	38,925
Civilian Labor Force (CLF) [2]	5,221	4,568	4,777	7,336	10,730	10,811
CLF - Employed	4,982	4,388	4,495	5,465	7,819	8,374
CLF - Unemployed	239	180	282	1,871	2,911	2,437
Percent of unemployed persons	4.58	3.94	5.90	25.50	27.13	22.54
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		2,420	1,177	676	724	537
Construction		232	582	373	497	641
Manufacturing		464	775	1,229	1,639	1,575
Retail trade		400	571	788	1,174	926
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	N/A	20.8	26.6
Persons who work in area of residence [6]		3,088	2,411	2,271	3,102	3,500
Per capita Income (dollars) [7]			616	1,490	3,186	6,773
Median Household Income (dollars) [8]		810	1,700	3,926	7,900	12,378
Individuals below poverty level [9]			17,529	21,982	21,452	21,670
Percent of Individuals below poverty level			79.99	75.91	65.60	55.67

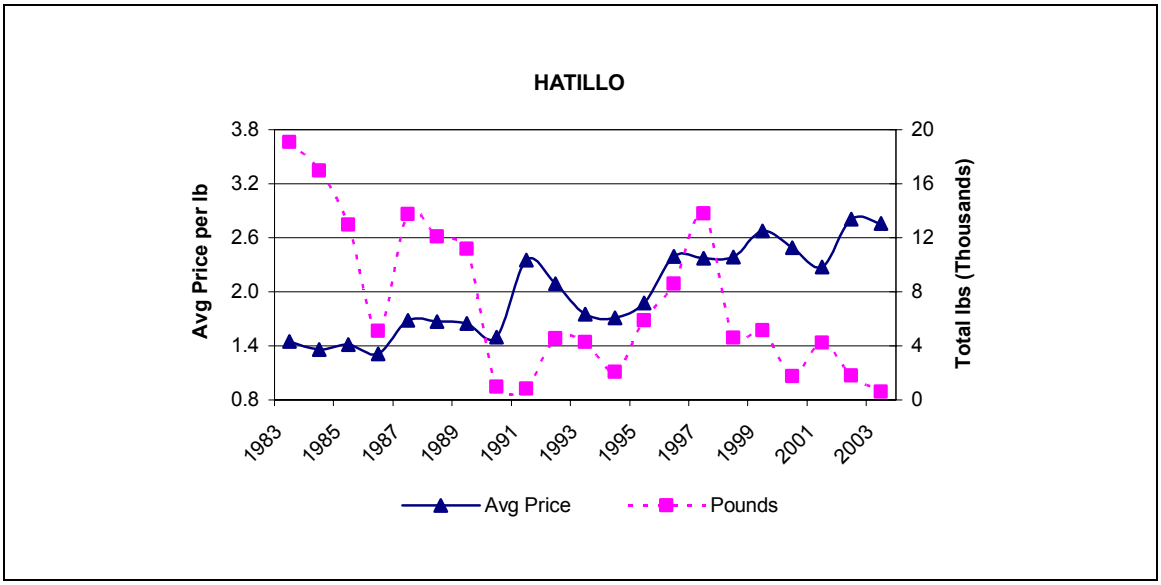
ISABELA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	29,113	28,754	30,430	37,435	39,147	44,444
Civilian Labor Force (CLF) [2]	8,280	5,676	6,122	8,486	11,725	12,975
CLF - Employed	8,043	5,504	5,700	6,854	7,819	9,827
CLF - Unemployed	237	172	422	1,632	2,343	3,148
Percent of unemployed persons	2.86	3.03	6.89	19.23	19.98	24.26
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		2,768	1,115	478	462	246
Construction		428	773	570	458	813
Manufacturing		376	1,126	1,781	2,844	1,862
Retail trade		544	803	914	1,459	1,163
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	N/A	19.3	25.7
Persons who work in area of residence [6]		4,048	4,121	4,102	6,129	5,368
Per capita Income (dollars) [7]			630	1,475	3,074	6,816
Median Household Income (dollars) [8]		506	1,569	4,252	7,433	11,685
Individuals below poverty level [9]			24,582	28,039	27,329	24,548
Percent of Individuals below poverty level			80.78	74.90	69.81	55.23

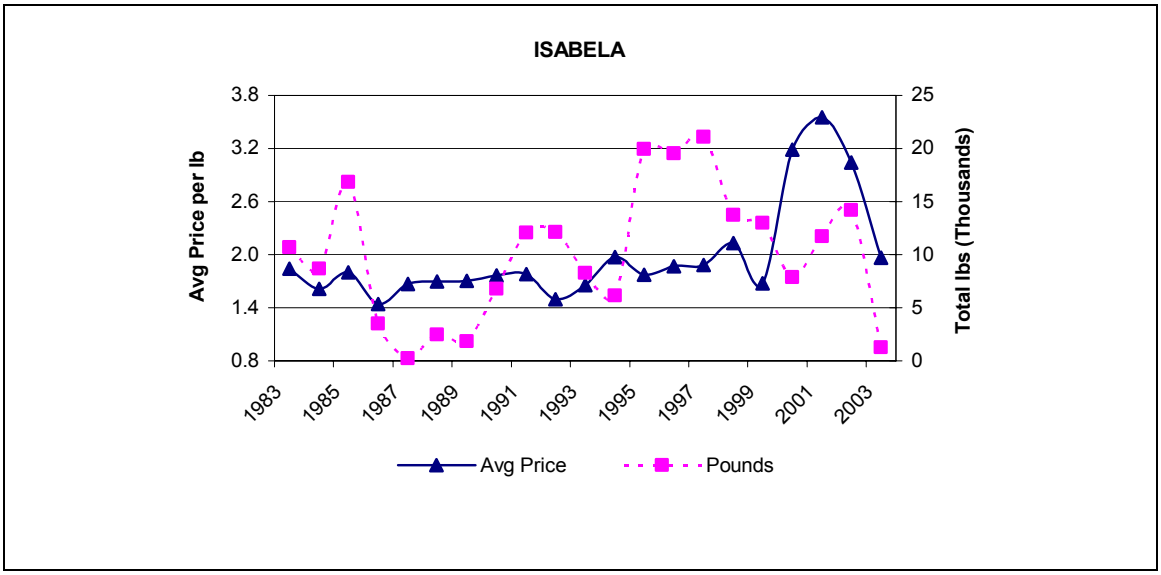
QUEBRADILLAS	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	13,712	13,075	15,582	19,728	21,425	25,450
Civilian Labor Force (CLF) [2]	3,669	2,964	3,472	4,915	6,811	7,368
CLF - Employed	3,582	2,896	3,282	3,956	5,134	5,690
CLF - Unemployed	87	68	190	959	1,677	1,678
Percent of unemployed persons	2.37	2.29	5.47	19.51	24.62	22.77
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,344	535	149	189	149
Construction		240	449	374	347	526
Manufacturing		300	828	1,120	1,252	1,420
Retail trade		240	408	512	914	572
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	N/A	20.3	24.7
Persons who work in area of residence [6]		2,360	2,176	2,127	3,109	2,731
Per capita Income (dollars) [7]			664	1,600	3,058	6,209
Median Household Income (dollars) [8]		817	1,878	4,831	7,631	12,210
Individuals below poverty level [9]			12,161	14,107	14,361	14,056
Percent of Individuals below poverty level			78.05	71.51	67.03	55.23

Figures NC.1- NC.4: North Coast Fishery Landings Data, 1983-2003









These charts show some highly erratic landings and price fluctuations, though again not necessarily linked to one another in any predictable way. The correlation coefficients reflect this, with Arecibo's .7151, Camuy's -.2770, Hatillo's -.5178, and Isabela's .1428 (average = .015775). These findings are difficult to interpret, but again may point to the ability of fishers with lower landings to be more selective about what they sell and what they keep for themselves, distorting the average prices per pound in ways that we are less likely to find in municipalities with higher numbers of landing centers and higher landings. This entire north coast region has only one more landing center (8) than in Cabo Rojo alone.

North Coast History

Rainfall across the northern coasts of the Greater Antilles has nearly as much to do with the salient features of their histories as does human exploration and settlement. Always far wetter than the southern coasts, north coast environments on Caribbean islands with large central mountain chains encouraged settlement if only because the rivers flowing north have carved out sanctuaries from the sea. The northern municipalities described here are no exception. Lush and in places swampy, they attracted some of the earliest Native American settlers and continued to attract explorers into the colonial period.

Prior to European settlement, the north coast had been settled by the predecessors to the Taino—natives referred to in the literature as "archaic Indians." Significant archaeological sites have been found in Isabela (at Coto), Manatí, and Dorado and signs of their settlement are scattered all across the region. As hunters and gatherers, rivers tended to collect early natives, although the later caciques that emerged reached across coastal and mountain landscapes between the rivers as well.

Arecibo became the center of Spanish influence in the region, its port among the most important on the main island for shipping agricultural products. Turtle fishing was an early important economic activity from Arecibo, along with the production of a wide variety of crops and livestock. Toro Sugrañes calls Arecibo the most productive municipality on the island in terms of 19th century agriculture.

Variations of this economic profile characterized the municipalities to its east and west. Camuy emerged early as an important producer of livestock and milk. Vega Baja and Vega Alta, whose histories were intertwined because of periodic flooding from powerful rivers, was the site of primarily subsistence, peasant farming on fertile alluvial soils. Isabela specialized in livestock and fishing, with some production of plantains, tobacco, corn, and fruits until sugar rose to prominence in the 19th century.

Variations in agricultural activity and ties to other resources meant that slavery was unevenly distributed over the region, with higher concentrations of slaves in places like Arecibo and less common in Vega Baja and Vega Alta. The abolition of slavery across the region was accomplished with little difficulty, rapidly replaced, as it was, by a combination of a peasant-rural proletariat (or semiproletariat) labor force (Steward 1952).

Sugar—with all its tense and impoverishing class relations—dominated the north coast through the first five to six decades of the 20th century. However, during the past few decades the region has become more and more important as a center for both manufacturing and tourism. Resorts have sprung up in Dorado and other areas, and in many of the municipalities there were factories that produced clothes and shoes. While some of the manufacturing has declines, particularly the textile industry, the region still produces pharmaceuticals and computer equipment.

Fishing from the West Northern Muncipalities

Arecibo

Near the lighthouse and mouth of the Río Grande de Arecibo, the calm waters attract a variety of classes of recreational fishers, some of whom may fish for subsistence. Near the Club Nautico de Arecibo, an intersection beside a short bridge is bustling with *pincho* (shish kebob) stands and roadside barbeque operations. They advertise seafood *pinchos* along with other kinds. Recreational fishers fish from the bridge. They also fish from the much larger bridge leaving Arecibo just before the turn to the Club Nautico. Beyond the intersection is a small beach and another marina, Arecibo Outboard Club, which stores sportfishing and other recreational vessels.

Figure NC.5. Club Nautico de Arecibo with Sportfishing Boats in Background

The Club Nautico at Arecibo is distinct from those of the west and south coasts. Unlike the Club Nautico marina in Boquerón, for example, or the marina in Puerto Real, where commercial vessels squeeze in between the yachts, here there are few commercial vessels. Wilson reported in 1998 that 8 commercial fishers kept boats there, but they fished primarily for trip expenses (1998: 172). Our observations revealed that, today, nearly all the slips are taken up by sportfishing/ recreational boats. There is a ramp near the outboard club, and this happens to be one of the calmest, most sheltered locations along the whole North Coast, yet it has been more or less completely gentrified. In 1998, the club had between 250 and 300 members with 82 boat owners, with a few part-time artisanal fishers and many recreational fishers; only three have commercial licenses (Wilson 1998: 171). Recreational fishers hailing from Arecibo target sportfish such as marlin, dolphin, and tuna, while the artisanal fishers are more likely to target grouper and snapper using hand lines.

The Arecibo waterfront has been unevenly gentrified. Along the beach road are abandoned buildings that have been gutted and stand empty, although a few upscale neighborhoods parallel the coast nearby. In the neighborhood just off the short loop road 660, there are few signs of fishing and many signs of a population of the kind that may supply itinerant merchants and roadside stands to the tourist roads. Route 2 is lined with people selling food, towels, hammocks, toys, etc. Other neighborhoods near the beach road are somewhat more upscale, yet mixed, with still no signs of households using commercial fishing gear or keeping vessels.

Most of the fishing activity remains confined to the river mouth and bay where the Club Naútico is located. In 2002, we reported that one of the tourist attractions of Arecibo is the fish larvae (*el siti or zeti*), which is popular among Puerto Rican tourists in particular. This has developed into a festival held in October and June, which Wilson describes as follows: "During the festival, the restaurants prepare traditional foods with the Zeti's meat. This festival, which coincides with the Zeti's natural patterns of migration, promotes for a few days the economic development of the local sea food industry" (1998: 169).

Jarielito

Arecibo's fishing association, Jarielito, has around 30 members who fish with hand lines for a few deep water and a few pelagic species. They fish either 10 miles off the coast of Arecibo or to the west, where they target tuna, sawfish, and dorado. Among the problems Wilson reported was the association's lack of facilities to store fish in freezers, which limits their sales to low-level retail activity. Many restaurants in the area prefer imported fish.

Hatillo

In Hatillo, across from the police station, is a structure that appears to be an abandoned Villa Pesquera, inside of which was a ruined commercial yola. This was the only sign of fishing activity in the municipality. There seems to be slightly more commercial fishing activity going on from *Camuy* than from either of the other areas. Near a road called Camino de Muerte, we photographed one commercial vessel near a row of small housed, adjacent to the beach. Farther down 485 there was a surfer's place where 4 other vessels sat near a stainless steel fish-cleaning location. It may be possible to launch boats from this area: though it is rocky and rough, there is a large island and another large rocky spit that might provide some protection from the surf while they are launching the boats, much in the same way we described fishers launching vessels from Jobos Beach (Griffith and Valdés Pizzini 2002).

Figure NC.6. Fishing Vessels & Cleaning Station on Beach in Camuy

Puerto Hermina

This is a small beach facility on the Camuy/ Quebradillas border, where we photographed two recreational fishers. Otherwise, the place was empty (though there were two other cars) on this pretty Sunday afternoon. It is located at the bottom of a long, winding, paved road. At the top of the road is a nice restaurant, which said nothing about specializing in seafood, and a neighborhood where there was no conspicuous fishing gear.

Jobos

Here we have a little historical perspective. About 15 years ago, when we first visited this beach, a small fleet of commercial fishing boats set sail from Jobos. Now, however, the place has been completely gentrified, with a tiki bar and surfers and bathers and a handful of restaurants and hotels adjoining the beach.

The low commitment to fishing along the north coast, in every municipality except Isabela (discussed in more detail below), is evident in the data from the fishing census. In the five northern municipalities, a total of 68 fishers were included in the census, with more than three-fourths of those fishing fewer than forty hours per week and the mean only 24.5 hours:

Table NC.6. Association Membership and Hours spent Fishing, W. North Coast (n=68)

Variable	Response
Percent Affiliated to Association	83.8
Hours engaged in fishing activity	
0 – 20	44.1
21 – 30	32.4
31 – 39	4.4
40	14.7
> 40	4.4
Mean hours	24.5 (sd = 12.712)
Minimum	0
Maximum	55

Hand lines—the favored gear of subsistence, casual, and recreational fishers—are the most widely used gear in the northern municipalities, with nets, traps, and other gears used by relatively small numbers of fishers. Most fish the continental shelf, which is narrow along the northern coast, extending only around a quarter of a mile to the very deep Puerto Rican trench, which drops off precipitously; nearly two-thirds also list "oceanic" as a fishing location, however, indicating they have boats or access to boats. About the same percentage fish for their own bait, likely with cast nets. The low rate of fishing from the shore, as with low rate of use of beach seines, is probably a reflection of the north coast's notoriously rough seas.

Table NC.7. Locations and Fishing Types among W. North Coast Fishers (n=68)

Location or FishingType	Percent
Shore	10.3
Continental Shelf	92.6
Shelf edge	7.4
Oceanic	64.7
Reef fishes	88.2
SCUBA	11.8
Skin	7.4
Pelagic	44.1
Bait	61.8
Deep Water Snappers	58.8

Table NC.8. Gear used among W. North Coast Fishers (n=68)

Gear	Percent
Beach Seine	2.9
Trammel Net	1.5
Troll line	61.8
Fish trap	17.6
Gill net	17.6
Cast net	30.9
Hand line	79.4
Rod & Reel	30.9
Lobster trap	1.5
Snapper reel	2.9
Winch	24.5
Spear	13.2
SCUBA	10.3
Gaff	75.0

Based on observations and interviews conducted during the cultural mapping, it seems that the north coast fishers represent subsistence/ recreational fishing more than other municipalities in Western Puerto Rico. Although over eighty percent claim to be affiliated with an association, only a little over half sell to the association—just a slightly larger proportion than sell along the street, a favorite method of casual fishers—and nearly a quarter do not market their catch at all.

Table NC.9. Marketing Strategies among W. North Coast Fishers (n=68)

Marketing	Percent
Private	1.5
Fish buyer/ dealer	19.1
Association	54.4
Street vending	42.6
Restaurant	8.8
Own *pescadería*	0
Gutted	47.1
Iced	45.6
None	23.5

West North Coast fishers share many of the same views of the status of fishery resources we find across the islands, with nearly three fourths believing them to be in worse condition today than in past years. They differ from their counterparts in the eastern section of this region, however, in high numbers citing both pollution and habitat destruction as the principal causes of resource decline. This may be due to the dominance of the metropolitan area of Arecibo in the region, whose population and industry are responsible for both habitat-destroying development and pollution.

Table NC.10. Opinions of W. North Coast Fishers Regarding Fishery Resources (n=68)

Opinion	Percent reporting
Status of Fishery Resources	
Better	2.9
The same	23.5
Worse	72.1
Reasons for problems in fisheries	
Pollution	76.5
Habitat Destruction	72.1
Overfishing	10.3
Laws, regulations, and licensing	4.5
Crowding	0
Seasonal factors	0

Isabela: Punta Sardina

Isabela's *Villa Pesquera* sits amid several small businesses that cater to tourists across from one of several beaches in the area. Despite being situated along the north coast and comprised of part-time fishers, this association, like La Guancha in Ponce and El Seco in Mayagüez (both discussed below), takes advantage of a brisk seasonal and weekend tourist trade. Situated directly across from the beach, in an area that was built by the federal government (Department of Agriculture) and then rented to the municipality. The association sits in an area that experiences very high tourist traffic, much of it international. October is the height of the tourist season. The association adjoins four small huts that double as shops, bars, etc. and a convenience store that is also a bar & restaurant. A woman working at the convenience store reported that there were only two to three *bona fide* fishers fishing from that location.

The Association president, however, said that there were 15 members, all of whom fish part-time. They are principally divers and *cordel* (long-line) fishers, targeting lobster, conch, octopus, snapper, grouper, and dorado. They fish near the shorline from Quebradillas to Aguadilla, and never go as far away as the closed areas. While they aren't affected directly by the closures around Desecheo or Tourmaline, they are currently filling a niche in the nearshore waters that may be more heavily targeted as these off-shore areas become less accessible (legally). We know from other interviews that most fishers are familiar with the near-shore environment: during the windy, hurricane prone times of year, they are less likely to venture far off shore and so become knowledgeable about these nearshore areas: they are predisposed to fish them more heavily if regulations prevent them from going off-shore.

Members typically sell to a restaurant that is part of the facility, Restaurant el Pescador, though sometimes they sell from their homes or on the street as well. The president also noted that all of the fishers who fish from this area have other occupations, citing the lack of economic incentives to fish. That they are deeply embedded in the tourist development of the area is evident from the fact that the association president operates a small bar/ empandilla stand out of one of the permanent structures built by the DOA.

Figure NC.7. Isabela Villa Pesquera Association President's Bar/ Empanadilla Stand (note the Villa Pesquera lockers in the background)

Figure NC.8. Pescaderia near Villa Pesquera, Isabela

The president's wife works with him in the stand, and she said that this area was a great tourist destination, attracting people from all over the world. She mentioned "everywhere," but then specifically said a lot of people came from China. They stay in the beach hotel that is just beyond the new condominium complex. There is much construction going on in this region, and one of the association's projects is to get a ramp constructed. Right now they are waiting for an engineering report to secure a

permit and get it underway; already there has been a $20,000 university study to assess the feasibility of putting in the ramp. He said that once it was put in it wouldn't only aid commercial fishers, but jet skis and recreational boaters as well, indicating that they are willing to cooperate with the recreational sector.

The association hosts a Virgen del Carmen celebration, which is well attended. While they are a seemingly active association, with fine facilities, having the Virgen celebration, and applying to build a ramp, they nevertheless remain part-time and clearly well-integrated into the tourist industry, which dominates this area of the North Coast.

Figure NC.9. Monument between Villa Pesquera & Beach, Isabela

The plaque below her reads**:**

A
TOMAS CRUZ MEDINA, Q.E.P.D.
POR SU IDEA DE
ERIGIR EL ALTAR A LA
VIRGEN DEL CARMEN

In addition to the permit for the ramp, they would like to get permits to keep their boats on site rather than having to trailer them home every evening. Again, with all the construction occurring along the North Coast, combined with the tourist industry, there are alternative employment opportunities for fishers and their families, yet these may be either short-term (as with construction) or relatively low-paying, subservient jobs (as waiters, clerks, etc. in the hotels). There is no Club Nautico in Isabela: both people we interviewed said that the closest one was in Arecibo.

Our field team visited Isabela again on a Saturday to assess weekend activity. Although there were several people on the beach, the area around the Villa Pesquera was relatively dead. Only one of the huts

was open (the same one that was open the other day, belonging to the president), but there were some fishers landing their catch and I got the sense from seeing others around the community that the little parcela adjoining the association may be a kind of place-based "fishing community."

It seems to be primarily a weekend fishery, which is in line with part-time fishing. The pescaderia was open and there were about six men and a boy standing around unloading a boat and packing all the equipment both in a truck and in one of the *Villa's* storage lockers.

At least 4-5 seafood and other restaurants and bars neighbor the *Villa*, some at the end of the beach, near the rocks that offer some shelters for launching:

- El Sardinera Guest House & Restaurants
- El Pescador Restaurant
- Cafetin Brisas del Mar
- Waterfront Convenience Store
- 2-3 other places

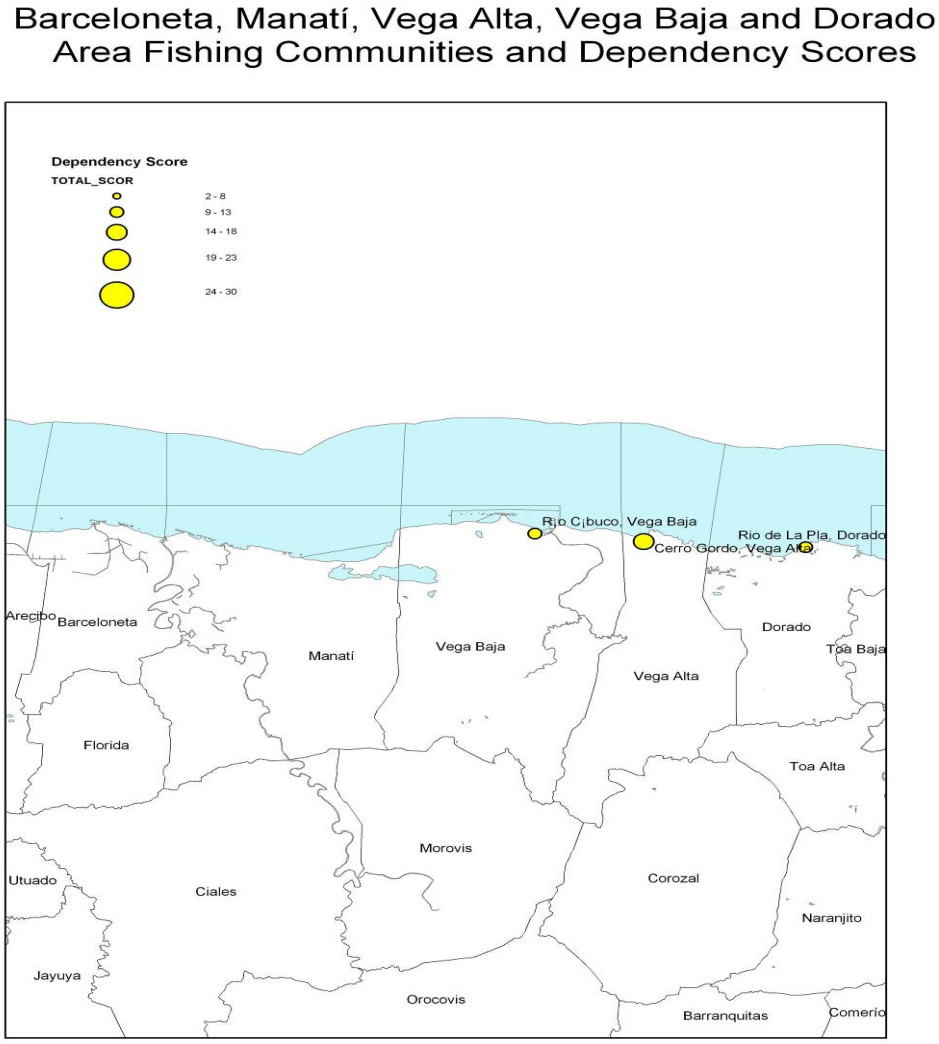
This whole area is welcomed with signs advertising the *Villa Pesquera*, separated from the rest of Isabela by the winding steep road from the main coastal highway to the sea. This enhances its appearance as a place-based fishing community, even if one where the fishers straddle part-time fishing and catering to the tourist trade.

Northern Muncipalities III:

Barceloneta, Manatí, Vega Baja, Vega Alta, Dorado

These municipalities stretch between the two largest metropolitan areas on the north coast— Arecibo and San Juan—where much of the coast is swampy and undeveloped yet interrupted at times by extensive, new, sprawling condominium and resort development. Like the other northern municipalities, fishing does not play a large part in the economy, again in part because of the lack of sheltered waters for launching. Tables NC.11 – NC.15 show that this is a region with typically high rates of poverty and unemployment, with the picture only improving as one moves closer to San Juan. Dorado's economic profile, slightly better than those of the others, still suggests somewhat lackluster performance.

Map NC.1. East North Coast Municipalities



Tables NC.11 – NC.15. East North Coast Census Data

BARCELONETA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	19,897	19,334	20,792	18,942	20,947	22,322
Civilian Labor Force (CLF) [2]	4,700	4,760	4,887	4,949	6,781	6,464
CLF - Employed	4,549	4,512	4,580	4,155	4,833	4,926
CLF – Unemployed	151	248	307	794	1,948	1,538
Percent of unemployed persons	3.21	5.21	6.28	16.04	28.73	23.79
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		2,204	790	214	105	75
Construction		272	707	418	406	527
Manufacturing		840	1,099	1,505	1,544	1,393
Retail trade		324	539	303	463	468
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	20.2	20.5	21.8
Persons who work in area of residence [6]		3,300	2,689	2,432	3,002	2,710
Per capita Income (dollars) [7]			648	1,665	3,183	6,938
Median Household Income (dollars) [8]		654	1,779	4,542	7,173	11,706
Individuals below poverty level [9]			15,491	12,685	13,478	12,483
Percent of Individuals below poverty level			74.50	66.97	64.34	55.92

MANATI	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	30,449	29,354	30,559	36,562	38,692	45,409
Civilian Labor Force (CLF) [2]	7,374	7,436	7,593	10,281	11,967	12,569
CLF - Employed	6,836	6,864	7,132	8,126	9,635	9,553
CLF – Unemployed	538	572	461	2,155	2,332	3,016
Percent of unemployed persons	7.30	7.69	6.07	20.96	19.49	24.00
Industry of employed persons [3]						
Agriculture, forestry, fishing , mining [4]		1,992	881	320	214	195
Construction		444	718	660	589	708
Manufacturing		1,804	2,108	2,986	2,991	2,512
Retail trade		776	1,128	1,020	1,443	1,020
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	22.5	21.0	27.1
Persons who work in area of residence [6]		5,432	4,566	4,638	5,752	4,865
Per capita Income (dollars) [7]			748	1,864	3,434	7,502
Median Household Income (dollars) [8]		786	1,924	4,871	7,161	12,796
Individuals below poverty level [9]			22,055	22,742	25,032	23,465
Percent of Individuals below poverty level			72.17	62.20	64.70	51.67

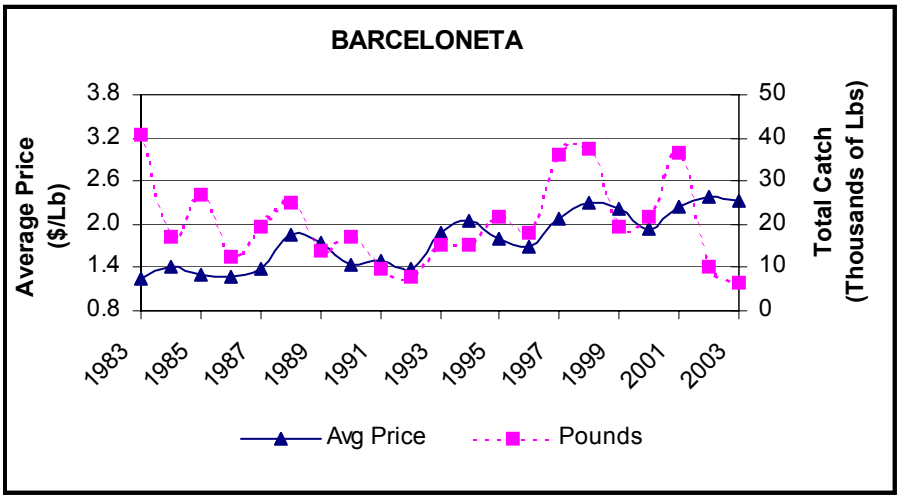
VEGA BAJA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	28,925	30,189	35,327	47,115	55,997	61,929
Civilian Labor Force (CLF) [2]	7,191	6,960	8,825	12,665	18,353	17,867
CLF - Employed	6,943	6,636	8,128	10,560	13,765	14,152
CLF – Unemployed	248	324	697	2,105	4,588	3,715
Percent of unemployed persons	3.45	4.66	7.90	16.62	25.00	20.79
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		2,296	767	360	293	156
Construction		460	892	831	981	1,053
Manufacturing		1,552	2,557	3,836	3,878	3,597
Retail trade		644	1,059	1,224	1,923	1,675
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	24.9	24.2	29.8
Persons who work in area of residence [6]		4,772	4,291	5,136	6,767	5,901
Per capita Income (dollars) [7]			755	1,898	3,389	7,279
Median Household Income (dollars) [8]		877	2,414	5,571	8,455	13,933
Individuals below poverty level [9]			26,089	29,594	34,185	31,287
Percent of Individuals below poverty level			73.85	62.81	61.05	50.52

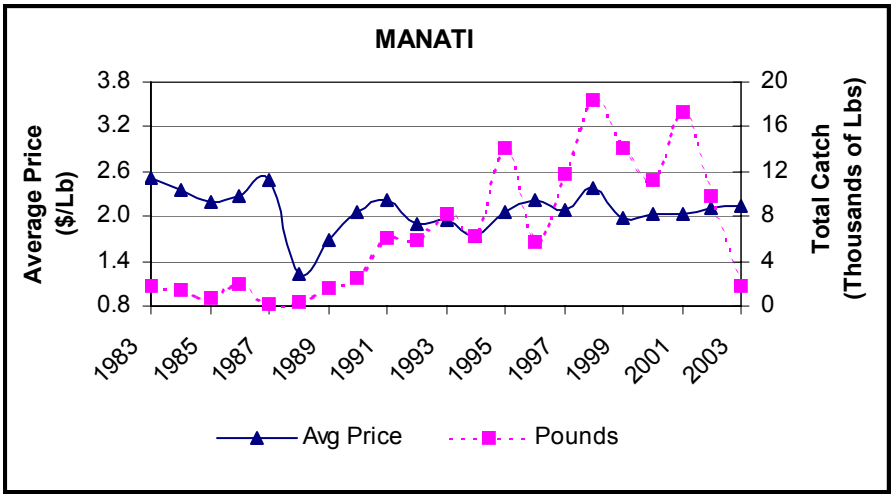
VEGA ALTA	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	16,521	17,603	22,810	28,696	34,559	37,910
Civilian Labor Force (CLF) [2]	3,822	3,980	5,376	7,558	11,350	10,561
CLF - Employed	3,678	3,544	4,968	6,273	8,731	8,612
CLF – Unemployed	144	436	408	1,285	2,619	1,949
Percent of unemployed persons	3.77	10.95	7.59	17.00	23.07	18.45
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,092	408	223	117	106
Construction		344	753	492	736	858
Manufacturing		836	1,367	2,195	2,252	1,776
Retail trade		340	657	700	1,168	977
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	28.3	28.7	31.2
Persons who work in area of residence [6]		2,224	2,083	2,590	3,294	2,884
Per capita Income (dollars) [7]			705	1,680	3,313	7,356
Median Household Income (dollars) [8]		968	2,405	5,361	8,834	13,495
Individuals below poverty level [9]			16,616	18,805	21,909	19,224
Percent of Individuals below poverty level			72.85	65.53	63.40	50.71

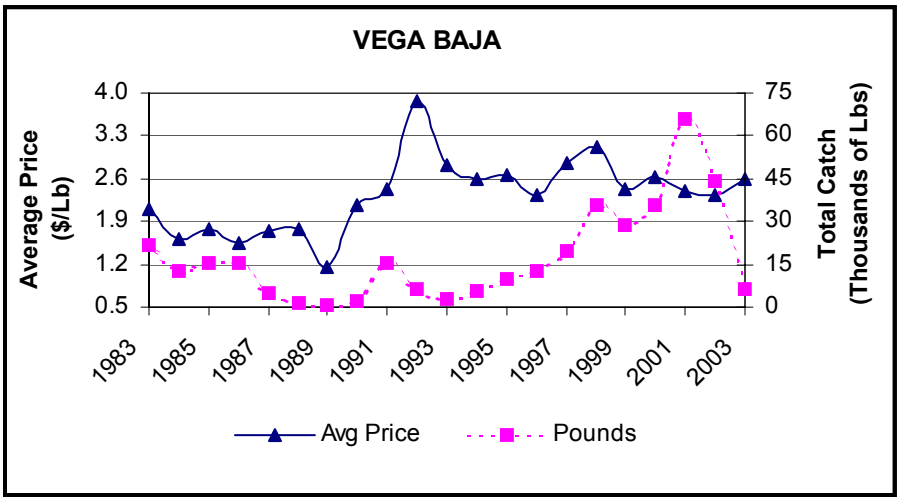
DORADO	1950	1960	1970	1980	1990	2000
Population Characteristics						
Population [1]	11,749	13,460	17,388	25,511	30,759	34,017
Civilian Labor Force (CLF) [2]	3,024	3,200	4,297	6,201	10,099	10,386
CLF - Employed	2,954	2,988	4,008	5,511	8,107	8,848
CLF – Unemployed	70	212	289	690	1,992	1,538
Percent of unemployed persons	2.31	6.63	6.73	11.13	19.72	14.81
Industry of employed persons [3]						
Agriculture, forestry, fishing and mining [4]		1,036	293	182	227	130
Construction		340	677	425	586	672
Manufacturing		464	833	1,546	2,022	1,383
Retail trade		196	308	455	972	892
Socioeconomic Characteristics						
Mean travel time to work (minutes) [5]		N/A	N/A	28.3	27.3	32.1
Persons who work in area of residence [6]		1,684	1,797	2,301	3,318	3,165
Per capita Income (dollars) [7]			781	1,938	4,326	8,765
Median Household Income (dollars) [8]		1,244	2,655	5,391	9,534	16,460
Individuals below poverty level [9]			12,046	16,537	17,204	14,012
Percent of Individuals below poverty level			69.28	64.82	55.93	41.19

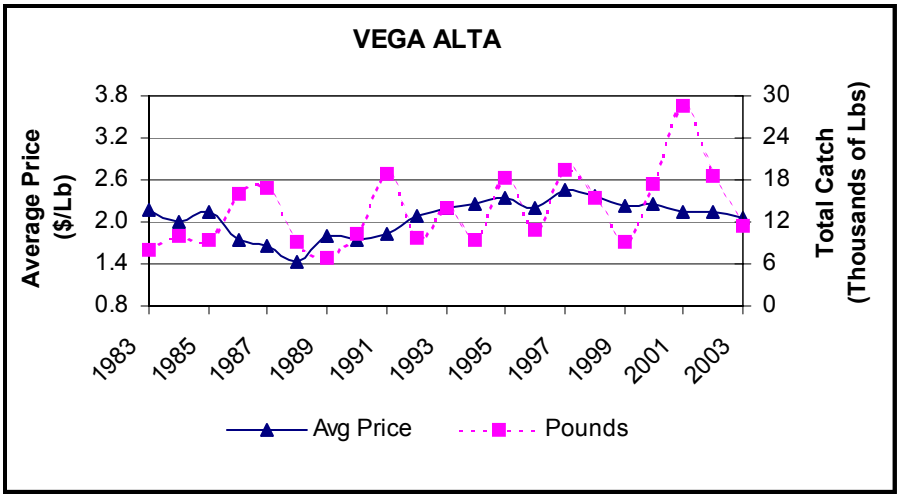
Of all the economic sectors listed in these tables, construction is the only sector that saw improvement from 1990 to 2000, reflecting both public works and the development of new housing, including coastal condominium high rises. Landings data from these municipalities reflect the decline in employment in agriculture, forestry, and fisheries. As noted in the introduction, north coast municipalities make up most of the lower quartile of the 1999-2003 landings data. Only Vega Baja did not make the bottom of the list.

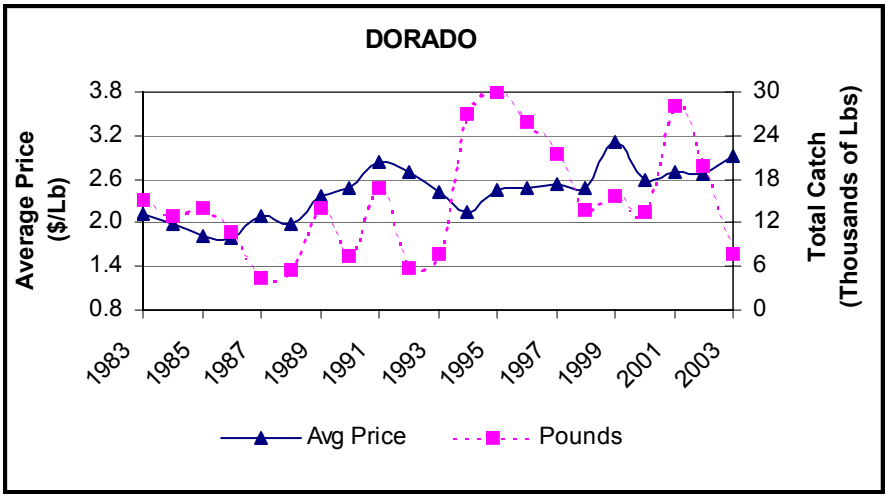
Figures NC.10 –NC.14. East North Coast Landings Data, 1983 - 2003




MANATI
Average Price ($/Lb)
Total Catch (Thousands of Lbs)
3.8
3.2
2.6
2.0
1.4
0.8
20
16
12
8
4
0
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
Avg Price
Pounds


VEGA BAJA
Average Price ($/Lb)
Total Catch (Thousands of Lbs)
4.0
3.3
2.6
1.9
1.2
0.5
75
60
45
30
15
0
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
Avg Price
Pounds


VEGA ALTA
Average Price ($/Lb)
Total Catch (Thousands of Lbs)
3.8
3.2
2.6
2.0
1.4
0.8
30
24
18
12
6
0
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
Avg Price
Pounds



Landings in all these municipalities have fluctuated considerably over the past 20 years, while price has risen steadily, more or less independently of supply. The correlation coefficients are as follows:

- Barceloneta .0821
- Manatí .0341
- Vega Baja .1808
- Vega Alta .2273
- Dorado .1741

Fishing from the East North Coast

Both the fishing census and landings data agree that this is primarily a line and gill net fishery, the fishers dividing their time between the reefs of the continental shelf for snappers and other deep water species and oceanic fishing for pelagics. The north coast is a known location for sports fishing that targets big game species such as marlin and swordfish; commercial fishers may take part in some of this activity, but are more likely to fish for smaller food fish than the larger game species. They are, too, primarily part-time fishermen, with just over two-thirds affiliated to an association, compared to over 80% west of Barceloneta on the north coast. Their part-time status is reflected in our ethnographic work, encountering fishers fishing irregularly over space and time in this region.

Table NC.16. Association Membership and Hours spent Fishing, E. North Coast (n=66)

Variable	Response
Percent Affiliated to Association	69.7
Hours engaged in fishing activity	
0 – 20	36.4
21 – 30	30.3
31 – 39	6.0
40	21.2
> 40	6.0
Mean hours	12.36 (sd = 12.466)
Minimum	0
Maximum	55

Table NC.17. Locations and Fishing Types among E. North Coast Fishers (n=66)

Location or Fishing Type	Percent
Shore	9.1
Continental Shelf	80.3
Shelf edge	4.5
Oceanic	59.1
Reef fishes	80.3
SCUBA	12.1
Skin	13.6
Pelagic	56.1
Bait	51.5
Deep Water Snappers	54.5

Table NC.18. Gear used among E. North Coast Fishers (n=66)

Gear	Percent
Beach Seine	10.6
Trammel Net	9.1
Long Line	39.4
Troll line	42.4
Fish trap	19.7
Gill net	48.5
Cast net	68.2
Hand line	68.2
Rod & Reel	65.2
Lobster trap	6.1
Snapper reel	10.6
Winch	27.7
Spear	27.3
SCUBA	9.1
Gaff	74.2

Table NC.19. Marketing Strategies among E. North Coast Fishers (n=66)

Marketing	Percent
Private	3.0
Fish buyer/ dealer	9.1
Association	50
Street vending	33.3
Restaurant	6.1
Own *pescadería*	4.5
Gutted	15.2
Iced	68.2
None	15.2

Table NC.20. Opinions of E. North Coast Fishers regarding Fishery Resources (n=66)

Opinion	Percent reporting
Status of Fishery Resources	
Better	7.6
The same	18.2
Worse	57.6
Reasons for problems in fisheries	
Pollution	42.4
Habitat Destruction	10.6
Overfishing	12.1
Laws, regulations, and licensing	1.5
Crowding	3.0
Seasonal factors	4.5

Barceloneta

Between Arecibo and Manatí, along the north shore, Barceloneta has at least two significant multipurpose fishing sites: Las Palmas Altas and La Boca. Both are situated along and at the mouths of rivers that offer some shelter from the otherwise crashing surf of the north coast. Both are recreational/ subsistence fishing and commercial fishing locations and neither has been extensively gentrified. Neighboring parcelas, even the houses along the waterfront, seem to be more working class than higher class.

Asociación de Pescadores Las Palmas Altas

The community of Las Palmas Altas sits along highway 641, a narrow coastal highway with a handful of small colmados and restaurants, most of which open only on weekends. In most places the highway runs within a few yards of the beach, allowing for, at the most, a single house lot, and in some places comes within about 100 yards of the surf (clearly within the 1918 Tsunami flood zone).

The association is a nice facility, although there was no one there at the time we visited and the gate was locked. The entire compound consists of a parking lot, a ramp, and a building with a covered porch/ patio on the back facing the river. Just upstream are a few rapids that must make sitting in that location quite pleasant. It is surrounded by a nice steel fence (not chainlink) and concrete walls.

Figure NC.15. Asociación de Pescadores Las Palmas Altas

Three vessels sat in the large parking lot (which was otherwise empty) near the ramp, and a fourth vessel was moored in the calm waters of the river near what appears to be a social club. One of them (the middle one, Figure NC.16) might have been a sportfishing vessel, but the others looked like those vessels in Playa Santa that the government gave to the fishers there: somewhat more modern in design than *yolas.*

Figure NC.16. Vessels Parked near Ramp at Las Palmas Altas

The posted signs warn that it is a private facility and that people wanting to park there need to request permission. No signs suggest that they have a pescadería, however, although there is enough space inside the facility that they could have one. Yet no signs advertised the selling of fish.

Figure NC.17. Side View of Asociación de Pescadores Las Palmas Altas

Just a few hundred yards to the west of the association, the river seen in the above picture empties into the sea. A recreational fisher near the river mouth, across from the pier (figure NC.18), said that it was just a small stream and didn't have a name. On the map, it is designated as one end of the *Caño Tiburones* (Canal of Sharks) that parallels the highway, running more or less east-west and emptying both here and in Arecibo, near the lighthouse.

Figure NC.18. Recreational Fishers on Pier at Mouth of *Caño Tiburones*

Where this river/ stream/ canal empties into the sea is a recreational fishing spot. On the western shore of the stream's mouth is a pier where at least two families of recreational fishers were fishing today. On the eastern shore another recreational fisher (the one who claimed the stream had no name) was setting up to fish.

La Boca

Just beyond the turn into the town of Barceloneta, where 681 becomes 684, there is a small community/ parcelas called La Boca. Locals I spoke with their said, "Toda de este area se llama La Boca," and was named, most likely, for the mouth of the *Río Grande de Manatí* (or so the map calls it). In fact, the people who mentioned this to me said that the river was also called La Boca, contrary to the map designation. These were recreational fishers, enjoying the day with a handful of others who had parked their cars facing the river, in a small parking lot.

This area is a recreational fishing area, although perhaps some commercial fishers use it as well. Far out on the point I saw two men tossing cast nets into the water, near where the river empties into the sea. Earlier, too, at a place called Pescaderia Pérez, on the coastal road in the parcela, I saw several men sitting around shooting the breeze, who may have been pescadores; another small cluster of men sat in the parking area at the end of the road, near the abandoned pescaderia depicted below.

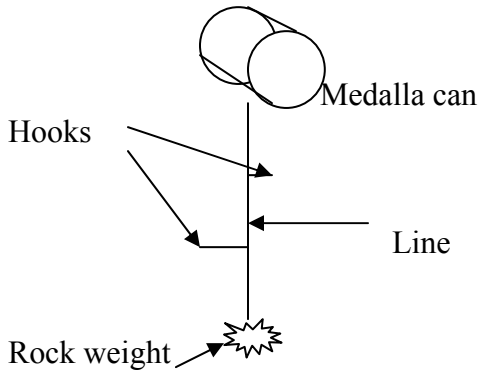
Figure NC.19. Abandoned Pescaderia Reyes/ Villa Pesquera at La Boca

This old pescadería sits across the drive and parking lot from the river. It was a Tuesday, but still active (still holiday season). Near the entrance to the parking lot were two seafood restaurants: one called "La Llave del Mar" (The Key to the Sea), specializing in seafood. The other was similarly disposed.

From the parking lot one can see the point depicted in the photo below (figure NC.20), from which the two men, barely visible here, were tossing cast nets for bait. They may have been using the same bait (camarones, or shrimp) as an old Medalla can fisher we interviewed: he had an interesting rig consisting of a Medalla beer can wound with line, two hooks, and a small stone that looked like a piece of gravel tied to the end. A sketch follows.

Figure NC.20. Fishers Casting Nets Off Point at the River Mouth, La Boca

Figure NC.21. Medalla (Beer) Can Rig Used by Fisher at La Boca



The sketch shows the basic rig, which had two hooks attached to a line that were wound around a Medalla can. Medalla is the local brewery's light beer.

Manatí

Much of coastal Manatí is swampy country, which may account for the lack of development along the beach. There are wide low country areas that seem too soggy on which to build, over which the road runs. Much of the country on either side of highway 686 looked to me like swamp. This municipality has a short coast line, with rough seas, and, according to one informant, no Villa Pesquera. This isn't surprising, with the lack of protected areas here. There are two Balenarios—Las Molinas y Playa Los Tubos—and the only recreational fishing takes place was from a bridge over highway 686 about 100 to 200 yards east of Playa Los Tubos.

The former beach, Las Molinas, may in fact see some recreational fishing, in that there is a wide lagoon type structure inside the surf, protected by rocks. The opening in the rocks is far too rough to launch boats from, however, and we did not actually see any recreational fishers, just lots of bathers and beach goers. Neither of these areas were active when we visited, although we only went during the week. Tubos was empty, and Las Molinas had only a handful of cars. One informant reported that the closest Villa Pesquera was in Vega Baja.

In a place called Los Altos there were a few *parcelas*, one of which was called Shanáy (perhaps after Shanghai, in Vietnam, because a disproportionate number of Puerto Ricans died in Vietnam and Korea). Among the *parcelas* in Los Altos were a few wealthy persons' homes.

Vega Baja

In contrast to Manatí, Vega Baja has been recently and is currently being heavily developed, with gated communities lining both sides of 686. The development includes a park called *Los Pescadores* ("The Fishermen") on the water, which is currently being renovated:

Figure NC.22. Park in Downtown Vega Baja

Vega Baja's *Villa Pesquera* is beyond this, down a long, isolated road in a line of facilities that includes a Pescadería, a Maritime Police station, and the Club Nautico de Vega Baja. This was the site of a dispute between recreational and commercial fishers that Griffith and Valdés Pizzini discussed in their book (2002: Chapter 7).

We were only able to interview people at the Villa Pesquera. The Club Nautico was completely empty, closed, and devoid of any activity at all. In fact it didn't look like it had been used for some time, although the inside, a social club, was relatively clean and well-cared for looking. Several photos of the facility follow:

Figure NC.23. Pier and Muelle at the Club Nautico de Vega Baja

Figure NC.24. Signs Adorning Club Nautico de Vega Baja

Figure NC.25. View of Club Showing Tournament Cross-Bars

Figure NC.26. Interior of Club Nautico, Showing Stuffed Marlin

As these photos depict, very likely the most preferred activity from the Club Nautico de Vega Baja is sportfishing for large game fish off the north coast of Puerto Rico, where the deep trench makes this fishing some of the best in the world. In Vega Baja (the town) they were actually advertising the selling of *Pinchos de Marlin* (marlin shishkabobs), which may suggest that this area is a good staging ground for deep sea fishing. However, there is an ambivalent dimension to this in Vega Baja, as the photo of the pier and the ramp show that, strewn with debris, they are difficult areas to launch vessels from.

Concerning the dispute chronicled in Fishers at Work, Workers at Sea noted above, the Club Nautico wanted a permit to build a ramp but the local fishers complained that they were being discriminated against. The club charges $10.00 for parking, which certainly discourages poor fishers from using the ramp (there is very little parking elsewhere). However, nearby there is a similar facility that will soon be the site of the Villa Pesquera de Vega Baja.

Villa Pesquera de Vega Baja

From this small, block and concrete building by the water, which sits on what must be at least a million dollar piece of real estate, they operate a small (*un congleador*—single freezer*) pescadería* and a restaurant with only two tables. The woman who operates the place is a kind of entrepreneur. She was a small elderly woman, perhaps 65-70, and she cooked in a hair net. They serve typical fare: seafood dishes and the array of empanadillas, king mackerel filets, and seafood snacks.

Figure NC.27. Villa Pesquera de Vega Baja (futuro)

When asked whether or not this was the Villa Pesquera, the woman said that it would be "*pronto.*" She said that there were about 20 members (mas o menos) in the association, but that they couldn't fish full time because of the conditions of the sea, which too often were rough. In the freezer were the fruits of their efforts, but all frozen, none fresh: chillo, mero, ballyhoo, etc. This suggests these are line fishers, reinforcing the information in the census and landings data.

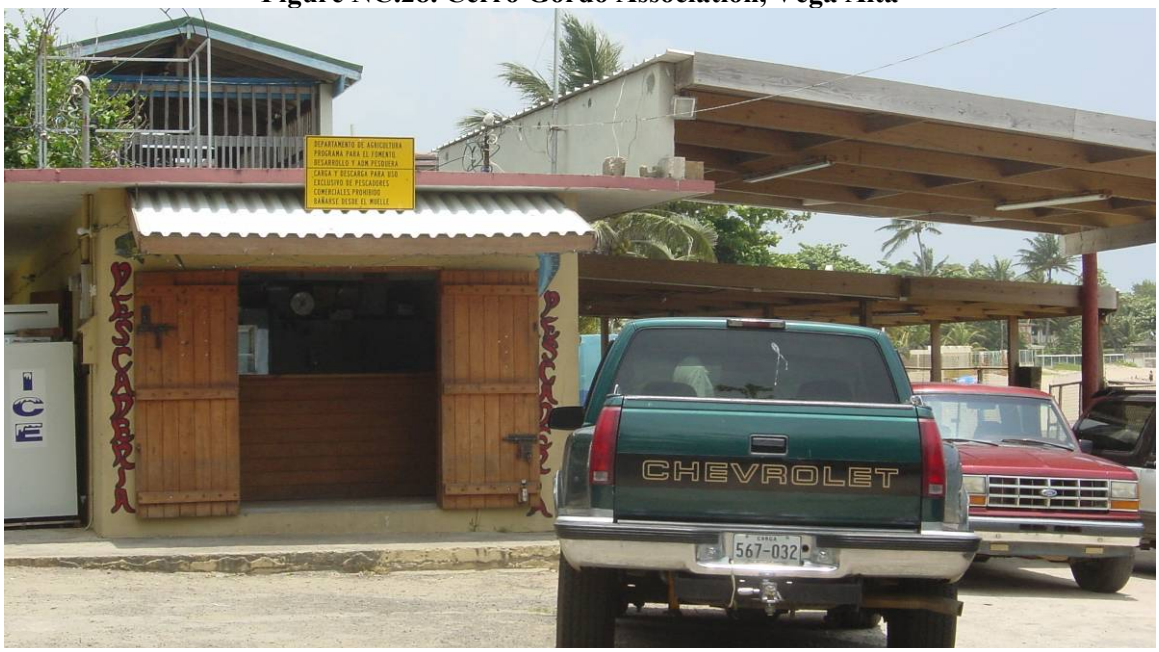
Vega Alta

Cerro Gordo

After stopping by the *Villa Pesquera* and receiving little help from those who were there, we happened upon the president of the association in a shop about five blocks from the *Villa* called J.E. Marine (La Casa del Pescador Comercial y Deportista). This shop is owned by his son and his daughter-in-law, and he was taking care of it while his son, a charter boat captain, was fishing. He was taking people near the waters of the Dominican Republic, and said that normally the fishers from this region fished the western shores, as far as around La Mona.

He said the number of commercial fishers in Cerro Gordo fluctuates between 18 and 22, some of which belong to the association and others who don't at any given time. Fishers have a tendency to come and go from the association, given the slightest little problem.

Figure NC.28. Cerro Gordo Association, Vega Alta



The association sits right on the beach. Fishers launch from a ramp that is gated when not in use, and they evidently allow recreational crafts to launch from this area as well, as one used the ramp when I was there today. They have to negotiate among bathers, however, particularly on weekends. It was a Saturday when we visited and the beach was packed.

Figure NC.29. Gated Ramp at Cerro Gordo Association

Despite that the fishers have a small area inside their pescadería that could serve as a bar and restaurant, taking advantage of the tourists, and that they have a glass box of the kind people use for empanadillas, this association was not serving food to the public during this busy weekend day. One informant said that most of the members were out fishing. However, I counted only 7 trucks in the parking lot, and one trailer. The president later told me that fishing was "mal" this time of year (June) and that the fish were small. He said that June and July tended to be poor months, but that things would pick up in August, when they would begin to catch big fish.

J.E. Marine

The familial link between commercial and recreational fishing is interesting, given Cerro Gordo's position as the only landing center in Vega Alta, an area that has been heavily developed and is continuing to develop (see photos, below, of neighboring Dorado). That the son, a fisherman's son, established a business that caters to both commercial and recreational fishers (as well as stocking a few items for the beach crowd) suggests that they are taking advantage of the new, changing conditions.

Dorado

Río de la Pla (Recreatonal Fishing Site)

We interviewed 5 recreational fishers near the downtown along the river. There's a small ramp and place where the boats tie up along water. They were mostly older men who said that recreational fishing was primarily good therapy. They weren't fishing today because the rains had made the waters muddy, but they said that the river would clear by the morning and that then they would fish again.

Figure NC.30. Ramp in Downtown Dorado

Dorado Villa Pesquera

We spoke with three different fishers here, one retired and the others active. The one who retired did so because the licenses got to be too cumbersome for him. They said there were 30 to 32 members in the association here. It sits next to a recreational fishing club site, where they host fishing tournaments. The youngest association member is around 17 and the oldest in his 80s.

The men we spoke with reported that there are around 300 boats in Dorado that use their facilities. Most of them are trailered here and stored at their homes. The men we spoke with fish to the west and east of

Dorado, never (or rarely) directly off shore. One, the president, fishes near the shore to the west, and another, a skin diver, fishes off Fajardo, between Fajardo and Culebra. The skin diver also works for the local park service.

Figure NC.31. Fishers Cleaning Fresh Fish, Dorado Association

The president said that the government hasn't helped them very much (all the assistance, he said, goes to Fajardo and Culebra), but in the absence of government assistance, they help one another, sharing bait and other things among the members. They say there is never a time that fisher is against fisher.

They fish off Río Manatí, but certain times of the year they run charters for marlin out of the association, fishing as far away as St. Thomas. Until September, they fish for sierra, colirubia, chillo, picua, pargo, etc.. They sell their catch individually, rather than through the association, out of their own freezers. The association does have an ice machine, which the members use and also they sell some ice to tourists, being so close to the *balneario*. The association is near not only the beach but a number of seafood restaurants, perhaps two blocks of them (at least five or six), that purchase fish from members of this association. They also sell to members of the community, but they said that they don't sell to the big hotels. Radisson, Embassy Suites, Hilton, and others have big resorts nearby.

Fishing varies considerably through the year. They use trasmallos, filetes, and chinchorros, as well as hooks and lines and traps, obviously engaging a number of gear types, but their primary problem along the north coast is that they can't fish through the year. Cabo Rojo and Fajardo, they said, are much better situated to have viable fisheries. Some times of the year they can't buy any more than beans with what they earn from fishing, they said.

The skin diver we interviewed fishes with a spear. His son and grandson are also skin divers. They fish for grouper, sometimes going as far as Costa Rica, vacationing, but fish primarily for food rather than income, selling only the surplus they can't eat. He was very environmentally conscious. The way he

fishes doesn't disturb the reef. He said there was a lot of contamination these days, which has led to a decline in fish. Griffith and Valdés (2002) report that north coast fishers mentioned contamination as a major problem. He mentioned, specifically, pharmaceutical and chemical companies, oil spills, growing coastal populations (human waste), and a lack of government punishments for contamination.

Mangroves, however, have been increasing. There have been some restoration efforts going on, but they have disappeared in other places, and he considered the *veda* (seasonal closure) for conch a good thing.

That this is an active, creative association is seen not only in their ability to tap into the tourist trade in a number of ways, but also in their expressed solidarity. They celebrate the Virgen del Carmen every year, reaffirming their identity as fishers. Along the north coast, they share many of the same characteristics as fishers from Isabela and Vega Baja.

Summary of the North Coast

With the growing importance of tourism on the north coast, fishers here have made in-roads into taking advantage of tourist economic activity, adapting their skills to charter boat fishing and providing services such as bait and ice to recreational fishers. With only a handful of functioning fishing associations across an area that spans more than half of the territory of the north coast, no community can be said to be dependent on fishing. Yet with the growing provision of services to tourists, an increasingly symbiotic relationship may develop that allows room for part-time commercial fishing, coastal development, and recreational uses of the coast to co-exist.

Appendix A:

Research Protocols & Survey Instrument

Contents:

- Open-Ended Interviewing Guide
- Questions for Charter Boat Captains
- Cultural Mapping Protocol
- Survey Form

Open-ended Interviewing Guide

Questions to ask individuals in municipalities:

Try to interview individuals who are familiar with either the fishing in the *municipio* or are familiar with the economy/ social make-up of the community (por ejemplo: mayors, civic leaders, etc.).

Questions for everyone:

Get some idea of what their role is in fishing and how long they have been involved in fishing.

How would you characterize fishing in your area?

For example, how many families in the community/ *municipio/ parcela* are dependent on commercial fishing? If not dependent, is commercial fishing important here?

Is commercial fishing important to the cultural heritage of this community/ *municipio* or to this neighborhood/ *parcela?*

Is commercial fishing an attractive part of the *municipio's* coastal landscape?

Is the economy of this neighborhood/ parcela, or are parts of the community/ municipio, dependent on recreational fishing (e.g. recreational fishing clubs, sportfishing charter boats, etc.)? If not dependent, is recreational fishing important here?

How many fishermen do you think there are in this community?

What are the most important jobs in the area?

What are common *chiripas/* informal sector jobs around here?

Would you describe the local economy as thriving, stable, stagnant, or depressed?

Do you know of festivals or events that celebrate fishing or the seafood industry in this community?

How important do you believe fish is to the local diet around here?

In what ways are marine resources important to the local economy? (e.g. diving, sportfishing, recreation, etc.)

Are there well-known or famous commercial or recreational fishers in this community? (e.g. *individuals known as local leaders, boat builders, artists or craftspeople who use marine resources, etc.*).

Could you list *parcelas* or neighborhoods where commercial fishers live? Where do most fishermen live in this community?

Questions for Fishing Association Members

How many members currently fish out of this location?

What kinds of gears do most of them use? Where do they fish, and for what species? [Here you want to ask about those territories of interest to NOAA managers: coral reefs, Tourmaline Bank, Buoy 6/ Abrir la Sierra Bank, and Bajo de Sico]

What kinds of businesses supply local fishing families? (*Elicit names of marine suppliers, gear manufacturers and dealers, ice distributors, boat builders, etc.)*

Are members of this association involved in any conflicts over fishing territories, gears, coastal development, or other factors? Are they between large and small vessels, different gears, and so forth?

Has the destruction of mangroves or pollution been a problem for commercial fishing in this area? Where is pollution a problem?

How has commercial fishing in this area changed in the past three to five years?

What are the relationships between tourism and commercial fishers in this area? Por ejemplo, how have tourists affected markets for seafood, land values, access points, etc.

Are young people from this area becoming involved in either commercial or recreational fishing businesses? Why do young people enter the fishery?

Questions for Sportfishers/ Club Nautico Members

How many members belong to the club?

How would you describe them? (e.g. as primarily local, from San Juan or other distant locations, well-educated, middle-class?)

Are the club's facilities used by commercial fishermen as well as sportfishermen?

Have the numbers or types of people using your facilities changed in the past three to five years? For example, more people from the metropolitan area, more seasonal visitors, more tourists, etc.?

What kinds of businesses supply or depend on recreational fishing around here? (*Elicit names of suppliers of gear, fuel, ice, etc.*).

Have members of the club been involved in any conflicts over access to dockage, launching facilities, crowding, or other issues?

Preguntas para Charter Boat Captains:

Cuánto tiempo ha estado envueltos en la pesca? *How long have you been involved in fishing?*

Cuál temporadas son mas importate para su negocio? *What seasons are most important for your business?*

Donde pesca? *Where do you fish?*

Cuantas clientes tiene por mes? Por año? *How many customers do you have per month? Per year?*

Especies pesqueras mas importantes, si esto ha cambiado en los ultimos años? Porque cambiaron? *What species (of fish) are most important, and have these changed in the past few years? Why did they change?*

Hay reglas particulares que son malas para su negocio? Porque? *Are there particular regulations/ laws that are bad for your business? Why?*

La economía de esta area o sector/parcela tiene lazos o depende de la pesca recreativa/deportiva? (Club de Pesca Deportiva, Club Nautico, Torneos de Asociaciones de Pescadores, Tiendas de efectos de pesca deportiva, T, etc.? *Is the economy of this area dependent on recreational fishing?*

De donde vienen sus clientes? Cuál estados, municipios, etc.? *Where do your clients come from? Which states, municipalites, etc.?*

Donde anuncia su negocio? *Where do you adverstise your services?*

Tiene información (p.e. precios) sobre su servicios? *Do you have information about your services (brochure, etc.)?*

Pesca en torneos? Cuales? *Do you fish in tournaments? Which ones?*

Lo ha mejorado, o no lo mejorado, su negocio? Porque o porque no? *Has your business improved or not? Why or why not?*

Tiene relaciones con pescadores comerciales (p.e. compra carnada de ellos, trabaja con ellos durante algunas meses, tiene amigos)? *Do you have relations with commercial fishers (e.g. buy bait from them, work with them some months, have friends)?*

Tiene relaciones con pescadores recreativas? *Do you have relations with recreational fishers?*

If associated with a club, ask the following questions too:

Preguntas para Pescadores Recreativos, Deportistas, Miembros de Clubes Nauticos:

Cuántos miembros hay en su club?

Usted conoce de alguien que se dedique a llevar a gente a pescar recreativamente?(Charters) Quien (es)?

Los miembros de su Club, son primariamente: 1)de clase alta, media, trabajadora, 2) Locales o de San Juan, 3) Extranjeros?

Ustedes organizan o patrocinan torneos de pesca o competencias pesqueras? Cuantas al año, como se llaman, que especies se persiguen? Cuales son los premios? De "pote" o con premios específicos?

Las facilidades de este club: Las usan también pescadores comerciales, o solo deportistas?

La gente que usan sus facilidades/club: ha cambiado en los últimos 3-5 años? Como?

Que tipos de negocios dependen de la pesca deportiva por aquí? (lista de nombres de suplidores de equipo, charters, hielo, sea tows, mecánicos de botes, etc.)

Los miembros de este club, han estado envueltos en algun tipo de conflicto por acceso al mar, ambiental, etc.?

Cultural Mapping Protocol
Site Name Municipio Location (directions) Nature of fishing facility (*Villa Pesquera, Club Nautico,* etc.) & activity
Type of site (landing center, marketing center, sportfishing location, etc.). *Frequented by tourists? Natives?*
Number and types of fishing vessels (include some description of condition, age, how well-maintained, how secure, etc.)
Gear present: types, numbers, etc. *Are there storage facilities for gear?*
Types and numbers of vehicles at the site (personal cars, trucks, vans, commercial vehicles, delivery vans, service vans, etc.) *Might any of these indicate linkages to other economic sectors?*
Marine Infrastructure/ type of access to marine resources (ramp, sheltered bay, beach, etc.). *Note numbers of docks, number of lockers to store fishing equipment, etc.*
Places people from this location fish (in-shore, off-shore, near mouth of river, etc.)

Cultural Mapping Protocol
Marine or fishing-related support services present (repair services, ice, gas, air for dive tanks, etc.)
Evidence of linkages to other sectors *(e.g. types of commercial vehicles doing business at site, others conducting business, alternative uses of the site such as for tourism, evidence of commercial fishers participating in alternative employment, etc.)*
Alternative employment in immediate vicinity

Perfil Socio-Economico de Pescadores/as y sus Comunidades en Puerto Rico

Entrevistador/a	Fecha	No. Contacts	Razón de rehúso	Núm. De Entrevistador/a	Sample*

***Important: Please note whether the interview came from random sampling or cluster sampling/ intercept.**

Se estima que en promedio se toma una hora en completar la entrevista contenida en este cuestionario, esto incluye revisar las instrucciones, identificar las fuentes de datos existentes, buscar y mantener los datos necesarios, y el proceso de completar y revisar la colección de la información. Envíe sus comentarios acerca de este estimado o cualquier otro aspecto o problema asociado a esta entrevista a Bob Walker, National Marine Fisheries Service, 75 Virginia Beach Drive, Miami, Florida 33149. Este informe es requerido y autorizado por 50 CFR 622.5(a)(1)(v). La información sometida será confidencial de acuerdo al NOAA Administrative Order 216-100. Sin embargo, ninguna persona será obligada a responder, ni sera Peñalizada por no hacerlo. El NMFS require esta información para la conservación y el manejo de los recursos pesqueros marinos. Estos datos se utilizarán para desarrollar un perfil socio-económico de las comunidades pesqueras.

Estamos llevando a cabo una encuesta entre pescadores/as del oeste de Puerto Rico para entender mejor los problemas que ustedes enfrentan, cómo trabajan junto a otros/as pescadores/as para resolverlos, cómo responden a cambios en los recursos pesqueros y a nuevas reglamentaciones de pesca, y qué le gustaría ver en el futuro. El estudio está diseñado para identificar comunidades en Dónde la pesca es importante, cómo la vida en estas comunidades está cambiando, y cómo distintas agencias y personas manejan esos cambios.

Todo lo que hablemos será confidencial. Cuando terminemos nuestras entrevistas y otros aspectos de este proyecto, escribiremos un informe en el que resumirá todo lo que hemos aprendido. No utilizaremos nombres de personas en este informe, tampoco escribiremos sobre temas sensitivos. Su participación en esta encuesta es completamente voluntaria y no tiene que contestar ninguna pregunta que no desee contestar. Si usted está de acuerdo con esto, y no tiene preguntas, me gustaría comenzar con la entrevista haciéndole algunas preguntas relacionadas a sus prácticas pesqueras.

Prácticas Pesqueras

Nos gustaría hacerle algunas preguntas sobre su historial de pesca y prácticas actuales, para identificar cambios en prácticas pesqueras a través del tiempo.

1. Actualmente, qué tipo de pesca realiza mayormente?
   - ☐ Es capitán de pesca comercial (o ☐ proel?)
   - ☐ Es capitán de un barco de pesca para fletar ("Charter boat") (o ☐ tripulación?)
   - ☐ Es capitán de un barco de buceo (o ☐ tripulación?)
   - ☐ Es capitán de un barco de pesca recreativa (o ☐ tripulación?)
   - ☐ Es usted alguien que pesca o bucea principalmente para comer?
   - ☐ Es usted alguien que pesca para obtener algún ingreso adicional para su hogar (los fines de semana, por ejemplo)
   - ☐ Otro (especifique):_____

2. ¿Quién lo introdujo a la pesca como profesión u ocupación?
   ☐ Padre ☐ Madre ☐ Esposa ☐ Esposo ☐ Hermano ☐ Hermana ☐Hijo ☐Hija
   ☐ Primo/a ☐ Amigo/a ☐ Suegro/a ☐ Otro/a _____

3. Por favor identifique en orden de prioridad las cinco artes o equipos de pesca mas importantes **hoy dia** y las especies que captura con estas (*1 sería el más importante y 5 el que sería el menos importante*):

Equipo:	**Especies (las 3 más importantes)**
__Chinchorro de Arrastre	_____
__Redes (filete/ trasmallo [], mallorquín [], attaraya []	_____
__Cajones (nasas para langosta)	_____
__Nasas de pesca	_____
__Palangre de fondo	_____
__Palengre vertical	_____
__Anzuelo(s) y linea	_____
__Buceo libre (sin tanque)	_____
__Buceo con tanque (SCUBA)	_____
__Pesca con figa	_____
__Otro (list): _____	_____

4. Por favor identifique en orden de prioridad las cinco artes o equipos de pesca mas importantes **hace cinco años** y las especies que captura con estas (*1 sería el más importante y 5 el que sería el menos importante*):

Equipo:	**Especies (las 3 más importantes)**
__Chinchorro de Arrastre	_____
__Redes (filete/ trasmallo [], mallorquín [], attaraya []	_____
__Cajones (nasas de langosta)	_____
__Nasas de pesca	_____
__Palangre de fondo	_____
__Palengre vertical	_____
__Anzuelo(s) y linea	_____
__Buceo libre (sin tanque)	_____
__Buceo con tanque (SCUBA)	_____
__Pesca con figa	_____
__Otro (list): _____	_____

5. Si encuentra que hay cambios en la composición del equipo, pregunte a qué se deben tales cambios (algún o cualquier cambio):

_____

_____

_____

_____

_____

_____

_____

6. ¿Cuán satisfecho/a se encuentra usted con la pesca como profesión?

☐ Extremadamente satisfecho/a ☐ Bastante satisfecho/a ☐ Satisfecho/a ☐ No muy satisfecho/a ☐ Insatisfecho/a ☐ No responde

7. ¿Cuán difícil es encontrar trabajo fuera de la industria pesquera?

☐ Extremadamente difícil ☐ Bastante difícil ☐ No es difícil ☐ Fácil ☐ No responde ☐ No se

8. Por favor, diganos cuales son las cuatro actividades no relaciones con la pesca mas importantes a las que se dedica:

1ra_____ 2da_____ 3ra_____ 4ta_____

9. Aproximadamenta ¿cuántos dias al mes usted pesca y cuántos días al mes realiza actividades que no están relacionadas a la pesca?

Mes	**E**	**F**	**M**	**A**	**M**	**Jun**	**Jul**	**A**	**S**	**O**	**N**	**D**
Pesca												
Trabajo no relacionado a la pesca #1: _____												
Trabajo no relacionado a la pesca #2: _____												
Trabajo no relacionado a la pesca #3:_____												
Trabajo no relacionado a la pesca #4:_____												

Información Demográfica, Sobre el Hogar y Sobre el Empleo

Ahora nos gustaría preguntarle sobre su hogar. Estamos interesados/as en entender la importancia de la pesca en comparación a otras actividades.

10. Cuál es su estado civil (o marital) actual?

☐ Soltero/a ☐ Casado/a ☐ Divorciado/a ☐ Viudo/a ☐ Otro_____

11. Número total de miembros del hogar (incluyendo el/la entrevistado/a): _____

12. ¿Cúantos miembros de su hogar (incluyendo a Usted) obtienen ingresos de la pesca? _____

13. ¿Cúantos miembros de su hogar (incluyendo a Usted) tienen otros trabajos no relacionadas con la pesca? _____hh

14.¿ Por favor, diganos cuales son las cuatro actividades no relaciones con la pesca mas importantes a las que miembros de us hogar se dedica:

1ra_____ 2da_____ 3ra_____ 4ta_____

15. Lazos comunitarios

a) ¿Su lancha/yola/bote/o barco fue construido localmente? (Sí/No)
Dónde (Pueblo/ciudad):_____ Nombre de la Compañía (si es posible):_____

b) ¿Le dá mantenimiento a su lancha/yola/bote/o barco localmente? (Sí/No)
Dónde (Pueblo/ciudad):_____ Nombre de la Compañía (si es posible):_____

c) ¿Usted le da servicio a su motor localmente? (Sí/No)
Dónde (Pueblo/ciudad):_____ Nombre de la Compañía (si es posible):_____

d) ¿Compra su equipo de pesca localmente? (Sí/No)
Dónde (Pueblo/ciudad):_____ Nombre de la Compañía (si es posible):_____

e) ¿Compra equipos electrónicos o de navegación localmente? (Si/No)
Dónde (Pueblo/ciudad):_____ Nombre de la Compañía (si es posible):_____

f) ¿Compra carnada localmente? (Si/No)
Dónde (Pueblo/ciudad):_____ Nombre de la Compañía (si es posible):_____

Composición de la tripulación

Ahora nos gustaría hacerle unas preguntas sobre su tripulación para poder describir completamente sus actividades pesqueras.

16. ¿Cúantas personas normalmente pescan con Usted durante un viaje de pesca tipico?

17. ¿Cuál es la etnicidad de la tripulación y su relación o parentesco con usted?

Miembro de la tripulación # 1: Etnicidad _____ Relación _____

Miembro de la tripulación # 2: Etnicidad _____ Relación _____

Miembro ¿de la tripulación # 3: Etnicidad _____ Relación _____

Miembro de la tripulación # 4: Etnicidad _____ Relación _____

18. Cuán difícil es encontrar una tripulación aceptable?

☐ Muy difícil ☐ difícil ☐ no es difícil ☐ muy fácil ☐ N/A ☐ No se

Disposición de la captura

Las siguientes preguntas son acerca de la captura, como esta se distribuye y se vende.

19. Cuál porcentaje de su captura es para… [si no sabe porcentajes, puede estimar como "la mitad, tercera, cuarta, etc."]

___% Consumo en el hogar ___% para venta en el mercado __% Regalo a la tripulación.

___ % Regalos a la comunidad (iglesia, amigos/as, etc.). ___ % Regalo a clientes (e.g., capitán barco fletado) __ % Otro (especifique):_____ make sure matches 100

20. Dónde vende el pescado y qué porcentajes van a cada uno de estos sitios? [si no sabe porcentajes, puede estimar como "la mitad, tercera, cuarta, etc."]

Asociación de pescadores___%	compañía de pescado privada____%	mercado privado____%
Mercado público de pescado____%	comprador/a ____%	en casa ____%
Restaurante ____%	muelle o rampa____%	en la carretera ____%
otra (especifíque)_____ ____%		

Asuntos de Pesca

Ahora nos gustaría saber cuáles usted piensa que son los asuntos más importantes relacionados a la pesca local.

21. Por favor indique, usando la siguiente escala de 5 puntos, cuál cree que era el estado de los arrecifes de coral, recursos pesqueros, y mangles en su area hace 10 años, y hace 5 años? **Nota: si usted quiere contestar de manera específica a su area, no hay problema, aunque originalmente pensamos que su respuesta iba a ser global (de la isla completa) en lugar de ser tan específica.**

1=Arrecifes de coral muertos, ……., 5= Arrecifes de coral saludables,
1=Ausencia de peces, ……., 5=Abundancia de peces
1=Ausencia de mangles,…..,5=Abundancia de mangles

	Hace 10 años	*Hace 5 años*	*Hoy*	*Dentro de 5 años*
Arrecifes de coral				
Recursos Pesqueros				
Mangles				

22. Por favor expliquenos por qué cree eso acerca de los arrecifes de coral, peces, y mangles:

Arrecifes de coral:

_____

_____

_____

_____

Recursos pesqueros:

_____

_____

_____

_____

Mangles:

Reservas Marinas/ Temporada de veda

22. Ahora nos gustaría saber cómo usted se siente sobre los santuarios marinos locales y los cierres de temporada.

Area	¿Ha pesado allí? (Y/N)	Usted, ¿está de acuerdo o en desacuerdo con las siguientes aseveraciones sobre este tema, o diría que no sabe? (scale: 1= Fuertamente en desacuerdo; 5=Fuertamente de acuerdo; NS=No se; NC=No contesta)							
		Mantiene o aumenta araes de desove ("spawning aggre-gations")	Mejora cantidad de peces de arrecifes **adentro** reserva o veda.	Mejora cantidad de peses de arrecifes en áreas pesqueras **adyacentes de** reserva o veda	Protege espeecies explotatas en areas vulnerables (p.e. areas de vivero)	Restaura o mantiene la calidad del habitat (p.e. arrecifes de coral, mangles)	Crea problemas para sustentar a mi familia y a mi.	Crea problemas sociales o económicos en las comunidades que dependen de la pesca.	Mantiene y/o aumenta las oportunidades de empleo e inversión (p.e. charter, operadores de buceo)
Reserva Natural Canal de Luis Peña (Culebra)			Especies:	Especies:					
Laguna de Condado			Especies:	Especies:					
VI National Park & Coral Reef National Monument (St. Johns Park)			Especies:	Especies:					
Hind Bank MCD			Especies:	Especies:					
St. James Marine Reserve/ Cas Cay-Mangrove Lagoon			Especies:	Especies:					

Area	¿Ha pesado allí? (Y/N)	Usted, ¿está de acuerdo o en desacuerdo con las siguientes aseveraciones sobre este tema, o diría que no sabe? (scale: 1= Fuertamente en desacuerdo; 5=Fuertamente de acuerdo; NS=No se; NC=No contesta)							
		Mantiene o aumenta araes de desove ("spawning aggre-gations")	Mejora cantidad de peces de arrecifes **adentro** reserva o veda.	Mejora cantidad de peses de arrecifes en áreas pesqueras **adyacentes de** reserva o veda	Protege espeecies explotatas en areas vulnerables (p.e. areas de vivero)	Restaura o mantiene la calidad del habitat (p.e. arrecifes de coral, mangles)	Crea problemas para sustentar a mi familia y a mi.	Crea problemas sociales o económicos en las comunidades que dependen de la pesca.	Mantiene y/o aumenta las oportunidades de empleo e inversión (p.e. charter, operadores de buceo)
Grammanik Bank			Especies:	Especies:					
Veda a Boya 8/ Tourmaline			Especies:	Especies:					
Veda a Bajo de Sico			Especies:	Especies:					
Veda a Boya 6/ Abrir la Sierra Bank			Especies:	Especies:					
Veda a La Mona y Monito			Especies:	Especies:					

Area	¿Ha pesado allí? (Y/N)	Usted, ¿está de acuerdo o en desacuerdo con las siguientes aseveraciones sobre este tema, o diría que no sabe? (scale: 1= Fuertamente en desacuerdo; 5=Fuertamente de acuerdo; NS=No se; NC=No contesta)							
		Mantiene o aumenta araes de desove ("spawning aggre-gations")	Mejora cantidad de peces de arrecifes **adentro** reserva o veda.	Mejora cantidad de peses de arrecifes en áreas pesqueras **adyacentes de** reserva o veda	Protege espeecies explotatas en areas vulnerables (p.e. areas de vivero)	Restaura o mantiene la calidad del habitat (p.e. arrecifes de coral, mangles)	Crea problemas para sustentar a mi familia y a mi.	Crea problemas sociales o económicos en las comunidades que dependen de la pesca.	Mantiene y/o aumenta las oportunidades de empleo e inversión (p.e. charter, operadores de buceo)
Isla de Desecheo			Especies:	Especies:					

Temas sensitivos

Las siguientes preguntas buscan entender cuán dependiente es usted de las actividades pesqueras, en comparación a las demás actividades a las que usted se dedica.

23. ¿Cuánto le costaría reemplazar su embarcación/es y equipo de pesca y electrónico? $ _____

24. ¿Que porcentaje del ingreso total de su hogar (no ingreso personal) proviene de **actividades no relacionadas a la pesca**? ____ %

25. Compartando la situación economica de su hogar de hace cinco años con la de hoy, cómo describa su situacion económicamente? Diria que es:

☐Mucho Mejor ☐Mejor ☐Aproximadamente El Mismo ☐Peor ☐ Mucho Peor ☐ N.A.

Appendix B:

Glossary of Acronyms & Common Terms

Acronymns

CODREMAR	Corporación para el Desarrollo y Administración de los Recursos Marínos, Lacustres y Fluviales (Corporation for the Development and Administration of the Marine, Lake, and River Resources)
DOA	Department of Agriculture (Puerto Rican)
DRNA	Departamento de Recursos Naturales y Ambientales (Department of Natural Resources and the Environment)
EEZ	Exclusive Economic Zone
NOAA	National Oceanographic and Atmospheric Association (NOAA Fisheries was formerly the National Marine Fisheries Service).
RUM	Recinto Universario Mayagüez
UPR	University of Puerto Rico

Terms used frequently in text	*Meanings*
Anclas:	Anchors
Atarraya	Cast net
Buzos:	Divers
Cajones:	Lobster traps
Cala (La cala):	Hand-line; in some areas, a long-line on a spool.
Carnada:	Bait
Chinchorro:	Beach Seine
Chiripas:	Temporary jobs/ odd jobs/ casual employment
Club Nautico:	Nautical Club (recreational fishing/ boating club).
Colirubia	Yellowtail snapper
Colmado:	Small grocery & dry goods store
Cordel:	Type of hook-and-line rig
Dorado:	Dolphin fish (mahi-mahi)
Empanadillas:	Pastries filled with lobster, shrimp, meats, etc.
Filete:	Gill net
Fritura:	Fried pastries
Lancha:	Fishing vessel or boat
Langosta:	Spiny lobster
Malacates:	Diesel-powered rigs for pulling up fishing lines
Mallorquín	Trammel net (three-curtained net)
Mero:	Grouper
Muelle:	Pier or dock
Palangre:	Multiple hook-and-line stationary gear
Parcela:	Government-sponsored housing/ neighborhood
Pescadería:	Fish Market
Pinchos:	Shiskabobs (of fish, chicken, etc.).
Proel:	Crew member
Pulpo:	Octopus
Nasas:	Fish traps

Naseros:	Trap fishers
Sama:	Mutton Snapper
Sierra:	Kingfish or King Mackerel (also called *carite*)
Trasmallo:	Gill net
Villa Pesquera:	Fishing Association
Yola:	Typical fishing vessel (<25’ in length)

References

Notes on Data Sources

Landings Data: 1983-2003 Landings Data were provided by the Puerto Rican Department of Natural Resources, Mayagüez, Puerto Rico Laboratory.

- Average price: this is a weighted average.
- Pounds: this is the summation of the pounds.

Puerto Rican Census of Fishers, 2002. Fisher census data were provided by the Puerto Rican Department of Natural Resources, Mayagüez, Puerto Rico Laboratory.

Census Data Sources:

[1] http://www.censo.gobierno.pr/Censo_Poblacion_Vivienda/Datos_Históricos_1950_2000.htm
[2] http://www.censo.gobierno.pr/Censo_Poblacion_Vivienda/Datos_Históricos_1950_2000.htm
[3] US Department of Commerce. Bureau of the Census. US Census of Population: 1960-2000.
[4] The year 2000 also includes hunting.
[5] For 1990: US Department of Commerce. Bureau of the Census. 1990 Census of Population. Social and Economic Characteristics, Puerto Rico.
For 2000: http://fastfacts.census.gov/servlet/CWSFacts?geo_id=04000US72&_sse=on
[6] US Department of Commerce. Bureau of the Census. US Census of Population: 1960-1990 and http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=DEC_2000_SF3_U&_lang=en&_ts=113787863937
[7] Values are in current dollars. http://www.censo.gobierno.pr/Censo_Poblacion_Vivienda/Datos_Históricos_1950_2000.htm
[8] Values are in current dollars. http://www.censo.gobierno.pr/Censo_Poblacion_Vivienda/Datos_Históricos_1950_2000.htm
[9] http://www.censo.gobierno.pr/Censo_Poblacion_Vivienda/Datos_Históricos_1950_2000.htm

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