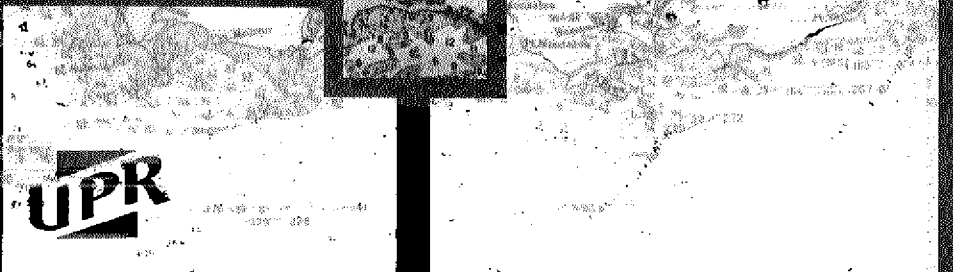
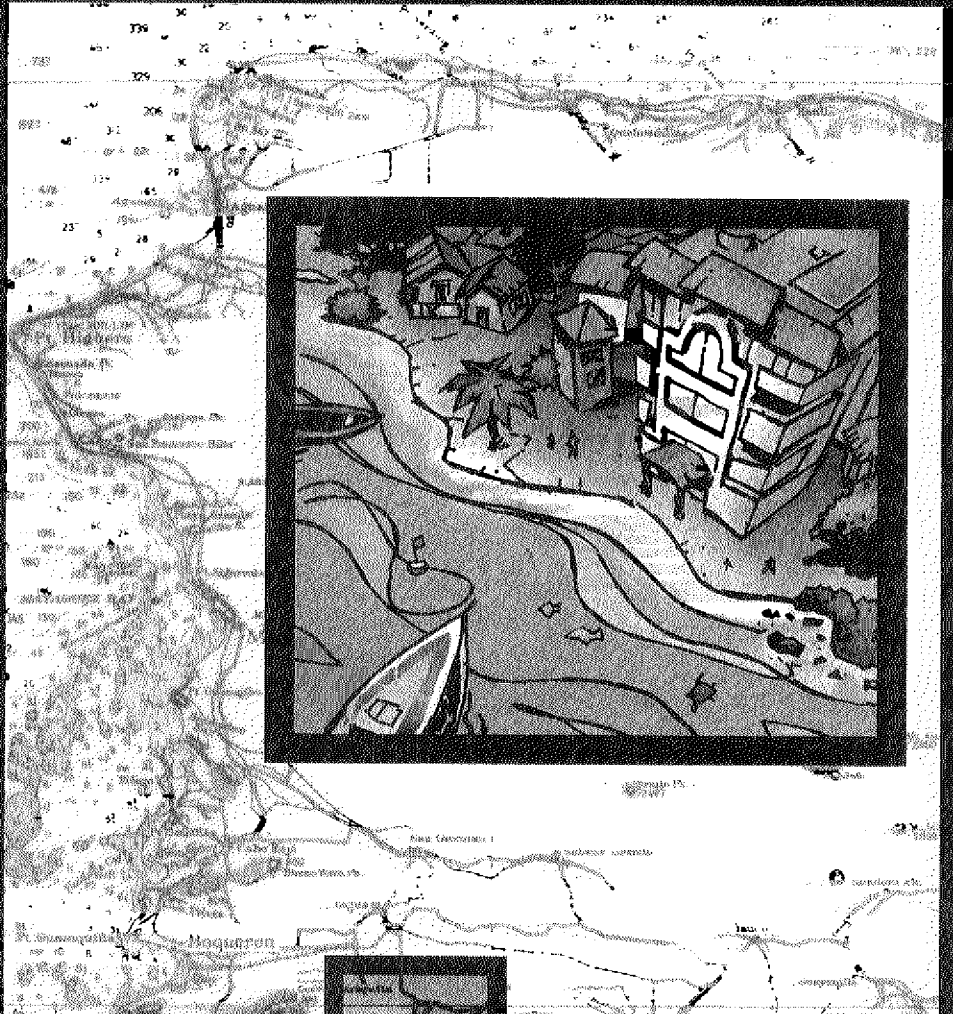
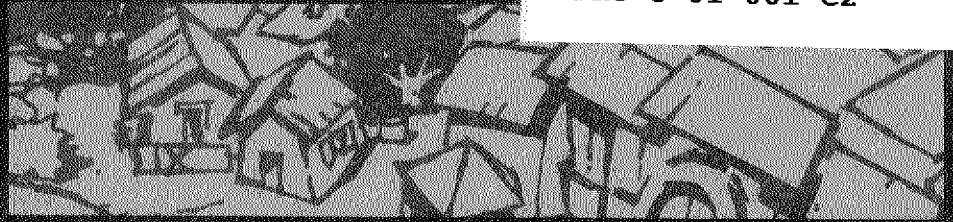


Historical contentions and future trends in the coastal zone: the environmental movement in Puerto Rico



Manuel Vaidés Pizzini
Director
University of Puerto Rico
Sea Grant College Program

Professor and Researcher
Center for Applied Social
Research (CISA) Social
Sciences Department, University
of Puerto Rico-Mayagüez



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Manuel Valdés Pizzini
Director
University of Puerto Rico Sea Grant College Program

Professor and Researcher
Center for Applied Social Research (CISA)
Department of Social Sciences
University of Puerto Rico-Mayagüez

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University of Puerto Rico Sea Grant College Program
PO Box 9011
University of Puerto Rico-Mayagüez
Mayagüez, Puerto Rico 00681-9011

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To the memory of Carlos Goenaga, Pedro Santana Ronda, and Carmen Salomé Rodríguez, to whom we all are deeply in debt.

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Introduction

In 1992, my colleague Jaime Gutiérrez Sánchez and I embarked on a research venture to assess the socioeconomic and political factors transforming coastal communities in Puerto Rico. Having observed the growth of recreational activities and infrastructure in the coast (see Valdés Pizzini, Gutiérrez and Chaparro 1991), we thought it was a logical step to assess the displacement of traditional settlers, and the evident changes in the traditional uses of the coast. The coastal zone, as a "new" space for leisure, and a landscape of high aesthetic value, attracts a large number of visitors, and investors. Constant commodification of coastal lands, and their high price and status value, attracts high-income home buyers who, by sheer numbers, tend to displace traditional dwellers from the historical coastal settlements: rural communities, fishing villages, and small harbors. Development focuses on the construction of high-end condos, resorts, and houses, whose prices make these housing units unattainable for the local population suffering from unemployment and poverty. Coastal change is evidenced by new architecture, social practices, lifestyles, languages, and ethnic groups present in the area. Guided by current theories on similar processes in urban areas (see Smith 1996:41), we labeled this process "coastal gentrification" (see Iranzo 1996).

One of the assumptions of our project was that "coastal gentrification," jointly with development and urbanization, was highly correlated with an increase in the formation of community-based and environmental organizations. These organizations were formed to protect nature, and the social and cultural integrity of local communities threatened by economic change.

Based on previous research on fishing communities, also funded by Sea Grant, we had a relatively thorough understanding of the socioeconomic and landscape transformations occurring in the western Puerto Rico municipality of Cabo Rojo (see Valdés Pizzini, Gutiérrez Sánchez and González, forthcoming). We used the Cabo Rojo case for the design of the study and the identification of key variables and processes. Unfortunately, this project was

dramatically underfunded. As a result, it had to be scaled down and most field activities could not be carried out adequately. The number of municipalities to be studied was reduced by half, so that four municipalities (two pairs of contiguous units) were finally selected: Guánica-Lajas (southwest), and Aguada-Rincón (west). As principal investigators, we only had the opportunity to initiate an exploratory research project in which undergraduate Sociology students participated as research assistants, and expenses were supported by Sea Grant funds. In addition, a small number of students were hired to do fieldwork in coastal communities.

Despite its scant funding, this project played a key role in developing undergraduate research activities in our Social Sciences department at the University of Puerto Rico at Mayagüez (UPRM). The project also supported the consolidation and growth of our Center for Applied Social Research (known, by its Spanish acronym CISA). Carrying out this project reminded us that sometimes innovative investment of scarce funds can go a long way.

Since 1992, large number of students have participated in a variety of investigative endeavors that have covered the following topics: municipal planning, local community-based environmental organizations, coastal conflicts reported in the press, changes in the demography of coastal districts (*barrios*) and municipalities, inventories of businesses, and a census of business' owners' opinions on a variety of coastal issues affecting their livelihood, the environment, and the local economy. This last teamwork effort also produced several case studies of communities, using ethnographic and survey data to assess social displacement and changes in the social composition of coastal settlements. Case studies from other municipalities, such as the northern coastal town of Río Grande, were also prepared for this project. In the municipality of Guánica, we had the opportunity to link our project to similar efforts and activities conducted by other colleagues and students (see Álvarez and Valdés Pizzini 1994, CANARI 1995, Montes and Santana 1993, Acosta 1995).

The report presented here is based on data collected during this project by student and

faculty researchers on the role of environmental organizations in the west coast of Puerto Rico. The original piece of research was conducted by Marialba Hernández, whose work serves as a platform for this report (Hernández 1992). I have expanded the scope of that initial research to provide a sociological assessment of environmental contentions in the coastal zone in Puerto Rico as a whole.

Originally, this report had the objective of providing a simple typology of organizations, and a brief description of their activities for the readers of an anthology of the Latin-American environmental movement. However, in response to a critical reading from my collaborators, I added sections on socioeconomic trends in Puerto Rico, and the alternative paths down which the environmental movement may go in the next ten years, in relation to population, politics, policies and the economy.

This report outlines and critically assesses the main environmental problems occurring in the coastal zone of Puerto Rico, and briefly analyzes, in a historical perspective, the process of social and political participation of the environmental movement. It should be noted that this report does not present an exhaustive inventory of events, groups, and organizations forming the environmental movement (see Giusti 2001).

The main argument presented here is that unsustainable growth is expected. Therefore, civil society will continue to play a key role in the stewardship of nature, and the integrity and health of coastal communities and marine ecosystems. The main challenge for the environmental movement will be to develop, engage and transform the policies and politics of sustainability. I also argue that universities (and programs like Sea Grant) have a critical role to play in the processes of capacity building and policy making related to this issue.

Form and Content of the Environmental Movement

During the last thirty years, social scientists have passively witnessed the steady rise of the environmental movement in Puerto Rico. This movement is formed by a wide

spectrum of groups and organizations, with different class, social and political backgrounds and agendas. Except for a handful of general works (Torrecilla 1986, García 1988), specific case studies (Berman-Santana 1993, Acosta 1995, Anazagasty 2000, Maldonado 2000), and an overdone critique (Cerame-Vivas 1994), no attention has been paid to the structure, dynamics or processes involving the environmental movement; nor has a critical appraisal of the efforts of communities and organizations toward conservation and environmental protection been made. This lack of a critical appraisal leaves us without an appropriate framework for the analysis.

I propose here a framework for the understanding of the environmental movement in Puerto Rico, cognizant that research in that area is sorely needed. Following is a typology (in the Weberian tradition of the "ideal type") of groups formal and informal and organizations that form the movement.

- A. Conservation and Environmental Non-Governmental Organizations (NGOs). These are composed of what sociologist Alvin Gouldner (1985) called the intelligentsia (scientists) and intellectuals (social scientists, artists, writers and philosophers, among others) sharing the "culture of critical discourse" (a form of knowledge and a social praxis derived from the university experience and high levels of cultural / educational capital). In terms of ideology, values and social composition, members of the environmental movement at this level tend to share the tenets of the New Environmental Paradigm (NEP). The NEP is a set of social values, attitudes and practices that rejects the old consumption-production paradigm of industrial society. It also embraces an environmental ethics based in conservation values and environmental protection (Catton and Dunlap 1978). These NGOs receive funding from international and national conservation agencies and foundations to do work related to education, environmental action and the conservation of natural

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- areas. They may also receive government funds for the acquisition of land for its conservation or "wise use."
- B. Environmental-Social-Political NGOs. Organizations formed by environmental, social, religious, labor and political animators (members of the intelligentsia, intellectuals, and others). These NGOs have complex political, religious, social and environmental agendas and ideologies, which are often intertwined in an undifferentiated manner. They provide technical and legal advice to communities, labor unions, and other groups that oppose either the state or the private sector in the environmental field.
- C. Environmental Groups. These are composed of diverse community members (communities, clubs, NGOs) facing one key environmental issue or problem affecting the area or region. These groups are, at times, formed by a strategic coalitions of some or all of the other groups mentioned here.
- D. Community Environmental Organizations. These groups are defined as local, grass-roots organizations protecting their own communities. These also include organizations formed by resource users (e.g., fishers, boaters, farmers). Although these organizations are composed of specific popular sectors of society, they show a certain level of social pluralism, according to the make-up of their communities. These organizations may be either informal or formal in their structure. Usually, they tend to formalize as they go through various steps in their development, increasing their tactical and strategic capabilities (after Hernández 1992).

What unites all these types of groups in a common movement is the fact that they are part of a process in which civil society challenges the state in the environmental field. The "environmental field" is defined as those processes and problems that affect the (social,

cultural and biotic), health of the community, alter ecosystems, threaten species, change traditional culture and resource use patterns. It is also characterized by a pervasive form of environmental injustice in which communities and organizations remain separated from policy and decision making on the environment. In response to these circumstances, the environmental movement engages in an ongoing process of empowering communities, groups and institutions, which enables members of the movement to confront the state, design and implement tactics and strategies, educate and organize communities, engage in co-management arrangements, claim traditional rights and underscore the importance of local, indigenous and traditional forms of knowledge and resource use (Acosta 1995, Renard and Valdés-Pizzini 1994).

As do their worldwide counterparts, members of the Puerto Rican environmental movement engage in legal, social, political, cultural and economic disputes with members of the private sector (e.g., industry, real state developers) and with the state when those entities threaten the health and integrity of the social and natural communities. As is the case in the U.S. (Dunlap and Mertig 1992), contentions in P.R. are many and varied: the need for conservation schemes for protected and unprotected natural areas, "Not in My Back Yard" (NIMBY) opposition to projects, "locally unwanted land uses" (LULUs), interruptions of traditional resource use patterns, and, most important, struggles to solve health and environmental problems caused by urbanization and industrialization. Recently, a number of organizations in Puerto Rico have taken active roles in co-management endeavors. Co-management is the process by which organizations share responsibility and authority in the management and stewardship of natural areas and resources.

The development of the environmental movement in Puerto Rico is congruous with sharp rises in the island's per-capita income, consumption, population, and industrial development, and with the environmental impacts of those increases. Perhaps the most critical result of those development has been the

dramatic collapse of the agriculture industry, including the substantial reduction of land devoted to agriculture in the coastal plains, where sugar cane and pastures once dominated the landscape. Agricultural land has been regularly replaced by urban areas, which have steadily expanded in a manner similar to that which sociologists and planners call "the urban sprawl."

This urbanization process follows the same pattern common to industrial and post-industrial societies characterized by the automobile-highway duo, commodification and social production of space, urban expansion based in the construction of single house units (structured as consumption units), decentralization and deurbanization of the central cities, and the hyper-mobility of capital through suburbia (Gottdiener 1985, Knox 1993).

Through the mid-1990's, urbanization industrial development, population pressure over resources and space, and the problem of waste disposal turned the coastal zone of Puerto Rico into an area of social and political contention among the diverse stakeholders, including dwellers. While environmental problems are present throughout the archipelago, including in mountainous inland areas, they are more acute in the coastal zone of Puerto Rico. The historical reasons for this are presented in the next section.

The Coastal Zone as a Haven

Early this century, a large number of landless rural laborers abandoned the highland municipalities of Puerto Rico in search for work in the coastal zone. These landless laborers found their future further darkened by the 1898 U.S. invasion of Puerto Rico that dramatically altered the island's structure of power and the economic well-being of the coffee haciendas. The political and economic events of that period of transition, combined with two major hurricanes (1899 and 1928), weakened the agrarian economy of the island's interior, despite the production of tobacco for U.S. manufacturing companies (Pumarada 1993). The most noticeable result of the changes was a population increase in coastal towns and cities that were the hubs of numerous sugar mills

(*centrales azucareras*), most of which were owned by U.S. firms (Ayala 1999).

While the coastal zone became a haven for the highland peasants and rural workers, it also became a haven of sorts for U.S. military installations, and the geopolitics of the times (see Rodríguez Beruff 1988, Estades Font 1988). The U.S. government constructed naval bases and installations in the island municipalities of Vieques and Culebra, in the capital city of San Juan, and in the town of Ceiba (where the Roosevelt Roads Base is located), thus displacing many local, poor inhabitants of those areas. The transfer of thousands of acres of mangrove forests and beaches to the U.S. military forces, and the use of some of those areas in Culebra (until the early 70s) and Vieques for target practice became, and have remained, major political and environmental concerns (Delgado-Cintrón 1989, Giusti 1999).

From 1976 through 1981, the fishermen of the island of Vieques openly and consistently defied U.S. Navy prohibitions against entering target areas during bombing exercises. The fishermen disobeyed the orders, and entered into the area several times. As a result of those major political and environmental acts of defiance, many political and resource-user organizations gained popular support throughout the island. The fishers argued that military target practices contributed to the environmental degradation of local coral reefs and coastal habitats in the area. In the opinion of some observers, the fishers' protest and defiance of regulations was a unique event of a non-political, nonpartisan confrontation with U.S. military authorities. The fishers demanded the halt of the military use of the area. In the early 70s, Puerto Rican Independence Party (PIP) leaders, notably Rubén Berríos Martínez, joined the civilians in a confrontation with the U.S. Navy over their occupation of portions of the island-municipality of Culebra, and requested the cessation of its use as a bombing range. Today, Culebra is no longer used for military purposes; those lands were distributed to the local government and to the U.S. Fish and Wildlife Service. Since the 1970s, other organizations have followed similar paths in confronting the U.S. military forces with protests charged with

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political, peace and environmental arguments. Five years ago, there was a massive protest forestalling the installation of Navy radar facilities in the Lajas Valley, on the southwest coast. That event attracted many different organizations to the process, turning it into a pluralist movement.

In 1999, a bombing accident responsible for the death of a civilian guard nearby the target range triggered a massive protest and a formal request from the civilian community to end the use of Vieques as a bombing range and military post. One of the key arguments for requesting the U.S. Navy to leave Vieques consists of the claim that such bombing has caused contamination and environmental damages to the area. Bombing is pointed to as the culprit of the unusual patterns of morbidity and diseases among the local population. This process, well-documented and commented upon elsewhere (Giusti 1999, Benedetti 2000), has consolidated the interests and forces of the civilian community, including the environmental movement.

The Demise of Agriculture

By the end of the 1980s, there was an increase in the amount of land devoted to agricultural activities. The government intentionally stimulated farming of crops for local consumption (rice, tomatoes), as well as for export (millet, mangoes). Despite such recent efforts, agriculture has declined steadily since the 1930s, especially in the coastal zone. As a result, agricultural land has been shifted and re-zoned for industrial, tourist and housing development.

While urbanization and industrial development featured a barrage of social and economic pressures over space and resources, agriculture had a major share in the process of environmental deterioration, which occurred quietly and imperceptibly without any environmental opposition. Prior to the urban assault on coastal ecosystems, agriculture was the major culprit in habitat loss and environmental degradation in the coastal zone. State agricultural agencies, jointly with landholders, large and small, persistently destroyed, drained and filled coastal wetlands (Álvarez-Ruiz 1991, Giusti 1994). The state's

policy during this century was to turn unproductive land (meaning wetlands) into productive agricultural fields, eliminate foci of diseases (mangroves and swamps), eradicate shantytowns and their physical contexts (mangroves), and to turn idle land (wetlands in general) into space suitable for infrastructure development such as airports and harbors (Martinez 1994, Seguinot 1997, Sepúlveda and Carbonell 1988).

During this process, Puerto Rico was either waving goodbye to the Great Depression by means of the New Deal's reconstruction programs, or was engaged in the discourse and cultural construction of the island's industrial development strategy of the 1940's, dubbed "Operation Bootstrap." Puerto Rico was betrothed to the code of the old industrial paradigm, offering the promise of a better future, even at the expense of environmental destruction. Therefore, there was no environmental movement, no NEP, not the hint of a pluralist movement to stop what seemed to be the unstoppable progress. Social movements and political actions were then fueled by the controversial question of Puerto Rico's Commonwealth status and controversy, by new forms of armed struggle (e.g., bombings of U.S.-owned businesses), by opposition to the Vietnam War, and by the university student movement, all of which were in consonance with social movements elsewhere.

The Rise of Industrial Development

Puerto Rico's economic and industrial "miracle" was the result of the state policy of investing in infrastructure, and the attraction of state-side manufacturing firms and enterprises to the island, lured by tax exemption mechanisms, which eventually led to the "936 industries" (so named after the Internal Revenue Service Code, Section 936). This industrial development underwent several phases, which involved garment industries, electronic appliances, food processing plants, heavy refineries, advanced electronics, and pharmaceutical plants (López Montañez and Meyn 1992, CIIES 1992). The latter period of

the industrial development process also produced a large amount of toxic waste that today is prompting concerns over acute health problems in many communities, especially in the 936-Industrial Belt of the north coast.

In support of the industrial development of the period, the government controlled the supply of water and electricity, the latter generated by a network of petroleum combustion plants built throughout the coastal zone. In the watersheds, a number of dams and reservoirs were constructed for the water supply. The final result of that process has not been assessed in terms of the destruction of habitats and the introduction of exotic species. However, the use of the reservoirs came into the limelight during a recent "drought" when it was discovered that construction permits had been authorized for critical areas of the watershed. Construction in those areas had provoked erosion and the accumulation of sediment, which, in turn, had dramatically reduced the storage capacity of the reservoirs, thus contributing to the so-called drought.

The environmental movement has constantly been critical of development in the watershed areas, and has confronted both the state and the private sector on the detrimental impacts of infrastructure and industrial development impacting most of the coastal area. Local citizens have also played a key role in the protection of the environment. For example, fishers and coastal settlers have opposed the construction, and ensuing impacts, of oil refineries on the south coast (Pérez 2000), as well as the attempt to build an electrical generating plant using coal as fuel in the west coast (Maldonado 1999, Anazagasty 1999). The movement against the coal plants in Rincón and Aguada in the 70s and 80s is an example of an environmental movement typical of the demographics of industrial societies, carried out by pure grassroots movements and community-based organizations, energized by community animators and other political actors. A recent study of environmental stakeholders in the municipality of Guánica shows how the local population, forming a pluralist body made up of residents ranging from teachers to fishermen, and of all political tendencies, has been involved

in many struggles against the adverse environmental effects of industrial development in that southern town (Acosta 1995).

Two issues that have united many environmental organizations throughout the years are health problems and water quality.

Health Issues: As noted scientist and environmentalist Neftalí García has argued (1988), one of the basic concerns of this grassroots environmental movement has been the health of the local population, which has been impacted by industrial development and the ensuing contamination of the water and air. In the municipality of Cataño, to the south of old San Juan, a group of dwellers has organized a movement against the level of particles emitted by the *Autoridad de Energía Eléctrica* (AEE, the commonwealth energy company) plant in the municipality. The Federal Environmental Protection Agency (EPA) designated the area as the Cataño Air Basin, and recognized the health problems caused by violations by the government energy company (AEE). Similar grassroots organizations have been found in the town of Guayama in the south, and among industrial workers in the western city of Mayagüez. Mayagüez also witnessed the rise of a grassroots-intellectuals movement called *Mayagüezanos por la Salud y el Ambiente*, which has been quite active in opposing the AEE attempt to build and operate, though subcontracting the operations, a coal-fueled electricity generating plant by the Congentrix firm. The main issue there was also the health of the nearby communities and the potential hazard of other projected plants. Those and other efforts for the sake of better health in the work place and in the communities are perhaps the direct heir of the consistent fight to control contamination caused by oil refineries in Cataño in the early 80s, in Guayanilla in the south coast in the 70s, and by Union Carbide in Yabucoa in the east in (1973-1985).

Water Quality: Contamination and pollution of freshwater and coastal bodies of water by industries have been a major problem in Puerto Rico, affecting watershed areas, underground aquifers, and the water quality in the coastal zone. Critical assessments of illegal practices by industries, waste disposal by

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communities and individuals and the problems of both freshwater and coastal water quality have been recognized by private environmental organizations such as *Misión Industrial*, consulting firms (*Servicios Técnicos*), state officials (Environmental Quality Board 1994), university programs such as Puerto Rico's Sea Grant College (Vélez-Arocho 1994, Chaparro 1998), international environmental organizations, and independent scientists (Hunter and Arbona 1995). In that respect, environmental groups like *Mayagüezanos por la Salud y el Ambiente* have taken the local tuna canneries to court to make them comply with the EPA's regulations related to waste disposal in the Mayagüez Bay.

Urban growth

Puerto Rico became an urbanized country during the last three decades. According to the U.S. Bureau of the Census, nearly 71 percent of the population lives in urban areas. During the first part of the twentieth century, urban expansion followed the archetypical growth pattern of the less developed countries, in which the rural population moved first to the center of the cities, occupying the city's *barriadas* (or quarters), and afterwards to marginal lands in the periphery. The formation of *arrabales*, or shantytowns, in the fringing wetlands and other idle lands became a too familiar pattern in the cities (Ramírez 1976, Safa 1974). This process also contributed to the depletion of extensive mangrove forests, especially in the north coast (Martínez 1994, Seguinot 1997).

However, by the 1970s, government urban renewal programs started a massive relocation of the urban poor into public housing projects called then *caseríos*, now *residenciales públicos*. The decade of the 1960s had seen the growth of the construction sector, fueled by the massive expansion of subdivisions or *urbanizaciones* in a mass production scheme of concrete and cement block houses to provide housing for the expanding population, and to receive the large numbers of return migrants during the 1970s. After the peak year of housing construction in 1974 (\$487.2 million) the construction sector of the economy shrank until 1977, and was unable to recuperate its strength

and prominent role in the GNP until the second half of the 1980s (Villamil 1994:14). According to official sources, investment in the construction sector was \$2,986.2 million in 1994, reflecting a 5.6% increase over dollars invested in 1993, and a gain over a brief deceleration period in 1990-1992 (Burgos 1994). By 1995, total investment (both public and private) in construction reached \$3.3 billion, most of which consisted of the development of private housing, hotels and shopping centers. A total of 13,664 housing units (mostly subdivisions) were constructed in 1995, for a total investment of \$761.7 million, a 18.6% growth in spending from 1994 and an average "production cost" of \$56,000 per unit (Neggers 1995:B29).

This urban expansion, coupled with industrial development, was dubbed "liable" for the acute process of contamination of aquifers in the north coast:

"Pollution causes well closings but the process is driven by increasing population, urbanization and industrialization. Statistical parameters by quadrangles are only approximate but show clearly that total population and the total number of manufacturers are positively correlated with well closings over the limestone: population $R=0.771$, $P=0.003$; manufacturers $R0.773$, $P=0.003$. The two variables are closely inter-related and either predicts environmental pressures" (Hunter and Arbona 1996:134).

As Hunter and Arbona demonstrate, there is a strong correlation between population, industries and contamination of water wells in the limestone formation of the karstic zone of the north. The north coast is also the main geographical axis of the Consolidated Metropolitan Statistical Area (CMSA) of San Juan-Caguas that grew from a conglomeration of nine municipalities and 1.2 million inhabitants in 1980, to a large area of 30 municipalities and almost two million people, extending from Barceloneta in the central north coast, to Fajardo and Humacao in the east corner of the Island in 1990. The cost of this urban expansion, in terms

FACTS:

The north coast limestone region occupies 20% of the island's surface area.

It holds 48% of the total population and 55% of the manufacturing plants.

Source: Hunter and Arbona 1995.

The US census estimates that most of the population growth will be in the municipalities of the MSCA of San Juan-Caguas.

Sources: Gilbe 1998, Carmona 2000.

of water quality and environmental pressures, is evident. Through the latter half of the twentieth century, urban expansion became a major threat to important protected areas, critical and unique habitats, coastal wetlands and estuaries, and watershed areas. For example, the municipalities adjacent to the San Juan Bay estuary grew significantly from 1950 to 1990, adversely impacting that ecosystem (see Seguinot 1997:71-72).

Suburban growth in San Juan has reached the once rural and mountainous areas of the municipality, like Caimito. Caimito is now a rural and poor area surrounded by middle and high class subdivisions. Those projects have caused erosion, and changes in the watershed. These poor communities have repeatedly requested better environmental safeguards and a moratorium on housing development. The "conservation" and well-being of these communities is tied to the well-being of the San Juan Bay estuary. The intensive urbanization in the Río Piedras highlands is responsible for the degradation of water quality throughout the watershed (Gilbe 1998), and for the sedimentation of portions of the estuary (Webb and Gómez-Gómez 1998:5-6).

While the environmental movement has been overwhelmed by this drastic growth of urban space, its actions have been directed at the protection of the karstic environment. They have also focused on halting the wanton

expansion of all-inclusive hotels and exclusive subdivisions that threaten *poyales* (wetlands) in Humacao in the east and in Dorado on the north coast (Alvarez-Ruiz 1991). Other efforts, perhaps more massive or receiving of greater media coverage and popular support, have been the protection of the Vacía Talega wetland in Carolina-Loíza, the coastal lagoon of Tortuguero in Vega Baja, the estuary of the Espíritu Santo river in Río Grande, and El Yunque (or the Caribbean National Forest) in Luquillo and various other municipalities, all of which are protected areas.

In the rest of the island, both urban growth (although at a slower pace than in the MSCA) and development of a leisure infrastructure has prompted the mobilization of environmental groups and community-based organizations to halt development projects menacing the environment, including government projects to expand the Route 66 highway system in the northeast, into environmentally sensitive areas.

Production of Tourism and Leisure Space

One of the critical processes triggering contentions between the environmental movement and the government and private sectors in Puerto Rico is the sharp increase in the tourism infrastructure and those facilities destined for recreational activities in the coastal zone. The east and west coasts are the most affected by the increase in the number of projects. Those areas also exhibited the most acute development of a leisure infrastructure (e.g., hotels, marinas, resorts, see Valdés-Pizzini, Chaparro and Gutiérrez 1991).

A pluralist community movement forming the group *Comité Pro-Rescate de Guánica* developed in 1986 to deter the construction of a Club Med hotel on a beach property adjacent to the Guánica Dry Forest Biosphere Reserve. Despite the lure of jobs and increase in income for an area depressed by lack of industrial development, low local (or outside) investment, and the collapse of the Guánica sugar mill, the communities managed to understand the importance of biodiversity conservation, and the need for environmentally

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appropriate development (Alvarez and Valdés Pizzini 1990).

That community movement paralyzed the project, protected the Dry Forest, and lured the Puerto Rico Conservation Trust (a conservation NGO) to purchase the property for conservation purposes. Despite those efforts, the Commonwealth recently re-zoned the adjacent area as a tourism zone, making development at the borderline of the reserve a possibility. That change in zoning is being fought by local property owners, most of whom are from the upper class, exhibit an open pro-environmental stance, and were also part of the movement opposing Club Med (Montes and Santana 1994).

Throughout the Caribbean, urban growth and tourism development tend to directly affect traditional fishing communities in detrimental ways. Puerto Rican fishermen --the most directly affected stakeholders-- have developed a critical outlook and an active political stance toward urban growth and tourism development issues, which puts them at the forefront of many environmental causes. In 1983, the National Oceanographic and Atmospheric Administration (NOAA) Marine Sanctuary Program proposing of a sanctuary with conservation and recreational purposes in the southwest coast encountered the fierce opposition of fishers and community organizations. Members of the local community and the fishers themselves felt that imposing a federal marine sanctuary was, in fact, a way to curtail their freedom and penalize them. Instead, they felt intervention was necessary to stop the main culprit of mangrove destruction and sewage disposal: absentee upper class owners of second homes (stilt houses) who had control over the shoreline (see Krause 1994).

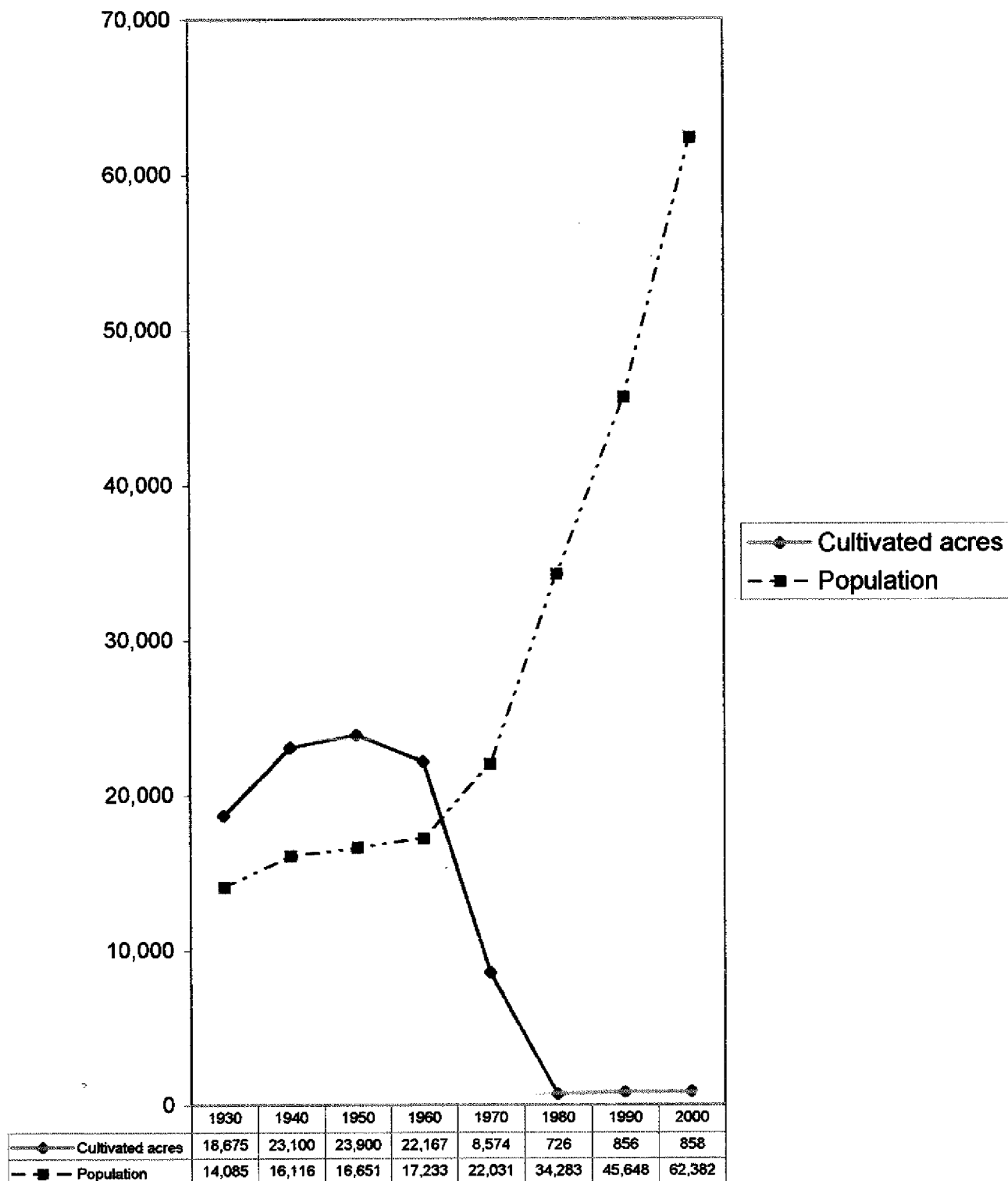
Such confrontation with the Commonwealth and the federal government provided local organizations with the strength to defend their rights to have environmentally clean coastal waters. The complexities of this particular case have been discussed at length elsewhere (Valdés-Pizzini 1990, Fiske 1991). It suffices to say that the movement was successful in halting the marine sanctuary. It also established the artisanal fishers as an important political force in maintaining

negotiations and contentions with Commonwealth agencies for the protection of the coastal waters. The local fishers, with a genuine concern for the conservation of the stocks, joined local researchers in supporting the establishment of a Marine Fishery Reserve. Similar to fishermen from La Parguera, fishers from Boquerón, San Juan, Fajardo, Vieques and Salinas have also formed organizations to protect their areas from the assault of leisure activities and infrastructure. Illegal use and occupation of the coastal zone by middle and upper class "squatters" have been a problem for the fishers in other areas such as Guánica, Papayo in Lajas, Ponce, and Las Mareas in Salinas, all in the southern coast. Local residents, communities and environmental organizations have taken a vertical stand to stop the illegal use of the coastal zone and to protect access to the coast, often unsuccessfully. Another area in which the environmental movement in Puerto Rico may be assessed is in the struggle for the ecological integrity of protected areas threatened by development. As discussed here, the cases of Vacía Talega, Guánica, and even La Parguera are examples of those efforts in the coastal zone.

Río Grande Case Study

The municipality of Río Grande, in the north east coast, has experienced a remarkable increase in population since 1970, responsible for the evident pressures over land needed for housing and tourism and leisure development. In the 1950s, Río Grande was a decaying agricultural town in the midst of the northern sugar cane belt and piedmont small landholdings that survived in the scant available land that had been left unincorporated to the protected areas of the U.S. Forest Service. From 1950 on, there has been a dramatic collapse of the agricultural activities in Río Grande, measured in terms of the acreage of land devoted to agriculture. Coastal lands were systematically transferred to the commonwealth's Land Authority and to developers in the private sector who started to construct mega-resorts and high income --all inclusive-- housing villas with golf courses for wealthy investors.

Population and cultivated acres in Río Grande



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A landscape of 14 kilometers of beaches in coastal plains and sugar cane plantations changed. Here the government removed coastal settlers from what they considered communities immersed in "pestilent," unhealthy, and flood-prone mangrove areas. With the poor removed, two corporations bought most of the idle land in the coastal zone. The string of projects was impressive: large landholdings for agricultural and speculative purposes, Coco Beach subdivision, Berwind Country Club, Río Mar Villas, Ríomar, Yunque Mar Resort, and private houses (Caraballo 1991: 13-18 *in passim*).

The voracious consumption of coastal lands and beaches by the resorts and housing developments had the most critical impact. As a result, the Río Grande population lacked appropriate access to their local beaches, to the extent that there is no public road providing physical or visual access to the coast in the entire municipality. In fact, Río Grande citizens do not have any public beaches with a government infrastructure to tend to the needs of the users. Instead, the *riograndeños* have to go to the nearby --and famous-- Luquillo Beach. In Las Picúas, a strip of idle agricultural land with a shoreline, the local fishermen found one of the few sites to moor their crafts and land their catches. The company who owned the land sold it to a developer who in turn parceled out the property in small plots. Those plots were sold for individual housing projects, mostly weekend-second homes, without the knowledge and consent of the Commonwealth's Planning Board. The immediate effect was that access to the beach was curtailed and the fishermen lost one of the very few available strips of land with access to the shoreline.

The history of this event is rather complicated and sad, since the matter is still unresolved despite a court order declaring plot division and housing construction illegal, and validating the fishers' right of access to the shore. It suffices to say that this case became a landmark case study, both legally and socially for its impact on the environmental movement. Consciousness of the problems of beach access and the ensuing confrontations among the state, the private sector and the local population for the use and control of the coastal zone became

evident in various other cases throughout the Island.

Las Picúas turned from a site and a case into a symbol of community resilience in the struggle of the coastal poor to regain access to the shore, access that tended to decrease with tourism and leisure development.

In the analysis of the environmental movement in Puerto Rico, access to the coast is at the core of what some may daringly call environmental justice. A number of groups kept claiming the shoreline as the last frontier for free leisure space and productive activities in close contact with nature. Such claims, held at Commonwealth and federal fora, continued to serve as a sign of the stance of the environmental movement on this particular problem. In summary, Río Grande features the forces of the demise of agriculture, and the rise of urbanization and the accompanying leisure and a tourism infrastructure that has impacted the surrounding habitats and has curtailed equitable access to, and use of the coast. The rupture of "traditional rights" and the de-facto violation of laws impeding the privatization and appropriation of beaches were the key issues in coastal user conflicts at the turn of the decade, and have continued to be so, as environmental contentions escalate.

Brief notes on the origin and potential future of the environmental movement

It is difficult to assess the growth and development of the environmental movement in Puerto Rico due to a lack of sociological analyses. However, in this reflexive work, I dare to offer a handful of thoughts on the movement's recent development and future path.

Environmental impacts on ecosystems and on human communities are of great magnitude and affect all orders of life. In a political context almost exclusively devoted to the status issue and the old paradigm of growth, the main moral responsibility for environmental stewardship falls on the shoulders of civil society. The Puerto Rican environmental movement was probably ignited by those communities affected by development projects,

and by changes in the overall health of the civilian population due to acute contamination from industries.

Key actors in this process were the religious organizations and NGOs devoted to solving local health problems, improving of the material conditions of poor communities, and empowering those populations, both political and spiritually. These organizations provided communities with the tools for self-support and for political and civic organization and praxis, in their daily struggle for a better quality of life. Environmental organizations with a long histories of projects for community empowerment and political struggles, such as *Misión Industrial*, tend to corroborate our assessment. The Puerto Rico National Ecumenical Movement (*PRISA*) also contributed to forge what may be labeled as the environmental movement (Saltalamacchia 1995).

The academic community, and some leftist political organizations also participated in the formative process of the environmental movement, and their contribution must also be assessed.

Leftist and pro-independence organizations and parties saw in environmental problems either evidence of the colonial predicament of dependence on, and exploitation by, the metropolitan power, or the contradictions of capital. In my own assessment, their contribution to the environmental movement has been uneven. However, that topic awaits research. Recently, there have been discussions about their role in the struggle of those community problems and their participation as animators in a process characterized by pluralist class and political (ideological) coalitions (García 1988). The Pro-Independence Party (PIP) has been very selective in its environmental incursions. However, it has shown its presence in various highly publicized cases, such as the Vacía Talega struggles (see Irizarry-Mora 1996).

The role of the university also needs to be adequately assessed. Since the mid-eighties, several university programs and community members have increased their participation in solving local environmental problems. Recent conservation efforts by university community

members have been documented in the press (Rivera 1990, 1995), but a more critical assessment remains to be done. This particular "community" has often intervened in a number of environmental issues during the last two decades, and in some instances has been the key social actor mobilizing people and confronting the state with the technical knowledge and "culture of critical discourse." Certain successful environmental struggles in Puerto Rico may be linked to the insertion of a progressive episteme of academics in the environmental discourse. Lastly, the university has played a major role in the dissemination of information and technical and social knowledge used by the community-based organizations in their struggle, and in the consolidation of regional networks of environmental and community organizations.

Future Trends

The present state of the environmental movement features a great number of community-based organizations, environmental NGOs and interest groups, and the participation of the university. Although there are ideological discourses, social practices, and historical experiences which tend to draw the different groups and organizations together, they remain scattered throughout the physical and political landscape. Most of them remain site-oriented (focused on their particular problems) and unable to make the ecological and social connections between the environmental impact at one site or community, and its ramifications and linkages with the rest of the archipelago.

Far from forming a united front, such organizations' pluralist backgrounds, and their individual and collective differences in cultural capital, class position, ideologies, political affiliations and primordial loyalties keep the environmental movement fragmented and unable to consolidate against the pervasive process of environmental degradation. Such constraints, combined with the status orientation of political discourse in Puerto Rico, prevent the formation of environmental political groups similar to *les verts* or *die grünen* in other parts of the post-industrial world. The fragmentation and lack of a block support for an independent

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candidate for the Senate (environmentalist and scientist Neftalí García) is perhaps an example of this. Nevertheless, the formation of such a coherent and united front against environmental degradation is inevitable.

The observable trends during the last decade suggest that in terms of economic policy, Puerto Rico will continue to embrace the old industrial paradigm, with its formula of growth, mostly ignoring the externalities produced by it. Development will continue without a strong consideration for sustainability as a factor in planning and development. Patterns of urban growth, current levels of consumption and use of resources and coastal land, and the oftentimes timid government efforts regarding the enforcement of environmental laws, fiscal support of environmental agencies, and the conservation of critical habitats, will force the environmental movement to continue with its stewardship of nature, and perhaps drive its diverse participants to coalesce into a united front.

In this section, I will present a list of ongoing processes that will claim the attention and efforts of Puerto Rico's civil society in the next decade. My argument is that these processes will shape the nature and structure of environmental actions, depending upon how they threaten the integrity of coastal ecosystems and human communities.

One important caveat is needed here. This section of the report was written in 2000, obviously taking into consideration the policies implemented by the New Progressive Party (a pro-statehood party), that was in power in the Commonwealth of Puerto Rico, from 1992 to 2000. In 2001 a new administration, from the Popular Democratic Party (a pro-Commonwealth party), came into power. At the moment of the publication of this report, most of the policies developed by the NPP have remained in place under the new administration. It is my understanding that the development policies remain, in essence, similar in scope: to increase economic activity by promoting construction, tourism and manufacturing. However, one critical difference that needs to be assessed and monitored is the new administration's platform commitment to sustainable development. This

commitment includes an urban growth policy, a construction moratorium in ecologically sensitive areas, development of a land use plan, an ecologically oriented Planning Board, and other environmental policies related to waste disposal, and citizen's participation. The new administration's policies and actions will modify the trends discussed here. Their impact requires a thorough assessment from environmental organizations, policy analysts, and scholars.

Demise of traditional economic activities

Traditional uses of the coastal zone, such as: agriculture, harbors, fishing, and processing plants, will be replaced by tourism and leisure infrastructure, transshipment harbors, shopping malls, and technology oriented enterprises. Coastal cities like Ponce lost its tuna processing plants a few years ago. Similarly, Mayagüez is slowly losing its tuna cannery jobs, as well as the garment industry that attracted many rural workers to the west coast (Griffith, et al. 1995, Valdés Pizzini 1996). Government reports indicate that a large transshipment harbor will be constructed in the Ponce, Guayanilla and Peñuelas area, in southern Puerto Rico, centralizing the transit of commodities at that particular site. Similar to the process of the construction of the Commonwealth Oil Refinery Company (CORCO), changes in the local and regional economy, impacts to the environment, and transformation of traditional communities are the expected to occur (see Pérez 2000).

The construction sector

In the last ten years, the Puerto Rican government has invested heavily in the stimulation of the construction sector, funneling funds into infrastructure projects. It has also instituted a policy of "fast tracking" procedures and permits to allow an increase in the number of projects receiving government approval. Construction is viewed as an alternative to palliate the potential effects of a deceleration in the growth rate of the economy, estimated at a 2.7% and 2.4% for fiscal years 2000 and 2001, respectively, after an "extraordinary boost" of

4.2% in 1999. The unusual increase in construction projects during the 1998-1999 was due to reconstruction efforts after hurricane Georges, a rush of economic activity that is unlikely to repeat at the same level, *ceteris paribus*, in the upcoming years. Despite these extraordinary events, in the opinion of local economists, construction is the "motor for economic growth" in the Island.

The construction industry, the boom is expected to last until the year 2006, when most of the government infrastructure projects will end. There are some critics of the illusion created by the figures describing the growth of the construction industry. For example, economist Santos Negrón argues that the time line of 2006 is revealing because that is the year when Congress will eliminate all benefits obtained by U.S. industries under the IRS 936 Section. According to Negrón, the government established a synchronic strategy (in terms of the scheduling) of heavy investment in the construction of infrastructure, a period that lasts precisely until that year, with the expected effect of ameliorating the impact of a massive decrease of employment in the manufacturing sector. The multiplier effect of construction has a greater impact than other economic activities due to the purchase of construction materials, most of which are locally produced (Negrón, in Díaz Román 1999:10).

Construction of housing, second homes and condominiums on the shoreline are also expected to increase. Economic growth in the United States and Puerto Rico resulting in an increase in "disposable" income of the middle and upper classes is directly responsible for investment in apartments and houses for living and leisure purposes, as well as an investment to reduce taxes. Showing constant increments, increases the housing industry is also contributing to the process of coastal gentrification, in other words, changes of traditional uses of the coast, and displacement of settlers. The increasing number of condominiums constructed on the shoreline, and the high cost of those units, is changing coastal communities. Habitat destruction will continue to be a major threat of this development. Tourism, leisure and recreational activities in the coastal

areas are already taking their environmental and social toll. An increase in those activities has a direct impact on coastal communities through: consumption of scarce water supplies, improper sewage disposal and the associated pathogen contamination, solid waste disposal and the carrying capacity of dumps, and heavy seasonal traffic, all of which are signs of a deteriorating quality of life.

Private Housing Units

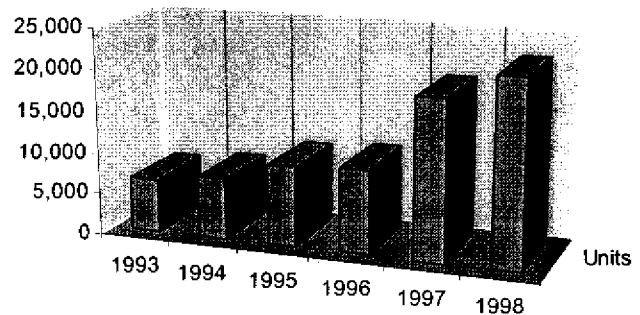


Figure 2

Tourism as a priority

Similar to most countries in the Caribbean (Island Resources Foundation 1996, Patullo 1996) and Central America (Stonich 1999), tourism development is a priority for Puerto Rico, as stated in the New Economic Development Model (NEDM), promoted by former Governor Pedro Rosselló (see Lara Fontánez 1998:4). This approach to tourism, based in and promoted by the Commonwealth Tourism Company, is based on the quality of the beaches (see Chaparro 1997), and on a growth orientation measured by the annual increase in the number of rooms and facilities.

In the wake of the "936 industries," tourism was identified as the key sector with the potential to compensate for the loss of jobs in the manufacturing sector. For example, tourism has been identified as one of the solutions for unemployment in the western region, an area harshly affected by industrial unemployment. The natural beauty of the southwest region, the quality of its beaches, its natural protected areas

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and recreational potential make southwest decision-makers prone to exploiting tourism as an economic alternative. Although there are a large number of foreign and US visitors (mainly in winter), the majority of the visitors are local (Puerto Ricans) who flock to the region, mainly in summertime, to go to the beaches and practice water sports. However, tourism remains a highly volatile and uncertain activity for many. For example, in the summer of 2000, local firms complained about the scarcity of tourists in the region, and the lack of business.

Also, several indicators suggest that overall tourism activity in the West Coast is not sustainable, and that it has a direct and negative impact on local resources. However, one key aspect of the industry is the fact that it remains locally based, managed by small firms (local entrepreneurs) that, thus far, have been removed from the large resorts that are common in the north and east coasts of the Island. The Tourism Company is aggressively pursuing a strategy for the increase in the number of hotel rooms (the key indicator of success) for years 2000 and 2001. Several projects currently under construction (including expansions to existing facilities) are expected to produce 2,298 rooms, while projects to be completed by 2001-02 will yield an additional 2,460 rooms. Projects that started in 2000 will eventually add 2,517 rooms (Guadalupe Fajardo 2000:20-26). Pressure on the use of the coastal zone, water supplies, sewage and solid waste management, access to the beach, beach erosion, littering, and pollution is an anticipated by-product of this development in the coastal zone.

Privatization of coastal land

Privatization was an essential component of the government's NEDM, as evidenced in the sale of companies that traditionally have been public. Land privatization of government-owned properties is also a small and almost inconspicuous component of that policy, which may change with the new administration. During the previous administration, the government transferred and sold land of the Commonwealth to private developers, often at prices below market value.

FACTS:

Almost half of the municipalities in the San Juan-Caguas MCSA will present large increases in population, most showing increases in excess of 15% from 1990.

Coastal municipalities are showing significant increases.

Cabo Rojo and Rincón, on the west coast, are expected to increase on 17% and 28%, respectively.

Most urban population growth for the next twenty years will occur in the San Juan Metropolitan Area.

This suburban sprawl will threaten the key watershed areas, and will have an impact on the coastal habitats.

Sources: Gilbe 1998, Carmona 2000.

In one particular case, a plot sold by the Commonwealth was located within a mile of the Tortuguero wetland, a natural reserve under the protection of the Department of Natural Resources. This process of tourism development must be monitored by civil society, as it could easily threaten the integrity of ecosystems.

Management and Enforcement

The number of acres of land placed under a diversity of "natural protected areas" by the Commonwealth was, ironically, highest during the nineties. However, most of the land was in non-coastal areas and none received sufficient funding for management, or even for the development of management plans. Management and enforcement of the Commonwealth's protected areas remain a critical problem. This is a major hurdle for future work in terms of marine reserves, legislation for habitat protection (e.g., coral reefs), fisheries

(essential fish habitats), and enforcement of Coastal Zone Program regulations.

Urban growth

The number of people living in urban and coastal areas is expected to increase. Urban growth is expected to continue. As indicated by the 2000 US Census, the San Juan-Caguas MESA is expected to see growth in population, housing density, and a small but a significant increase in the number of municipalities included in the area. This growth is expected to affect the surrounding wetlands and watersheds.

Persistence of the "Old Industrial Paradigm"

My appraisal of the situation leads me to conclude that Puerto Rico will remain committed to the "old industrial paradigm," at least for the next decade. Currently, the lines of action identified in the Commonwealth's New Economic Development Model are: tourism, industrial development, external trade, capital markets, human resources, and science and technology. To offset the difficulties encountered in the discontinuation of the tax incentives provided to the manufacturing sector by the Internal Revenue Service, Code Section 936, the Puerto Rico government, through the Puerto Rico Industrial Development Company (PRIDCO), is providing special tax credits for research, development and training activities. PRIDCO is currently making concerted efforts to make up for the acute loss of jobs in the manufacturing sector by attracting new companies and providing incentives to local entrepreneurs. This commitment to the industrial sector (combined with the support of construction) will probably result in the same policy of growth that had the nefarious environmental impacts documented by Hunter and Arbona (1994), unless a connection is made between the new technologies and resource conservation. It is the challenge of the new administration to make that growth compatible with sustainability, as stated in their environmental platform.

Civil society involvement in environmental protection

As the main political parties remain involved in the struggle to solve Puerto Rico's political status problem, and the government

remains committed to economic growth, stewardship of natural resources, protection of natural areas, watersheds and biodiversity will fall on the back of civilians, mainly those environmental organizations with proposals for co-management and management of "natural" spaces. This will require the empowerment of communities and organizations, and a knowledge of resource management technologies.

In the next section, I will identify alternative paths that the environmental movement could traverse to have an impact in the conservation of coastal and marine ecosystems and resources.

Alternative pathways

According to Hunter and Arbona (1995), the pristine nature of the island has been lost forever, due to the lack of implementation of conservation measures and policies. They cogently argue that "what is fundamentally needed is a wider level of public awareness and a consensus to act in harnessing the political will" (1995:444). I agree with their assessment, which underscores the desperate need for the environmental movement to have a stronger voice, deploy a coordinated political effort, and to engage in strategies and practices that prioritize conservation, and sustainability in a holistic manner. Based on the historical contentions and future trends discussed in this report, I strongly argue that the following issues, processes and potential activities need to be addressed by the environmental movement.

Population, consumption and the environment

A critical appraisal of urban growth and the construction sector is sorely needed. The relationship between population, consumption and the environment needs to be assessed, employing critical theoretical perspectives that allow investigators and organizations to make the connections among those processes and variables. In Puerto Rico, the environment, as a "natural" category belonging to the physical world, is an object of analysis and research. As a space, it is also the object and field of political actions. However, there is little attention paid to

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the triangular and complex relationship among the environment, human populations and consumption patterns, all of which are affected by economic policies. Giving attention to this triad is becoming an important research endeavor worldwide, and a form of interdisciplinary applied research (also involving colleagues from the natural and environmental sciences) aimed at producing changes in policies affecting biodiversity, ecosystems and human societies (see Arizpe and Velázquez 1994, Stedman-Edwards 1998, Stonich 1998). In the case of Puerto Rico, this triad must be assessed, with special attention to the process of urbanization.

Information and technology transfer

The University has a role in the process of capacity building and the empowerment of coastal communities affected by these processes, by providing communities and stakeholders with the appropriate knowledge, technology and tools for achieving their goals. The University must play a key role in promoting sustainability, environmental protection, and the conservation of biodiversity, ecosystems and those human communities whose histories have been woven in close interaction with the environment. There is always the huge shadow of advocacy vs. non-advocacy, objectivity vs. social action, and similar dilemmas that restrain and modify the university's interaction with the general public. But, without informed and active advocacy, change will not occur. An example of this is the UPR Sea Grant College Program's project with local community organizations facing environmental problems. Sea Grant water quality specialist Ana Navarro has developed a series of activities and interventions aimed at information transfer, capacity building, and empowerment of the communities in the western portion of Puerto Rico (see Navarro and Navarro 2001). The success of this project will trigger similar projects for other communities facing similar environmental challenges in the coastal areas.

Policy making

Information transfer must also continue at the level of policy making. Some government

officials still believe that the University, like the community, *should not* have a role in policy making. This belief reflects a distorted view of democracy that the environmental movement tried to dispel. Civil society, and the University have the right and the duty to contribute to the welfare of the polity, by offering appropriate alternatives based on the best knowledge and experience available. In informing various stakeholders, fellow citizens, and policy makers of the best alternatives and courses of actions, members of the University must be resolute, which requires (contrary to the mainstream extension philosophy) certain forms of advocacy. For example, Puerto Rico did not have a firm policy on the conservation and management of beaches until the University of Puerto Rico Sea Grant College Program published Ruperto Chaparro's policy paper (Chaparro 1997). Despite opposition, and even political pressure from the Secretary of the Department of Natural and Environmental Resources Daniel Pagán, Chaparro continued to inform the public, stakeholders, and law makers of the importance of investing in beach management programs, and the diversity of options and programs available. The result: a variety of programs and efforts (legislation, and the formation of a board responsible for beach management), community and private sector (tourism industry) support for the development of beach management projects, and the full (and verbatim) incorporation of Chaparro's guidelines in the DNER document on coastal policy: Puerto Rico and the Sea (1999).

Sustainable Development

It is rather telling that sustainable development, as a component of policy, or even in the daily political and environmental discourse, is absent at all levels of Puerto Rican society. Unless action is taken, sustainability will not be incorporated into public policy. Elsewhere throughout the Caribbean, the discourse of sustainable development, protection of biodiversity, protection of ecosystems, and appropriate development for small islands is common. Ironically, the United States, our key political example and beacon, has a presidential policy of sustainability (still unchanged under the

new Republican administration) that theoretically translates into action in the educational and resource management fields. For example, the National Oceanic and Atmospheric Administration (NOAA), and its related agencies, such as the National Sea Grant College Program, and the National Marine Fisheries Service feature a strong commitment to sustainability. Again, sustainability is neither a panacea for all environment related ills, nor a well defined set of rules that can be followed blindly. On the contrary, it remains a highly controversial and complex proposition that requires analysis, research, and experimentation through pilot programs. Nonetheless, sustainability forces society to deal holistically with a number of environmental issues, such as waste reduction, conservation of nature, biodiversity and ecosystems, the wise use of resources, optimization of industrial and agricultural production systems, improvement of commercial practices, the inclusion of communities in the conservation process, thorough planning and allocation of space and scarce resources, and the philosophical tenet of protecting the integrity of nature for future generations. These challenges must be met by the society and government in Puerto Rico.

The "New Economy"

The Commonwealth's economic policy from 1992 to 2000, based on the NEDM, was also an essential component of the New Progressive Party platform, and a key element of the social and economic policies designed to achieve the political status of statehood (Hexner and Jenkins 1998). In assessing the future of the economy, the NEDM primes the role of science and technology, and the promise of "the new economy" based on globalization, and digitalization of production, commerce and services. Interestingly, the political platform of the Popular Democratic Party (pro Commonwealth, and currently in power) is also committed to an economic development strategy based on the tenets of "the new economy." In my view, the tenets of "the new economy" do have the potential to promote resource conservation and sustainability, although its proponents have not stated such a connection

(see, for example, The New Economy Index: Understanding America's Economic Transformation, by Robert D. Atkinson and Randolph H. Court, 1998).

Having learned the lessons of a top-down economic development program based on the "old industrial paradigm," the commitment to the new economy could provide a new field of action for the environmental movement in Puerto Rico, which may, and ought to, seize the opportunity to promote alternative forms of growth that are consonant with the integrity of biodiversity and ecosystems. Theoretically, the "new economy" should promote optimization of the production process, reductions of scale, new forms of transportation, use of tele-communications, digital transactions, and waste reduction, all of which are fully compatible with sustainability. Again, the responsibility to make the intellectual and concrete connection between "the new economy" and the conservation of the environment will fall in to the hands of civil society.

Traditional coastal communities

Local communities have an important role to play in the sustainable development of Puerto Rico's coastal areas. They must, and should, have a future in the context of current economic policies and the touted benefits of "the new economy." Sparing the complicated issues, definitions, labels and arguments related to the new forms of tourism, I argue, following Mowforth and Munt (1998), that sustainable tourism is consonant with philosophical tenets of the Commonwealth's NEDM. Small, localized, traditional, culturally bound communities are not contrary to the process of an economy dominated by globalization, post-Fordist practices, digitalization and information at the fingertips. They are potential spaces for sustainable development and cultural integrity despite attempts to homogenize local cultures (see García Canclini 1999).

From La Parguera in the southwest, to the island-municipality of Vieques in the east, fishers and traditional coastal settlers remain the fundamental custodians of the coastal environs. Ironically, due to that historical and cultural role,

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they also are perceived by many (including policy makers) to be a barrier to progress.

Writing on the communities of the Chesapeake Bay, and the Abermarle and Pamlico Sounds of North Carolina, David Griffith (1999) argues that fishermen and coastal settlers are the custodians of a long history of exchanges and reciprocity with nature based on a set of rules much different from those guided by profitability and the market. Rules and behaviors closer to what some may call sustainability. Such history also guards a rich knowledge of nature, which is critical to its understanding, appreciation and conservation. Similarly, fishers and coastal settlers in Puerto Rico are also the stewards of a vast knowledge of habitats, species and ecological dynamics, as well as an appreciation of and historical perspective on changes in nature (Valdés Pizzini 1996, Giusti 1995). Sea Grant-sponsored research indicates that fishers also feature behaviors of territoriality and spatial utilization that reveal olden conservation practices and ethics, and a sense of the true commons with the active participation of the communities in defining sea tenure and usage patterns (see Posada, Valdés Pizzini, Grove and Rosado 1996, Jean-Baptiste 1999). More important, they have historically been responsible for heading coastal contentions in favor of the protection of the environment, and will continue to play that role. In my view, they will resist and defy the

trends, and the predictions of experts that coastal communities, and fishers in particular, are bound to phase out.

Final Comments

The coastal zone of Puerto Rico has been, and will continue to be, a critical area for environmental contentions between civil society, the private sector and the state. It is evident that social research is sorely needed in this particular field. This brief report is perhaps one of the few first steps in the understanding of the social, political and economic processes at work in the coastal zone. A well-documented history of the environmental movement and its relation with the island's socioeconomic processes is also required, as different groups and organizations prepare for the future. Equally important, the superficial exercise in forecasting that was presented in the last pages of this report should be scientifically structured to provide a better and critical assessment of the environmental situation, and to offer alternative scenarios, as has been done for the issues of the political status and economic future of Puerto Rico (see Gutiérrez 2000). Unfortunately, the environment and its social, political and economic ramifications seldom attract the analysis of social scientists or interdisciplinary teams. I certainly hope this situation changes, as the future could be shaped by the strategies that such analysis could provide.

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