



Developmental and Social Recommendations for the Puerto Rico Boat Ramp System

An Interactive Qualifying Project

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of the

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The views and opinions expressed herein are those of the authors and do not necessarily reflect the positions or opinions of the Puerto Rico Department of Natural and Environmental Resources or Worcester Polytechnic Institute. This report is a product of an education program, and is intended to serve as partial documentation of the evaluation of academic achievement. The report should not be construed as a working document by the reader.

May 5, 2005

Mr. Erasto Nieves  
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Marine Resources Division  
Munoz Rivera Avenue, Stop 3 1/2  
San Juan, Puerto Rico 00906-6600

Dear Mr. Nieves:

Enclosed is our report entitled Developmental and Social Recommendations for the Puerto Rico Boat Ramp System. It was written at the Puerto Rico Department of Natural and Environmental Resources during the period March 14 through May 2, 2005. Preliminary work was completed in Worcester, Massachusetts, prior to our arrival in Puerto Rico. Copies of this report are simultaneously being submitted to Professors Jiusto and Mathews for evaluation. Upon faculty review, the original copy of this report will be catalogued in the Gordon Library at Worcester Polytechnic Institute. We appreciate the time that you and Mrs. Mayra Garcia have devoted to us.

Sincerely,

Brett Dickson  
Jamison Divoll  
Brian Martiniello  
Ashley Zalucky

## **ABSTRACT**

Due to the poor condition of Puerto Rico's current water access system, the Department of Natural and Environmental Resources (DNER) requested that an inventory be taken of all existing and potential boat launch sites. Essential data such as ramp dimensions, surrounding environmental conditions, wave action, and parking availability was gathered at each site and put into a digital database. After the data was collected, potential launch sites were compared to one another to determine which sites had the highest potential to be upgraded. A public participation plan was created to address potential concerns that may be brought to communities where ramp upgrades are possible. Using the database, site comparison results, and public participation plan, the DNER will be able to choose which launch sites to upgrade to create a comprehensive boat access system for all of Puerto Rico, while having minimal environmental and social complications.

## EXECUTIVE SUMMARY

In Puerto Rico, the number of recreational boats has almost tripled over the last 20 years. A large majority of these boats are considered to be trailerable, meaning the vessels are 26 feet or less and can be stored at the home of the owner and launched into the water with a car or truck via a boat ramp. Along with this significant and continued increase in recreational boating comes the need to increase people's options for access to the water through boat ramps and boat launching facilities. Increasingly, proper water access is being defined as a boat launching facility that not only allows a boat to get into the water, but one that does so with adequate space for parking, bathrooms, boarding dock, and a variety of other amenities.

The existing problem in Puerto Rico is not necessarily a lack of boat ramps, but a lack of suitable boat launching facilities. Because of this lack of suitable launching facilities, people are forced to use ramps that are in disrepair and others that do not have sufficient space to park their vehicles. In some cases, people resort to launching at an informal site. These informal locations, examples of which include a sandy beach or an opening in a group of mangrove trees, do not contain an actual boat ramp. The use of these informal launch sites, as well as formal sites that are in poor condition, is a problem for several reasons.

Ramps in poor condition as well as informal ramps around Puerto Rico often do not have owners or persons responsible for maintenance. This makes it very difficult to regulate when the ramps are being used, what types of boats are using the ramps, and where the boats may travel once in the water. Because of the inability to regulate these sites, people often launch in places that are not only dangerous to them but dangerous to the environment as well. Some of the environmental concerns of informal ramps include erosion of sand and beaches by boat trailers and the vehicles pulling them. Mangrove trees are often cut down to make space for launching in different bays and lagoons. Also, when people launch from informal sites, they may be traveling in places where they shouldn't be because of manatees and or sea turtles.

Another problem concerning boat ramps is public acceptance of existing locations and their development. Boat ramps are a controversial topic because of the road and water traffic they may bring to local communities, the environmental impacts, as well as what the ramp is used for. Currently there is no systematic way of informing the public about a project such as a boat ramp and receiving public input regarding future plans of development.

It is for these reasons, the high demand and poor condition of ramps, as well as the lack of regulation, that the Department of Natural and Environmental Resources of Puerto Rico (DNER) sponsored this project. Our objective was to develop a comprehensive understanding and create an information system that would provide the DNER with better resources for boat ramp planning. To do this we separated the project into three sections: creating a boat ramp information system; conducting a site comparison analysis; and creating a public participation plan.

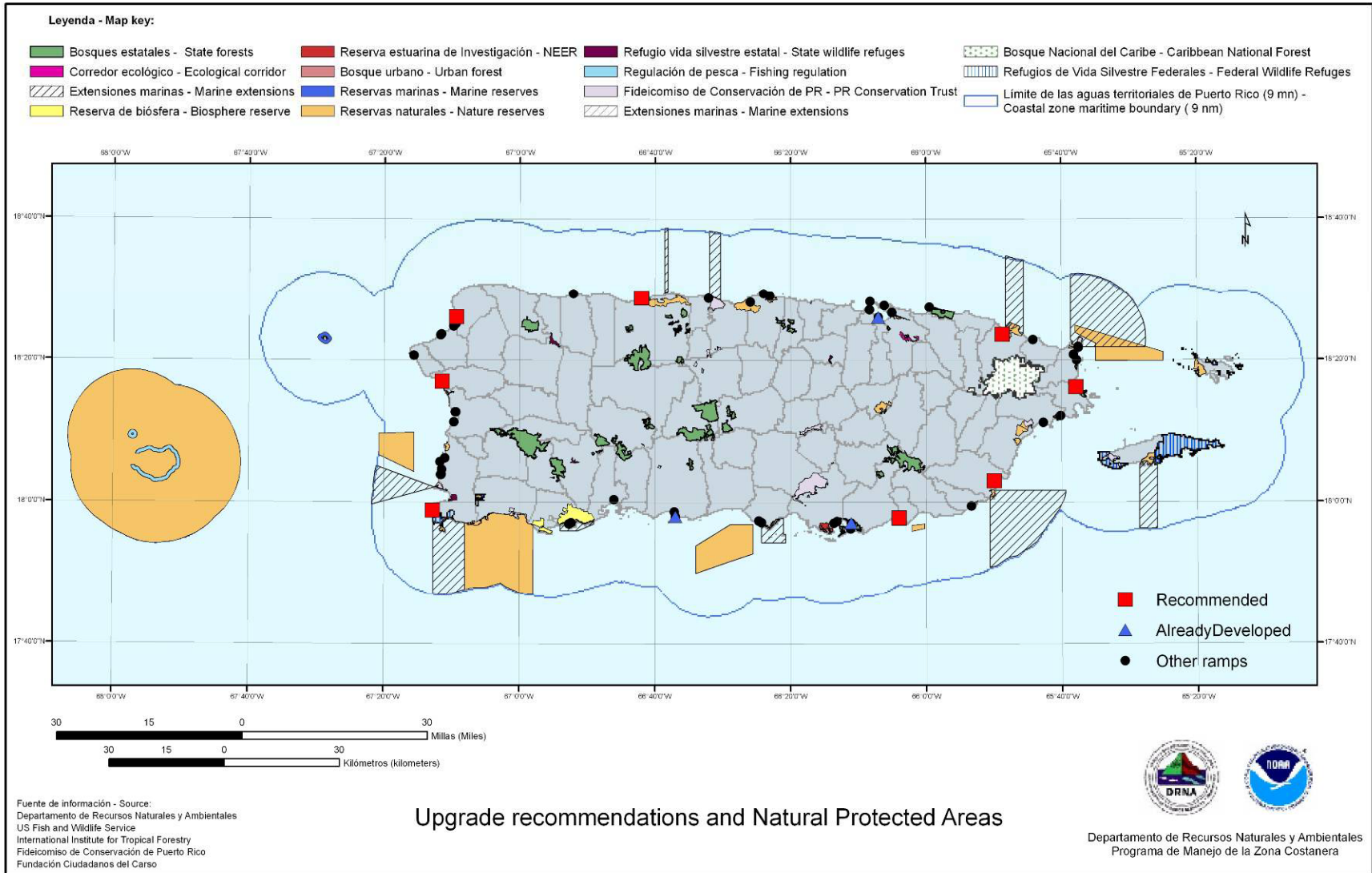
To create a boat ramp information system we first traveled to 52 boat ramps and launching facilities all over the island and collected various types of data. We gathered three types of data, physical, ecological, and social. Physical data includes measurements such as length, width and slope, as well as any other boating related amenities around the ramp. Ecological data consisted of different plant and animal life nearby, as well as any reserves or protected areas. Lastly, the social data consisted of taking notes on the surrounding area such as whether it was rural, commercial or residential. We stored this information in a Microsoft

Access database that was designed and developed by our project team to best fit our needs with the needs of the DNER.

With the information stored in the database, we developed a way to rate each site in comparison to other sites. To do this we came up with a Site Comparison Plan that scored each location based on various categories which, through our research, we determined to be most important. The plan was based on six categories, including available parking, user friendliness, and surrounding area. Each of the six categories was scored on a one to ten point scale. After all of the 52 sites were scored, we compared them to each other to determine which sites had the best potential to be developed by the DNER.

Along with the Microsoft Access database and the site comparison results, we developed a Public Participation Plan. The DNER did not have any systematic way of informing or involving the public, and because of this, they have had mixed results when dealing with public boat ramp projects. Because the development of a boat ramp can be a controversial issue, we took the opportunity to develop a plan that would help the DNER to do this. Through background research and key informant interviews we were able to get an idea of how the people in Puerto Rico would best respond to development of sites in their communities, and centered our plan around this information.

Using our database, site comparison results, and public participation plan we recommended 8 sites to the DNER which we feel will create a network of ramps that will best meet the needs of the people of Puerto Rico and be most effective for the DNER. We hope these recommendations, along with all of the information that we provided, will allow the DNER to develop the best possible sites and improve the boat access system in Puerto Rico while having minimal environmental and negative social implications. **Figure 0-1** below shows all of the launch sites we visited and notes those sites that have previously been developed as well as the eight sites we have recommended for future development.



**Figure 0-1: Site Upgrade Recommendations and Natural Protected Areas**

## **ACKNOWLEDGEMENTS**

We would like to acknowledge everyone who helped us complete this project:

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## **AUTHORSHIP**

All group members contributed equally to the writing and research of this project. This has been agreed upon by all members of the group

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# 1. INTRODUCTION

The use of boats is important to the lives of many people throughout the world. People rely on boats for their livelihoods, using them for business or industry. Boats are also used for recreational purposes. Increased boating and boater registration has placed a large demand on current boat access facilities. As a result, the need for facility maintenance and enhancement has increased as well. These issues have become particularly evident in Puerto Rico which is currently without an updated inventory of public boat ramps and an organized system of boat launching facilities. Here, many people have resorted to gaining access to the water through informal boat ramps, which has raised both social and environmental concerns.

The boat industry is directly related to the economies of many nations worldwide and the strong economy seen in the late 1990's proved to be beneficial for the boating world. In the United States, boat retail sales saw their highest increase ever in 1999, rising 20% to \$23 billion dollars. Boating sales are mostly correlated with recreational boats, and even though the strength of the economy has diminished in years since, recreational boating and fishing are still becoming increasingly popular. The number of boats registered in the U.S. rose by 94,000 in 2001, a 7% increase. Many states like Florida, Georgia, California, and Oregon continue to see annual increases in the number of recreational boats ("California leads US...", 2005). Puerto Rico has also seen this trend, having experienced a growth in both its economy and recreational boat sales in recent years. There were 60,911 registered boats in Puerto Rico in 2003, an increase of 3,933 registered boats since 2001, and this growth was also seen throughout previous years (United States Coast Guard [USCG], 2004).

Because of the trend of increased boating, access to lakes, rivers and the ocean is becoming increasingly important, yet in many places, boat launching facilities have not been able to keep up with the demand for water access. A number of the aforementioned states have begun developing plans to assess the need for boat access in their communities. The lack of adequate public water access facilities is a particularly pressing issue in Puerto Rico. The majority of registered boats in Puerto Rico are less than 26 feet long, and these boats are not required to be kept at private marinas. Instead, these boats can be trailered and launched into the water by their owners at public boat ramps. Puerto Rico is currently without an updated inventory of public boat ramps and an organized system of boat launching facilities, and many people have resorted to gaining access to the water through informal boat ramps.

The current state of water access in Puerto Rico has many associated problems. As stated, the lack of formal launch facilities and the fact that informal boat ramps have become common are the main concerns for the people and the government. Informal boat ramps are too often used without proper regard for the environmental impacts they may cause on the surrounding land, such as pollution and erosion. Safety considerations are not addressed as they would be at formal sites. Social implications, such as community privacy, are also a particular concern because these sites are often created without the consent of citizens who may be affected by boat launch sites within small distances of their homes. These and other issues could be monitored by the government through rules and regulations regarding such structures.

Although attempts have been made to improve water access in Puerto Rico, these attempts have lacked simultaneous consideration for all the issues involved. A particular example occurred in Loiza, a small coastal community within San Juan. Here, the construction of a multi-lane boat ramp accompanied by sufficient parking and road access was proposed. The

necessary permits for the ramp were obtained, required regulations were followed, and the proper agencies were notified. Two endangered species in close proximity to the proposed site were even identified so as to show concern for important ecological factors, indicating consideration for issues outside the main objectives. The proposal was approved by the authorities, but upon public disclosure of the plan, it was met with protest from local citizens and was subsequently halted. Time and effort may have been saved if each issue surrounding the boat ramp had been addressed before large steps in the development process were made. The Department of Natural and Environmental Resources of Puerto Rico is interested in developing a siting and public input process that will avoid such problems in the future.

After seven weeks of work in Puerto Rico, this project group has analyzed the current state of water access in Puerto Rico and proposed suggestions for its enhancement. A total of 52 boat ramps and launch facilities, both formal and informal, were characterized physically through measurements such as length, width, and slope percentage. Additional information such as surrounding environmental conditions, wave action, existing amenities, and parking availability were also noted at each site. Current formal sites were examined and their needs for improvement were identified. Informal sites were also visited and documented for their developmental potential. After comparing the visited sites to one another other, we were able to provide recommendations concerning which of the formal and informal locations deserve particular attention due to their developmental potential. Because community acceptance is a major concern of the project, a public participation plan was created to evaluate public sentiment in a given area before any plans for construction are made. Upon completion of this project, we will present our sponsor with our final results, analysis and recommendations. We hope that these deliverables will serve as valuable tools to assist the DNER in creating an island-wide organization of launch facilities while preserving environmental and social interests.

## **2. BACKGROUND RESEARCH**

The development of a comprehensive plan to assess and provide recommendations for boat access in Puerto Rico requires careful consideration of a number of important factors. Here we present information regarding those factors we deemed most relevant to our project. We consider social concerns by researching questions such as “Why do people want boat ramps?,” “Why does a need for boat ramps exist?,” and “For what reasons would people oppose these facilities?” Environmental concerns are also considered because of the potential impacts on natural resources. We also research details concerning the site selection process and common problems faced by existing sites. Finally, we review previous studies that have analyzed boating access needs and note specific methods that may be applicable to our project. The initial information that we have gathered will allow us to assess the current state of water access in Puerto Rico and allow us to provide recommendations for its improvement. Having a sufficient understanding of these issues will provide a strong basis for our project and guarantee its successful completion.

The information presented has been organized in such a manner for a number of reasons. We feel that the social considerations surrounding boat ramps is the most important information regarding this project. Although one may feel that only positive benefits of boat ramps exist, there are undoubtedly reasons why others may not agree. Here, we have presented points on both sides of this issue. Next we discuss environmental issues which are often controversial. This information is presented as an issue for consideration rather than as arguments for or against the building of a boat ramp because of the many sides that surround such a topic. After we discuss environmental considerations, we present information that describes the details of the physical characteristics that make for potential boat ramp sites. The environmental considerations therefore lead into this description of boat ramps. We then conclude by drawing important ideas and lessons from other attempts at solving similar issues.

### **2.1. Social Considerations**

The ocean and its coastal waters are vital resources to many people across the globe. For some, a career is made out of the use of these waters, which provide occupations for people from marine biologists to fishermen. To others, the ocean provides a means of escape from the toils of everyday life, allowing them to participate in a range of recreational activities. In many cases, these characteristics apply not only to individuals, but to entire countries and societies as well, represented in industries such as agriculture and tourism. Such is the case with the island of the Commonwealth of Puerto Rico. Here, many of the people of Puerto Rico understand the importance of the resources that are available to them by the surrounding seas.

In order for these waters to be available to people, sufficient access must be provided. Access to bodies of water is dependent on many things, such as location requirements and governing laws, but the social significance of these access points and their facilities must not be overlooked. Because of its importance, the subject of water access is one that is surrounded by much controversy. There are many reasons why people support the use of current facilities such as boat ramps and why there exists a need for increased water access. The following will discuss

some of those issues, such as economic ties and public opinion, with respect to access through the use of boat ramps and as they pertain to the Commonwealth of Puerto Rico. The importance of these issues and information will be a major part of our project goal to recommend the development of new sites. As such, we have presented arguments both for and against boat access and boat ramps.

### **2.1.1. Support for Water Access and the Use of Boat Ramps**

Recreation has become an important aspect of the lives of many people. People need a break from the bustle of the working world and for many, boating provides a means for this escape. Boating allows people to enjoy the natural beauty of lakes and coasts. An example of the magnitude of recreational boating can be found in a public park located just outside of Tampa, Florida. The facilities there are the subject of weekend and holiday overcrowding. Nearly 800 feet wide in width, it has the ability to launch 30 boats at once and draws as many as 500 vehicles and trailers on a busy day (Tomalin, 2004). Crowds of this size put a strain on the boat ramps located there because of the frequent use, and its parking lot becomes overwhelmed as well. Having a large number of people also brings frustration and irritation to individuals using the boat ramp. The combination of overcrowding and unhappy people can increase the danger at the sites due to the congestion and the loss of concentration of an emotional person. Creating more available boat ramps and access facilities will help decrease overcrowding at nearby sites and increase safety when using them.

Recreational boating has become important to the people of Puerto Rico as well. In 2001, there were an estimated 249,868 recreational fishermen on the island (National Oceanic and Atmospheric Administration [NOAA] Fisheries, 2004). According to a study regarding recreational boating, in Puerto Rico there were 60,911 registered boats in 2003, up from 59,034 in 2002 (USCG, 2004) and up further from 56,972 in 2001 (USCG, 2003). The vast majority of these boats are not housed at marinas. According to data collected during a previous IQP conducted by WPI students and the DNER, only 4,547 boats were housed at marinas (Carrie et al., 2004). It may be concluded that the remaining boats must be brought to public or informal boat launching ramps for access to the water. This data shows the importance of recreational boating to the people of Puerto Rico, and the significance of boat ramps found there.

Boat ramps are also important to local businesses. These facilities draw people who may visit the shops and restaurants that surround them. This became an issue in the city of Forest Lakes, located on the western coast of the Florida panhandle, where planned city upgrades called for the elimination of an existing boat ramp. The value of the ramp was not taken into consideration by the city, and two citizens of the town began a petition in opposition to the city's plans. They argued that the ramp was a gateway to the town's best natural asset. One of the originators of the petition, Del Branum, commented, "As a businessman, what an attraction we have. This is our most natural attraction and it brings a lot of people to our town" (Buchan, 2002).

The connection between water access and the economy can be seen in Puerto Rico as well. Tourism accounts for 5.5% of the nation's Gross National Product, and impacts factors such as employment, transportation and communication, and trade (Government Development Bank of Puerto Rico [PRGDB], 2004). With most tourist attractions located on or near the coast

of Puerto Rico, the tourism industry almost certainly depends heavily on water access. Access to water is also important to the agricultural industry in terms of fishing. In 2001, there were an estimated 2,023 artisanal fishermen. Artisanal fishing is small scale commercial fishing which requires a license, with the use of fishing boats that are typically 15 to 30 feet long (NOAA Fisheries, 2004). In a written letter to WPI, the DNER characterizes boats of this size, specifically less than 26 feet, as trailerable boats that do not require the use of marinas for water access (personal communication, November 2004). This means that boats of these sizes may be launched at public or informal boat ramps. These numbers do not include what may be commercial fishing on a larger scale, which obviously also requires water access. These facts support the claim that access to the ocean is a significant part of the nation's economy.

In some instances, support for boat ramps and facilities stems from the lack of public boat access. An example of this can be found in Anne Arundel, a county in Maryland. The county has more than 500 miles of shoreline but does not own a single public boat ramp. Some people consider this fact embarrassing ("Our say: County's shortage...", 2004). They feel that people should not have to travel to nearby counties when theirs has a public park that includes a freshwater pond and coastline. Some people simply cannot afford to travel long distances and pay to use a private facility. Often, these people own smaller boats which cannot even be housed at private facilities such as a marina.

Lack of public boating access may be a particular issue in Puerto Rico. Puerto Rico is a nation whose population is roughly four million, 75% of which is located in urban areas (EarthTrends, 2003). The majority of urban areas lie on the coasts of the island, which places a great deal of people within a relatively small distance of the ocean waters. There are only 23 marinas in Puerto Rico which house roughly 4,500 boats. Keeping in mind the large number of registered boats and the rate of use of water access facilities, it is easy to see that there is likely a strain on the facilities that are currently available. Finances involved with marina membership could also be a problem for people such as the artisanal fishermen and others with modest incomes.

### **2.1.2. Concern Regarding Water Access and Boat Ramps**

Although there is much evidence that supports water access and suggests boat launching facilities have positive impacts on people and communities, there are also many reasons why increasing access may not be desirable. When communities are looking to upgrade or build new ramps, some of the main concerns are money, environmental issues and legal policies.

Building a boat ramp is an expensive endeavor no matter where it is. For example, two Florida counties have had particular trouble with boat ramps because of the finances involved. In 2004, commissioners of Charlotte County were looking to purchase a small private marina for its public boat ramp. The owners of the marina submitted an asking price of \$2.9 million. The county parks director Laura Kleiss Hoeft estimated that if the county were to preserve the existing dry storage building and store, then there would be space at the site for only twenty-four boats trailers, making the acquisition \$120,833.33 per space (Ernst, 2004).

The cost of water access is also playing a role in another Florida count, North Pinellas, where many people feel that a need exists for a large public boat ramp. Currently, there is a small unpaved ramp at a local park that is used by approximately 50 boaters a weekend. If the



park were to renovate the existing ramp as well as add 50 new parking spaces in its vicinity, the project would cost about \$600,000. Aside from the cost, many residents feel the new ramp will bring in lots of traffic not only to the streets, but to the water as well. They feel that this is not only dangerous to the children who live and play around the park, but will also take away some of the natural feeling of the park (Shoichet, 2004).

The increased traffic from ramps on streets and in the water does not only have an effect on the people, but can have a tremendous effect on the environment as well. First, the construction of a boat ramp can often require dredging of sand and sediment at the ramp location. The dredging can affect the sea grass beds that are home to many underwater creatures (Blackwell, 2004). An underwater creature that is particularly affected by boat traffic is the endangered manatee. In July of 2004 a dead manatee was discovered in Florida's Goodby Lake. The death of the animal was caused by the propeller of a boat that was passing by. This incident caused a neighborhood group to increase their efforts to stop the construction of a boat ramp in the same area where the manatee was killed. The ramp was the first built by the city in seven years. The Army Corps of Engineers, which gave the city the permit to build the ramp, felt the accident was enough reason to revoke the permit, but other state and federal agencies disagreed. City officials are going ahead with the ramp, claiming that manatees will be protected by posting manatee zone signs and warnings around the lake. The neighborhood group says they will not give up the fight to save the manatees, but so far they have not been successful (Scanlan, 2004).

Situations have also arisen in another small Florida community, where a town was considering purchasing 13.5 acres of waterfront property, which included a canal, for \$4 million. The goal of the acquisition was to relieve some of the congestion on another boat ramp in the town. The town was particularly interested in the land because it already contained a 26 foot wide boat ramp, which is wide enough for two boats to be launched simultaneously. It also included several boat slips, and it was approximately 1,000 feet from the Intracoastal Waterway, which is a main outlet to many popular boating sites. Although the proposed deal sounded ideal for the town, the news was not perceived so by some people living in the neighborhood. Chris Fitzsimmons, a town resident who lives near the possible new ramp, said, "They don't need to be spending \$4 million to be putting boat ramps in the middle of residential neighborhoods." The local residents were not only upset at the possibility of this new ramp, but they were also upset that the town did not make the plan public until only a few days before the scheduled vote. Homer Hoe, another resident of the town and president of the Cape Haze Property Owners Association said, "This is poor public policy, to be, in effect, developing something on the sly and then springing it full-blown into public consciousness." The lack of respect for the opinions of the town's citizens may have been a large mistake made by the decision makers. The people who use the canal and those who live around it were given little time to think about the proposed plan and its advantages and disadvantages, which may have contributed to the controversy that was created. The residents of this small Florida community feel they are justified for being upset, noting that the canal is too small for the kind of traffic a public ramp would attract, and that many areas of the waterfront are even too shallow for larger boats.

Another example in which the lack of public consideration affected water access can be found in the town of Riviera Beach, Florida. The town is working on a \$1.25 billion city redevelopment plan that will include a public boat ramp and 75 parking spaces for trailers. While this plan promises significant improvements for the town, it also greatly affects about 20 homeowners whose houses will be demolished as part of the plan, making way for the new facilities. The city plans to take the undervalued waterfront property and make it into a

“shopping and boating paradise.” Riviera mayor Michael Brown, one of the plan’s biggest supporters, said, “It creates a space for boaters and kick-starts our redevelopment program.” According to County Administrator Bob Weisman there is a significant public need for the ramp, but that need does not take into account the lives of those who will be affected. “I’m very angry,” said Renee Corie, a resident on one of the lots to be removed, “People who live in these homes... we know each other and we’re good neighbors.” The Cories bought their home on the water 6 years ago and do not want to move. They feel they will not be able to afford another house so close to the water with the money the town is offering for their property, and they just do not want to move. “I have a neighbor who is 90 years old, and her husband died in that house and she wants to die there too, she can’t conceive that she has to leave,” said Corie (Piloto, 2003). While the city of Riviera may need a boat ramp, more consideration for the people it will affect may have softened the impact of the proposal, especially when dealing with property as valuable as a person’s home.

There are many issues that surround the topic of boat access. The demand for more access to water is a strong one based on things such as amount of use, personal safety, finance and business, and also an amount of personal value. This demand is counteracted by concerns such as those regarding cost, community privacy, and increased water traffic and safety. There are both positive and negative aspects that correspond to the issues pertaining to the use and construction of new boat ramps and to make good decisions regarding boat ramps, it is important to take into consideration all of these issues.

## ***2.2. Environmental Implications***

Tied to the construction and the use of boat launch facilities are the environmental issues that surround such establishments. The construction of new facilities requires waterfront property with sufficient land area, which will ultimately be altered and transformed. The placement of a boat ramp can disturb the sites’ natural erosive patterns, and can significantly increase unwanted erosion. Water traffic generated by a launching facility can also add to erosion problems, as well as introduce harmful pollutants into the environment. Water pollution is of particular concern because there are a number of factors that contribute to it, from boat discharges to waste left by users of the site. The surroundings of a boat launch facility can be greatly affected by these factors, and this section will describe some of those associated environmental problems. This information will be presented as considerations rather than specific arguments for or against developing boat ramps because it is not possible to address the many views that are held concerning environmental impacts.

### **2.2.1. Water Pollution**

Water pollution is a particular concern with regards to our project because of the proximity of boat launching facilities to the water. Because boat launch facilities are located at the water’s edges, pollutants produced by the facilities and by the boats using them are less likely to be absorbed by the environment through natural processes. Due to the fact that pollutants are

less likely to be absorbed through natural methods pollutants generated at a boat launching facility can have potentially harmful affects on water quality and aquatic life in the facility's vicinity (California Environmental Protection Agency [CEPA], 1998). Some examples of pollutants that might be generated are nutrients and pathogens from overboard sewage and pet waste, sediments from parking lot runoff and shoreline erosion, fish waste from dockside cleaning, petroleum hydrocarbons from fuel and oil drippings, toxic metals from hull and boat maintenance debris, as well as liquid and solid wastes from engine and hull maintenance. Construction and reconstruction along with propeller wash and boat wakes can also disturb aquatic habitats, plants and animals (USEPA, 2003).

These pollutants can have significant affects on the quality of water. Decreased levels of dissolved oxygen are a common problem that occurs as a result of pollutants. The pollutants that cause these problems are introduced into the water from storm water runoff, discharges from boats, and spills of fuel or bilge water. Organic matter in materials such as sewage discharged from boats, trash tossed into surface waters, pet waste carried to water bodies in storm water runoff and fish waste disposed of into surface waters consumes dissolved oxygen as it decomposes. A certain amount of dissolved oxygen is required to decompose sewage and other organic matter. Consumption of oxygen by decomposing organic matter leaves less oxygen for fish, crabs, clams and other aquatic organisms. Very low levels of dissolved oxygen can result from high water temperatures which is often the case when more boats are present in one location (Lavendel, 2000).

Another common problem associated with water quality is increased levels of metals and metal containing compounds. Metals and metal containing compounds have many functions in boat operation, maintenance and repair. Arsenic is used in paint pigments, pesticides and wood preservatives. Zinc anodes are used to deter corrosion of metal hulls and engine parts and zinc is often used in creating motor oil and tires. Chromated copper arsenate is used in wood as a preservative. Nickel is a component of brake linings and pavement material and cadmium is present in batteries and brake linings. These and other metals are used in various components by boaters and during construction. The metals can wash from parking lots, service roads, and launch ramps. These metals can contain compounds that can concentrate themselves into sediments. A disturbance of sediments can introduce toxic compounds into the water where they can be ingested by fish and other aquatic organisms and in turn by the people who eat those organisms (USEPA, 2003).

Petroleum hydrocarbons are other pollutants that affect the quality of water (Lavendel, 2000). Hydrocarbons come from operation, maintenance and repair of boat engines. Petroleum hydrocarbons are contained in fuel, oil, grease, lubricants, finishes and cleansers. Petroleum can be spilled directly into surface water when fuel drips from nozzles or when a fuel tank has been overfilled. Oil, fuel, paint, antifreeze, or other liquids dripped from engines enter the waters' surface indirectly through storm water runoff or in flow of ground water after the substances have seeped into the ground (USEPA, 2003).

Solvents can also cause pollution related problems with respect to water quality. Solvents such as methylene chloride, tetrachlorethane, along with others are contained in degreasing agents, varnishes, and paint removers. These are used for engine maintenance and vessel painting and cleaning. Solvents can contribute to another source of pollution in the water if not properly contained. Solvents can enter from water surface runoff or through ground water transport from hull maintenance areas. Solvents are stable compounds that are insoluble in water

and they are usually long, heavy chained organic compounds so they sink to the bottom and accumulate. Many solvents are known cancer causing compounds (USEPA, 2003).

Aside from poor water quality, pollution can also lead to other hazardous conditions. The dredging that is usually pursued in construction or maintenance of a boat launching facility can disturb aquatic habitats, re-circulate toxic metals, and increase turbidity which reduces sunlight available to algae and aquatic vegetation. Increased turbidity will lower the rate of photosynthesis and decreases the rate at which dissolved oxygen is added to the water. Consequences of dredging can have long lasting impacts. Operation of boats can also cause these same problems for water quality and the aquatic habitat by disrupting shallow communities and mixing near shore sediments into the water. Propeller driven boats operated too fast near the shoreline can cause bank erosion. The shallow water can be affected by propellers cutting off or uprooting aquatic plants from the bottom. This will not only reduce photosynthesis but also interfere with fish and other animal's food intake. The propellers can also smother plants and animals (CEPA, 1998).

Shoreline vegetation may be reduced at some locations upon construction of launching facilities. Bottom sediments may be stirred up more frequently due to increased boating activity and dredging. Although water quality might not be poor in some instances, it may still cause the aquatic habitat of the location to become unhealthy, diminishing its ability to support a natural diversity of aquatic organisms. Sediments still may be contaminated by pollutants from storm water runoff or by anti-foulants that have leached from ship hulls or piers (Nedd, 2004).

The effect that boat traffic and motor operation can have on water quality and the water habitats and surroundings varies and depends on the location. Locations must be carefully sought out with the awareness for the potential pollutants generated by a boat launching facility kept in mind. Establishing management measures to reduce pollution is important in ensuring the best possible water quality at the location of the boat launch (CEPA, 1998). Construction and maintenance must be planned and carried out in order to ensure that pollution does not become such a negative matter that it outweighs the benefits of having a boat launching facility.

### **2.2.2. Erosion**

The process of erosion is a major area of concern in our project due to the fact that any shoreline disturbance will help induce or accelerate it (USEPA, 2002). Because informal boat launchings and boat ramp construction create disturbances to the shoreline, we must closely examine all of the relevant causes and effects of erosion. This section will discuss the relationships between boating access facilities and erosion, and help us determine the best practices for minimizing potentially harmful impacts on the environment.

According to the Environmental Protection Agency (EPA), there are two main types of erosion. Streambank erosion refers to erosion along non-tidal streams and rivers, and shoreline erosion refers to tidal portions of bays and estuaries. Because the majority of our work will be conducted along the coastline of Puerto Rico, we will focus mainly on shoreline erosion. Erosion occurs naturally as a result of water acting on the shore. Beaches are constantly eroded and restored with sediment from other areas as a result of waves and tides. The problems arise when erosion is induced or accelerated as a result of a shoreline disturbance (USEPA, 2002).

Any sort of disturbance to a shoreline can potentially have harmful erosive effects. For example, removing vegetation from a shoreline leaves the soil and structure of the shore exposed to waves, tides and currents. Without penetrating roots to provide strength and stability to the shoreline, the sediment along the shore is more vulnerable to being washed away. Altering a watercourse by building a boat ramp can also induce erosion by changing the natural course by which sediment is removed and restored. For example, a solid structure such as a boat ramp may trap sediment in moving water, not allowing the sediment to deposit along its natural course. In this manner, erosion caused by an altered watercourse can sometimes occur a distance away from the obstruction in the water. Induced erosion may also occur as a result of boating. Boats that create wakes increase the rate of erosion to a beach because boat wakes increase the amount of wave energy that hits the shoreline (USEPA, 2002).

The effects of erosion can be devastating to an area for a number of reasons. First, erosion is a threat to all buildings and structures located along the coastline. A government study released last spring estimates that during the next 60 years, one-fourth of houses within 500 feet of the U.S. shoreline could be destroyed (Ogelsby, 2000). A loss of that magnitude to Puerto Rico could be crippling to its economy because of the close proximity between buildings and business and the shore. Water quality is also harmfully affected by erosion. The introduction of sediment into a body of water can significantly diminish the water quality and aquatic habitat by making the water more turbid. The increased turbidity inhibits sunlight to penetrate the water, causing problems for aquatic plants that need sunlight to survive. Furthermore, suspended sediments in the water have the potential of clogging the gills of aquatic organisms (Mill Creek Watershed Group, 2004). Another destructive impact relevant to our project occurs when erosion destroys or impairs a boat launching facility. This can happen when the soil surrounding a ramp is washed away by the waves, tides, wakes or runoff from rain that is channeled along the sides of the ramp. Erosion around a boat ramp leaves the ramp elevated from the surrounding land making it unstable and dangerous to use. Erosion of this kind can result in costly repairs or the shut down of a ramp (USEPA, 2002).

The difference between the erosion problems associated with informal boat launches and the problems associated with formal boat launches is that the erosion concerns of formal boat launches can be controlled. For example, structures such as rip raps and jetties can be constructed around boat ramps to reduce erosion (USEPA, 2002). Also vegetation can be replanted after boat ramp construction and optimal sites with minimal erosion probability can be carefully chosen to reduce possible harmful effects (Oregon State Marine Board [OSMB], 2002). When informal boat launches are performed, the boater tramples vegetation while launching the vessel with no knowledge or concern of erosion. They may be causing irreparable erosive damage without knowing it by launching in sites that are prone to erosion such as shallow, flat areas (USEPA, 2002). We plan to combat the problem of erosion associated with boat launching ramps in Puerto Rico by identifying where many of the informal launchings are taking place, and determining if it is an area that is vulnerable to erosion. We will also be able to offer the DNER advice as to where boat ramps can be built with minimal erosive impacts and also methods of how to reduce the harmful effects such as building jetties and replanting vegetation after construction.

### **2.2.3. Environmental Impacts During the Construction of Boat Ramps**

The DNER of Puerto Rico is concerned with potential environmental problems as a result of their current system of boating access. One option they are considering to fix these problems is the construction of additional boat ramps (personal communication, Erasto Nieves, 2005). We must closely examine all possible environmental impacts associated with the actual construction of a boat ramp to ensure Puerto Rico does not worsen the condition of the environment by constructing launching facilities. This section will discuss any possible environmental problems associated with the construction of boat ramps, and prepare us to assess whether building additional launching facilities is a valid option to solve their environmental troubles.

Any time construction occurs along the shore of a body of water, there is a potential for environmental damage. Many of the actions and events that take place during construction put the environment at risk. For example, contractors must bring heavy equipment to the construction site. During the transportation of equipment, vegetation around the construction site may be trampled or removed leaving the shoreline exposed and vulnerable to erosion (OSMB, 2002; USEPA, 2002). Also, there is the possibility of petroleum products and chemicals leaking from the equipment and construction vehicles (OSMB, 2001). Because boat ramp construction takes place close to water, any chemical leakage will go straight into the water and diminish water quality. This can be devastating to aquatic life in close proximity to the construction site. Lastly, the concrete used to build the boat ramp can be a danger to the environment. If concrete is placed in the water before it has fully hardened, it can be harmful to the water quality and destroy aquatic life (OSMB, 2002).

Although there are many possible threats to the environment during the construction of a boat ramp, safety measures can be taken to minimize these threats. For example, after construction is completed, all the vegetation that was destroyed or removed may be replanted. Plants of similar size and variety of those removed should be used in the replanting process. This will restore the construction site back to its original state, which will minimize the environmental damages (OSMB, 2002). Also, site cleaning should be performed daily to remove all chemicals and debris from ramps, access roads, and surrounding areas. All material removed should be disposed of in an appropriate location above the bank line. This will protect the water quality of the area (OSMB, 2001). After examining possible environmental damages associated with the construction of boat ramps, we feel that boat launches can be built with minimal impacts to the environment as long as the builders use appropriate construction methods and safety procedures after sites have been properly selected.

### **2.3. Site Selection Process**

Many of the informal boat ramps in Puerto Rico pose potential threats to both the boaters using the ramps as well as the environment surrounding the site. The reason these threats exist is because the location of the boat ramp was poorly chosen. Not all locations can accommodate boat launching facilities equally. A lot of care must be taken when choosing a proper site for a boat ramp, and many social as well as environmental issues must be considered before building can begin. The DNER is worried that many of the informal ramps currently in use are in poor

locations, because the users of the ramps have inadequate knowledge or consideration of proper boat ramp siting (personal communication, Mayra Garcia, 2005). Some boaters may be causing long-lasting effects on the environment by launching their vessels at poorly located boat ramps. For this reason, the DNER explicitly asked us to provide them with recommendations for possible locations of new projects as well as development potential for existing sites. This will ensure all of the boat ramps in Puerto Rico are located in areas that will have minimal effects on the environment, and are safe to use for all boaters. This section will discuss some of the key considerations that must be considered before a launching facility can be built, as well as some of the factors that make one potential site better than another.

### **2.3.1. Key Factors**

One factor that must be considered when determining a potential site for a boat ramp is the topography or slope of the shore. Ideally, the slope of the shore should match the slope of the ramp. This reduces both the cost and environmental impact during the construction of the ramp. Typically, boat ramps have a slope percentage of between 12 and 16 percent, so shoreline slopes of the same values are considered ideal (Virginia Department of Game and Inland Fisheries [VDGIF], 2001). Anything above or below these grades requires the builder to either fill or cut the shoreline to make the slopes match. Not only does this become very expensive, it can have harmful environmental impacts as well. Scouring and erosion will occur if a drastic cut of the shore is required, while sedimentation or the build up of soils is inevitable if too much fill is used on the shoreline. Both of these processes also diminish the water quality by increasing the turbidity of the water (USEPA, 2002). If the slope of the shoreline initially matches that of the ramp, the topography of the shore will maintain its original form, and have minimal effects on the environment.

Another factor to consider while determining the location of a potential ramp is how close the site is to other boat launching facilities. Boat ramps should be properly spaced to reduce water traffic. The state of Oregon found that boat ramps should be spaced no less than five miles apart. They came up with this distance because they determined most recreational boating activities occur within a five-mile radius of the launch ramp (OSMB, 2003). If ramps are built too close to each other, there will be excessive boat traffic in one congested area. This can cause boaters to have unpleasant boating experiences as well as harm the environment. A large volume of boats in a small area can cause harm to aquatic life in that area because all of the pollutants from the boats are expelled in a small, concentrated location. Also, increased traffic in a small area will increase the wave energy acting on the shores due to the wakes of all the boats (USEPA, 2002). This can be harmful to the shoreline by causing harmful erosive effects.

Boater safety is another important issue that needs to be looked at during the process of finding an adequate site for a launch facility. Areas that have extreme waves, tidal action or currents make it very difficult for boaters to launch and retrieve their boats. The moving water can cause boats to be unstable, and present a danger to anyone using the facility (OSMB, 2003). Also, exposure to large waves and currents can cause erosion of the ramp itself. The constant abuse from large waves and currents can cause cracks, crevices, and potholes in boat ramps, making them unstable and unsafe to use (USEPA, 2002). Not only is this dangerous to the users,

but it is costly for the community to fix. For these reasons, ramps should be located in areas that are exposed to small waves and currents.

The physical attributes of a potential boat ramp site are also important to consider while evaluating different locations. The size of the site must be large enough to accommodate a ramp along with other amenities such as rest rooms, tie down areas, and an adjacent parking lot. The size of the ramp and parking lot depends on how many people are expected to use the ramp on a daily basis. Sites with too much vegetation are not a good choice because it must be cut during the construction process. This can be harmful to the environment by altering the natural state of an area. Also, areas that require access roads to be built should not be chosen for a boat ramp site. The construction of access roads is very expensive due to the high cost of purchasing land and building the road (OSMB, 2003).

After considering these important criteria for evaluating a potential site for a boat ramp, we have a better understanding of what type of location to look for. We determined that areas close to public roads, with small amounts of vegetation, and properly spaced from other launch sites are logical places to consider building a boat ramp. The deciding factors in these areas will be if the slope of the shore is between 12 and 16 percent, and if the area is not overly abused by waves, currents and tides. Although many locations may be fit for a boat ramp based on the physical location, the community may decide against it. Just because a community has a “perfect” physical location for a ramp, they may oppose the construction of it for various reasons. The social implications of building a ramp are specific to each community, and they cannot be inferred until different members and organizations of the community state their opinions. After examining this criteria, we are aware of what physical sites best accommodate a boat ramp, but we understand that the social make-up of a community may be the deciding factor in determining potential boat launch locations.

### **2.3.2. Common Problems with Boat Ramps**

The disrepair and lack of maintenance of some existing boat launching facilities is also a contributing factor to the use of informal boat launching sites. The DNER of Puerto Rico has indicated in its project proposal letter that some of the island’s formal boat ramps are broken or damaged. Currently, there is no universal standard for building a boat ramp, but the past has indicated that the design and construction of boat launches must be thought out and executed with care in order to produce a successful launch site. There are many considerations that must be taken into account before the construction of a ramp can begin. Some factors that builders and contractors must consider while constructing a boat launch include: site accessibility, user safety, materials, water depth, size, siltation rates, and slope percentage. If any of these factors are overlooked, the result can lead to a dangerous and unusable boat ramp that poses a potential threat to boaters as well as the environment. The cost of fixing these errors is also very high. This report will discuss some common problems associated with the construction and design of boat ramps, and what measures can be taken to ensure the completion of a successful boat launch.

One common problem with boat launches is the slope percentage of the ramp. This proved to be a major issue last year for boaters using a ramp for access to a lake in Palm Valley, Florida. Contractors constructed a flawed ramp using drawings that called for too much of an



incline. Engineers inadvertently drew the designs with a 24 percent slope instead of the 15 percent slope specified in the plans. As a result, some boat bottoms were wrecked while trying to be launched into the lake. Smaller boats around 17 to 19 feet launched with no problems, but larger boats could not be launched with a slope of this degree. The original cost of the ramp was \$167,000 including an adjacent parking lot, but another estimated \$50,000 will have to be spent to repair the structure (Woods, 2003). In general, boat ramps should have slopes of 12 to 15 percent (VDGIF, 2001).

Another common flaw that results from the construction of a boat ramp is a lack of traction on the ramp's surface. This summer, the town of Quincy, Massachusetts spent \$87,000 to fix its only public boat ramp which had become too slippery for proper use. The ramp was dangerous to anyone trying to launch their vessels. As a result, many boaters in Quincy could not use their boats because they had no way of getting them into the water. Since the repairs were done, it has been estimated that about 100 people use the ramp on a typical weekend day (Fargen, 2004). The reason the ramp was too slippery was that not enough care was taken when the ramp was originally constructed. Most all boat ramps are made out of concrete which can be a problem because smoothed concrete becomes slippery when it becomes wet. Also, the longer a ramp is in the water, the more slippery it becomes due to algae growth on the surface of the structure. To fix these problems, the concrete should be finished with a surface rough enough to provide good traction, even when covered with algae. To create a rough surface, a rake can be used to make quarter-inch deep grooves into the fresh concrete for improved traction. This will improve the quality as well as the safety of the ramp (VDGIF, 2001).

Another common dilemma that is found is related to the size of a boat ramp, or the number of lanes it has. Some ramps are not large enough to accommodate everyone who wants to use it. At some locations, people have to wait in line for hours to launch their boats. To accommodate all users, builders must conduct research to determine how many people will be using the launch site on a daily basis. Typically, a single lane boat ramp with a parking lot of 30 to 40 spaces will accommodate about 80 launches per day. These figures assume that most ramps have daily turnover rates of 2 to 2.5 per day. If the builder anticipates more than 80 launches per day, additional parking spaces and launch lanes must be added. It is also important to remember that the parking spaces must be large enough for a vehicle plus its trailer. A vehicle-trailer parking space should be at least 10 feet wide and 40 feet long with adequate maneuvering room to line up and get into and out of the parking space (VDGIF, 2001).

Choosing the correct location to build a boat launch is crucial. The topic of major concern for a sufficient boat launch facility is water depth. The water depth of the site in consideration, when considering boats an average size of 20 feet should be no less than three feet at the end of the ramp. A more desirable water depth of four feet is preferred and five feet if power loading is going to be used (VDGIF, 2001). Power loading is when an engine is used to load bigger boats onto a ramp. Florida's Fish and Wildlife Conservation Commission has documented that power loading has caused many of the state ramps to age prematurely. The premature aging is said to be due to insufficient water depth. If water depth is not sufficient, the end of the ramp will fail to be protected and then propeller wash, or the loose or broken water left behind by a boat as it moves along and includes the churned water thrown out by the propeller, created from power loading will erode a hole at the end of the ramp. This hole in the ramp will cause a sharp drop-off and undermine the end of the ramp. When a ramp has a drop-off and trailer wheels are backed off the end of the ramp, the trailer can hang on the end of the ramp causing damage to the trailer (Meehan, 2004). The Virginia Department of Game and

Fisheries suggests that the ramp be increased for the last 10 to 15 feet so that the end of the ramp will be in deeper water or dug into the bottom to protect the end of the ramp (VDGIF, 2001). The problems caused by water depth can be avoided by carefully choosing a site location with the proper site specifications.

Siltation rates of a site can also make for a good boat launching site or a problematic one. It is very possible that the water depth will not remain constant and water shifting from side to side could undercut the end of the ramp and cause the end to break off. This phenomenon usually takes place at site locations on rivers or bays. At site locations at the back of bays, near stream inlets or on long sandy beaches, active deposition is known to occur. Sand or silt might cover up the ramp requiring dredging to obtain deep water. This process is expensive and can have an adverse impact on the environment (VDGIF, 2001). The Petaluma River Boat Launching Facility in California has lost a large sum of money trying to accommodate water siltation rates. The facility had to continually remove sediment to keep the channel open due to the fact that water depth was continually varying. This required the facility to undergo frequent dredging. A further complication was that, due to increasing public concern about the disposal of dredged material, the removal process became more stringent and costly. As a result the county judge agreed and appointed a group of people to pursue a project that would provide boating access at an affordable cost (Balshaw, 2005). Once again site location must be thought out in great detail. If dredging is avoidable, one is suggested to do so and if not, select a suitable site for placement of the dredge material (VDGIF, 2001).

The site must be accessible not only as far as the water is concerned but the land as well. A boat launch with usable land area for things like parking and turning radius is imperative. For a boat of 20 feet, a 30 to 40 foot turning radius and staging area is needed at the head of the ramp. If possible it is suggested to reserve areas that can be expanded when considering the design location for a boat launch. Site selection must bear in mind existing roads and other ramps. Boat ramp facilities should be located at existing boating access points whenever reasonable and feasible. Road construction and maintenance is expensive and therefore the closer the site is to a mainland road, the better. Sites should be chosen to avoid excessive impacts to aquatic vegetation and fish spawning or rearing habitat. Boat ramp locations should be well designed so that the greatest amount of evacuation occurs above the water line, with the underwater portion of the ramp closely matching the mud line topography whenever possible. This will reduce the required cut or fill in the submerged or submersible zone and decrease any resulting environmental impacts and issues (Whitty, 2002).

Building a successful boat ramp and facility is a key element in successful boat launching. As one can see many problems can arise if every small detail is not carefully thought out. Although many of the problems described above have answers, the solutions are very costly. By evaluating the site and design completely, people can steer clear of the problems that have been previously encountered. Avoiding these problems increases the probability of constructing a successful boat launching facility.

### 2.3.3. ADA Site Requirements<sup>1</sup>

An issue that must be addressed and another criterion for a quality boat launching site is how well a site meets the standard American Disabilities Act (ADA) requirements. The boat launch facility must be readily accessible to, and usable by, individuals with disabilities. The requirements include having at least one accessible route connecting accessible buildings, facilities, elements, and spaces on the site in consideration. ADA requirements must be considered for both launch ramps that are part of boarding piers and launch ramps that are not part of boarding piers.

An accessible gangway which links a fixed structure or land with a floating structure must be on site. An ADA gangway should be designed for the least possible slope in order to provide better access to persons with disabilities. In general the slope of the gangway must be no greater than 1 foot for every 12 feet in length but there is an exception which states that the gangway does not have to be longer than 80 feet. The slope requirement also has an exception when a facility includes less than 25 boat slips which are places where a boat can be docked. In these facilities the slope may exceed 1 foot for every 12 feet in length as long as the gangway is at least 30 feet long but may not exceed a slope of 1 foot for every 20 feet in length. An ADA accessible gangway has to have a transition plate attached to it. A transition plate is a sloping pedestrian walking surface located at the end of a gangway. In order to be ADA compliant the slope of a transition plate may not exceed 1 foot for every 20 feet in length. If the slope does exceed this requirement then the transition plate must have a landing at the non-gangway end of the transition plate. Also, the gangway must have accessible handrails if the slope is greater than 1 foot for every 20 feet in length. When handrail extensions are necessary they do not have to be parallel with the ground or floor surface, since the surface may be moving due to water. The handrails do however have to be located on both sides and extend at least 12 inches beyond the top and bottom of the gangway ramp. Also, the handrail should be mounted between 34 and 38 inches above ramp surfaces.

Boat slips are boarding piers that are not part of a boat launch ramp. The number of boat slips required to be accessible is based on the total number of boat slips in the facility. Basically for every 25 boat slips at least one must be ADA compliant. If the number of slips at a site is not identified, then each 40 feet of launching space along the perimeter of a pier counts as one boat slip. Accessible boat slips must have piers that are at least 60 inches wide and as long as the slip. In addition, every 120 inches of linear pier edge must contain at least one opening that is a minimum of 60 inches wide. These clearances provide boaters with disabilities space for maneuvering as well as space for using transfer devices to embark and disembark from their boats. The width of the pier may be reduced to a minimum of 36 inches for a maximum length of 24 inches as long as multiple 36 inch wide segments are separated by pier segments that are 60 inches clear in both width and length and the clear openings are at least 60 inches deep. Edge protection on a pier is not required but if provided it can be 4 inches high maximum and 2 inches deep maximum.

Now the requirements for a boarding pier where the boat launch ramp is included will be discussed. One example of a boarding pier where a boat launch ramp is included is when a facility provides a chain of floats on a launch ramp. In this case the last float must serve as the accessible boarding pier. An accessible boarding pier must be located at the last float because as

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<sup>1</sup> Information gathered from *Accessible Boating Facilities* [Electronic Version] document issued by the United States Access Board.

water levels decrease, segments of the chain rest on the launch ramp surface, matching the slope of the launch ramp and therefore the last float would function as the boarding pier at the lowest water level, before it possibly grounded out. Since the entire chain also functions as a boarding pier, it must comply with the 60 inch clear pier minimum requirement.

There could also be a facility which provides a non-floating boarding pier that is supported by piles and divides a launch area into two launch ramps. An accessible route must connect the boarding pier with the other accessible buildings, facilities, elements and spaces on site. Although the boarding pier is located within a launch ramp, because the pier is not a floating pier, no exceptions apply. The accessible route could run down between the two launch ramps or the fixed boarding pier could be relocated to the side of one of the launch ramps which would allow the slope of the launch ramps to remain unchanged since the accessible route would run outside the launch ramps. The entire length of accessible boarding piers must comply with the same technical provisions that apply to boat slips. There is no minimum length for the pier. However, the accessible boarding pier should be at least as long as other piers provided at the facility. If no other boarding pier is provided, it should be at least as long as what would have been provided if no access requirements applied. For example, at a launch ramp, if a 20-foot accessible boarding pier is provided, the entire 20 feet must comply with the pier clearance requirements. If a 60-foot accessible boarding pier is provided, the entire 60 feet must comply with the pier clearance requirements.

There are no specific provisions that address access to launch ramps without boarding piers. The Department of Justice advises that if there are no applicable scoping requirements then a reasonable number, but at least one, must be accessible. It is recommended that an accessible route serve at least one launch ramp. The portion of the accessible route located within the launch ramp is not required to comply with the slope.

The ADA requirements place emphasis on ensuring that individuals with disabilities are generally able to access the boating facility and use a variety of elements. Incorporating accessibility into the design of a boating facility should begin early in the planning process with careful consideration to accessible routes. Although these requirements may seem minor, when selecting a site there must be a sufficient amount of space in all the necessary places described to be able to accommodate these requirements.

## **2.4. *Prior Research***

As is the case with any sort of plan development, sufficient knowledge of previous studies is required. By reviewing efforts to resolve similar issues, we will increase our awareness of various methods involved, some of which we may not have been considering. This will also help to visualize some specific details that may have been unclear during our initial methods development. We will be able to adapt these characteristics to the methods we feel are applicable to our project. Viewing the results of these studies will help us to choose which methods may be more efficient than others. By conducting research regarding previous case studies, we significantly increase the chances of completing our project successfully.

We have divided our case study research into two topic areas. First we begin by examining how exactly others have previously inventoried and performed needs assessments on boat ramps and access facilities. This will help us to determine details regarding data collection

methods that will be suitable for our project and will help us to determine what to consider when analyzing development potential for boat ramps. We have paid particular attention to the state of Oregon as per request of the DNER. Secondly, we consider studies and recommendations regarding public participation and siting of environmental projects. This will assist us in assessing social concerns that might arise due to boat ramps and facilities, and will provide us with methods to address those concerns.

### 2.4.1. Inventory Details & Methods and Needs Assessment

Oregon is a state that has greatly recognized the boating activities taken up by its communities. The Oregon State Marine Board is a state agency that regulates public facility standards and assists facility owners with funding for development. As part of the agency’s work, an inventory of all facilities statewide is maintained through the use of Microsoft Access. This database is used to for the printing of a boating facilities guide and provides information to an on-line boating guide as well. The database keeps track of a large amount of information for each facility, some of which can be seen in **Table 2-1**. This information is based off of information gathered through personal communication of Oregon State Marine Board employee, Sabrina Owings.

<b>Facility Contact</b>	<b>Marine Board Contact</b>	<b>Characteristics</b>	
Facility Name	Name	Ramp Type	Nearby State parks
Owner	Phone #	Number of Launch Lanes	Nearby Facilities
County	Fax Address	Parking Size	Local Hazards
Phone #	Email	Number of Slips	Local Links
Address		Slip Sizes	Speed Limits
Directions		Slip Direction	Motor Prohibited
River and River Mile		Moorage(Y/N)	Electric Motor (Y/N)
		Transient Tie-up(Y/N)	Waterski/PWC Allowed

**Table 2-1: Oregon State Marine Board Database Information**

Although owners are not required to inform the agency about their facilities, many owners do provide updated information because of the agency’s strong reputation (personal communication, Sabrina Owings, 2005). Information is also gathered through regular on-site data collection by the engineering department. Information is also collected through the survey processes of the state’s Boating Facilities Plan, which will be described below.

This inventory does not track social considerations or information concerning local impact. Local governments are relied upon to track this kind of information for their area. Many local citizens also rely on other state agencies for these types of information, for example the Department of Transportation, Department of Environmental Quality, and the deputies of the Marine Patrol. Funding to local governments for marine law enforcement and education is provided by the agency, so local law enforcement is relied upon to deal with these issues.

Oregon has also acknowledged the importance of boating for recreational purposes, and in doing so has developed the Six-Year Statewide Boating Facilities Plan. As stated in its introduction, the plan is used to “identify and prioritize public recreational boating facility needs

throughout the state of Oregon, and to plan for the funding and implementation of the recommended improvements” (OSMB, 1998).

In addition to providing data regarding the supply and demand for boat access sites, as well as particular constraints that may affect the project, the plan provides a vast boating needs assessment for the state of Oregon. Because of the large quantity of boat access sites in the state, the Marine Board took a community approach to identifying details regarding the current conditions of boat facilities. The agency gathered information through facility user and provider surveys, public information meetings, and the staff was asked to conduct reviews of related plans. This method was chosen for its balance of input.

User surveys were sent to 25 randomly selected registered boat owners in each county. These surveys asked for information such as site name and location, estimated annual uses, overall maintenance condition and site specific improvements needs. These surveys were short, limited to one-page for ease of use. Provider surveys were sent to local, state and federal groups known to provide public access sites. These surveys requested more data and specific details on the condition of the existing facility and improvement options. In addition to the surveys, the staff conducted ten public meetings throughout the state. These meetings were used to discuss regional issues and needs. The staff also consulted documents concerning previous boating studies in Oregon.

The results of these methods were compiled into separate databases. Specifically, the results of the user surveys, meetings, and research were compared to the results of the provider surveys. This comparison seems logical because providers will have a greater knowledge of actual specific issues and the additional results can be used to fill in any missing information. A well-rounded description of each site is therefore created.

Based on the details of the results, cost estimates were made using a rubric for the required calculations. These cost estimates included things such as the reparation or new construction of road access and parking, and the construction of new launch ramps based on different construction materials. Each of the sites was also put through a priority ranking process to determine which sites may need attention sooner than others. This priority ranking was based on previously established guidelines, boat use and boaters served, as well as other factors such as safety concerns, accessibility, and land and water resources.

The result of this plan is a comprehensive overview of the current state of boating access in Oregon. It provides recommendations for specific improvements for each site as well as the cost estimations. Although the method of this plan may differ from the method used in Puerto Rico, a few suggestions can be taken from it. The information that is requested from the surveys gives us an idea of what public opinion may be focused on. It provides us with other data we may feel is necessary to collect at the sites that are visited. It provides a basis on how we may want to assess the cost of the improvements we find necessary for particular sites. It also gives us a general idea of one method of the data collection for a boating access needs assessment.

In addition to the studies in Oregon, another study was considered. This study was entitled “Boating Professionals’ Attitudes Toward the Future of Boating in the U.S.” This study was conducted to “identify boating issues, priorities and concerns that are most important among the boating community and its leadership” (Responsive Management, 2001). In addition to analyzing issues such as boater participation and education, the study also gathered details surrounding the issue of boat access and boating facilities.

This information was gathered by standardized survey questionnaires developed by the research group and approved by a recreational boating governing body. The survey was then

administered to a number of boating groups within the boating community of the United States. A number of interviews were conducted also, both in person and by telephone. Many of these interviews were conducted with representatives from state agencies responsible for recreational boating. The results of these surveys and interviews were compiled into a database system, which allowed the research group to characterize responses and analyze the data. The data was then presented to recognizable bodies within the boating community.

Although the scope of this particular study is much larger than what our project may include, it gave insight into particular issues that professionals were concerned about regarding boat access and facilities. Some of these issues included the need for improved boat ramps, parking, and restrooms. Other issues included safety, crowding and water/environmental/aesthetic quality. The details of these issues were not explicitly stated because of the fact that this study was very large and broad. Even though these details may have been lacking, the fact that professionals voiced their concern regarding these issues highlights our need to keep these factors in mind when collecting data in Puerto Rico. We must be aware of the characteristics of boat launching facilities that fall under these concerns.

## **2.4.2. Public Participation**

Public participation is a key component to any type of decision-making that affects the public community. Projects that take into account and process public views and opinions have a greater chance of being accepted by the communities in which they are to be placed. A project such as the construction of a boat ramp is one such project whose success depends on the satisfaction of the community that surrounds its location. Because the public plays such a vital role in our project, as can be seen from the information presented in the previous sections of this report, a greater understanding of acceptable public participation policy is required. Here, we will discuss the results of two studies concerning the public participation process.

The first piece of material consulted, entitled *What Is a Good Public Participation Process*, described five discourses of a strong public participation process that resulted from analysis of a forestry project. Although some of the characteristics of these discourses were in conflict with one another, integrating the points presented by each could lead to a well-rounded process.

One characteristic of a good public participation process is legitimacy. A process that has this characteristic is based on consensus decision-making, has evaluated technical and local knowledge, and is transparent. A transparent process is one in which “there is a clear plan for the process from start to finish, all information is disclosed, all issues can be brought to the agenda, all components of the process are open, and room is made for all people to attend” (Webler et al., 2001). This characteristic relies upon the fact that solid evidence is produced and the public is able to provide additional information and has access to this evidence.

Being fair and unbiased also characterizes a strong public participation process. This characteristic is based on the interaction of the people involved. There should be room for trust and respect, between individuals from the public and between the governing body or authority and those individuals. This characteristic can be summarized by the report which stated, “People do not necessarily need to agree with the outcome, they only need to consent to it, which they

will do if they are informed, if they believe they had a proper and fair opportunity to influence the outcome, and if the final decision can be justified” (Webler et al., 2001).

Other characteristics of good public participation deal with power and leadership. There should be a common, level ground so that those that do hold power in the matter do not abuse it and do not use it to negatively influence interested parties. The process should educate people as matters evolve, and the scope of this evolution should not be limited. Leadership should be responsible for understanding these issues concerning power, and should provide reasons for legitimacy as described above (Webler et al., 2001).

These general characteristics are important for the overall decision making process, but knowledge of the specific process is also essential. The document helped us to define the two major steps of an acceptable public participation process.

The first step in planning for public participation is identifying decision-making goals. The actual decision to be made must be defined. This must be stated in such a way that the public can respond in terms of values and priorities. Who is going to make this decision, how it is to be made, and when it will be made must be determined. The decision-maker must be informed of public opinion and concern throughout the process, requiring a schedule of the process. Public participation must be integrated into this schedule so the public is informed in a timely manner of all relevant information. A sufficient amount of time must be allotted to gathering public views so that people have time to voice their concerns and do not feel rushed by unnecessary deadlines. Finally, the goals of a public participation process must be identified. This will help to determine what methods can be used for the actual participation of the public.

The next step is to identify the technique used for public participation. This begins with determining the issues that the public will have concern for, and what stakeholders will have interest in the project. Stakeholders are defined as “people who perceive themselves as having a stake in the decision;” the stake might be economic, based on use of the resource, or a particular interest in the matter, among others (United States Department of Energy [USDOE], 2005). An estimate on the amount of controversy that might arise, and preparations to deal with this controversy must be determined. An analysis of the information to be exchanged must be performed by asking questions such as ‘What needs to be learned from the public to complete this step?’ and ‘What does the public need to know to participate effectively at this step?’ (USDOE, 2005). Finally, a public participation technique can be chosen. These techniques can be found in **Table 2-2**, which divides these techniques into information-providing, -gathering, and information-exchanging techniques.



<b>Public Participation Techniques</b>		
<b>Information-providing</b>	<b>Information-gathering</b>	<b>Interaction/Information exchange</b>
Briefings	Focus groups	Advisory groups/task forces
Exhibits/Displays	Mail-in response forms (including in advertisements, inserts or newsletters)	Hotlines
Feature stories		Interviews
Information repositories	Plebiscite	Open houses
Mailings containing technical /environmental reports	Polls, surveys, questionnaires	Participatory television/cable television
		Public hearings
News conferences		Paid advertisements
Newsletters		Public meetings
Newspaper inserts		Retreats
News releases		Workshops
Press kits		
Public service announcements		
Speaker's bureau		
Web sites		

**Table 2-2: Public Participation Techniques (USDOE, 2005)**

Although this process for developing a public participation plan is very comprehensive, it allows us to determine some steps we may need to take in involving the public with our project. The characteristics of a good public participation process also provide a basis for how this process should be planned. Keeping in mind the characteristics of a good public participation process will allow communities to have confidence in the plan we have developed and allow for the right decisions to be made that will satisfy as many people as possible.

## **2.5. The Department of Natural and Environmental Resources – Project Sponsor<sup>2</sup>**

This project is supported by the Department of Natural and Environmental Research (DNER) in Puerto Rico. The DNER is an agency that was created by the government of Puerto Rico in 1972. As described in its mission statement found on the organization's website, the goals of the DNER are "To protect, to conserve and to administer the natural and environmental resources of the Country [in] balanced form to guarantee to the next generation its benefit and to stimulate one better quality of life" (DNER, 2003). A further description of the goals of the DNER is expressed by the scope of its vision:

"To cause a healthy and healthful atmosphere through the promotion of sustainable use of the natural resources, the arrangement of the environmental management and the transformation of the environmental culture of the Puerto Ricans towards one of conservation, with the participation of all the sectors of the society to improve the quality of life" (DNER, 2003).

<sup>2</sup> Information gathered from Department of Natural and Environmental Resources webpage <http://www.gobierno.pr/dner>, translated by Google.com

The DNER is concerned about all aspects of the Puerto Rican environment. It has powers over the jurisdiction of wild life, state forests, natural reserves, lakes and lagoons. It also has the power to make rulings over public properties such as waters used primarily for economic purposes, fish, minerals, materials of the rivers, and marine-terrestrial zones and territorial waters. Jurisdiction concerning environmental issues is exercised through the creation of laws and regulations.

### **2.5.1. Project Interest**

The DNER is particularly interested in this project because of the agency's concern over the coastal zones of Puerto Rico. The agency understands the importance of the island's coasts in terms of the economic values associated with them, with particular respect to tourism. It recognizes that the coasts are prime locations for further development of the country. The scope of this project falls directly under these areas of interest. Water access and boat ramps are gateways to the natural beauty of the coastal waters of Puerto Rico. They are important because of the recreational value as well as the economic value to people such as fishermen. Construction of public access facilities also raises environmental concerns, and these concerns are central to the agency's mission.

The DNER has made rulings over access to public beaches and ocean waters. These regulations were created after many questions arose from citizens of coastal towns regarding how access to public beaches was being regulated. As a result of the regulations created by the DNER, any project that is undertaken adjacent to the coast must provide public access to it. If a public access site cannot be constructed near a particular project, the regulations require that an access site be placed within specified distances from the project. The regulation also states that buildings constructed close to the coast must be oriented in such a way as to pose the least obstruction to the sea, which will help to guarantee access to the coast. These regulations prove that the DNER has a vested interest in our project, because boat ramps constitute the primary means of access to the ocean for many people.

Currently citizens of the country feel that there is a lack of involvement by the DNER to develop and improve the organization of boat access around the island. These people have voiced their frustrations through newspaper articles calling for the DNER to act on these matters. This project may possibly help to characterize the reasons for public frustration. The DNER hopes to use the results of this project to uncover the extent of needed improvements and to justify the fact that additional funding is required to structure and revitalize boat access in Puerto Rico (personal communication, Mayra Garcia, February 4, 2005). The DNER is particularly interested in this project because it is a starting point in assisting the communities of Puerto Rico.

### **2.5.2. Public Participation Policy**

In order to have a successful relationship with communities and residents, an agency such as the DNER that partakes in public projects and environmental activities must have effective public participation policies. These policies allow the agency to inform the public of its ideas,

and give the public an opportunity to voice its opinions regarding the issues. A reflection of communication such as this allows differences of opinion to be considered in crafting a successful final product.

The DNER understands the importance of letting the public know of its intentions and encourages the public to comment on the topics they present. They know that the public's participation should occur in conjunction with the development of the project, not after the project has been finalized, as was researched previously in section **2.4.2 Public Participation**. This comes from experiences where completed projects were presented to communities who reacted negatively to the information that they were given. They also understand the importance of having a legitimate process, one that is fair and unbiased, and one that keeps the powers of the parties involved in check as described section **2.4.2 Public Participation** as well (personal communication, Erasto Nieves, 2005).

Although the DNER is knowledgeable about these areas of public participation, the agency itself does not have any established policies that exist regarding the siting of boat ramps. They do, however, make efforts to involve the public with their decisions. These efforts coincide with the permitting process that is conducted for each site that the DNER wants to develop. The DNER must submit to the US Army Corps of Engineers (USACE), the federal body concerning such developments, a Federal and Commonwealth Joint Permit Application for Water Resource Alterations in Waters, Including Wetlands, of Puerto Rico. As part of the evaluation of the permit, there are some public participation considerations. Section III.1.C(3) of the application, entitled *Evaluation Factors*, states, "The decision whether to grant or deny a permit is based on a public interest review of the probable impact of the proposed activity and its intended use" (USACE, 1999). Included is also a list of items that are considered regarding this public interest review, such as economics, cultural values, and needs and welfare of the people.

The inclusion of the public with regards to the USACE permit can also be found in section III.1.C(2), entitled *Typical Processing Procedure for a Standard Individual Permit*, which includes a numbered list of the steps taken in reviewing the application. The fourth step of this process is the issuance of a Public Notice. This notice is addressed to the district and is a description of the applicant, the location of the project with longitude and latitude, and its work and purpose which is a description of the construction to be done. It includes the basic purpose and overall purpose which describes what the project will provide to the community. Environmental, historic, and cultural considerations are discussed. A list of agencies that have reviewed the project is included, and additional notes are provided which typically includes contact information for anyone wishing to learn more details concerning the application. This public notice is summarized and placed in ads of local newspapers, posted at local post offices and libraries, and mailed to individuals or groups who may have particular interests in the project. Examples of these documents can be found in **APPENDIX A: Permit Documents**.

After the Public Notice is issued, a 15 to 30 day commenting period is established, which is step five of the permit process. Step six is a review of the proposal by the USACE as well as other groups such as the public, special interest groups, commonwealth agencies, and federal agencies. Copies of the application are sent out to these groups so that they may view the actual documentation of the project. The USACE then has time to consider any comments made about the project and its application, and may also directly consult with some of the groups previously mentioned. If necessary, step ten allows the USACE to hold public hearings regarding the application.

This information shows that a fair amount of consideration is given to the public regarding a project such as a boat ramp. But because this permit process takes a significant amount of time, the DNER takes it upon itself to conduct some of its own public participation, while the permit process is under way. They understand that, although the methods of informing the public that are included in the USACE permit process are important, many citizens may receive the wrong impression when they find out that the permit process has already begun. They may feel that since there is already an application submitted for a permit, the DNER is going to get what it wants, in the form of a boat ramp, regardless of whether the community may agree or disagree. The DNER realizes that by the time they receive word of a project through the permit process many people feel that it is too late to voice a comment or opinion. For these reasons, the DNER also makes direct contact with the communities that will be affected by their projects.

For each boat ramp project that the DNER considers, the agency makes contact with groups that may have a particular interest in that specific project. Some groups that may be contacted are fishing associations, commercial associations in neighboring areas, municipality representatives such as the mayor or staff, project managers of natural reserves in the area, environmental activists, and local residents and the public in general. The DNER prefers that residents of the actual community to be affected are present rather than residents of nearby cities and towns so that the issues remain localized to the community in question. These groups are contacted by letters through the mail or phone calls and are invited to attend public meetings that are set up in the area.

The DNER uses these meetings to talk briefly about what their plans are for the project and to present a rough schematic of their ideas. They want to let people know that something is going on, but that the project has not been finalized. In this manner, they hope that people will not be as concerned as they may be if they were presented with a completed design. The main goal of these meetings is to allow the invitees a chance to make the DNER aware of their thoughts. The DNER encourages them to explain what they would like out of the project. They let the people talk about how big they would like the project as far as the number of lanes at the site, and discuss what type of complementary facilities they would like to see. The DNER asks whether or not the people desire the project to be a cooperative development with the local government.

The purpose of these meetings is both information providing and information gathering with a stress on the information gathering aspect. The DNER really wants to get an idea of how the project is viewed by the community. They do make an attempt to have these methods maintain the characteristics of a good public participation process as described in the section **2.4.2 Public Participation**. To further these characteristics, the DNER is also considering the use of an impartial moderator to facilitate the discussions between the agency and the group representatives. These meetings can last for roughly three to four hours, a sufficient amount of time for a great deal of communication. The DNER also tries to hold three or four of these meetings so that issues can be resolved and a compromise can be reached. Upon completion of these meetings, a memorandum of understanding is signed by representatives of each group that has taken part in the process in accordance with the previous discussions. The memorandum is then used to help receive endorsement of the project from federal and state agencies.

In summary, the DNER makes significant attempts to involve the public in the planning and designing of public boat ramps. Although these methods are conducted by the agency, an overall standardized process does not exist. The DNER hopes to create such a standardized

process with the use of our project. They would like to develop a method for presenting the state of boat ramps and water access of the entire island of Puerto Rico as a whole. They would like to receive some public input at the very beginning stages of the process, before specific sites have been chosen and any plans have been developed. From this point, general plans for public participation concerning the individual sites can then be developed (personal communication, Erasto Nieves, 2005).

In addition to the DNER, a Boat Ramp Committee was established to involve other informed individuals who could contribute to public participation with boat ramp projects. Mr. Erasto Nieves and Ms. Mayra Garcia, our liaisons at the DNER, are part of this Boat Ramp Committee, assembled to gather various opinions and views on the water access situation in Puerto Rico. Mr. Nieves began this group in April of 2003. Aside from Mr. Nieves and Ms. Garcia the committee consists of four other members from different professional backgrounds. The four current members are Mr. Carlos Diaz, a ranger for the US Fish and Wildlife Service in Cabo Rojo; Mrs. Rosa Hilda Ramos, a community and environmental leader in Cataño; Mr. Benito Pinto, the editor of *La Regata*, a boating newspaper; and Mr. Alexis Molinares, an environmental consultant and professor at University of Puerto Rico.

It was also thought that this group could play a role in making well-informed decisions on where and when to develop or upgrade potential boat launch sites, with insight at the very beginning stages of planning. Unfortunately, due to busy schedules and lack of resources for analyzing the problem and developing solutions, the committee has only met twice, the last of which was about a year ago. The committee still remains intact and all members have expressed that they still wish to pursue the goals of the committee.

### 3. METHODOLOGY

This project was intended to assist the DNER in improving the system of public boat ramp access in Puerto Rico by gathering information on the current status of formal and informal launching facilities around the island. The group carried out field investigations of boat launches throughout Puerto Rico and created a digital database which includes physical, ecological, and social information of each ramp visited. The group provided recommendations for locating and developing new public sites as well as improving current sites. The group also provided suggestions on how the overall boat ramp development project can be presented to the public, and how to include the public's participation. The project took place between March 14, 2005 and May 2, 2005, with the actual design and construction of ramps taking place at a later date. The team completed the project by addressing each of the objectives listed below:

- Create a boat ramp information system
  - Identify essential criteria for evaluation of ramps
  - Gather field data based on criteria
  - Compile a digital database
- Analyze and compare potential sites
  - Develop a method to compare potential sites
  - Conduct analysis of site locations
- Develop a public participation plan
  - Compile information from key informants
  - Develop plan for overall project
  - Recommend individual siting process

A visual representation of our project overview can be seen in **Figure 3-1**. This figure shows the interaction of the methods of completing our objectives, as well as the background research related to each objective.

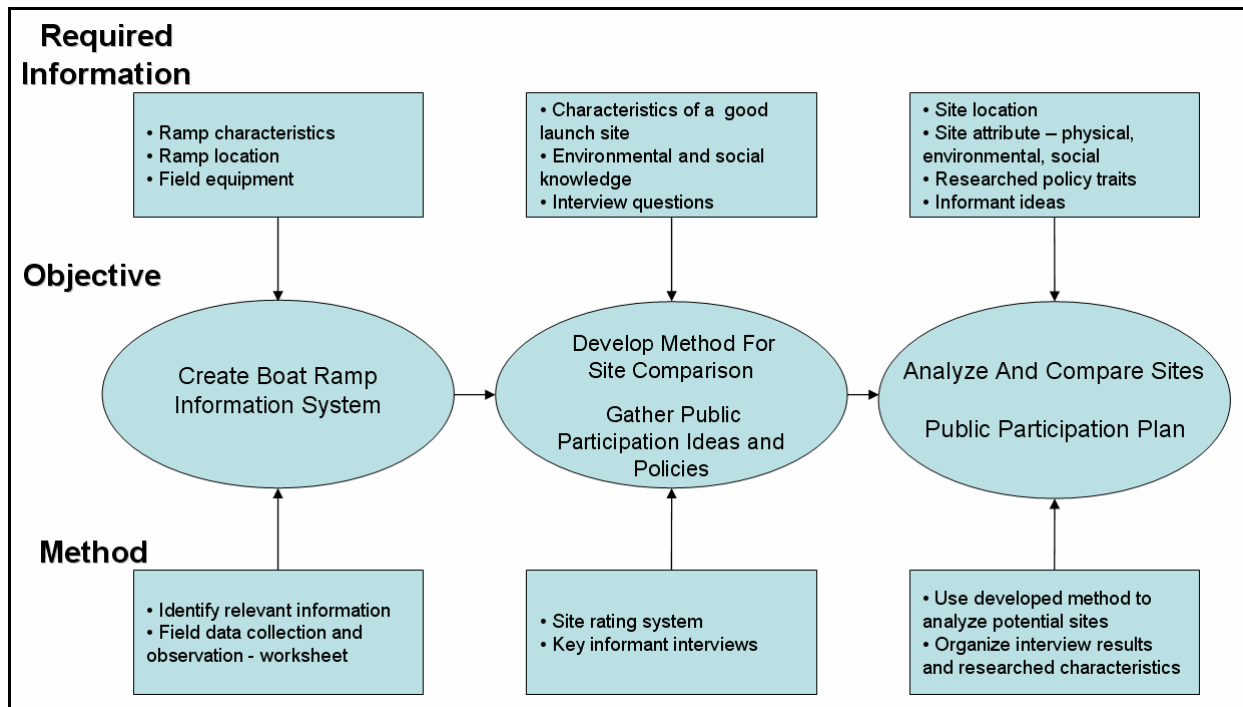


Figure 3-1: Project Overview Diagram

### 3.1. Boat Ramp Information System

Creating the boat ramp information system was essentially a three step process. The first step was to identify exactly what information we needed to collect at each ramp to make the database valuable. The second step was to then travel to the sites to collect the data, and the third step was to input the recorded data into a digital database.

#### 3.1.1. Identify Essential Criteria

Our first step in identifying the proper information to extract from each ramp was to do extensive background research on what other people and places had identified as important aspects of a boat ramp. The results of this information have been presented in section **2.3 Site Selection Process**. Along with our research, the DNER sent us a draft of a data sheet they had put together to give us an idea of what type of information they felt we should gather. Because the data sheet was only a draft they asked us to make changes as we saw fit to ensure the validity of the project and our data. **Figure 3-2** is a sample of the finalized data sheet that was created based on our knowledge and the initial data sheet.

BOAT RAMP INFORMATION																		
<b>Weather Conditions:</b>	<b>Team:</b> <input type="text"/>	<b>Date/Time:</b> <input type="text"/>																
<b>1. Boat Ramp Name:</b>	<input type="text"/>																	
<b>2. Physical Address:</b>	Street 1 <input type="text"/>																	
	Street 2 <input type="text"/>																	
	City <input type="text"/>		Zip Code <input type="text"/>															
	Phone <input type="text"/>	Region <input type="text"/>																
<b>3. Contact Person:</b>	Last Name <input type="text"/>		First Name <input type="text"/>															
	Group <input type="text"/>																	
	Street <input type="text"/>																	
	City <input type="text"/>		Zip Code <input type="text"/>															
	Phone <input type="text"/>																	
<b>4. Operating Hours:</b>	<input type="text"/>																	
<b>5. Coordinates:</b>	Latitude <input type="text"/>	Longitude <input type="text"/>																
<b>6. Access Restriction</b>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Type: <input type="text"/>															
<b>7. Boat Ramp Type:</b>	Private <input type="checkbox"/>	Public Improvised <input type="checkbox"/>	Public Gov. <input type="checkbox"/>															
	Other <input type="checkbox"/>	Unknown <input type="checkbox"/>																
<b>8. Boat Ramp Construction Material:</b>	Concrete <input type="checkbox"/>	Asphalt <input type="checkbox"/>	Gravel <input type="checkbox"/>															
	Other <input type="text"/>																	
<b>9. Estimated Dimensions:</b>	Length (ft) <input type="text"/>	Width (ft) <input type="text"/>	Ramp Slope (%) <input type="text"/>															
<b>10. Boat Ramp Amenities:</b>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"><input type="checkbox"/> # Lanes</td> <td style="width: 33%;"><input type="checkbox"/> # Car Parking</td> <td style="width: 33%;"><input type="checkbox"/> # Trailer Parking</td> </tr> <tr> <td><input type="checkbox"/> Non Skid Surface</td> <td><input type="checkbox"/> Lettering</td> <td><input type="checkbox"/> Lights</td> </tr> <tr> <td><input type="checkbox"/> Handicap Access</td> <td><input type="checkbox"/> Restrooms</td> <td><input type="checkbox"/> Ready to Launch</td> </tr> <tr> <td><input type="checkbox"/> Boarding Dock</td> <td><input type="checkbox"/> Loading area</td> <td><input type="checkbox"/> Tie down area</td> </tr> <tr> <td><input type="checkbox"/> Cleats</td> <td><input type="checkbox"/> Fenders</td> <td><input type="checkbox"/> Others</td> </tr> </table>			<input type="checkbox"/> # Lanes	<input type="checkbox"/> # Car Parking	<input type="checkbox"/> # Trailer Parking	<input type="checkbox"/> Non Skid Surface	<input type="checkbox"/> Lettering	<input type="checkbox"/> Lights	<input type="checkbox"/> Handicap Access	<input type="checkbox"/> Restrooms	<input type="checkbox"/> Ready to Launch	<input type="checkbox"/> Boarding Dock	<input type="checkbox"/> Loading area	<input type="checkbox"/> Tie down area	<input type="checkbox"/> Cleats	<input type="checkbox"/> Fenders	<input type="checkbox"/> Others
<input type="checkbox"/> # Lanes	<input type="checkbox"/> # Car Parking	<input type="checkbox"/> # Trailer Parking																
<input type="checkbox"/> Non Skid Surface	<input type="checkbox"/> Lettering	<input type="checkbox"/> Lights																
<input type="checkbox"/> Handicap Access	<input type="checkbox"/> Restrooms	<input type="checkbox"/> Ready to Launch																
<input type="checkbox"/> Boarding Dock	<input type="checkbox"/> Loading area	<input type="checkbox"/> Tie down area																
<input type="checkbox"/> Cleats	<input type="checkbox"/> Fenders	<input type="checkbox"/> Others																
<b>11. Waters:</b>	<b>Wave Exposure</b>	Low <input type="checkbox"/>	Medium <input type="checkbox"/>															
	<b>Current Strength</b>	Low <input type="checkbox"/>	High <input type="checkbox"/>															
<b>12. Surrounding Area:</b>	Commercial <input type="checkbox"/>	Urban <input type="checkbox"/>	Rural <input type="checkbox"/>															
	Residential <input type="checkbox"/>	Recreation <input type="checkbox"/>	Other <input type="checkbox"/>															
	Notes <input type="text"/>																	
<b>13. Ecology:</b>	Vegetation <input type="text"/>	Wildlife <input type="text"/>																
	Notes <input type="text"/>																	
<b>14. Development Potential:</b>	Low <input type="checkbox"/>	Medium <input type="checkbox"/>	High <input type="checkbox"/>															
<b>15. Pictures:</b>	Numbers <input type="text"/>																	
<b>Additional Notes:</b>																		
DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES FISH AND WILDLIFE BUREAU BOATING AND FISHING ACCESS PROJECT PO BOX 906800 CUERVADE TIERRA STATION SAN JUAN, PUERTO RICO 00906-8800 7248774, EXT. 2200/2148																		

**Figure 3-2: Sample Data Collection Worksheet**

### 3.1.2. Field Work

To gather the information needed we traveled with our two liaisons by car to each site. The data we collected was very important; however, due to time constraints our methods of gathering the data were simplified to increase speed and efficiency. This did not affect our analysis of the data because only estimates were required for our study. These issues were addressed during our pre-testing period.

We gathered three different categories of information on and around the boat ramp. The first category was the physical properties of the ramp such as the ramp name and address. We were also required to find out who owns, runs, and maintains the boat ramp. In some cases this was easy, because the ramp belonged to a marina or a specific group. However, some informal ramps have been built by communities and do not have specific owners. In these cases we spoke



with people using the ramp or people around the ramp and asked them if they had an idea of who may have been responsible for the ramp. In other cases, ramps were only run by the community, so our contact information was a general town administrator.

Along with the address and owner of the ramp we tracked the ramp's geographic location. To do this we used a hand held Global Positioning System unit. This device uses radio signals sent from any three satellites in a system set up in space. The three satellites use a mathematical equation to triangulate the position of the hand held device on earth. This allowed us to simply stand on the ramp and take latitude and longitude readings right from the device itself.

Aside from location, some other physical measurements were taken as well. The length and width of the ramp were recorded using a commercial measuring tape that was approximately 200 ft. long. Another measurement we recorded was the slope percentage of the ramp. Slope percentage is a simple calculation of the rise of the slope divided by the run of the slope multiplied by 100. To calculate slope we developed a method that allowed us to measure the triangular dimensions of the ramp and calculate the slope. To do this we used a pipe that was about five feet long along with the measuring tape. One person stood at the base of the ramp near the water and held the pipe as well as the measuring tape. Another person stood at the top of the ramp holding the other end of the measuring tape. Another team member stood to one side and told the person holding the pipe and measuring tape whether he should move the end of the tape up or down the pipe. When the tape measure appeared to be level we took the measurement of how high the tape was on the pipe as well as how long the tape was from end to end, giving us the two measurements necessary to calculate slope. However, after measuring a sufficient number of ramps we were able to begin estimating the slope by visual examination. The last of the physical data we recorded was the other boating-related amenities that were found on and around the ramp.

The second category of information we recorded was ecological information. Because wave exposure and current strength have an effect on the life span and ease of use of a ramp, we noted wave activity and current strength based on a scale of low, medium, or high. Because the area surrounding the ramp is just as important as the ramp itself, we also took additional notes relating to endangered species like manatees, and amounts of vegetation such as trees, shrubbery, and any natural reserves around the ramp. Because this information is qualitative in nature, individual team member characterizations may vary. To address this we did pre-tests to discuss how we characterize this information as a team.

The third category of information we gathered was related to the social aspects of the ramp. We took notes describing what type of setting the ramp was located in. Some examples of places in which we found ramps included commercial areas with waterfront businesses, neighborhoods with mainly residential housing, and rural areas that do not contain any adjacent buildings. We also took notes of what people were using the ramp for, whether it was for recreational use or for commercial or fishing. This information is also qualitative and was addressed during our pre-testing process.

Because the social impact of a ramp is so large, the notes we took regarding the area will not be sufficient information. The limited time we had to gather information did not enable us to travel to individual communities to determine opinions regarding existing ramps or the development of new ramps. We have recommended possible procedures the DNER could use to gather information on public opinion in and around chosen launch sites. We did however have a

short information sheet about the project to give to people we saw at the ramps. This sheet will be explained further in section **3.3 Public Participation Plan**.

To make sure that all of the data we collected could be recorded easily and efficiently, we did several pre-tests. The pre-test consisted of traveling to a few ramps and running trials of the data collection process. This enabled us to make any necessary changes to the data sheet and to our methods of collecting data before we began the actual process. Along with ensuring the validity of our data, the pre-tests also helped us to check for intercoder reliability. As described previously, this allowed us to make sure we were all rating ramp characteristics uniformly.

Lastly, to ensure our data sheets were filled out completely and efficiently, we always recorded the data by following the numbers listed down the left hand side. Upon completion of each data sheet, digital photos were taken of the ramp itself as well as its surroundings and the photo numbers were recorded to keep them with their proper site. These photos were stored in folders organized by the boat ramp name, and the database will link each boat ramp to its respective photo folder. All the files and folders will accompany the database.

### **3.1.3. Compile Digital Database**

The program that we used to create the digital database was Microsoft Access. Microsoft Access is a very powerful database software package that offers a wide range of features to make developing a database as well as inputting and searching for data very easy. We chose Microsoft Access specifically for these reasons. Access allowed us to customize how we could input the data, and the order in which we wanted each record to be inserted and stored. It also allowed us to make customized searches that we felt would be used most often. These searches were created in a user friendly manner that will make it easy for the DNER to get information from specific records.

The first step we took in developing the database was to set up tables. Tables are the main storage format for all of the information, and can be linked to connect related information. Rather than creating one large table as would be done using Microsoft Excel, several smaller tables were created to simplify searching through the database. Access allows for many tables to be created, however we only needed three: a boat ramp table, which contains the majority of the information from each ramp; an amenities table which contains what amenities are at each ramp; and a boat identification table which gives each ramp an identification number and connects each ramp to the amenities for that ramp.

These tables are the foundation of the database, and information can be inserted directly into these tables, however, doing so can be sloppy and is not efficient. To insert data more efficiently we have designed an input form. A form is a page that allows you to set up how and in what order the data is put into the tables. Because we already had the Boat Ramp Worksheet which we used at each site, we designed our form to look exactly like the datasheet to allow us to quickly transfer information from paper to computer.

After the form was created, we wanted to have a way to search the database for a specific record or group of records by a given category such as region, city, or slope percent. To search a database in Access, queries are created. Each individual search criterion is its own query; therefore region, city, and slope percent would all be individual queries. To set up these queries the table and the category are identified. For example, to be able to search for ramps in a

particular region, the region category from the boat ramp table would be selected. After selecting the category, the information to be displayed when the search is complete must be decided upon. We decided that we wanted all the information for each ramp to be shown so that no information will be missing when searching.

When searching with queries, the information found is shown in table view. Table view is also complicated and sometimes hard to follow. To fix this we created a report. A report is much like a form, in that it allows you to better organize the information you want to show. This form allows the user to see the ramp information clearly and in a way that is easy to comprehend. This report also allows the user to print out all information from a ramp neatly so it is easy to refer back to it.

The last step in creating the database was to design operating forms. These forms are user friendly pages in which the user can choose what he or she would like to do. From these pages you can search for ramps by various criteria, enter a new record, and view pictures of each individual ramp. With these pages in place, the database was then locked so that only new records can be added through the form, and the internal design and functions of the database cannot be altered. The completed database was then placed onto a CD-ROM along with all of the photo files and given to the DNER for further use.

### **3.2. Site Comparison**

In order to efficiently compare all the potential launch sites to each other to find which have the highest development potential, we decided to implement a site rating system. The rating system was used to take all the data and quickly organize it in order to recommend sites based on physical characteristics as well as minimizing environmental and social problems that could arise upon its construction or during its existence. The reason we decided to use a numeric rating system was to make inherently qualitative information into a quantitative number. This ensured that all the important issues for each site were examined in the same fashion, and given a final score based on how well it met all of the criteria. The final scores determined by the rating system were valuable in deciding which sites to recommend for further development.

Although there were many measurements and concerns we had to take into consideration while collecting data, we chose to use only the most important criteria in our rating system. The factors we deemed as essential criteria of a quality boat ramp were the slope of the shore or existing ramp, availability of parking, wave and current action, possible environmental impacts, type of area in which the ramp is located (commercial, residential, etc), and user friendliness. The user friendliness category includes maneuvering room at the site, road access quality, and existing amenities. We felt that this set of criteria encompassed all of the relevant aspects of a quality boat ramp due to the findings of our background research as well as experiences gathered since arriving to Puerto Rico.

The crucial criteria for each boat launch site were put onto a separate sheet and each issue was given a rating from one to ten. A rating of one meant that the issue in consideration was very poor and the criterion was not met at that site, while a rating of ten indicated that the potential site perfectly met all of the necessary qualifications. We were able to give each site a rating in each category based on the information gathered while conducting field work as well as pictures taken at each site. The only criterion that we had trouble gathering complete

information on was the environmental impacts category because all environmental issues could not be examined in such a short visit to each site. For this category, we used environmental sensitivity indices (ESI), along with GIS maps we created which detailed any major environmental concerns around the island (NOAA, 2000). Sites were given a low score if there were significant concerns in that area such as sea grass, mangrove trees, manatee areas, or sea turtle nesting sites. They received a higher score if no major environmental issues were present in that area. The reason we chose to rate sites based on the type of area in which they were located was based on information gathered during key informant interviews. As we conducted our interviews, we determined that commercial and recreational areas are much more suitable sites for ramp upgrades than residential or rural areas due to community acceptance. We based our rating for this criterion on this notion; however, a much deeper look at the social implications should be looked at for each site. This issue will be addressed in section **3.3 Public Participation**. The rubrics we used as the basis of our site comparisons are defined for each specific criterion in **Table 3-1**. This table was based primarily upon the background research that we conducted.

Criterion	Rating of 1-3	Rating of 4-5	Rating of 6-7	Rating of 8-9	Rating of 10
Availability of Parking	-No open space for building a parking lot -Parking would have to be located on side of street	Small area to build necessary parking area allowing no more than 10 car spaces and 0 trailer spaces	Space is available for car and trailer parking, 10 to 15 spaces	-Approx. 30 car and trailer spaces for each lane at the facility -A large parking area is located off-site	-35 or more car and trailer spaces for each lane at the facility
Slope of the Shore or Existing Ramp	Slope of shore is much to shallow to build a ramp	Slope of shore or the slope of the ramp is very shallow or steep	Slope of the shore or the slope of the ramp is moderately too steep or shallow, but ramp construction is feasible	Slope of the ramp is good and little effort would have to go into the construction to adjust it	Slope of the ramp is ideal and it would not have to be adjusted upon construction
User Friendliness	-Little maneuvering room and/or maneuvering interferes with the flow of traffic -No ramp amenities -Access to ramp consists of a long narrow winding road in poor shape	-Maneuvering room available may cause difficulty and may interfere with the flow of traffic -Very few amenities -Access to ramp may be difficult due to a narrow road or many turns	-Adequate maneuvering space but may interfere with congestion of parking area -Some amenities -Access roads are adequate but some difficulty may arise	-Next closest ramp is good distance away -Good maneuvering space not interfering with traffic -Moderate amount of amenities -Access to ramp is easy	- There is no other ramp in the area -Maneuvering would be done with ease and no problems could arise -High number of amenities -Access to ramp is quick and easy
Wave and Current Action	Both wave and current exposure are high	Wave and current exposure are medium to high	Wave and current exposure are medium	Wave and current exposure are medium to low	Both wave and current exposure are low
Possible Environmental Impacts	-Sediment and weed build up is significant -Reefs nearby -Endangered species nearby and/or natural preserve	-Sediment and weed build up is noticeable -Reefs nearby -Spotted species now and then	-Minor sediment or weed build up -Very rarely seen aquatic life	-Minimal sediment and weed build up -No endangered species or preserves located nearby	-Almost no sediment or weed build up -No endangered species or preserves located nearby
Type of Area in Which the Ramp is Located	-Isolate area with few people around to use ramp -Completely residential area	-Somewhat residential area -Area used for recreational swimming	-Recreational area -Industrial area	-Commercial and recreational area	-Commercial area with businesses located nearby -Recreational area -Area that already consists of a boating community

**Table 3-1: Rubrics for Site Rating**

Because all of the sites were very different from one another, there were many factors that had to be taken into account while rating each location. For example, there may be plenty available room for parking at a given site, but the land may be privately owned. This means that there is no guarantee that the space for parking can be obtained no matter how well the site meets

the remaining criteria. Issues such as this were difficult to address while conducting the rankings because each site had its own distinct concerns. For this reason and those stated previously, we chose to rate each criterion on scale of a one to ten to allow for a greater distribution of scores. We broke each criterion up into two or three point subsections defined by specific characteristics. This way we had more leeway to use individual judgment while rating each criterion. As a result, we ended up rating the sites relative to one another as well as relative to independent criteria. We used the table as a starting point to rank the sites, and then tried to rate the subsequent sites by comparing them to ones already ranked. We feel that this was an appropriate method because we had a firsthand look at each site and were able to use this knowledge for rating each specific criterion of each site as well as use our ideas of which sites had the highest development potential. By rating the sites relative to one another, we obtained results that accurately compared the development potential of each site that we visited.

After rating each site's most important features and completing a total for each site, we were able to choose which sites to recommend based on the best overall scores. Those locations receiving the highest scores were the locations that had the best mix of the criteria essential for constructing a boat launch facility. The results of our site comparisons are detailed in section 4. **RESULTS** of this report. A sample rating system sheet can be found in **Figure 3-3**. As previously stated, the system we used looked mainly at the physical aspects of each site, and was unable to take into account all social implications. For this reason, public sentiment of each specific site must be further examined, and to address this issue, we must refer to our public participation plan which follows.

Boat Ramp: _____	Number: _____								
Site Rating System									
Available Parking Area									
1	2	3	4	5	6	7	8	9	10
Slope of Shore/Existing Ramp									
1	2	3	4	5	6	7	8	9	10
User Friendliness									
1	2	3	4	5	6	7	8	9	10
Wave/Current Action									
1	2	3	4	5	6	7	8	9	10
Possible Environmental Impacts									
1	2	3	4	5	6	7	8	9	10
Surrounding Area									
1	2	3	4	5	6	7	8	9	10

**Figure 3-3: Rating System Sheet**

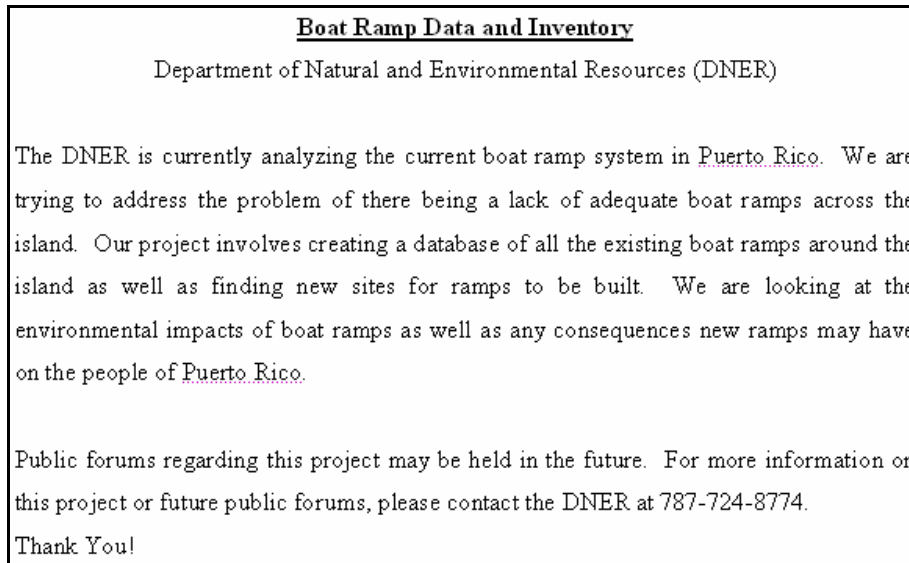
### **3.3. Public Participation Plan**

We understand that projects such as the development of boat ramps can be controversial with the communities in which they are to be placed and we felt it was necessary to make some preliminary notes on factors that may influence this controversy. Along with gathering information regarding the physical characteristics of the boat ramps we visited, we also took note of some of the social considerations of each ramp. Due to the time constraints of our project, it was not possible for us to document the full social impacts that each site may have on the surrounding community. In order to incorporate public sentiment into our project, we decided upon the recommendation of a public participation plan. This plan is a document of some general ideas concerning public participation that can be used as a reference for establishing contact with parties interested in the project and for guidelines concerning information-providing and information-gathering, as discussed in section **2.4.2 Public Participation** of the background chapter. The hope is that this document will help to bring all the issues of a particular project to light and to allow for the most successful course of action to be taken.

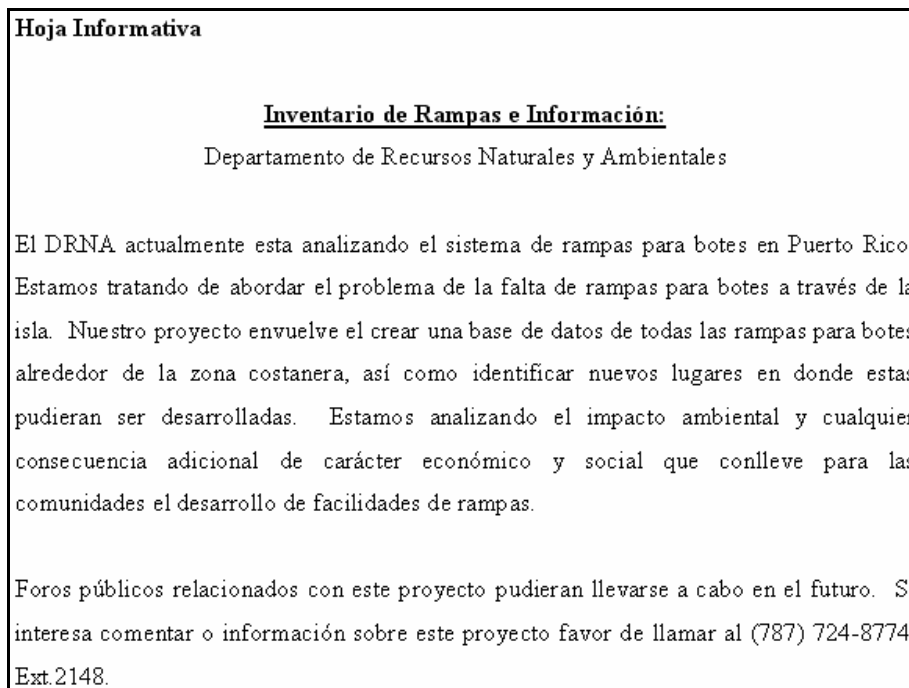
#### **3.3.1. Flyers**

For the first phase of our public participation plan, we decided to implement an information-providing method to give the public a better understanding as to who we are, and what we hoped to accomplish with our project. We hoped that we could give communities a chance to have some time to understand the goals of the project and to formulate ideas and concerns regarding the project. In this way, when communities are presented with more information, they will already have an idea of what is going on and will be able to present some of their own information. Overall, we hoped this method would begin to facilitate the exchange of information in a non-controversial manner.

To distribute information about our project, we decided to hand out flyers as we conducted our work around the island. As we traveled from site to site to gather required information, we gave out flyers to any people we encountered throughout the work day. The main goal of our flyer, a copy of which is shown in **Figure 3-4** in English text and in **Figure 3-5** in Spanish text, was to inform the public about our project. Along with a brief description of who we are, and our project goals, we provided them with contact information to the DNER so they would be able to get any additional information not provided on the flyer. Another reason we decided to disperse flyers was to introduce ourselves to anyone who may have been using a ramp when we arrived. One concern that we had was that we would not be openly accepted to ramp users when we arrived with many tools and measuring equipment. We were worried people would see us as intrusive or threatening to their boat ramp, and providing them with a flyer describing who we are helped ease their minds.



**Figure 3-4: Public Flyer - English**



**Figure 3-5: Public Flyer - Spanish**

### **3.3.2. Key Informant Interview Plan**

As previously stated, in order to complete the social aspect of this project, we developed a plan to assist the DNER in evaluating the possible social impacts of our work. Because our group was fairly unfamiliar with public participation techniques as well as common public policies in Puerto Rico, we decided to interview some key informants related to our project, and seek help in the development of the plan. The DNER helped identify some informants through



current relationships that they have with interested people and organizations. One of the major problems in Puerto Rico is the lack of available waterfront land. This means that a site may not be ideal for a boat ramp, but due to the lack of alternatives, it may still present the best option for boat ramp development. For this reason, we chose to conduct key informant interviews with the hope of gaining knowledgeable advice to help us create an effective plan for social evaluation. We also used the advice they gave to us to help make our site comparison plan the best that it could be. We are aware that everyone will not be pleased with certain ramp sites, but by using key informant interviews to develop a public participation plan, we can reduce controversy by demonstrating we have taken all considerations into account.

The first step we took in conducting key informant interviews was to identify who to interview. We had a general idea of the types of people we wanted to interview, but we did not have a way to locate them. We hoped to interview people with a legitimate interest in our project such as environmentalists, tourism groups, community leaders, fishing organizations, and members of the boating industry. We wanted to make sure that we interviewed some people who would oppose further development of boat access facilities, and some people who would support it. This way, we would be able to listen to opinions and suggestions from all parties who could potentially be affected by the project. The DNER assisted us in locating and contacting the following key informants:

- Miguel Rolón – Caribbean Fisheries Management Council (San Juan)
- Benito Pinto – Editor of La Regata, bimonthly boating newspaper
- Alexis Molinares – Environmental Consultant (San Juan)
- Manuel Valdés Pizinni – Former Sea Grant Director and acting Dean of the College of Arts & Sciences, University of Puerto Rico (Mayagüez)
- Ruperto Chaparro – Sea Grant Program Director (Mayagüez)
- Carlos Díaz – US Fish and Wildlife Service (Cabo Rojo)
- Rosa Hilda Ramos – Community and Environmental Leader (Cataño)
- Julio Morell – Chemical Oceanographer at University of Puerto Rico (La Parguera)

We also expressed interest in interviewing someone involved in boating, but we were informed by the DNER that no appropriate boating associations exist in Puerto Rico.

The first step of our interview process was to present the interviewee with a clear picture of the boating access problem in Puerto Rico. We did this through the use of a Microsoft PowerPoint presentation outlining the major problems of water access using graphics and pictures. We also presented to them our project plans and findings to inform them of the most current details of our project. After we presented them with the main problem and project details, we conducted a semiformal interview using the set of questions seen in **Figure 3-6**. These questions were a basis from which conversation could be started and further questions could be asked as the interview progressed. During a typical interview, one person gave the initial presentation, another person asked all of the interview questions, and the remaining two members took notes of the conversation. Our liaisons were also present in case there were any communication problems. We felt that using these methods would allow us to gather all the informant's opinions completely and thoroughly.

### Key Informant Interview Questions

1. What are your feelings on the current boat access situation in Puerto Rico?
2. Do you see a need for more boat ramps?
3. How do you feel about the approach we are taking in order to solve the problem?
4. Do you think we are collecting the proper data given our short trip to each ramp?
5. Would you suggest anything else to add to our data information sheet?
6. What is your opinion on our public participation plan?
7. Do you have any ideas on what else could be done?
8. How do you feel local communities will respond to potential site suggestions, will they be in favor of further developing or constructing a site or will they oppose the idea?
9. Would you like to be involved with further development of a public participation plan and/or receive more information as the plan progresses?
10. Do you have any suggestions as to who else we can contact for more helpful information?

**Figure 3-6: Key Informant Interview Questions**

By interviewing these informants, we were able to use their advice and knowledge of the subject to develop a public participation plan that can be used to evaluate a community before any determination of ramp construction is made. This way the DNER will be able to reduce any problems due to ramp opposition before potentially wasting time developing construction plans. After conducting the key informant interviews, the advice and criticism we obtained was used to assist us in developing a suitable plan for social evaluation of potential boat ramp sites.

## **4. RESULTS**

This chapter will discuss in detail the results of our project. We explain the final configuration of the boat ramp information system and present visuals of the completed design. The ratings of our site comparisons have been included with individual scores for each site visited, as well as their final ranking compared to the other sites. Lastly in this chapter we discuss the results of our social evaluation. Our key informant interviews have been summarized and we explain the details of what our interviewees had to say.

The results of our project provided us with a solid foundation upon which to base our site selection and public participation plan. We were able to see firsthand the current state of water access in Puerto Rico, and have inventoried this information so that it may be accessible to interested parties and viewable by the general public. With the knowledge that we have acquired, we were able to best choose sites that meet development requirements to recommend to the DNER. The feedback we received from our key informant interviews was very helpful and provided the framework for our public participation plan. We feel that all of our results have been extremely valuable in meeting our objectives for the project, and may also be used as a reference for further research by others on our project topic.

### **4.1. Boat Ramp Information System**

The development of our boat ramp information system consisted of traveling to boat launch sites and collecting data found on our boat ramp worksheet. The information that we acquired was stored in a Microsoft Access database for organization and presentation purposes. We were able to amass information valuable in determining the current state of boat ramps in Puerto Rico, in evaluating the boat ramp sites, and in recommending to the DNER sites for development.

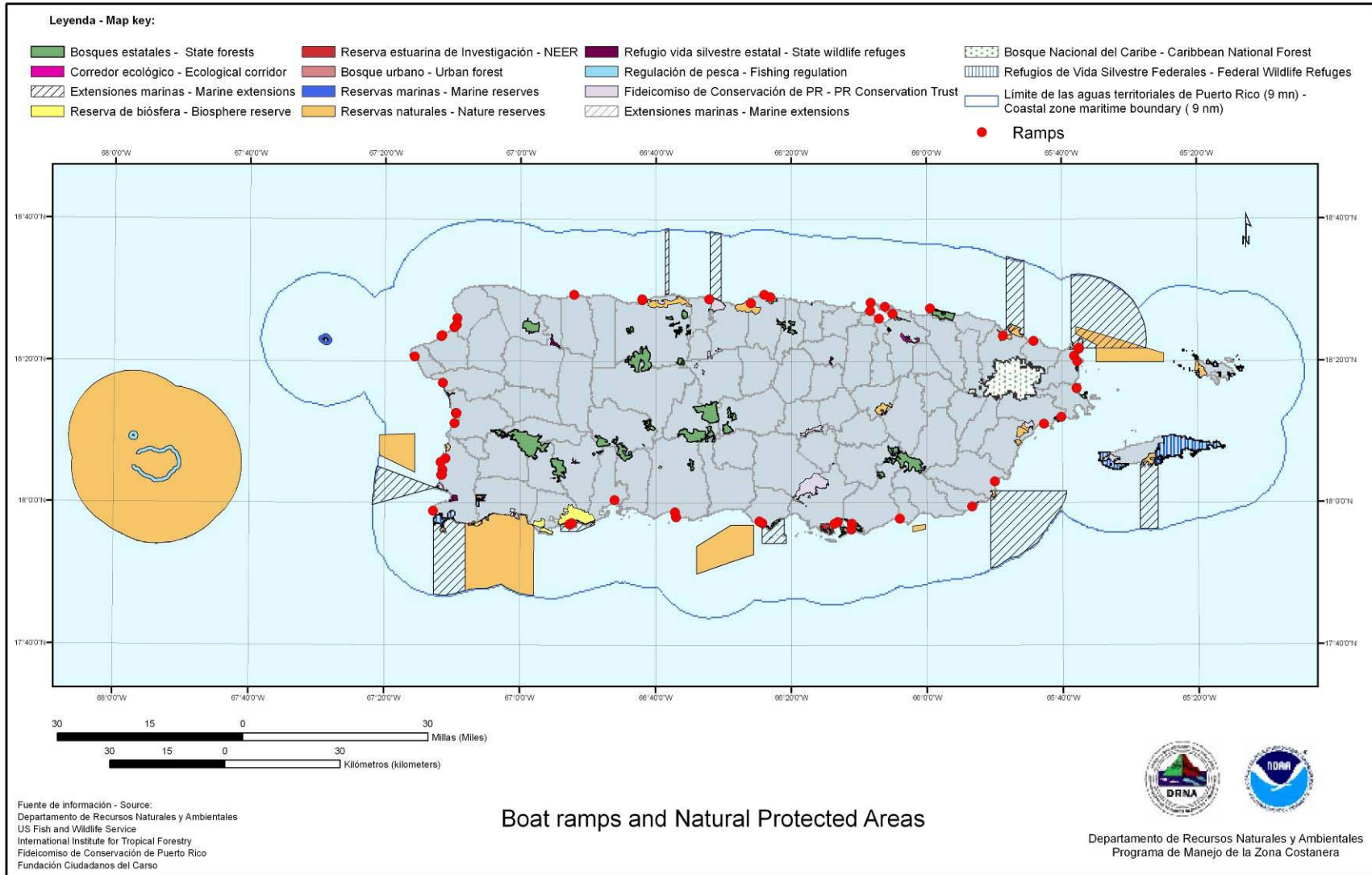
#### **4.1.1. Field Work**

As a group we traveled to and recorded data from a total of 52 sites around the entire coast of Puerto Rico. We saw a variety of different ramps in different locations. Most ramps were constructed from concrete, but their shapes and sizes varied. Some ramps were nothing more than a piece of concrete, while others had a few amenities such as boarding docks with cleats and fenders. Some were very short, roughly twenty to thirty feet in length, while others were quite long, ranging from fifty to one hundred feet in length. Most of these ramps did not sufficiently extend into the water, and many also did not have an adequate slope. The majority of these ramps were not well maintained, with cracks in the concrete and existing amenities in poor conditions. In some instances ramps were located directly on sandy beaches, while others were placed between mangrove trees or vegetation. More encouragingly, we also observed that most launch sites were not exposed to high wave or current action, except for sites located along the north coast of the island exposed to waves coming off the Atlantic Ocean. Waters around

launch sites on the south coast, on the Caribbean Sea, were generally much calmer. Overall, we saw a large number of ramps and ramp sites which deserved attention for development. Specific results have been summarized in our analysis which follows.

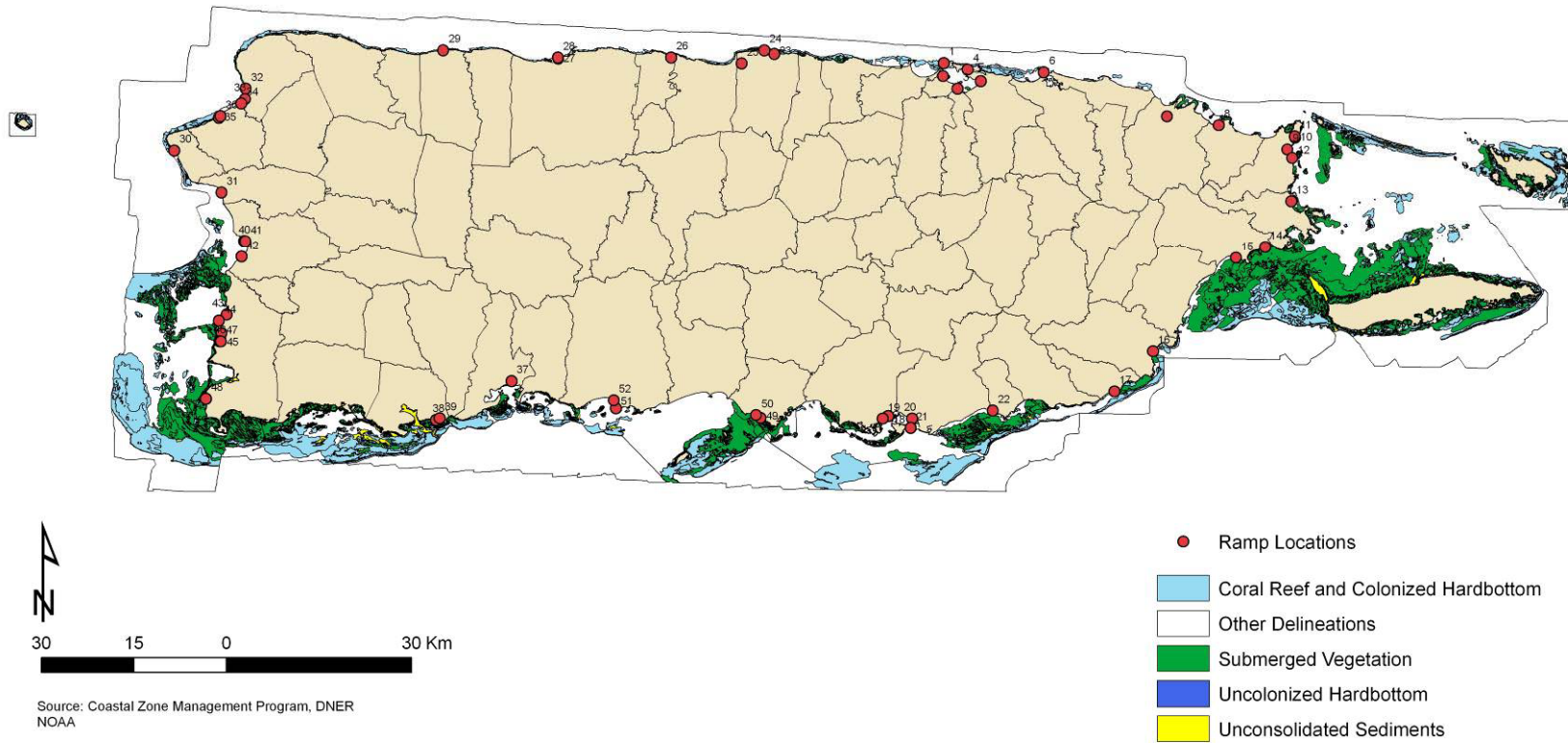
#### **4.1.2. GIS Mapping**

After traveling to all the launch sites our project team created a Geographical Information System (GIS) map in a program called ArcView using the latitude and longitude coordinates that we collected. With the assistance of Ms. Nora Alvarez, a DNER employee, and information pertaining to the environment of Puerto Rico contributed by Coastal Zone Management, a helpful tool was produced. First, all coordinates of individual sites were inserted into ArcView and all these coordinates were used to generate a first layer which placed the site locations individually on the map. The map of Puerto Rico with its municipalities was then placed as a second layer behind these site locations. This stage of the process was valuable in that it showed the distribution of launch sites along the coast of the island. Next we chose other features to display on the map. Since environmental concerns play a major role in determining whether or not a site has potential to be further developed, we added another layer showing all the naturally protected areas of Puerto Rico, determined by Coastal Zone Management and the DNER. A final layer indicating the benthic habitats was added to indicate the environmental classification of the coasts of Puerto Rico and particularly noted the areas which have coral reefs or underwater vegetation present. A map of the ramp locations along with the naturally protected areas can be seen in **Figure 4-1** and the locations along with, descriptions of the benthic habitats can be seen in **Figure 4-2**. The GIS map portrays the launch sites of Puerto Rico in a way that is informative and useful.



**Figure 4-1: Boat Ramp Locations and Natural Protected Areas**

## Puerto Rico Boat Ramp Locations and Benthic Habitats



**Figure 4-2: Boat Ramp Locations and Benthic Habitats**

Using these maps, we were able to note some of the characteristics of the boat ramp system in Puerto Rico. The area with the highest concentration of boat ramps is the west coast. The west coast and the south coast both contain fourteen ramps, but the west coast has less than half the amount of coastline of the south. Aside from a small cluster of sites on the west coast and another in the San Juan bay area, launch sites seem to be roughly evenly distributed around the coast of the island leaving, many options for development in almost all areas.

The maps show that almost all the sites inventoried have some environmental considerations to be aware of. Five regions were particularly noted for the existence of marine extensions and nature reserves. These regions are the northeast and southeast tips of the island, the southwest corner, and a region in the middle of both the north and south coasts. According to this analysis, there is not as much concern for environmentally sensitive areas with boat ramp locations outside of these regions. Benthic habitats, particularly coral reefs and submerged vegetation, are a concern for all ramp locations throughout the island. Coral reefs are located around roughly the entire perimeter of the island, and submerged vegetation can be found from the northeast tip of the island, around the southern coast, and the southern part of the west coast.

The GIS map and its layers were utilized in our site recommendation plan. Consideration for these environmental concerns was given in choosing which sites to recommend to the DNER for further development. However, it should be noted that almost all boat ramp locations will be affected by these environmental considerations, and because of this, the relative environmental impacts must be further considered.

#### **4.1.3. Completed Digital Database**

The digital database entitled “Puerto Rico Boat Ramps – Database & Inventory” was created using the Microsoft Access software. This database contains all the information that we gathered from the 52 boat ramp sites visited during our field work. The database was created in a user-friendly way to make viewing as well as adding and editing information quick and easy.

As was stated in section **3.1.3 Compile Digital Database**, three tables were created in the database; a boat ramp table, and amenity table, and a boat ramp identification table to connect these two tables. To insert information into the database, a form was created that resembled the boat ramp worksheet that was used for collecting data at each site. To add information, all that is needed is to use the mouse or the tab key to navigate to different text boxes on the form and input the information that is needed. To view the information of a boat ramp, a report was created. These reports extract and organize the information for each site in the database onto a single page that is ready for printing. Screen shots of a form and a report can be seen in **Figure 4-3**.

**BOAT RAMP INFORMATION**

Boat ID:  Date:  Time:

Weather:

1. Boat Ramp Name:

2. Physical Address: Street 1   
Street 2   
Municipality:  Zip:   
Phone:  Region:

3. Contact Person: Last Name  First Name   
Group   
Street   
Municipality:  Zip:   
Phone:

4. Operating Hours:

5. Coordinates: Latitude  Longitude

6. Access Restriction:  Restriction Type:

7. Boat Ramp Type:

8. Boat Ramp Construction Material:

9. Estimated Dimensions: Length (ft)  Width (ft)   
Ramp Slope (%)

10. Amenities:

Amenity	Amenity Count
X	

Record: 1 of 1

11. Waters: Wave Exposure   
Current Strength

12. Surrounding Area:

13. Ecology:

14. Development Potential:

Additional Notes:

Note: To DELETE record, delete amenities records from 10. Amenities then click DELETE button. DELETE:

**Boat Ramp Datasheet** ID: 7

**Name:** Villa Pesquera  
Street: State Road 187  
Municipality: Río Grande Zip Code: 00745  
Phone:   
Region: Humacao

**Contact Information:**  
Name: Bernard Rosano  
Group:   
Address: State Road 187  
Municipality: Río Grande Zip Code:   
Phone: (787) 887-1717  
Operating Hours: 8:00 a.m. to 5:00 p.m., Monday-Friday 8:00 a.m. to 6:00 p.  
Restriction:  Fee of \$10.00 for non member, no jet skis allowed

**Details:**  
Coordinates: Latitude: N 18°23'37.8"  
Longitude: W 65°48'42.9"

	Amenities List:	
Type: Private	#Lanes	1
Material: Concrete	Non-Skid Surface	X
Length: 28 FT.	Boating Dock	X
Width: 23 FT.	Clear	X
Slope: 7 %	Car Parking	40
Wave Exposure: Low	Trailer Parking	60
Current Strength: Low	Restroom	X
Ecology:	Food	X
	Ready to Launch	X

Surrounding Area:

Additional Notes:

Department of Natural and Environmental Resources  
Fish and Wildlife Bureau  
Boating and Fishing Access Project

P.O. Box 609500 Puerto De Tierra Station  
San Juan, Puerto Rico 00965-9500  
Phone: 724-8774 ext. 12662/68

**Figure 4-3: Example Database Form and Report**

The overall functioning of the database is based on three main forms: a User Form, a DNER Form, and a Guest Form. Upon opening the database, the User Form is opened which allows one of two users to be chosen, either a DNER user or a guest. If the DNER user is selected, a password form is opened which asks the user to input a password. If the password is incorrect, the user will not be allowed to proceed further. If the password is correct, the user is brought to the DNER Form. This form has a four searching features, as well as the ability to add, edit, or delete information. The user can choose to view reports of all the boat ramps, or can narrow down the reports based on boat ramp name, municipality, or region. The criteria for these options can be selected using dropdown lists next to each search button. The user can also choose to add and edit information. These options bring the user to the input forms described previously. Also included on the form are options to return to the User Form, or to quit the application.

The Guest Form is also accessed from the User Form, and is directly linked to it. This form has the same layout as the DNER form, but does not include options to add or edit information. Our liaisons indicated that they did not want information to be manipulated by others outside of the DNER, so as a result the database was designed in this manner. A screen shot of the DNER Form can be seen in **Figure 4-4**. The Guest Form has the same design as this form, but the Add/Edit Information section is removed. Also included on these forms is a map of Puerto Rico divided into regions defined by the DNER. A manual which has been submitted to the DNER along with this database further details how to use the database and has been included with this report in **APPENDIX C: Database User's Guide**.



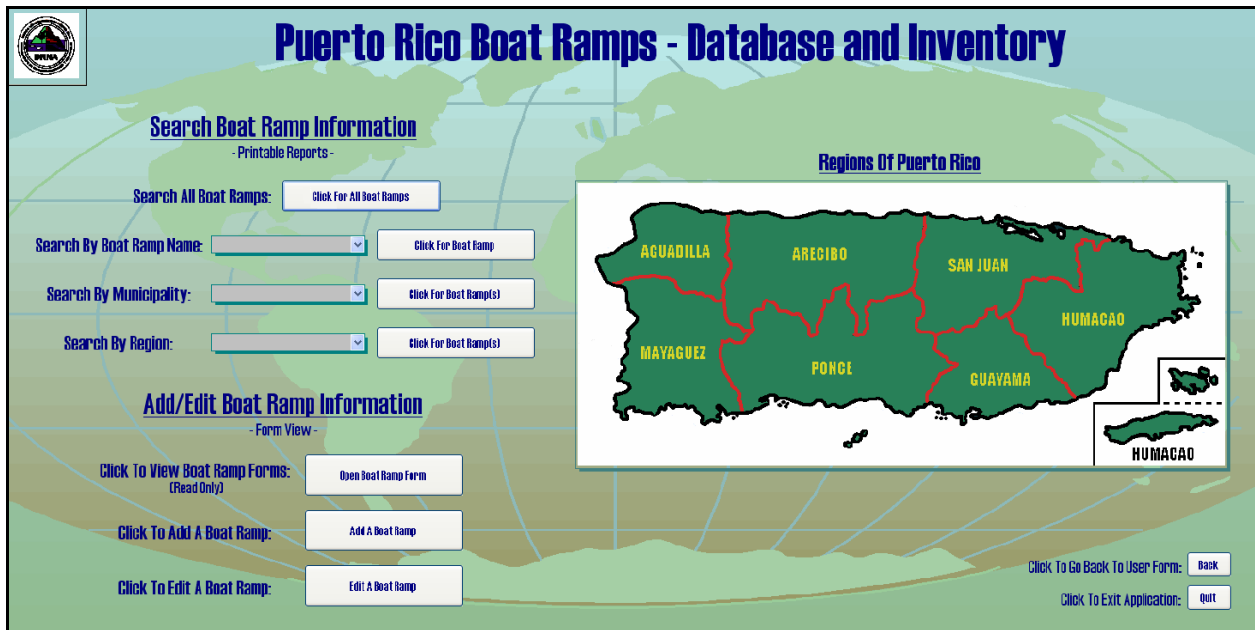


Figure 4-4: Database - DNER Form

## 4.2. Site Comparison Results

Based on the site rating system our project team developed, we were able to quantitatively take all the inventoried boat ramps and organize them in a list, ranking them from the site with the highest development potential to the site with the lowest development potential. Although this method gave satisfying results, other factors, which will be discussed in section 5. **ANALYSIS AND RECOMMENDATIONS** must be taken into consideration. The results received through implementation of our site rating system will assist greatly in deciphering which sites to recommend to the DNER as potential sites for future development.

The results of our rating system can be seen in **Figure 4-5**. After calculating the results, sites received total scores from twenty-eight to forty-nine. There were also five sites which were not rated in any category and therefore received no total score. Three of these five sites, Cataño, Puerto de Jobos Marina and La Guancha were not rated because they have already been developed and have reached maximum development potential. If these sites had been rated they would have most likely received the highest scores. Another site that would have received a high rating was San Juan Fishing Village, but as it is private and already developed, it was not a candidate for future development. The four sites that have reached maximum development potential are examples of good ramps that potential sites to be developed should strive to be like. The last site that was not rated, Rio Manati, could not be taken into consideration as a potential site to be developed because of the frequent flooding in the area and extremely shallow water.

Site Comparison Scores							
Boat Ramp Names	Available Parking Area	Slope of Shore/Existing Ramp	User Friendliness	Wave/Current Action	Possible Environmental Impacts	Surrounding Area	TOTAL
Arroyo	10	8	7	10	7	7	49
Aguadilla	10	6	8	10	8	7	49
Arecibo	9	7	7	10	7	8	48
Arecibo #2 (Lighthouse)	9	7	7	10	7	8	48
Villa Pesquera	10	5	6	10	7	9	47
Yabucoa	9	6	7	10	7	8	47
Guayanilla	9	7	8	10	4	8	46
Santa Isabel	8	7	8	10	6	7	46
Ponce	8	6	6	10	8	8	46
Las Croabas Shipyard	8	5	7	10	7	8	45
Anasco	7	9	7	8	7	7	45
Santa Isabel Fishing Association	6	8	8	10	6	7	45
Los Machos	10	5	8	10	3	8	44
Rincon	7	6	8	8	7	8	44
Parque Colon	7	8	6	10	8	5	44
Isla de Cabras	8	7	6	10	4	8	43
Esperanza	7	6	7	10	4	9	43
Aguirre	10	6	5	10	5	7	43
El Grafeto	6	7	8	10	4	8	43
Vega Baja Nautical Club	7	7	5	9	8	7	43
El Combate	8	7	7	10	5	6	43
Puerto Real	7	9	5	6	7	8	42
Los Locos Adams	7	7	7	8	5	8	42
Luquillo	9	3	6	8	8	5	39
Las Croabas	2	8	4	10	7	8	39
Coal	3	8	4	10	8	5	38
Los Tubos Beach	6	8	6	1	8	7	36
Higüey	2	8	4	7	8	7	36
San Jacinto	9	3	4	10	4	6	36
Pinones	6	4	7	10	5	3	35
Fajardo Sardinera	3	4	4	10	6	8	35
El Corcho	7	4	3	10	3	8	35
El Malecon	3	6	5	10	3	7	34
Aguirre Kayak	6	5	4	10	5	4	34
Bervedere	6	5	5	10	4	4	34
El Fanguito	3	8	4	10	5	4	34
El Seco	2	7	5	10	5	3	32
El Seco 2	2	8	4	10	5	3	32
Club Deportivo Del Oeste	4	3	4	10	4	7	32
Villa La Mela Fishing Village	4	5	5	10	4	4	32
Punta Tuna Fishing Association	2	4	3	10	7	5	31
Vega Baja Public Beach	2	7	3	5	8	6	31
Penon Amador	6	7	4	1	7	6	31
Aguada	4	7	6	2	8	4	31
Aguada Private	3	7	4	4	8	3	29
Villa La Mela	2	5	4	10	4	4	29
Guanica Improvised	2	4	3	10	4	5	28
Catano					Reached Full Development Potential		
Puerto de Jobos Marina					Reached Full Development Potential		
La Guancha					Reached Full Development Potential		
San Juan Fishing Village					Private Ramp - Already Developed		
Rio Manati					No Development Potential Due To Flooding And Shallow Water		

**Figure 4-5: Site Comparison Scores**

The total scores for each site separate the sites fairly well. Even though the total scores are close to one another in a descending order, there seemed to be a logical grouping of sites to aid in determining development potential. We consider that sites with total scores of thirty-five or less have a low development potential, and such sites would not be recommended to the DNER for immediate future development. This conclusion was based on the fact that sites with a rating of thirty-five or less have a poor rating, defined as four or less, in at least three of the six categories, with some exceptions. It was difficult to determine a cut-off point but it was evident that the sites with a score of thirty-five and below were lacking major components that were needed in order to be recommendable. Just about half the sites rated received a total score of forty or higher and these sites were examined first for recommendation. Total scores received in the forties consisted of sites that possessed characteristics of a good boat launching facility.

After carefully examining individual sites we analyzed the possibility that a site with a high score may be ruled out and a site with a lower score could be further considered for recommendation. One site that may be ruled out is Los Tubos Beach. This launching site could be very dangerous since it received a rating of one in the wave/current action category. The only other site to receive a rating of one in this category is Penon Amador, but it also received one of the lower total scores so it is in any event unlikely to be recommended. Some sites with lower scores were examined because of the fact that there needs to be access along the entire coast of the island. In some instances no ramps in a particular area received a score in the forties, but locations with scores less than forty were considered in order to accommodate the boaters in that specific area. For example, many sites on the southwest coast of the island received low scores but were further considered. An example of a site with a high score that was disregarded occurred with the sites Arecibo and Arecibo #2. Both Arecibo and Arecibo #2 received the same score of forty-eight. These two sites were located within very close proximity to one another and only one site was recommended to the DNER for future development.

The results of our rating system were a good way to start to determine which sites to recommend to the DNER for future development. Although both helpful and important, the rating system was just one part of the process that our project team executed in order to make a decision as to what sites should be recommended. We feel that the rating system produced accurate results and was of great assistance to our site recommendations plan.

### **4.3. Public Participation Feedback**

We feel that the social aspect of our project benefited greatly from our choice of methods. The flyers which we handed out at sites were, although minor, an attempt to make people aware that someone is addressing the current state of water access in Puerto Rico. We are not aware of how much of an impact these flyers have made, but we feel it was important to take a step in involving the public with this project. However, the information that was obtained from our key informant interviews was very helpful and established a foundation from which to build our public participation plan. We were able to gather details and ideas regarding the current state of water access in Puerto Rico from people who have direct experiences and contact with the issues. They also provided us with their thoughts on public participation traits and techniques, many times specifically relating them to the characteristics of Puerto Rico. We feel that we obtained a significant amount of useful advice from well-informed individuals. The results of these interviews, notes of which can be seen in **APPENDIX B: Interview Questions and Notes**, have been summarized in section **4.4.1** and section **4.4.2**.

#### **4.3.1. Flyer Distribution**

As stated, we are not aware of the direct impacts our flyer distribution has had on the people of Puerto Rico who may be affected by our project. We did hand out a flyer or two at roughly half of the sites that we visited. Because we visited these sites during the week, we did not encounter nearly as many users as there are on weekend days. In many instances, the ramps were not being used at all when we visited them.

A couple of the people that we did hand flyers to were particularly interested in the project. One man took some extra flyers to hand out to his friends, and indicated that he had some suggestions for the site which we were visiting. One ramp that we had visited was covered with rocks and gravel to discourage people from using it. An individual who received a flyer at this site indicated that he would like to see the ramp opened, but with consideration given to manatees that had been seen in its vicinity. At one other site, we encountered a group of local fishermen who took a couple of flyers and posted them on a bulletin at the site.

Although we created the flyer because we were worried that the people would feel threatened or angered by our presence at the ramp, we did not find this to be the case. None of the people we encountered voiced any concern about our data collecting and actually supported it. As stated, those we made contact with were interested in project and simply wanted a better understanding of what we were doing.

We were able to see some of the results of our flyer distribution, and we hope that the DNER sees more results in the future. It would be great if people contact the DNER and ask for more information regarding the project. Ultimately, we hope that when the DNER begins to start development of particular boat ramp sites, people will already have an idea of what is going on, and will be ready to ask questions and voice their concerns.

### **4.3.2. Informant Sentiment Regarding Current Access**

The completion of the key informant interviews gave an overall rewarding feeling to our project team. This feeling was created by each informant's sentiment on the current boat access situation in Puerto Rico. Each interviewee strongly agreed that the current boat access situation is poor and some type of improvement is needed. The overall feeling of inappropriate access gave new meaning to our project and made us aware that the purpose of the project is not an issue that only the DNER feels should be addressed, but an issue that informants recognize as well. For the most part, the informants, with a wide variety of backgrounds and motives, feel that the entire Puerto Rican community can benefit from the development of new boat ramps if carried out properly. Although all informants agreed that the current boat access situation in Puerto Rico is poor, they agreed and disagreed on other ideas closely related to the topic.

In order to express the boat access situation in Puerto Rico one interviewee remarked that access is "severely limited." The idea that boat access is severely limited pertained to both limitations in quantity and quality. All informants felt that boat access is limited on the island, but the reasons behind their feelings varied slightly. It was pointed out to our project team that there were roughly 60,000 recreational boats registered in Puerto Rico in 2003, this number being almost three times number of registered boats in 1983. A majority of these recreational boats are trailerable, and with the number of boats increasing so rapidly while the number of access sites is not increasing, water access has become extremely limited. Also, it was brought to our attention that the people of Puerto Rico are spending more money on recreational sports involving water than ever before and this could be a cause for access being limited. Another reason access was said to be limited is that water access has reached new standards. No longer does access just mean a place one can go to in order to launch a boat. Access now means a facility which offers adequate parking, security, lighting, and a boarding dock along with a ramp that has the proper slope and is made of the proper material. Another point that was made regarding poor access was competition for shoreline property. This issue was controversial, and some informants felt that this competition for shoreline property did not exist. In the end, we received the feeling that competition for shoreline depended upon the location in question. In some parts of the island there is competition for shoreline, such as San Juan, where developers are trying to get waterfront land to build more condos, hotels, and shopping plazas. This causes waterfront space to be more expensive and less available. However, in other parts of the island there is no such competition because waterfront development is not taking place.

Each key informant felt that access is severely limited and also felt that there is a need for more boat ramps or for existing boat ramps to be upgraded. One interviewee went as far as saying that there were possibly four good ramps in Puerto Rico and these ramps had been developed and funded by the DNER. Other than those four ramps, boaters would have to go into a private marina in order to be able to launch their boats appropriately and safely. Once again, all informants agreed more and better boat ramps are needed, but the concerns they stressed in the process of making this happen differed. The fact that a ramp is not just a ramp but also concerns and other issues as well was a theme that was repeatedly addressed.

A major concern pointed out was the effect construction or development would have on any of the island's many environmentally sensitive areas. Interviewees suggested talking to and involving environmental managers because they will play a very big role in a project such as boat ramp. An environmental concern stressed by interviewees was that dredging may need to be done at potential sites. Some felt that if a particular site was in need of dredging it should be

eliminated as a potential site. It was stressed that by creating a boat ramp that will be used regularly, much more petroleum hydrocarbon would be added to the surrounding water and this would be undesirable if the surrounding area is being used for recreational swimming or if there is any sign of aquatic life nearby. While some interviewees expressed concern, others felt that sites which at the current time are being used informally were hazardous to the environment and development would only benefit the area. All informants specifically brought up the environment as a topic of concern, even though none of our questions directly mentioned environmental issues. A topic mentioned by a few informants briefly was the ecological factors that would come into play. They wanted to make sure our project group was well aware that many areas have manatees and sea turtles, two animals that need to be protected. Also, we made note that we must be aware of and deal with the essential fish habitat and fish nurseries that could be located near a potential site. Interviewees wanted to be sure that we did not overlook details of ecological concern.

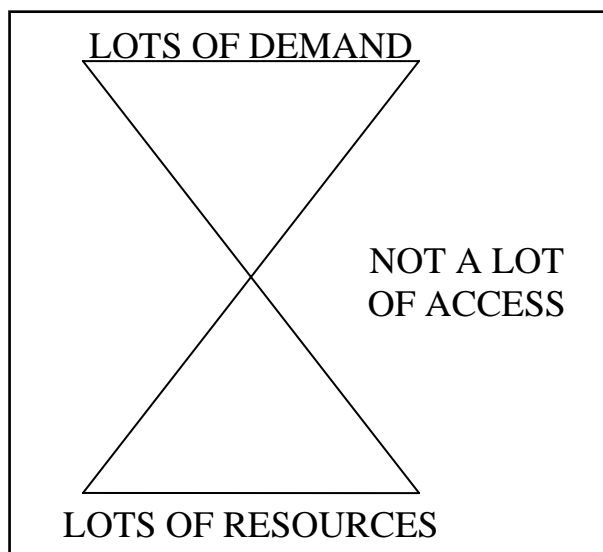
An idea that arose in a few interviews was the conflict of users at potential sites. Informants wanted to make sure that we knew potential launch sites might be located near a beach used for recreation. Swimmers may not feel comfortable having boating access so close to the water they use for recreation. Boats could possibly pollute some of the nicest beaches of the island. It was a general feeling that there is no conflict between recreational boaters and commercial boaters. It was explained to us that there is a handful of commercial fisherman who use these ramps, but commercial fisherman mostly use marinas or have their own ways of access, therefore this would not create a problem.

Parking for the facility was another topic that frequently arose during interviews, and interviewees made sure that our project team had thought about this as well as the space needed to launch a boat into the water. Parking space availability is a very important concern to be addressed. Maneuvering space used to launch a boat into the water must not interfere with the flow of road traffic. If need be, parking can be located off site to ensure good flow of traffic, appropriate maneuvering space and security. When evaluating a potential site, it was pointed out that not only does there need to be spaces for cars and trailers to park but people must feel secure and comfortable leaving their car for a large amount of time while they are offshore.

All informants felt that our data information sheet was very complete. They felt that gathering this information was something that needed to be done in order to document the need and to satisfy the needs of the population. Several informants commended our additional notes section of the data information sheet after we explained we take note of what is going on around each site. Remarks were made that each site is specific and it has its own background, and that we will find different things everywhere. The only significant suggestion made about our data information sheet was the fact that we should take note of the demand for ramps by region. However, others felt that this was not necessary because demand for sites was very high all over the island.

Each interviewee made known their concerns in order to point out that the project is a great idea and solving the limited water access situation in Puerto Rico is something that needs to be done. The two main reasons given for addressing issues involving the environmental, ecological and physical factors behind bettering the water access situation are the facts that access must be controlled and that it must be done so in an organized way. Also, proper planning will be a major factor in determining the success of the controlled and organized system.

Our key informant interviews resulted in a plethora of new knowledge. Individual informants contributed their thoughts and feelings on the water access situation in Puerto Rico. In conclusion, the simple but very informative hourglass diagram shown in **Figure 4-6**, drawn by key informant Ruperto Chaparro, sums up the story of how informants felt about water access. The diagram shows that Puerto Rico has a lot of demand and a great deal of resources for project development but not a lot of access available to take advantage of those resources and meet the demand. Although each individual response was unique and different, all informants strongly felt water access is limited on the island and recreational sport on the coastline of Puerto Rico is continually growing. Informants also felt that further development of existing ramps or constructing new ramps was a good idea and would help to organize access into the water. The different topics stressed by informants surrounding the issue will help to improve the planning process.



**Figure 4-6: Hourglass Diagram of Water Access in Puerto Rico (Ruperto Chaparro)**

### **4.3.3. Informant Thoughts Concerning Public Participation**

In addition to determining the informants' thoughts and feelings regarding the state of water access in Puerto Rico, we used the interviews to gather information regarding our public participation ideas. We received many suggestions regarding the characteristics a public participation plan should embody, and details on the methods that should be used to interact with the public. At times, we received conflicting suggestions regarding certain aspects of the project, but we were able to begin see how an overall public participation plan concerning water access in Puerto Rico should be structured.

One of the key ideas that was presented to us was the fact that communities must be involved from the very beginning of the project. More success will be guaranteed if the public is involved from the beginning stages of work. If people of the community see that a project has developed before they have been consulted, they are more apt to oppose the ideas no matter how information is presented to them. In the past, work done on projects such as these has been done from the top down, meaning little communication occurs between the designers and planners at

the top levels and the communities where the project will be constructed at the bottom levels. This can not happen if a successful outcome is desired.

Another consideration that must be kept in mind is the fact that each site is specific with its own background regarding the use of a boat ramp, the culture surrounding this use, and the conflicts that arise because of it. This can be a very difficult problem to solve because communities are reluctant to change, and in some instances feel that they have control over specific sites. People want to protect the individuality of their municipalities. As a result, one must remember that every case is different, and these local issues must be addressed for each site. If possible, the culture of the community must be incorporated into the project.

Another important consideration that must be addressed is the information that is provided to the public. In Puerto Rico, there is a general distrust of the government. People feel that the government is not a good communicator, and that the government expects citizens to know the reasons behind the decisions it makes. As a result, information concerning boat ramps and boat ramp projects must be complete and available to the communities. They need to know where this information is and how to find it. To be even more reliable, it might be necessary to physically present the information to the community. Many people like to see everything in writing. One key point that was made was related to the information regarding plans for a project. It is very important to stress the word “proposed” when discussing plans for development. This will allow people to see that no project is definite, and that the community has the opportunity to change designs to more appropriately fit their desires.

Providing this information will show that there has been recognition of a need for better water access and that there are people willing to address that need. It will indicate that the availability of access must be matched with the demand for it. It will also allow people to see the resources and determine where they may best be used. In one or two instances, it was suggested that this information be used to “sell” the idea that improvements to the current access situation are needed. In a sense, this is true because a definite lack of appropriate access does exist, as described in the previous section. But the extent to which one tries to “sell” the ideas presented must be carefully considered because people do not want to feel coerced or manipulated regarding efforts that may change their communities.

Along with providing this information to the public, gathering information on community thoughts and opinions is essential. The community must be made aware that someone is there to hear their concerns. They need to be asked what can be done for them, and what they would desire out of a project such as a boat ramp. If the community sees that their ideas are being incorporated into the project, or even better, if their ideas are used as a basis for the project, it allows them to feel like they are part of the plan. People need to see themselves in the plan.

Community residents also need to see the benefits of the projects. In some cases, their focus may be directed toward the negative impacts a boat ramp project may have. They choose to ignore or are not informed enough to see how a boat ramp may improve their communities. Some of the main benefits that were stressed were the economic impacts that a boat ramp may produce. People need to see that these access sites will generate income for their communities and provide employment for local citizens. People need to be aware of the opportunities for small businesses and enterprises. There will be more acceptance of the project if direct community benefits are visible.

It is critical that these ideas and characteristics of public participation are followed. It will show that the process is legitimate and unbiased, allowing the communities to be more accepting of proposed planning. Along with the characteristics of a good public participation



plan, the plan must also have the necessary methods of communication to allow ideas to be presented and an agreeable solution to be met. Our interviews also garnered many interesting points regarding public participation methods.

The most important part of public participation is actually getting a group of people together to discuss the issues. Someone must go to the areas that will be affected and find out who the leaders and representatives are in those particular areas. It shows consideration when these people are asked when and where it is best for them to have a discussion. It is important to note that one party should not be contacted alone. It is better to bring different parties together so that people do not feel betrayed by others having separate meetings to discuss the issues. In some instances, though, particular groups will not sit with each other due to conflicts and differences of opinion. In these cases, it may be better to sit with the groups individually and at an appropriate future time, bring them together. This will ease the process and allow time for plans to be designed to accommodate both sides, which can then be presented at this group meeting. This can be seen as a balancing act and needs to be done with care.

In terms of getting groups of people together, it was generally accepted that public forums were a good idea. A forum would allow many people to see and hear what is going on all at the same time. But it was also noted that sometimes people view public forums or hearings as places where many people argue and fight over the issues being presented, making it difficult for progress to be achieved. Another idea was presented in which small focus groups would be used. This would mean setting up a meeting with four or five interested parties to discuss the issues. It would allow the process of coming to a decision that meets the needs of these parties to be much more efficient. Several of these focus groups could be conducted, with different representatives at each. It would also be wise to include a well informed community member or conflict advisor to act as an impartial moderator over these meetings; someone who is not there to lecture, but will who control the flow of the meeting and make sure that all sides have an equal opportunity to speak and be heard and to help opposing sides understand conflicting ideas. When the process is nearing completion, one or two larger meetings can then be scheduled where the plans can be presented and all sides can see how their needs have been met, the concessions that have been made on their behalf, and what others have given up in the process also. In this way, a cooperative project can be designed.

Comments were also received regarding the establishment of a taskforce or a think tank that would have some responsibility over the public participation process conducted throughout the island. It was believed to be a good idea if it were planned suitably. It was also suggested that groups could be created with responsibility over different regions of the island, and that several major meetings could be conducted with all of these groups present. We were made aware, however, of the previous creation of a boat ramp committee which was to be used to tackle some of the issues regarding water access in Puerto Rico, and provided insight at the very beginning stages of the process of dealing with these issues. For a couple of reasons, this committee has not functioned to its potential. The main reason behind this is the fact that many people work in crisis mode. This is to say that some people will not pay attention to issues unless there is particular pressure to solve the problem, or unless it has been brought up to the highest level of importance. Another reason for the lack of action was the fact that participants had conflicting obligations. Some members could provide support and insight in the sense that a project would be beneficial to the public community, but in another sense, they could not support it due to government positions or job responsibilities. As a result of these comments, we determined that there needs to be some type of separation between different levels of power

when discussing the issue of water access in Puerto Rico. This is to say that it is good to have insight from people who may have some type of control over a boat ramp project, for example someone involved in the permitting process. However, the extent to which this person is involved must be controlled, because although this person may have provided tips on improving the acceptance of the project, he may ultimately have to deny the project if other standards are not met. This could lead to disappointment and frustration, and could put this person in a negative light when, in actuality, it is undeserved.

We also received a lot of information regarding who should be involved in projects such as these, and who should take part in focus groups and/or a taskforce. The most important people to participate would be residential representatives from the communities that will be affected. It would be best to find representatives of both sides, such as someone to represent local boaters and fishermen, who would support a boat ramp project, and also local neighbors, who may oppose the ideas. It is also important to contact environmentalists and environmental managers. It was indicated that these people would play a big role in projects such as these because Puerto Rico has many environmentally sensitive areas and ecosystems that are declared essential fish habitats. A representative from the U.S. Army Corps of Engineers should be included because they help with the actual design and construction of the facilities, and are responsible for the permitting process of a boat ramp. It may also be a good idea to have someone from the Coast Guard Auxiliary present. These people are located by region, have knowledge of the coast guard, are involved with local fishermen, and are also local citizens and ramp users. It would be beneficial to include economists and business or management representatives who can assess the economic impact such facilities will create. Some other people that may be included should be marina representatives as well as someone involved with the buying and selling of boats, such as a boat dealer, who may also be affected by boat ramp projects.

As can be seen, many comments and suggestions were provided regarding public participation characteristics and methods. We gained insight on aspects that have and have not worked, as well discovered some new ideas that may be used in designing an up-to-date participation plan. We feel that we were able to gather a lot of relevant information, and information that is specific to the communities and people of Puerto Rico. This information has provided us a basis for the public participation plan that has been recommended to the DNER.

With this foundation of knowledge, we were able to perform a thorough analysis of the information we gathered. This analysis allowed us to determine all of the essential information needed to provide a strong recommendation to the DNER for the development of future boat ramp projects. This analysis, along with our recommendations, follows in the proceeding chapter.

## **5. ANALYSIS AND RECOMMENDATIONS**

This chapter is an analysis of our Site Comparison Plan as well as recommendations to the DNER concerning potential sites and public policy. The Site Comparison Plan was simply a tool for us and the DNER to initially identify the best potential sites for development. By ranking the sites we were able to decide exactly which sites we wanted to recommend. We have recommended eight sites around the island that are described in detail below. Lastly, this chapter details our recommendations to the DNER regarding public policy. We have created a public participation plan which we feel can be used to eradicate some controversy as well as address any social concerns associated with the development of launch sites.

### **5.1. *Site Development Analysis***

After conducting the Site Comparison Plan, we were able to draw some conclusions regarding the results of the plan. This section will discuss the advantages and disadvantages of the Site Comparison Plan as well as how we recommend using the results.

The main problem we see in the Site Comparison Plan is that it may face strong criticism if presented to a key stakeholder in the project. We feel that people may question the accuracy of the results, or disregard them altogether if they are unaware or skeptical of the method used to obtain them. Key stakeholders may not trust the opinions and knowledge of college students foreign to Puerto Rico, causing them to distrust the results. People may also believe the results were fabricated to strengthen an argument to upgrade a particular site. For these reasons, we do not recommend using the results of the Site Comparison Plan as sole support to back up an argument or dispute.

We see the plan as a tool that can be used to begin the process of deciding which sites to upgrade. There were many factors that had to be taken into account while rating each site and each site had its own distinct advantages and disadvantages that may differ from the rest of the sites. Because there were so many factors that had to be considered while rating each site, the final scores could possibly sway two or three points either way if the ratings were conducted again. For this reason, we do not recommend to base any decisions directly on the absolute score of a particular site. A one or two point difference between sites is not enough to base a major decision on, however we do feel that a site scoring seven or eight more points than another site certainly has a higher development potential. The overall pattern of the scores matches the general feeling of the group regarding which sites to upgrade, based on our field experience. We feel confident that the ramps that scored in the top half definitely have a strong development potential, and each one should be looked into more closely to determine if it should be upgraded. This does not mean that all the ramps that scored in the bottom half cannot be upgraded, but we feel that the development potential is not as high. There also may be other factors that prevent the upgrade of a ramp even if it received a good score. A site may have strong scores in all the categories except one, but if it is overly deficient in that category, it may be enough to prevent further development. For example, Yabucoa received a rating of 47, and has a very strong development potential. Despite its lofty score, it gained a rating of 4 for possible environmental

impacts due to sea grass and sea turtles. A deeper examination of the ecological effects a high traffic boat ramp may have in this area could prevent further development at this ramp.

In closing, we recommend using the results of the Site Comparison Plan as a starting point in determining which ramps to upgrade. We are confident that the ramps that scored in the forties have strong development potential and should be examined more closely. Also, a site with a lower score may still be upgraded due to a lack of alternative sites in the vicinity. The Site Comparison Plan looked primarily at the physical attributes of each site, while the social implications of each site were not weighed as heavily in this system. Therefore, a deeper look into community acceptance should occur before any decisions are made. Recommendations for this realm of the project are discussed in the Public Participation Plan.

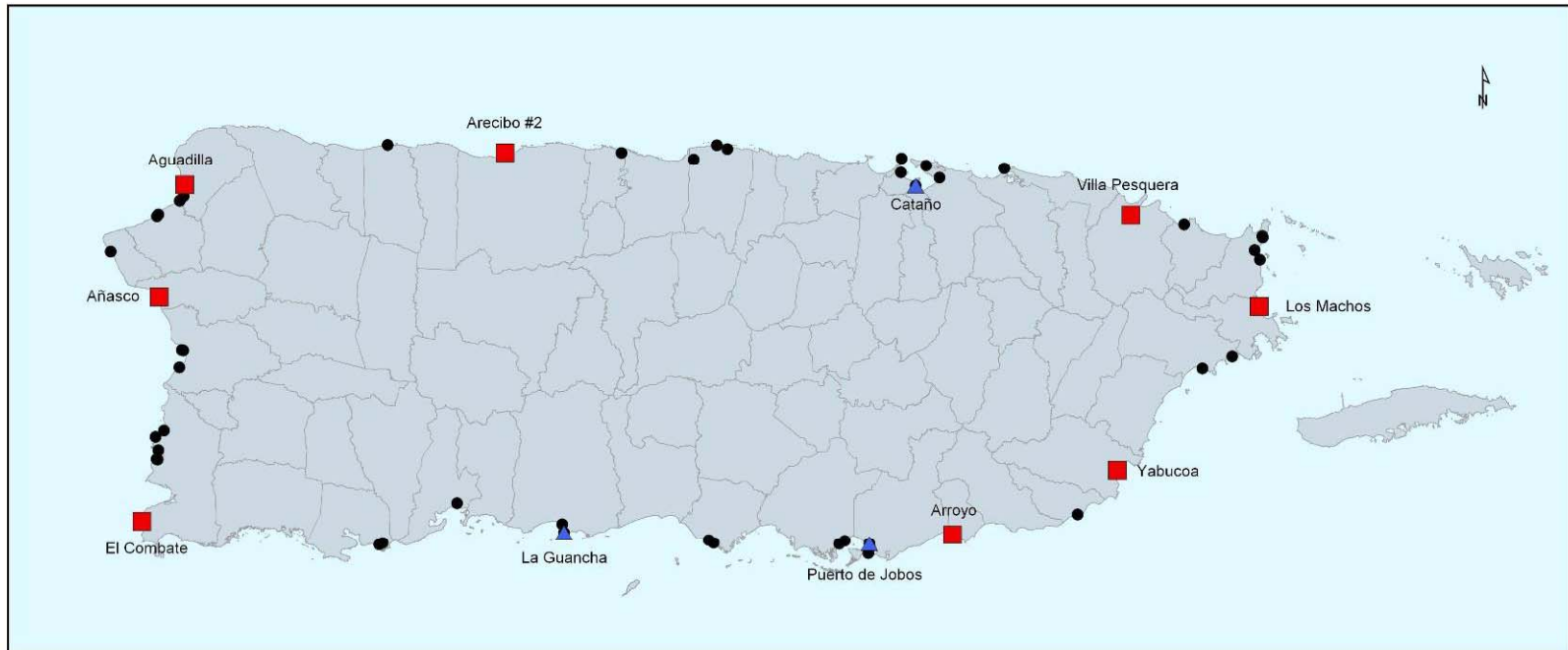
## **5.2. Site Recommendations**

The first step to our recommendation process included thorough background research on characteristics of a quality boat ramp. After deciding the information of greatest importance to be determined at each site, we began our field work. Upon completion of the fieldwork and digital database, we were able to conduct our site ratings. Next, we assembled GIS maps which placed each ramp at its specific location along the coast of the island, signifying their location relative to one another as well as areas of environmental concern. With this information, we were able to come up with a set of eight sites to recommend for further development. We had only a small amount of information regarding specific community perspectives due to the short amount of time we spent at each site. The only information used during the recommendation process was general assumptions gathered from key informant interviews. For this reason, the recommendations are lacking thorough social evaluation, and suggestions on how to address this issue are detailed in the Public Participation Plan.

We did not choose the eight highest scoring sites for recommendation; rather we chose sites that would create the best integrated system of boat ramps across the entire island. Because we saw a demand for water access in all areas of the island during field work, we decided that an even distribution of ramps would be the best system for Puerto Rico. An even distribution of ramps ensures that all boaters on the island will be within a reasonable distance to a quality boat ramp. To create a system of quality ramps that were evenly spaced, we looked at all the scores for ramps in a particular area of the island, and chose the one with the highest development potential in that area. The eight sites we decided upon for recommendation include Arroyo, Aguadilla, Arecibo #2, Villa Pesquera, Yabucoa, Añasco, Los Machos, and El Combate. We also took into consideration the fact that Cataño, Puerto de Jobos, and La Guancha are three quality public ramps already in existence. If our recommendations are carried out, there will be a system of eleven quality boat ramps evenly distributed along the island. We feel this would be a major step forward in improving the current water access situation in Puerto Rico. The map in **Figure 5-1** shows the existing ramps along with the recommended ramps to show the geographic distribution of the proposed boat access system. After the map is a brief description of each site, and some concerns that may arise if development is to occur. The descriptions, arranged to start at San Juan and travel clockwise around the island, are intended to alert the DNER of any possible concerns early in the planning process so there are no surprises in the future.

Many of the environmental concerns will have to be researched further because the information we gathered is based mainly on references such as environmental sensitivity indices (NOAA, 2000) and the GIS maps that we created. Each site will have specific issues that cannot be determined by conclusions from environmental maps. It is also important to note that other than Aguadilla, boat launchings are already taking place at each of these proposed sites. If environmental concerns exist in a given area, boaters may be unaware of them, and worsen the situation. Additional research of possible environmental impacts in specific areas will allow authorities to regulate current boating activities. Further development of these sites in conjunction with controlling where boats can navigate relative to habitats can reduce environmental concerns.

- ▲ Already Developed
- Recommended for upgrading
- Other ramps



### Upgrade Recommendations



Departamento de Recursos Naturales y Ambientales  
Programa de Manejo de la Zona Costanera

**Figure 5-1: Site Locations of Upgrade Recommendations**

## Villa Pesquera Recommendation Sheet

**Name:** Villa Pesquera  
**Municipality:** Río Grande  
**Region:** Humacao

Villa Pesquera is located on the northeast coast in the municipality of Río Grande. It is in a rural area, most likely resulting in few social issues regarding boat ramp development. The site has low wave and current action, and a suitable area for parking with about 40 spaces. Within the site is a boarding dock with cleats and fenders, restrooms and a restaurant. The ramp itself is in good condition, and is currently acceptable for launchings.



**Figure 5-2: Villa Pesquera Boat Ramp**

One concern of Villa Pesquera is that it is part of the Rio Espirito Santo Natural Reserve and is privately owned.

This creates an inconvenience for current users because a service fee is imposed upon non-members. There is also a long, narrow access road one must take to arrive at the launch site which makes maneuvering difficult. Another potential problem is the 8% slope of the ramp. Although the ramp is in good condition, the slope is too flat and may need adjustments in the future. There are some minor concerns associated with this ramp, however proper planning during development can eradicate these issues. This ramp scored a 47 in the rating system because there are no major issues to be dealt with, and it is a great choice for future development.



**Figure 5-3: Villa Pesquera Parking Availability**

## Los Machos Recommendation Sheet

**Name:** Los Machos  
**Municipality:** Ceiba  
**Region:** Humacao

On the far east coast of the island, we chose to recommend Los Machos. Los Machos has very low wave and current action and a substantial area for a parking lot. The potential parking lot would be located in a field just behind the ramp, and when developed, could hold approximately fifty cars and trailers. The combination of being a commercial and recreational area makes the site more desirable for development. The site is already user friendly considering there are restrooms, a cafeteria, and a boarding dock with lights and cleats.



**Figure 5-4: Los Machos Boat Ramp**

One downfall of this site is the ramp itself. There is gravel covering the ramp, and it must be smoothed out to accommodate heavy usage. The ramp is only twelve feet wide but could be extended if necessary, while the slope is only 8% and may also have to be adjusted. The other concern of Los Machos is possible environmental impacts. It is located very

close to the Ceiba forest and is within both a manatee and sea turtle area. Not enough research has been conducted to determine if ramp development here would cause damage to the surrounding environment, and it must be looked into further. Even though this site has some drawbacks, it is one of the only acceptable sites on the east coast, resulting in its recommendation.



**Figure 5-5: Los Machos Parking Availability**



## Yabucoa Recommendation Sheet

**Name:** Yabucoa  
**Municipality:** Yabucoa  
**Region:** Humacao

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Yabucoa Boat Ramp, located south of Los Machos, has a strong development potential. This site has an abundant area for a potential a parking lot. As of now, the parking area is a large open space of sand, but with construction, it would provide appropriate parking and maneuvering room for boaters. This site offers a very safe place to launch due to its low wave and current action. It is protected from the open ocean because it is in a bay which is not natural and has already been dredged. The ramp is located within a commercial port which presumably will reduce social controversy.



**Figure 5-6: Yabucoa Boat Ramp**

Two problems facing this site are its dimensions as well as possible environmental impacts of construction. The width and length of the ramp are sufficient, however the slope is not. Although the slope is poor, it is not too shallow, and can therefore be adjusted.



**Figure 5-7: Yabucoa Parking Availability**

Also, the ramp itself has rocks pressed into it and needs repair. ESI maps have shown manatees may exist in the area, but further research must be conducted to determine if upgrades will cause them harm (NOAA, 2000). Currently the area is not formally approved for boat launches although it is frequently used by boaters for water entry. This attribute along with its high potential is a great reason for this site to be recommended.

## Arroyo Recommendation Sheet

**Name:** Arroyo  
**Municipality:** Arroyo  
**Region:** Guayama

The Arroyo Boat Ramp, located in the southeast portion of the island, received scores of seven or above in each of the six rating categories. This ramp's quality ratings and location on the island qualified the ramp to be recommended for future development. The two major components that made this site stand out were its large area for parking and its low current and wave action. The parking area is large enough to accommodate a two lane ramp along with additional maneuvering room. The slope of the ramp is 12%, which is acceptable for launching, and no critical ecological issues were noted in this area.

Some areas of concern at Arroyo are the ramp conditions and surrounding area.

Just before the ramp reaches the water, there is a crack filled in with large rocks, and construction would be necessary to fix this problem. Also, the width of the ramp is only eleven feet, but there is room to expand it if desired. Community acceptance is another issue considering it is located in both a mixed commercial and residential area. The residents of this community may or may not want the construction of a boat ramp, and this issue would need further examination if explored for development.

Overall, this site has a very high development potential, and had the highest score of forty-nine in our rating system.



**Figure 5-8: Arroyo Boat Ramp**



**Figure 5-9: Arroyo Parking Availability**

## El Combate Recommendation Sheet

**Name:** El Combate  
**Municipality:** Cabo Rojo  
**Region:** Mayagüez

Of the eight sites we recommended for further development, El Combate received the lowest score on the site rating system with a 43, though it was still in the top twenty of the sites reviewed. The main reason we recommended the development of this site was because it is the only site in the southwest portion of the island with a strong development potential. All the other sites in that area do not have strong development potentials, yet a quality ramp is necessary due to boater demand. The main reasons El Combate emerged as the best option in this area is because it has plenty of room



**Figure 5-10: El Combate Boat Ramp**

for parking, low wave action, and an acceptable slope for launching a boat. The estimated 35 parking spots would accommodate a one lane ramp, and low wave action allows for easy entry to the water. The slope is a little shallow at 10%, but it could be adjusted if it proves to be a major problem during launchings.

The main points of concern at El Combate are the environmental impacts and community acceptance. Our GIS maps show that there are nearby sea grass beds as well as some coral reefs that are important fish habitats. It is also adjacent to a popular swimming area which may be affected by the upgrade of a boat ramp. These issues may make it difficult to proceed with development, but if they can be worked around, this could prove to be a very valuable ramp as the sole quality launch site on the southwest coast. It is important to point out that these environmental concerns exist everywhere along the southwest portion of the island, so it would be difficult to find a better option than El Combate in this area.



**Figure 5-11: El Combate Parking Availability**

## Añasco Recommendation Sheet

**Name:** Añasco  
**Municipality:** Añasco  
**Region:** Mayagüez

The existing boat ramp in Añasco could become an excellent launching facility with a little further development. It received a strong score of 45 in the site rating system, and scored no less than a seven in any of the rating criteria. The existing ramp has a slope of about 15% which we found to be ideal during background research. Although ESI maps show some sea turtles in the area, there have been no signs of a nesting site in the immediate area (NOAA, 2000). Other than that, we found no other environmental concerns associated with this site. There is above average wave exposure due to the fact that the ramp is



**Figure 5-12: Añasco Boat Ramp**

not protected by a bay or breakwater, but it does not seem like enough to affect the launching of a vessel. We also feel that a boat ramp would be widely accepted in this community because it is a popular recreational fishing area. It is located adjacent to a fishing village, and would provide easy access to the water for nearby fishermen.

The main concern regarding the Añasco Boat Ramp is parking availability. There is an estimated 25 to 30 spots for cars and trailers, and not much room for expansion. In our background research, we learned that a single lane boat ramp should contain about 30 to 35 spots



**Figure 5-13: Añasco Parking Availability**

to accommodate all users. If this boat ramp is to be upgraded, the issue of parking may have to be looked into further. Depending on the ramp usage, 25 spots may be enough. If not, other parking options must be sought. After exploring the characteristics of this site, we feel that the Añasco Boat Ramp has a high development potential because it is not overly deficient in any of the essential criteria that make up quality launch site.

## Aguadilla Recommendation Sheet

**Name:** Aguadilla  
**Municipality:** Aguadilla  
**Region:** Aguadilla

The boat ramp in Aguadilla has a very high development potential, tying the Arroyo Boat Ramp for the highest score in our site rating system with a 49. Although there is no existing ramp at this site, the remaining characteristics of this area make it a strong candidate for further development. There is ample room for parking with an estimated 60 to 70 spots for cars and trailers. A parking lot this large would easily be able to accommodate a two lane boat ramp. A breakwater protects the ramp from strong waves and currents, and our GIS maps along with ESI data show no major environmental concerns exist in the area (NOAA, 2000). We also feel that a boat ramp would fit in this location given that it is a mixed commercial and recreational area.



**Figure 5-14: Aguadilla Boat Ramp**

One area of concern in this area is the slope of the shore. The entire area behind the breakwater has filled in with sediment and sand, producing a shallow shore slope that must be dredged to create an acceptable slope for launching. Because dredging must occur, there are additional environmental concerns that may arise. As described in the background research, these environmental concerns can be avoided if proper precautions are taken during construction. Although dredging at this site is inevitable for a boat ramp, this is the only real concern that must be dealt with. All other aspects of the ramp make it a great site to consider for further development.



**Figure 5-15: Aquadilla Parking Availability**

## Arecibo #2 Recommendation Sheet

**Name:** Arecibo #2  
**Municipality:** Arecibo  
**Region:** Arecibo

In Arecibo, there are two potential launch sites in close proximity which both scored a 48 on the site rating system, and both have very high development potentials. The two ramps would have to share the same parking area, so we decided to choose one to upgrade rather than both. The Arecibo #2 Boat Ramp has a large parking area that could easily accommodate 50 to 60 cars and trailers. It has a ramp slope which is acceptable for boat launching, and has no major environmental concerns. Another positive characteristic is the ramp is protected from the extreme wave action that exists along most of the north coast. A breakwater protects the ramp so boaters should be able to enter their vessels without the danger of being harmed by large waves. This makes the Arecibo #2 ramp an important one to upgrade because there are very few options on the north coast due to wave action. Upgrading this site would facilitate water access for boat owners along the north coast of the island.



**Figure 5-16: Arecibo #2 Boat Ramp**

Another option would be to upgrade both ramps at this site. The parking lot is large enough to accommodate two lanes, so if both ramps were upgraded, the site would not get overcrowded. The other ramp at this site is smaller than the Arecibo #2 ramp, so the smaller ramp could be used for kayaks and jet skis, and the larger one for boats. One problem that may arise at this site is community acceptance. It is in a commercial and recreational area, which is normally good for a boat ramp, but there is a public beach between the two sites. People may oppose the upgrade of the ramp because increased boater traffic will disturb people at the beach. Other than this issue, the Arecibo #2 Boat Ramp has a very high development potential, and could be very important by being the sole quality upgrade option on the north coast.



**Figure 5-17: Arecibo #2 Parking Availability**

## **Existing Ramps**

Along with the eight sites we recommended for further development, there are already three boat ramps on the island that we feel have reached their maximum development potential. These sites include Cataño in San Juan, La Guancha in Ponce, and Puerto de Jobos in Guayama. We feel that these three ramps already possess all of the essential characteristics of a quality boat ramp. All three have ample room for parking, plenty of room for maneuvering, various amenities, and ramps in good condition. We foresee that the sites we recommended for upgrades will be developed to the same level of quality as these three existing boat ramps. If the eight sites we recommended are developed to this level, there will be an even distribution of quality boat ramps around the entire island. The reason we chose these specific sites was to ensure that all boaters on the island will have a quality launch site close to where they live, and they will not have to travel an unreasonable distance to launch their vessel.

### **5.3. Social Analysis and Recommendations**

As determined through our research, the DNER does not currently have a standardized process to inform and involve the public upon the start of a new project. Although they understand the public should be involved early on in the process of developing a project, they have no systematic way of doing so. The DNER has in the past followed a permitting process from the US Army Corps of Engineers as described in section **2.5.2 Public Participation Policy**, but feels following these methods lacks level communication between the agency and the public. It also creates tension to begin with when people realize that the permit process has already begun without their consideration. Given that the development of boat ramps can create this controversy, we took the opportunity to develop a public participation plan that would help the DNER to address these social concerns. By conducting interviews and doing research, as well as using current DNER public participation ideas, we were able to get an idea of how the people in Puerto Rico would best respond to development of sites in their communities, and based our plan on this information.

This Public Participation Plan, which can be found in **APPENDIX D: Public Participation Plan**, is a step by step process that will help the DNER to gain support for its projects from the communities in which they are hoping to develop. The Public Participation Plan is a standardized way for the DNER to approach the public as well as special interest groups when considering the development of a site. The goal of this plan is to allow the DNER to involve the public from the beginning stages of site development, before designs have been created and permits are sought. This plan can also be used as a tool for the DNER to demonstrate they are making an effort to involve the public and look forward to any opinions or suggestions that people may have to offer. To make this demonstration, an outline has been included with the plan that may be distributed to those who may be participating. It must be stressed, however, that this is not a cut and dry plan, and is open to further interpretation and research. Nonetheless, it provides people with ideas to take into consideration when planning boat ramp development.

When following the Public Participation Plan, other results from this project may be used to allow people to understand the current state of water access in Puerto Rico. The digital database we have created can be used to provide information for specific sites around the island, as well as provide evidence with photo documentation. The GIS maps will allow people to see the distribution of current ramps, as well as their proximity to environmental considerations. Our site comparison plan will offer people a chance to see how potential launch sites have been determined.

We feel the boat ramp committee can play a major role in the selection and development of our recommended launch sites as well as the social evaluation of these sites. We feel that this committee can have a significant positive impact on water access in Puerto Rico, and would like to see some action taken by this committee in the near future. Using the resources we have provided the committee, including the database, site recommendations, and Public Participation Plan and final report, all available at the DNER, we suggest that the committee should meet shortly after of the completion of this project to begin serious discussion of launch site development. This meeting should consist of talks about who and how to recruit other members for the committee, some of whom are listed below. The committee should also begin to consider the top sites for development. After the initial meeting, we suggest that the committee meet



every month for the next six months during the first week of each month. This ensures that topics discussed in previous meetings are tended to and not ignored.

We also feel it would be beneficial to the committee to seek some new members. The current composition of the committee adequately represents most relevant viewpoints, but there are some other perspectives that would be very helpful. Firstly, we recommend recruiting someone from the business world, for example Jose Vega, who was referred to us by Manuel Pizzini. Mr. Vega is the head of the Small Business Development Association in Puerto Rico, and would be able to offer some valuable insight to business opportunities in and around potential development sites. We also recommend the committee consider recruiting representative leaders of the fishing community and recreational boating associations, because these individuals could represent the viewpoints of the people who most often use the ramps. Another organization to recruit from might be the US Army Corps of Engineers, because this is the organization in charge of the permitting process, and it may be valuable to have someone from that organization on the committee from the start of the development process. Lastly, we recommend the recruitment Manuel Valdes Pizzini, former Sea Grant Director and acting dean of the College of Arts and Sciences at the University of Puerto Rico, Mayagüez. Considering his experience with public policy and contacts from many different professions, Mr. Pizzini might also be a very valuable committee member.

We do realize some of these people or organizations may not have the time to invest in such a committee, but even without being an actual member of the committee these people could offer very good insight and advice to various aspects of the development process and we strongly suggest contacting them.

The recommendations made by our group are the final results of our project. They are based on a thorough analysis of researched material as well as data collected by firsthand experiences. All of the information that is included in this report is relevant and valuable to our recommendations, as well as our entire project, and we feel it provides solid confirmation of the results and recommendations of our project. We do understand, however, that further research in particular aspects of our project should be considered if our recommendations are to be pursued. We do not believe that our recommendations are absolute requirements, but we feel that they offer the beginning steps toward the improvement of water access in Puerto Rico. The results of our project can be shaped to assist with the different circumstances that may be encountered as the improvement of water access progresses.

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#### Geographic Information System (GIS) Maps

Created by Ms. Nora Alvarez at the Coastal Zone Management Program of the Department of Natural and Environmental Resources (DNER), using information from the DNER, the Carso Citizen Foundation, the US Fish and Wildlife Service, International Institute for Tropical Forestry, the National Oceanic and Atmospheric Administration, and the Puerto Rico Conservation Trust.

# APPENDIX A: Permit Documents

## Public Notice

*Original*

 **DEPARTMENT OF THE ARMY**  
JACKSONVILLE DISTRICT CORPS OF ENGINEERS, ANTILLES OFFICE  
400 FERNANDEZ JUNCOS AVENUE  
SAN JUAN, PUERTO RICO 00901-3299

REPLY TO  
ATTENTION OF  
Antilles Regulatory Section

**PUBLIC NOTICE**

Permit Application No. SAJ-2004-1264 (IP-JER) **FEB 20 2004**

TO WHOM IT MAY CONCERN: This District has received an application for a Department of the Army permit pursuant to Section 10 of the Rivers and Harbors Act of 1899, (33 U.S.C. 403), Section 404 of the Clean Water Act of 1977, (33 U.S.C.1344), as described below:

APPLICANT: Department of Natural  
and Environmental Resources  
P.O. Box 9066600  
Puerta de Tierra Station  
San Juan, Puerto Rico 00906-0365

WATERWAY & LOCATION: The proposed project is located at Playa Ward, Guayanilla, Puerto Rico

LATITUDE AND LONGITUDE: Lat. 18°00'22.58"N., Lon. 66°46'05.23"W.

WORK & PURPOSE: The applicant proposes to construct a two lanes boat ramp with a pier between them, where a dilapidated 14' by 35' ramp exists. The ramps dimensions are 18' wide by 60' long. The pier dimensions are 8' wide by 60' long. A stone revetment rip-rap is proposed around the ramps for erosion control. The project would require the discharge of 2,500 cubic meters of concrete, and rocks and the dredging of 1,000 cubic meters of bottom material. The placement of a temporary fill pad to located the construction equipment, with 250 cubic meters of material is also proposed.

BASIC PURPOSE: To replace existing boat ramp which is deteriorated.

OVERALL PURPOSE: To provide adequate facilities, including parking for trailers, to access the sea for recreational boating.

EXISTING CONDITIONS: It is not known if in the vicinity of the proposed project area seagrasses and algae exist, the fact that a boat ramp exists means the site should be somewhat disturbed.

ESSENTIAL FISH HABITAT: This notice initiates Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Our initial determination is that the proposed action would not have direct impacts on Essential Fish Habitat or Federally managed fisheries in the Caribbean Sea. Our final determination relative to project impacts and the need for mitigation

measure is subject to review by and coordination with the National Marine Fisheries Service.

ENDANGERED SPECIES: The proposed project falls within the range of the endangered Antillean manatee, *Trichechus manatus manatus*. The U.S. Army Corps of Engineers (Corps) has determined that the proposed project may affect, not likely to adversely affect the manatee. By action of this public notice the Corps initiates formal consultation with the U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act.

HISTORIC and CULTURAL RESOURCES: The Corps is not aware of any historic properties within the area of the proposed project. Pursuant to 36 CFR Part 800, the Corps is requesting the Virgin Islands Historic Preservation Office (VIHPO) and the interested public to provide advise, assistance, and/or any information that will assist the Corps in the identification of historic properties. Information received in response to this Public Notice will be utilized by the Corps to take the necessary steps to identify historic properties, assess potential effects, and make the appropriate determinations pursuant to 36 CFR Part 800.

AUTHORIZATION FROM OTHER AGENCIES: A Coastal Zone Management Consistency Certification from the Department of Planning and Environmental Resources is required. A 401 Water Quality Certificate from the Department of Planning and Environmental Resources is also required.

NOTE: This public notice is being issued based on information furnished by the applicant. This information has not been verified.

Comments regarding the application should be submitted in writing within 15 days from the date of this notice to:

Chief Antilles Regulatory Section  
U.S. Army Corps of Engineers  
400 Fernández Juncos Avenue  
San Juan, Puerto Rico 00901-3299

Please reference application number in your correspondence. If you have any questions concerning this application, you may contact Mr. José E. Rosario of this office by E-mail at [jose.e.rosario-fabregas@saj02.usace.army.mil](mailto:jose.e.rosario-fabregas@saj02.usace.army.mil), or by telephone at 787-729-6905/6944, extension 3061.

# Public Notice Mail

**IMPACT ON NATURAL RESOURCES:** Preliminary review of this application indicates that an Environmental Impact Statement will not be required. Coordination with U.S. Fish and Wildlife Service, Environmental Protection Agency (EPA), the National Marine Fisheries Service, and other Federal, State, and local agencies, environmental groups, and concerned citizens generally yields pertinent environmental information that is instrumental in determining the impact the proposed action will have on the natural resources of the area. By means of this notice we are soliciting comments on the potential effects of the project on threatened or endangered species or their habitat.

**IMPACT ON CULTURAL RESOURCES:** Review of the latest published version of the National Register of Historic Places indicates that no registered properties, or properties listed as eligible or inclusion therein, are located at the site of the proposed work. Presently, unknown archeological, scientific, prehistorical, or historical data may be lost or destroyed by the work to be accomplished.

**EVALUATION:** The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including cumulative impacts thereof; among these are conservation, economics, esthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people. Evaluation of the impact of the activity on the public interest will also include application of the guidelines promulgated by the Administrator, EPA, under authority of Section 404(b) of the Clean Water Act of the criteria established under authority of Section 102(a) of the Marine, Protection, Research, and Sanctuaries Act of 1972. A permit will be granted unless its issuance is found to be contrary to the public interest.

The U.S. Army Corps of Engineers (Corps) is soliciting comments from the public, Federal, State, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make or deny this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

**COASTAL ZONE MANAGEMENT CONSISTENCY:** In Florida, the State approval constitutes compliance with the approved Coastal Zone Management Plan. In Puerto Rico, a Coastal Zone Management Consistency Concurrence is required from the Puerto Rico Planning Board. In the Virgin Islands, the Department of Planning and Natural Resources permit constitutes compliance with approved Coastal Zone Management Plan.

**REQUEST FOR PUBLIC HEARING:** Any person may request a public hearing. The request must be submitted in writing to the District Engineer within the designated comment period of the notice and must state the specific reasons for requesting the public hearing.

*John R. Hall*  
John R. Hall  
Chief, Regulatory Division

DEPARTMENT OF THE ARMY  
JACKSONVILLE DISTRICT CORPS OF ENGINEERS  
P.O. BOX 4970  
JACKSONVILLE, FLORIDA 32232-0019

OFFICIAL BUSINESS



DRNA  
27 FEB 2004  
OFICINA DE SECRETARIA  
SECCION DE CORREO

ID#678  
DEPARTMENT OF NATURAL RESOURCES  
DV OF FORESTRY COMMONWEALTH OF P R  
PO BOX 9066600  
SAN JUAN PR 00906-6600

## **APPENDIX B: Interview Questions and Notes**

### ***Key Informant Interview Questions***

1. What are your feelings on the current boat access situation in Puerto Rico?
2. Do you see a need for more boat ramps?
3. How do you feel about the approach we are taking in order to solve the problem?
4. Do you think we are collecting the proper data given our short trip to each ramp?
5. Would you suggest anything else to add to our data information sheet?
6. What is your opinion on our public participation plan?
7. Do you have any ideas on what else could be done?
8. How do you feel local communities will respond to potential site suggestions, will they be in favor of further developing or constructing a site or will they oppose the idea?
9. Would you like to be involved with further development of a public participation plan and/or receive more information as the plan progresses?
10. Do you have any suggestions as to who else we can contact for more helpful information?



## **Key Informant Interview Notes**

Interview #1  
May 30, 2005

Julio Morell  
Chemical Oceanographer  
University of Puerto Rico

What are your feelings on the current boat access situation in Puerto Rico?

- Severely limited in quantity and quality, except for a few projects privately or in Boqueron
- Some are built exposed to swells and are seasonal destroyed

Do you see a need for more boat ramps?

- Yes, definitely

How do you feel about the approach we are taking in order to solve the problem?

- Gathering all the information is something that we need
- Make sure to involve environmental managers because they play a big role in something like this since Puerto Rico has so many environmentally sensitive areas, most ecosystems are declared fish habitats
- There are two forces that will be fighting, those who support and those who oppose; We need to document the need to satisfy the needs of the population; We need to make managers aware that there is a need and that they need to give something up; Managers say they do not want anymore projects because that would bring more boats in and they try to design a policy regarding boat population by setting a limit for each municipality.

Do you think we are collecting the proper data given our short trip to each ramp?

- Looks very good (noted handicap access)
- Nothing documenting the demand per region, address with boating commissioner office (Erasto noted we don't need specifics because the demand does exist)

What is your opinion on our public participation plan?

- Bring some other elements into the process
- Make information available to other people
- Taskforce is a well thought out plan, needs to be done

Do you have any ideas on what else could be done?

- Public awareness campaign, let people know that there is a need and people willing to address it
- Contact other interest groups such as boat storage facility owners, people at supermarkets and gas stations

How do you feel local communities will respond to potential site suggestions, they will be in favor of further developing or constructing a site or will they oppose the idea?

- Local population would appreciate the facility, not only the boat owners but general commercial service
- Opposing people will be the hard core environmentalists and then the neighbors around (he thinks large % of neighbors will be against construction)

Would you like to be involved with further development of a public participation plan and/or receive more information as the plan progresses?

- Yes

Do you have any suggestions as to who else we can contact for more helpful information?

- Parguera (different interest groups)
- General locals
- Storage facility managers

Additional Notes:

- Boaters want ramps and people living next door to them do not
- Wanted to know purpose of questionnaires and flyers and what we would be doing with the results
- Environmental problems (garbage, petroleum hydrocarbon dredging), but this could actually improve in a sense with better ramps
- Make parking area away from homes, be smart about construction

Carlos Diaz  
US Fish and Wildlife Service  
Caribbean Islands National Wildlife Refuge

What are your feelings on the current boat access situation in Puerto Rico?

- Concur that access is inappropriate
- Recognize that since F-24, a government regulation, there has been or needs to be a different access approach

Do you see a need for more boat ramps?

- Not sure that more are needed, but upgrades are needed

How do you feel about the approach we are taking in order to solve the problem?

- Don't explain regional issues
- Need to match demand with availability
- Determine where to put resources

Would you suggest anything else to add to our data information sheet?

- Boat ramp may be changed to launch site
- Need to deal with essential fish habitats and expansion on ecology
  - o Manatees and turtles, sometimes brown pelicans
  - o Benthic maps on website

Have you ever had experience in dealing with controversial public issues?

- Piñones and Cataño
- Matching is not difficult, but bringing the two sides together is difficult
- Boqueron – new site was opposed, but after completing, residents saw good effects with the relieving of traffic
- Boat Ramp committee
  - o Used for insight at beginning
  - o Had problems with providing regulatory opinions at certain stages
  - o Conflicting obligations
  - o Have to keep levels separate

What is your opinion on our public participation ideas?

- People need to see everything in writing
- Never talk to one party alone, bring agencies or groups together, this usually works
- Newspapers don't work
- Word of mouth, find out who the leaders are
- Sometimes groups will not sit together, meet with them individually and then bring them together and note how they're needs have been met
- Piñones example, residents became representatives

- Sometimes the most vocal people are on the outside, and others are not concerned until they are touched
- Have to incorporate community culture into project

How do you feel local communities will respond to potential site suggestions, will they be in favor of further developing or constructing a site or will they oppose the idea?

- In general, the response will be good
- Main concern will be parking traffic and garbage
  - o Alleviate these concerns from neighbors, move site or change parking

Do you have any suggestions as to who else we can contact for more helpful information?

- National Marine Fisheries
- Coast Guard: Capt. Uberti, Marine Safety Office
- Lisa Marie Coruba, Project Leader of Fisheries Habitat, 787-851-3706

Additional Notes

- Environmentalists
  - o Work on every boat ramp
  - o Generally consider building negative
  - o Know some things may be corrected
  - o Deal with cumulative affects
    - Additional facilities
    - Look at all aspects
  - o Problem with ramps with solid pavement
    - Gas and oil
    - Recommend porous material

Manuel Pizzini  
Dean of Arts and Sciences  
University of Puerto Rico, Mayagüez  
M\_pizzini@hotmail.com  
mupizzini@uprm.edu

What are your feelings on the current boat access situation in Puerto Rico?

- Current access is poor at best
- Competition for shoreline is not an issue for boat ramps, it is more a matter of planning and the allocation of space
- Understand user conflicts in coastal areas, but if sites are being used, there is a potential to formalize the ramp
- Ramp is more than just the ramp, it also includes structures, activities, and services
- Problem is more about parking, need to design ways to solve parking, getting access to ramp, and maneuvering
- With government land, there is an opportunity to charge users
- Need to design a sustainable construction that is low impact

Have you ever had experience in dealing with controversial public issues?

- Each site is specific with its own background about use, culture and conflicts
- Take notes and observation at each site

What is your opinion on our public participation ideas?

- Likes the idea of focus groups, small groups of 4 – 5 people
- Public forums related to public hearings where people usually fight and argue
- Need to know how to sell the idea, and keep the system controlled
  - o Need appropriate design
- Think tank a great idea, with groups by region, and major meetings for with all groups
  - o Include economists, someone in business/management, someone for sustainability and conservation, someone with a fisheries background who are key users and understands the fishing communities which will be more important in years to come, environmentalists (feels that they should want more ramps), USACE representative, someone from boating industry, marina representatives, recreational representatives
  - o Coast Guard Auxiliary – located by region, capacity building with fishermen, safety course, know fishermen and coast guard, they are local citizens and ramp users

Do you have any ideas on what else could be done?

- Rank and prioritize sites
  - o Choose some sites to conduct specific interviews and research
- Take a look at some examples

- La Parguera – ideas about separating parking and using a trolley, people are willing to pay for safety
- Fajardo – upper middle class, able to pay higher charges
  - Poorer areas might find this offensive

How do you feel local communities will respond to potential site suggestions, will they be in favor of further developing or constructing a site or will they oppose the idea?

- Bet on more people being in favor of ramps
- Have local issue considerations, site specific
- Sustainability – low impact on vegetation, drainage during parking, paving issues (different ways to pave), off-site parking location
- Keep traffic flow, reduce interference, maneuverability

Do you have any suggestions as to who else we can contact for more helpful information?

- Jose Vega – head of small business development, recreational boater and fishermen
- Ruperto Chaparro – acting director of Sea Grant program

Ruperto Chaparro  
Sea Grant Director  
University of Puerto Rico, Mayagüez

What are your feelings on the current boat access situation in Puerto Rico?

- Thinks that maybe there are four good ramps here on the island either that the DNER has constructed and funded or else you have to go into a private marina
- Today access means something different than it did before; Access now means parking, security, lights, boarding dock, and so now many ramps do not qualify as accessible

Do you see a need for more boat ramps?

- We need to offer better access because people are spending money on recreation because people have more disposable income

Would you suggest anything else to add to our data information sheet?

- Maybe noting the conflict that a ramp may have with users or potential conflict (swimming area, or any other kind of users)

Have you ever had experience in dealing with controversial issues?

- There is no conflict between recreational users and commercial users
- Conflicts examples took place in Rincon, Parguera (Condos have been built and they are unhappy because cars and trailers are nearby and causing extra traffic)

What is your opinion on our public participation plan?

- Have community involved since the beginning or else you may run into some major problems
- Very difficult problem to solve, communities are reluctant to change, feel they own ramp
- Ask what can be done for them, look at what could benefit the community such as employment for local citizens
- Keep in mind every case is different

Do you have any ideas on what else could be done?

- We must look at what is there for the community (who is going to get the money, how much employment will it provide, who will sell the bait)

How do you feel local communities will respond to potential site suggestions, they will be in favor of further developing or constructing a site or will they oppose the idea?

- Piñones encountered a problem along with Parguera and Rincon
- Local communities would be more than happy (Mayagüez)

Would you like to be involved with further development of a public participation plan and/or receive more information as the plan progresses?

- Yes would definitely liked to stay involved

Do you have any suggestions as to who else we can contact for more helpful information?

- speak with recreational fisherman
- Ivan Soler (recreational boater and fisherman)
- Additional Notes:
- Many times people have the conception that boat owners are the “millionaires” but that is very untrue here in Puerto Rico
- Right now there is so much development and access is being limited
- If there is problem with access, there will no be enough space

Additional Notes

- Some people have conception that boat owners are millionaires
- There is conflict because of the development on the coast that threatens and limits access
- Some people buy property near a ramp, and then complain about noise and pollution;  
Example of this in Parguera where condos were built after the ramp was already there with traffic



Rosa Hilda Ramos  
Environmental Activist for Cataño Community (15 yrs)  
Community Leader  
Rosah@adelphia.net

What are your feelings on the current boat ramp access situation here in Puerto Rico?

- Not that well informed but in her community she feels the fisherman go out into the sea illegally due to lack of facilities
- Her community relies on access to the sea for seafood which attracts visitors and is the only income; "community is dying"; People are looking into other opportunities for economy
- Growth of boats related to underground economy, people don't want those involved with drugs around

Do you see a need for more ramps?

- Yes, the ramp may allow more opportunity for the smallest community of Puerto Rico
- Locations need to be developed to reduce environmental impacts
- San Juan bay only has one entrance because of road construction from WWI, and increases turbulence at the entrance
- Need a ramp that is safe for fishermen, need to give something back to the community

Have you ever had experience in dealing with controversial issues?

- Spanish influence can be seen, leaders have the solutions and send them to the community
- Some people don't understand that the community can solve its own problems, and they don't listen, don't answer phone calls or letters
- People do not trust the government

How do you feel about our Public Participation Plan?

- Surveys and forums can be very helpful

Do you have any ideas for our public participation plan?

- Tell them you are not part of the government, people do not trust the agencies
- Try to reach young people
- Possibly use the media
- Examine working model of estuary program which has three groups: government, science, community

Would you like to be further informed?

- Yes, would like to know what is going on

Additional Notes:

- Model of estuary committee may be helpful
- GIS database with 200 layers, contact Carlos Morales 787-396-2145

Miguel Rolon  
Executive Director  
Caribbean Fisheries Management Council  
Miguel.A.Rolon@noaa.gov

What are your feelings on the current boat access situation in Puerto Rico?

- Need to continue expanding project, but need to involve community because most work is done from top down
- Sometimes communities have done it on their own without experience and support from experts
- Ramps have been placed in inappropriate places
- Must focus on environmental aspects

Do you see a need for more boat ramps?

- Definite need for more and better ramps
- The economics of a ramp benefits the community

Would you suggest anything else to add to our data information sheet?

- Data is complete
- May compare with survey done by Sea Grant

What is your opinion on our public participation plan?

- Taskforce may be a good idea
- Include the DNER, leaders of the community, engineers – someone who knows how to build ramp, a person for education and outreach
- Need to sell the idea

Do you have any ideas on what else could be done?

- It is a balancing act
- Need to use the word “proposed”
- Ask when and where people like to meet, some fishermen like to meet at night
- You have to go to the areas
- Need a well informed team member to moderate and not to lecture
- Need to ask what the communities want
- Let them know you are there to hear their concern
- More success in the future if communities are involved from the start

How do you feel local communities will respond to potential site suggestions, will they be in favor of further developing or constructing a site or will they oppose the idea?

- Things need to be done right
- Need to cover all angles, if not obstacles are created in the future
- Sometimes people oppose first and ask questions later

- People will be all for it if they are guaranteed access
- They may be willing to pay if it is reasonable
- Communities have opposed boat ramps at hotel sites even though they were designated public (only on paper)

Would you like to be involved with further development of a public participation plan and/or receive more information as the plan progresses?

- Would like to have access to the report and help with the taskforce

Do you have any suggestions as to who else we can contact for more helpful information?

- Marina managers, boat sellers
- Hotel associations – have environmental group whose work includes boat ramps
- Banks, people who provide insurance (ramp info included in insurance) for boats and who finance boats – Banco Popular

Additional Notes

- Commercial fishing communities have their own ramps
- Marina ramps built by government, still need some assistance
- Keep in mind artisanal fishermen who travel to different sites
- Many people overlook the parking
- It is costly to acquire land and keep it fit to ecological standards
- With public funds, the ramp needs to be public
  - o Some ramps are privatized, or over time people don't know who owns it

Make communities aware of their responsibilities

Alexis Molinares  
Professor, University of Puerto Rico  
Environmental Consultant  
Executive Director of Environmental Foundation  
First Director of the Natural Reserve Division of the DNER

What are your feelings on the current boat access situation in Puerto Rico?

- People love to recreate on the coast, and there is a lot of pressure to have access to it
- People will push to have more facilities for recreational purposes and to raise money for the government – people are looking for more contribution from this sector
- Boating growth will continue until something occurs regarding money and prices

Do you think we are collecting the proper data given our short trip to each ramp?

- May include something about security and safety because this is an issue – maybe include something on how willing people are to use the sites

Have you ever had experience in dealing with controversial issues?

- Newspapers and radios, people love to discuss issues over and over
- Have to be aware of emotional issues that come about with environmental problems
- People have been contacting legislators, going around agencies that have designated procedures for the issues, people don't trust governmental agencies
  - o People are waiting on court decisions who don't have the expertise
- People expect certain outputs with certain inputs and with nature that is not always the case
- Have to be open for new solutions and be able to set aside own sentiments
- Boat Ramp Committee – people work in crisis mode, don't pay attention until there is pressure or it is brought to the highest levels, main bureaucrats haven't identified this as a main issue, not enough will
- People want to protect the individuality of their municipalities

Do you have any ideas on what else could be done?

- Emphasize economic aspect and how the community participates
  - o Government is not a good communicator, they expect people to know
- Better results with persons who are people-oriented
- People need to see themselves in the plan, need to see the benefit of the project
- People don't see their actions as part of the problem
- Provide alternatives for economic value, small business and enterprise options, better opportunities

How do you feel local communities will respond to potential site suggestions, will they be in favor of further developing or constructing a site or will they oppose the idea?

- People enjoy seeing facilities improved

- People may not be helpful at earlier stages, but they need to see the benefits
- Seeing nice places is a sign of progress to a better Puerto Rico

Do you have any suggestions as to who else we can contact for more helpful information?

- Marine industries, sellers of ramps
- Owners and retailers

Benito Pinto  
La Regatta Editor  
Former Law Administrator

What are your feelings on the current boat access situation in Puerto Rico?

- Very limited
- People are getting access through mangroves, beaches, and off the side of the road
- Few marinas offer use of ramps to outsiders

Do you see a need for more boat ramps?

- Yes because it is very important to have organized public facilities

Would you suggest anything else to add to our data information sheet?

- Actual position and need to find the demand associated with the ramps

Have you ever had experience in dealing with controversial public issues?

- Does not matter what the issue is some people will oppose it no matter what
- Some people will oppose as a way to get money out of the situation
- Need to make people aware of plans from the beginning
- Public issues have nothing to do with advertisement
- Media will put attention on opposition, not agreement

What is your opinion on our public participation plan?

- Maybe have plan be introduced by the community rather than the government
- Have to negotiate and stress communities will benefit
- Businesses should be involved in project
- Community has to be involved and know that they can take advantage of the situation

How do you feel local communities will respond to potential site suggestion, will they be in favor of further developing or constructing a site or will they oppose the idea?

- Boaters will support it
- Nonboaters and those who do not care will oppose it
- People like alternatives and new attractions

Do you have any suggestions as to who else we can contact for more helpful information?

- Hector Fosas (Yamaha waverunner dealer) 787-790-4900
- Geronimo Esteves (Honda dealer for Puerto Rico) 787-620-7010
- Dan Shelley (President of Marine Boatyard Association) 787-863-8880

Additional Notes

- Boat Ramp Committee should have a few meetings and visit some sites
- Documentary will be a great reference for boat ramp committee

## APPENDIX C: Database User's Guide



Puerto Rico Department of Natural and  
Environmental Resources

# **Puerto Rico Boat Ramps - Database & Inventory**

User's Manual



## **Welcome to the Puerto Rico Boat Ramps – Database & Inventory User’s Manual**

This document is intended to assist those desiring to use the Microsoft Access file entitled “Puerto Rico Boat Ramps – Database & Inventory”. This manual will describe the layout and general workings of the database: how to view information as well as how to add and edit information. Although this document describes the functioning of the database as completely as possible, there may be issues that have been overlooked or problems may arise that have not been addressed. For these and other issues, please consult the Microsoft Access help files found under **H**elp of the main toolbar of the software.

A photo archive has been included with this database. The photo folders within the archive have been linked to the database information, and can be opened when viewing this information. These photos can also be accessed separately.

This database, as well as this accompanying manual, was created by a group of students from Worcester Polytechnic Institute as part of an Interactive Qualifying Project, a university requirement that allows students to work on solving real world societal issues. The goal of this project was to assist the Department of Natural and Environmental Resources (DNER) in creating an inventory of all boat ramps and boat launch sites on the island of Puerto Rico. Prior to the completion of this project, there was no such organization of boat ramp information. This information could then be used as a tool to inform the public about the current state of water access, with regard to public boat ramps, and show its strengths and weaknesses. In this manner, the database can be used to collaboratively improve water access in Puerto Rico.

For more information, please contact that DNER at:

Fish and Wildlife Bureau  
Boating and Fishing Access Project  
P.O. Box 9066600 Puerta De Tierra Station  
San Juan, Puerto Rico 00906-6600  
Phone: 724-8774, ext. 2200/2148

May 4, 2005


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Database and User’s Manual created by Brett Dickson, Jamison Divoll, Brian Martiniello, and Ashley Zalucky of Worcester Polytechnic Institute in conjunction with Mr. Erasto Nieves and Ms. Mayra Garcia of the Department of Natural and Environmental Resources.

## To OPEN Database:

The database can be opened in on of three ways:

1. Navigate to the appropriate folder and click on the associated link or icon.
2. Open Microsoft Access and, from the main toolbar, click **File**, and then click **Open**. Then navigate to the appropriate folder.
3. Open Microsoft Access and, on the standard tool, click the open button.

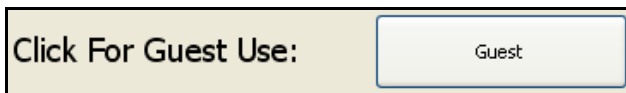
 **Note:** when the database file is opened, Microsoft Access will provide a security warning. This is a general warning that is displayed for all Microsoft Access files. Please click **Open**.



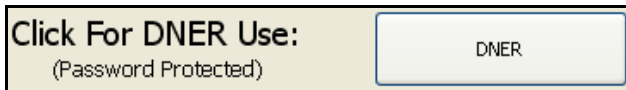
## User Forms

After the database is opened, the user selection form is displayed. This form allows for the selection of either a Guest user or a DNER user.

1. Click the **Guest** button to access the guest form. The guest form allows for the viewing of all the information within the database.



2. Click the **DNER** button to access the DNER form. Clicking this button will prompt the user for a password before viewing the DNER form. Through the DNER form, the database information can be displayed, and information can be added and/or edited.



3. To return to the user selection form, click the **back** button on any of the forms.

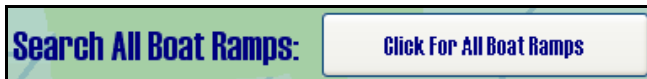


## To VIEW Information:

### Guest and DNER Forms

Both the Guest and the DNER forms allow for the viewing of the database information. Information in the database can be viewed in five different ways, include three ways to narrow down the amount of information that is displayed.

1. Click the search button next to the **search all** option to view a report for each individual boat ramp in the database.

A rectangular button with a light blue background and a dark blue border. The text "Search All Boat Ramps:" is on the left in a bold, dark blue font. To its right is a smaller, white rectangular button with a dark blue border and the text "Click For All Boat Ramps" in a dark blue font.

2. To view a report for a known boat ramp, choose the **boat ramp name** from the dropdown list next to the search button. The name of the boat ramp can also be typed into the dropdown list box, and Microsoft Access will auto fill if it is recognized in the database. If the name does not exist, an error message will be displayed indicating the name is not in the list.

A horizontal form element with a light blue background and a dark blue border. On the left, the text "Search By Boat Ramp Name:" is in a bold, dark blue font. Next to it is a grey dropdown menu box with a small downward arrow on the right side. To the right of the dropdown is a white rectangular button with a dark blue border and the text "Click For Boat Ramp" in a dark blue font.

3. To limit the reports displayed by **municipality**, choose the municipality from the dropdown list next to the search button. The municipality can also be typed into the dropdown list box, and Microsoft Access will auto fill if it is recognized in the database. If the municipality does not exist, an error message will be displayed indicating the name is not in the list.

A horizontal form element with a light blue background and a dark blue border. On the left, the text "Search By Municipality:" is in a bold, dark blue font. Next to it is a grey dropdown menu box with a small downward arrow on the right side. To the right of the dropdown is a white rectangular button with a dark blue border and the text "Click For Boat Ramp(s)" in a dark blue font.

Note: if a blank report is shown after a municipality selection is made, no information for a boat ramp is located in that municipality.

- To limit the reports displayed by **region**, choose the region from the dropdown list next to the search button. The region can also be typed into the dropdown list box, and Microsoft Access will auto fill if it is recognized in the database. If the region does not exist, an error message will be displayed indicating the name is not in the list.



Note: if a blank report is shown after a municipality selection is made, no information for a boat ramp is located in that region.

Information for each ramp can also be viewed using the input form. This form is used to insert information into the database and edit this information. The option to view these forms has been included in a read-only format, so information cannot be changed from these forms.

- To view information in **input form** display, click the button next to this option.



Note A: if any of the dropdown lists are left blank and the search button is hit, a simple error message will appear indicating that no search information was given.

Note B: To **scroll** through the reports or forms, use the direction arrows located at the bottom of the report or form viewing window.



## **To VIEW PHOTOS:**

Each boat ramp is linked to a photo archive which includes pictures of all the boat ramps in the database. This archive can be accessed through the input form (read only) for each boat ramp.

- To view information in **input form** display, click the button next to this option.



- Scroll to the bottom of the form using the scroll bar at the right of the screen. Click on the blue text next to the label **link to photo folder**.




Note: To view these photos, a CD-ROM must accompany the database. The photos should be organized in folders by the name of the boat ramp, as it appears in the database. These folders must then be placed into a folder titles “Photos - Puerto Rico Boat Ramps – Database & Inventory”.

### To **PRINT** Information:

The reports that are generated when information in the database is viewed have been formatted for printing. They will be printed exactly as they are shown when viewing. These reports can be printed by one of two methods.

1. From the main toolbar, click **File**, and then click **Print**. This will open up the print options screen. Make sure the appropriate information applies, and click **OK**.

Note: When viewing information, reports are grouped together by the search criteria (i.e. municipality or region). Although each report is viewed individually, printing may in fact print all the reports that have been searched for. To print individual pages, or a group of pages, make note of the record number(s) at the bottom of the report viewing window, and use this number to insert into the Pages sections on the print options page.



2. On the standard toolbar, click the Print button.

Note: This button will automatically print all reports being viewed.



### To **ADD/EDIT** Information:

Editing information in the database can only be done through the DNER Form of the database, which is password protected. To edit information, click on the Add/Edit button which will open the input form.



1. To **add** information click on the new record button at the bottom of the form window, next to the navigation buttons.



Note A: Please make note of the new record number in this display. The Boat ID number must match this new record number, or information may be lost in the database. To navigate through the fields, simply use the tab key, or click using the mouse. Some fields have an input mask on them, which formats the information automatically. Other fields have dropdown lists so that the information can be chosen from a list. Microsoft Access will auto fill the field if the information is recognized in the database. In some cases, if the information does not exist, an error message will be displayed indicating the name is not in the list and cannot be accepted.

Input mask example:

Dropdown list example:

Note B: The amenities section of the form acts as a form as well. To add new amenities, tab to a new record, or click the new record button at the bottom of this smaller form. The amenity field is a dropdown list that functions as described previously. The amenity count field is a textbox with a default value of 'X', signifying that amenity is present, but can be changed to a number as well.

2. To **edit** information, simply navigate to the desired record that needs to be changed and make the necessary adjustments.
3. **Deleting** information from the database is can not be directly done and is *not recommended*. A record's information can be substituted with information for a new entry if desired, but the Boat ID number must not be changed.

Note: Deleting information is not recommended because the information is tied to each Boat ID number, and if these numbers are not changed correctly, information in the database can be lost.

4. To **save** information, simply close the input form window. The information will automatically be saved in the database.

## To **EXIT** the database:

The database can be closed using one of three methods.

1. Click the **Quit** button located on any of the forms of the database.



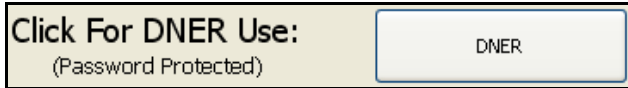
2. Click the 'X' buttons located at the top right of the database window(s), and then click a similar button for the Microsoft Access software as well.
3. On the main toolbar, click **File**, and then click **Exit**.

**\*\*For DNER Use Only\*\***

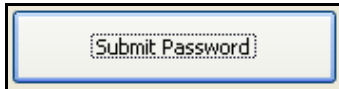
**PLEASE DO NOT DISTRIBUTE**

**To CHANGE PASSWORD:**

1. On the User Form, click the **DNER** button to access the DNER form. Clicking this button will prompt the user for a password before viewing the DNER form.



2. Click on the **submit password** button.

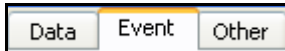


Note: A Microsoft Access warning stating “Please Enter A Password.” Please click **OK**.

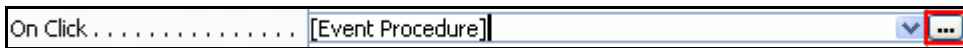
3. Click the **properties** button on the Form View toolbar.



4. The properties window will be displayed. Click on the **event** tab.



5. Click inside the ‘On Click’ text box, and then click the box that appears to the right.



6. A large text file will be displayed titled Microsoft Visual Basic – Puerto Rico Boat Ramps – Database & Inventory. Within the file, next to the word **PasswordCheck**, is a word or phrase in quotation marks. This is the current password. To change the password, change this text. Do not remove the quotation marks and do not capitalize the word.

```
Else
  PasswordInsert = Me![PasswordTextBox]
  PasswordCheck = "dner"
  If PasswordInsert = PasswordCheck Then
    DoCmd.Close
  'NOTE: To change password, change text within double quotation marks.
  'Do not remove quotation marks. Do not capitalize.
```

7. Click the save button and close the Microsoft Visual Basic file.



8. Close the properties window. The password has been changed.



## APPENDIX D: Public Participation Plan



Puerto Rico Department of Natural and  
Environmental Resources

# Public Participation Plan

## **Public Participation Plan**

This document is intended for use by the Puerto Rico Department of Natural and Environmental Resources (DNER) and its Boat Ramp Committee in addressing the social aspects of developing public projects in communities throughout Puerto Rico. It should be noted that every place and every situation is different, and each individual location has a different set of circumstances that requires a different approach. However, there are several characteristics and methods that, when taken into consideration, can improve the effectiveness of an overall public participation plan.

This document was created by a group of students from Worcester Polytechnic Institute as part of an Interactive Qualifying Project, a university requirement that allows students to work on solving real world societal issues. The goal of this project was to assist the DNER in characterizing the current state of water access in Puerto Rico as well as recommend methods to present the information to the public. As a result, the development and improvement of water access can be discussed openly, with all issues and concerns brought to light, and collaborative decisions can be made. Prior to the completion of this project, there was no such standardization of public participation. Although this document was created for the purpose of dealing with water access in Puerto Rico, it is believed that it can be applied to other forms of public projects as well.

For more information, please contact that DNER at:

Fish and Wildlife Bureau  
Boating and Fishing Access Project  
P.O. Box 9066600 Puerta De Tierra Station  
San Juan, Puerto Rico 00906-6600  
Phone: 724-8774, ext. 2200/2148

May 4, 2005

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Public Participation Plan created by Brett Dickson, Jamison Divoll, Brian Martiniello, and Ashley Zalucky of Worcester Polytechnic Institute in conjunction with Mr. Erasto Nieves and Ms. Mayra Garcia of the Department of Natural and Environmental Resources.

## Public Participation Outline

- Identify Key Stakeholders:
  - Determine which groups will be most affected by the project, including who will be the main users and who may be opposed
- Assemble Focus Groups:
  - Plan and set up focus groups with different groups of stakeholders to get ideas and opinions on the problem at hand.
- Determine Preliminary Design:
  - Using input from all of the focus groups, create a design that will accommodate the ideas, needs, and concerns that have been presented..
- Hold Public Forum:
  - Set up a public meeting that will allow DNER to explain problem to the community, explain that they want community input and opinions to solve the problem.
- Conduct Additional Focus Groups:
  - Hold additional focus groups to receive input and opinions on initial proposed design.
- Hold Additional Public Forum:
  - Hold another public meeting to show changes from last design. Collect more input from people. If sufficient progress has been made and there is general acceptance, moving forward with next stages of development may be possible.
- Notes on Possible Opposition:
  - If there is continuous strong opposition from the community at a site that has good physical characteristics, it may not be worthwhile for the DNER to develop the site. If there are other suitable alternatives nearby those should be looked into further.

# Public Participation

## Characteristics of a Good Plan

The first characteristic of a good public participation plan is legitimacy. A legitimate plan is one based on consensus decision-making and one that evaluates both technical as well as local knowledge. Along with legitimacy, a good public participation plan should have transparent processes. This means that from start to finish, the plan is clear, all information is disclosed, all and any issues can be brought to the agenda, and room is made so that anyone may participate. To ensure this characteristic is in the plan, solid evidence must be provided to the public. Also, the public must be able to provide additional information at every stage of the project.

Secondly, a good public participation plan must be fair and unbiased. This characteristic is based on how well the groups involved interact with one another. All groups involved should make an effort to be able to trust and respect each other as well as understand there are differences of opinion and alternative viewpoints. If the public can learn to trust the lead organization, or at least trust that the organization listened to them and gave them a fair opportunity to change the outcome of the project, then they will be more likely to consent to the development of a project.

The last characteristic of a good public participation plan is to have a balance of power and leadership. There needs to be a level ground so that the power or authority figures involved do not use their power to negatively influence the interested parties. The lead organization is also responsible for educating people as issues evolve, as well as providing reasons for why the solutions to those issues are legitimate, as described above.

## Exchange of Information

It is important to keep in mind how information is both presented and gathered when considering public projects. Information concerning public projects must be complete and available to the interested people. They need to know where this information is and how to find it. To be even more reliable, it might be necessary to physically present the information to those interested. Many people like to see everything in writing. It may not be necessary to provide technical or formal information, but information that describes the general goals and ideas regarding the project. When discussing plans for development it is very important to stress the word “proposed”. This will allow people to see that no project is definite, and that the community has the opportunity to change designs to more appropriately fit their desires. Providing this information will show that there has been recognition of a need for better water access and that there are people willing to address that need. It will indicate that the availability of access must be matched with the demand for it. It will also allow people to see what resources are available and determine where they may best be used.

Along with providing this information to the public, gathering information on people’s thoughts and opinions is essential. These people must be made aware that someone is there to hear their concerns. They need to be asked what can be done for them, and what they would desire out of a project such as a boat ramp. If they see that their ideas are being incorporated into the project, or even better, if their ideas are used as a basis for the project, it allows them to feel like they are part of the plan. People need to see themselves in the plan. People want to protect their individuality, and if possible the culture of the community must be incorporated into the project.

The public also needs to see the benefits of the projects. In some cases, their focus may be directed toward the negative impacts a boat ramp project may have. They choose to ignore or are not informed enough to see how a boat ramp may improve their communities. Some of the main benefits that must be stressed are the economic impacts that a boat ramp may produce. People need to see that these access sites will generate income for their communities and provide employment for local citizens. People need to be aware of the opportunities for small businesses and enterprises. There will be more acceptance of the project if direct community benefits are visible.

## Methods for Public Participation

The foundations for a good public participation plan are the methods which are chosen to carry out the plan. The methods chosen for this plan are based on research and interview feedback that was gathered to determine how the people of Puerto Rico would best respond to government projects, as well as drawing from lessons the DNER has learned in the past. The time required to carry out these methods will vary based on different locations and different projects types. Patience must be observed throughout the process to ensure a successful outcome.

### 1. Identify Key Stakeholders.

The first step in public participation is to identify the key stakeholders. These can be organizations or individuals in an area who have special interests in a proposed project. Identifying the key stakeholders is a difficult task because as many stakeholders as possible should be involved, and no stakeholder should be excluded. The best way to begin finding the stakeholders is to determine who might be most affected by the project. It is recommended that a representative physically visit project sites and identify interested parties through discussion and word of mouth.

Some examples of important key stakeholders are community leaders or representatives where the project will take place, environmental groups who have interests in areas like the one chosen, and the group of people most likely to be using the proposed facility. It would also be wise to include economists and business or management representatives who can assess the economic impact such facilities will create. It would be best to find representatives of both sides of the issues, such as someone to represent local boaters and fishermen, who would support such a project, and also local neighbors or marina representatives, who may oppose the ideas. These are just some examples of stakeholders; every site is different and for each project different groups of stakeholders may need to be identified.

### 2. Assemble Focus Groups.

The next step in the process is to assemble focus groups. The focus group should be set up by the leading organization (DNER). These focus groups should consist of a group of roughly four to five people who may be from the leading organization, any committees that may

be involved, or a group of stakeholders. It would show consideration if these people are asked when and where it is best for them to have a discussion. It is important to note that one party should not be contacted alone. It is better to bring different parties together so that people do not feel betrayed by others having separate meetings to discuss the issues. Several of these focus groups should be conducted, with different representatives at each. It is best to hold the initial focus groups with people of similar interests so the project does not begin with conflicts from different groups of people. At each of these focus groups, the lead organization will present the problem at hand and address why they think it needs to be solved. This could best be done with the use of a small structured presentation. The focus group should then be asked to discuss ideas on how they think the problem should be addressed. It should be stressed that the main goal of this meeting is to hear what these stakeholders have to say. For more information regarding this, please refer to the section regarding the exchange of information discussed previously.

One thing to remember during these focus groups is that it is important to keep conversations going and ideas flowing freely between people. For this it might be necessary to hire an experienced mediator who is a non-interested party with experience in group dynamics. This impartial mediator would ensure that all sides have an equal opportunity to speak and be heard and to help opposing sides understand conflicting ideas. As the meeting progresses and different people are offering ideas and opinions it is also vitally important to have at least two designated note takers to record all of the action that is taking place. These note takers should not participate in the actual discussion and should not interfere with the groups talk. It might also be a good idea to tape record the discussion to complement note taking.

At the conclusion of the focus group it would be a good idea to ask the group if they know of any other groups or stakeholders who might be interested in participating in similar focus groups. It would also be wise to exchange contact information with all involved, such as e-mail addresses and phone numbers, in case other issues and concerns arise after the meeting.

For more explicit details on planning focus groups and analyzing their results, it may be a good idea to look at a focus group text book. The text book consulted for the writing of this plan was "*Focus Groups 3<sup>rd</sup> Edition, A Practical Guide for Applied Research*" written by Richard Krueger and Mary Ann Casey.

### 3. Preliminary Design & Public Forum.

After convening all of the focus groups and analyzing everyone's initial ideas and concerns, the lead organization (DNER) should begin a preliminary design. This design should take into account as much information as possible from the focus groups. After this preliminary design is complete it is time to hold a public forum with the general public as well as all the interested stakeholders present. The public forum should be used to showcase the new design and explain why the design is the way it is, and how the design takes each group's ideas and considerations into account. The public meeting should begin with the DNER describing the current problem or situation to the public. After showcasing the problem, it would be good to describe what actions have currently taken place. This means explaining who the DNER has already talked with, as well as explaining that they have some ideas and a proposed plan. It is imperative to emphasize the word "proposed" and to make it clear that feedback on the plan is desired and that nothing is definite.

During this discussion the DNER should take the opportunity to explain how issues and concerns have been met by this design. It is also important to note the concessions that have been made on the part of individual stakeholders, so that each person can see what others have given up in the process as well. Also, it would be beneficial for the community to see the advantages of the development of the project, as previously discussed. If ideas are offered as to how the community will benefit from the project, they will be more likely to accept it. After explaining the problems and some ideas for solutions, the DNER should then ask the people at the meeting for their thoughts. As with the focus groups, gathering thoughts and opinions from those present should be the main goal of this meeting. The DNER should simply listen and answer questions, without trying to sell their ideas or convince people of the benefits and advantages of the project. People at the meeting should know that the DNER is there to hear their thoughts, and will respond thoughtfully to them at future meetings. People should be on hand to take notes on all that is said, and again tape recording may be useful to complement the note taking. At the end of this meeting the DNER should explain that they will review and analyze everyone's ideas and try to incorporate them into a new design; again emphasizing that this design will not be final. People should be made aware that another set of focus groups as well as another similar meeting will soon be held to showcase the new design and to gather more input.



#### 4. Conduct Additional Focus Groups.

The second set of focus groups should consist of the same groups of stakeholders as previously established. It may also be beneficial to hold one other focus group, with one member present from each of the previous groups. These focus groups should be conducted in the same way as the first set. However, instead of opening up with the main problem, potential changes for the preliminary design are discussed and any concerns or opinions are heard regarding this design.

#### 5. Hold Additional Public Forum.

The second public forum should again be targeted at the general public as well as the key stakeholders. At this meeting you want to reassure the public that their opinion is important in solving the problem. They must also be reassured that the new designs are simply proposed plans to present to them some more ideas, and that you want their additional help to make it most beneficial to them. At this meeting collect more information and discuss what actions have already been taken to appease some of the issues from the last meeting. The meeting can be run in a similar fashion to the first so that all parties involved are familiar with the flow and are comfortable speaking.

Depending on the results of the focus groups and the public meetings, there should be established a general idea of how the public is feeling about the project and how complete the project designs have become. At this time a decision must be made as to whether or not all issues have been considered and whether additional focus groups and public forums are necessary. If it is determined that sufficient public participation has occurred, it may be time to move forward with the permitting process or possible construction of the project. In this case, public and interested stakeholders should be made aware of the final designs, plans, and details of the permitting process. If the results are poor because of much resistance, it may be time to reconsider the effectiveness of the project. These decisions will ultimately be made by the leading organization.

#### 6. Notes on Possible Opposition.

Some instances may arise where a potential site is a very good site physically, but strong opposition from the community is holding back development opportunities. If a community is addressed with its needs put first, and the development is portrayed as being advantageous for the community first and for the leading organization second, then most communities will accept the project. However, in the cases where a community refuses any development, decisions must be made. If any sort of alternative site is nearby, and that site is suitable for development then it may be wise to target this site for development. It would not be advantageous for the DNER to develop a site surrounded by strong community opposition if other suitable alternatives exist.