
MAY 1993

**FLOOD CONTROL PROJECT
RIO PUERTO NUEVO
SAN JUAN AND GUAYNABO
PUERTO RICO**

ENVIRONMENTAL ASSESSMENT



**US Army Corps
of Engineers**
Jacksonville District
South Atlantic Division



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
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REPLY TO
ATTENTION OF

FINDING OF NO SIGNIFICANT IMPACT

FLOOD CONTROL PROJECT
RIO PUERTO NUEVO, PUERTO RICO

I have reviewed the Environmental Assessment (EA) for the proposed action. Based on information analyzed in the EA, reflecting pertinent information obtained from other agencies and special interest groups having jurisdiction by law and/or special expertise, I conclude that the proposed action will have no significant impact on the quality of the human environment. Reasons for this conclusion are, in summary:

1. A final Environmental Impact Statement for the Río Puerto Nuevo Flood Control project was filed in December of 1985. The project was authorized under the Water Resources Development Act of 1986. The attached EA discusses design modifications to the authorized project, and responds to unresolved issues deferred at the time of the FEIS for discussion during the design phase of the project.
2. There will be no impacts to endangered or threatened species as a result of project construction or related activities, including disposal of excavated materials and wetlands mitigation.
3. In consultation with the State Historic Preservation Officer, surveys will be conducted to identify significant cultural sites under the footprint of the modified project. Any sites identified will be studied and required mitigation will be completed prior to project construction.
4. Commonwealth of Puerto Rico water quality standards will be met and Commonwealth certification of water quality is expected.
5. The proposed project has been determined to be consistent with the Puerto Rico Coastal Zone Management Program.
6. Measures to reduce, avoid and mitigate for impacts to fish and wildlife habitats have been incorporated into the project. The wetlands mitigation plan will replace high quality mangrove habitat unavoidably impacted by the project footprint at a ratio of 1.5:1.

In consideration of the information summarized, I find that the proposed action will not significantly affect the human environment, and does not require a Supplemental Environmental Impact Statement.

30 JULY 92
Date



TERRENCE C. SALT
Colonel, Corps of Engineers
Commanding

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**ENVIRONMENTAL ASSESSMENT
and
FINDING OF NO SIGNIFICANT IMPACT
For GENERAL DESIGN MEMORANDUM
RIO PUERTO NUEVO FLOOD CONTROL PROJECT**

**U. S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT**

MAY 1993

ENVIRONMENTAL ASSESSMENT RIO PUERTO NUEVO, PUERTO RICO

1.00 SUMMARY. This Environment Assessment updates prior environmental documents and compliance of the Río Puerto Nuevo Flood Control Project, located along 11.2 miles of the Río Puerto Nuevo and its tributaries Quebrada Margarita, Quebrada Doña Ana, Quebrada Josefina, Quebrada Buena Vista and Quebrada Guaracanal, in San Juan and Guaynabo, Puerto Rico. A Final Environmental Impact Statement (FEIS) was filed in December of 1985. The Río Puerto Nuevo Project was authorized by the 1986 Water Resources Development Act. The present Environmental Assessment discusses changes in project design, impacts and/or mitigation actions subsequent to the FEIS and Congressional authorization, and responds to changes in environmental laws and regulations. This Assessment evaluates project NEPA (National Environmental Policy Act) compliance at the present stage of development. It also shows environmental commitments made during and subsequent to the completion of the Environmental Impact Statement Review. The level of protection of the project (100-year floods) has remained unchanged. Predicted project impacts, undefined or changed since circulation of the FEIS, include disturbance to a parking lot associated with an identified historic site and removal of about 20.5 acres (in contrast to the FEIS estimate of 33 acres) of mangrove wetlands along downstream tidal reaches, due to channel widening. Mitigation for cultural resources impacts will include a survey to assess significance and avoidance of any significant materials if possible or data recovery prior to project construction; this strategy has been accepted by the Puerto Rico SHPO. A mangrove mitigation plan (Attachment B) proposes creating 30 acres of mixed mangrove along the lower Puerto Nuevo channel behind the bulkheads and adjacent to the Margarita Channel disposal area. This mangrove mitigation plan incorporates many recommendations made by the U.S. Fish and Wildlife Service, EPA and other cooperating resource agencies, as well as responding to agency comments on the plan discussed in the EIS, and has been accepted by FWS, NMFS, USEPA and the local sponsor.

Project construction requires excavation of 6.5 million cubic yards of material from tidal and upstream channels. An estimated 3.3 million cubic yards of materials will be disposed of at the San Juan designated Offshore Disposal Site (Fig. EA-1). Material ineligible for offshore disposal will be deposited at upland sites.

A linear park will be built along the channel in cooperation with the Puerto Rico National Parks Trust. A recreational bikeway, cost-shared with the Department of Natural Resources, is included in the park design.

Data, tables and figures included in the General Design Memorandum (GDM) are incorporated by reference into this Environmental Assessment (EA). Commentary received on the EA is included at Attachment A.

2.00 INTRODUCTION: PROPOSED ACTION, LOCATION, PRIOR NEPA DOCUMENTATION AND COMMITMENTS.

2.01 DESCRIPTION OF THE PROPOSED ACTION: The recommended plan consists of improvements to 11.2 miles of the existing channel of Río Puerto Nuevo - Río Piedras and five tributaries (Quebrada Margarita, Quebrada Doña Ana, Quebrada Josefina, Quebrada Buena Vista and Quebrada Guaracanal). The plan will provide 0.01 exceedence probability (100-year) flood protection for areas adjacent to the river and the above tributaries. It includes 1.66 miles of bulkheaded trapezoidal channel and 9.54 miles of concrete rectangular channel. Additional features include two baffle pier stilling areas, two high velocity flow junctions with tributary streams (Buena Vista Diversion Channel and Guaracanal Channel), and two upstream debris basins with side-overflow spillways. Some of the mangroves now lining the tidal downstream section of Río Puerto Nuevo and the combined Puerto Nuevo-Martín Peña Channel will be removed by channel widening. The significant Constitution Bridge west parcel will be avoided. Porous concrete king pile and panel bulkhead, similar to bulkheads successfully emplaced in Martín Peña channel, will line most of the tidal section of the channel. The old concrete king pile and bulkhead structures that now line the north side of Martín Peña channel from Parque Central to the channel outlet at San Juan Bay will be removed during channel widening and deposited at an upland site, probably the municipal landfill. An estimated 15.9 acres (6.5 ha) of mangroves will be removed during the first phase of the project (up to the De Diego Expressway Bridge). An additional 4 acres (1.6 ha) of mixed wetlands will be removed by dredging and by deposition of dredged materials in Disposal Area II when the Quebrada Margarita tributary is channeled, leading to a total loss of 20 wetland acres (8 ha). The wetlands mitigation plan developed to compensate for this loss would replace wetlands at a ratio of 1.5:1 (wetlands created:wetlands destroyed). A bicycle path and linear park will be developed along the channel in cooperation with the Puerto Rico National Parks Trust. Cultural resources mitigation work will include archeological data recovery and will be completed according to a mitigation plan developed in coordination with the State Historic Preservation Officer (SHPO), prior to construction.

2.02 LOCATION: The project area is located in metropolitan San Juan, on the north coast of Puerto Rico. The watershed, which covers about 25 square miles, begins in the foothills of Río Piedras and ends at the southeast corner of San Juan Bay. The mouth of the Puerto Nuevo river discharges into the bay through a channel it shares with Martín Peña channel. Portions of some tributaries flow through adjoining Guaynabo municipality.

2.03 PROJECT HISTORY. The Puerto Nuevo River drainage basin is almost completely urban. Originally emptying into San Juan Bay east of Army Terminal Pier (an area now occupied by the Puerto Nuevo Docks), the river was re-routed

to the east in the 1950's to enter San Juan Harbor through Martín Peña Channel. The entire watershed lies within metropolitan San Juan, which has experienced continuous rapid growth since the 1940's. Due to frequent flooding along the river and major tributaries, and at the request of the Government of Puerto Rico, studies for flood mitigation began in 1978, under the authority of Section 204 of the Flood Control Act of 1970. A Survey Report and Draft Environmental Impact Statement were circulated in 1984, and a Final Environmental Impact Statement was filed on December 6, 1985. The Río Puerto Nuevo, Puerto Rico, Flood Control Project was authorized under the Water Resources Development Act of 1986. A preliminary Environmental Assessment documenting post-authorization project changes was coordinated in June, 1992. This Environmental Assessment incorporates and responds to public and agency comments on that draft. A Finding of No Significant Impact (FONSI) was signed on July 30, 1992.

2.04 ORIGINAL ALTERNATIVES ANALYSIS. Many flood damage reduction alternatives were considered during plan formulation, documented in the Study Report and EIS. Non-structural alternatives included flood plain regulation, storm water management, temporary and permanent evacuation and flood proofing. Structural alternatives included channel modification, floodwalls and levees and reservoir alternatives. Among non-structural alternatives, many were found to be in place already (that is, they are part of the "without-project" condition of the area). These include flood insurance and flood plain regulation. Structural alternatives involving mainly levees and floodwalls, or detention in the upstream areas of the watershed, were found not to be feasible because of high real estate costs. Three final plans were evaluated for the river and its tributaries, all based on channel improvements: a 25-year protection plan (Called Plan A), a 100-year protection plan (Plan B) and a plan providing protection against the Standard Project Flood (SPF), called Plan C. Benefit/cost analysis indicated that Plan B offered the highest net annual economic benefits; it was the plan recommended to and approved by the U.S. Congress in the Water Resources Development Act of 1986.

2.05 DESIGN CHANGES SINCE PROJECT AUTHORIZATION. The authorized plan has been revised. Revisions include the deletion of five stilling basins from the various channels and addition of extended reaches of high velocity channel and high velocity confluence junctions. The design level of protection and the project purposes have remained the same. The impact of the project on existing natural resources, including wetlands, is smaller than estimated by the EIS, because the high velocity channels have a narrower footprint. Mudflats described in the EIS at the mouth of Martín Peña Channel, which were expected to be impacted by the Puerto Nuevo project, were removed when the common channel was widened for the (unrelated) San Juan ferry project, formerly called "Agua-Guagua" and now called "Acua-Expreso." A concrete king pile and panel bulkhead system and sheet pile bulkheads have been extended farther upriver,

replacing parts of the unlined trapezoidal earthen channel segment discussed in the Study Report. These pile wall systems will minimize the project's footprint in tidal wetlands and provide a mangrove replanting strip immediately behind the bulkheads at each side of the channel. The Wetlands Mitigation Plan has been revised (Attachment B). It discusses prior losses of wetlands acreage, wetlands impacts of this project, options for on-site mitigation, and proposes compensatory mitigation at a ratio of 1.5:1 (30 acres created or restored : 20 acres impacted). This ratio is based on a consensus of wetlands biologists consulted at a 1991 interagency coordination meeting held in Puerto Rico. Estimates for the quantities of dredged and excavated material have been revised in the light of the above design changes. The Survey Report estimated 1.4 million cubic yards (1.1 million cubic meters) of material would be disposed of in the ocean, while an additional 5.2 million cubic yards (4 million m³) would be deposited in upland disposal sites, for a total of 6.6 million cubic yards of excess excavated materials requiring land or ocean disposal. The General Design Memorandum, prepared in 1991, estimated 3.5 million cubic yards of dredged materials for ocean disposal and 3.0 million cubic yards of other excavated materials for upland disposal, for a total of 6.5 million cubic yards of material. This is a slight reduction in excavated material quantities in comparison to the 1985 study report, although a greater proportion of the material was identified as potentially eligible for ocean disposal. Further material testing and revision of quantity estimates now indicates that 3.3 million cubic yards of materials will be suitable for ocean disposal. Refer to Attachment E (Section 103 Evaluation) for additional information.

2.06 COMMITMENTS MADE IN PRIOR NEPA DOCUMENTS. Commitments were made in the FEIS to (1) Conduct a survey for and recover culturally significant materials in identified historic sites along the project route; (2) develop recreation features, including a bike path and linear park, along segments of the project; (3) track project wetlands impacts and produce a wetlands mitigation plan providing for replacement of wetlands function; (4) conduct environmental testing to assure that dredged materials destined for offshore disposal comply with requirements under the Marine Protection Research and Sanctuaries Act (MPRSA); (5) conduct surveys and testing if necessary to verify the absence of toxic or hazardous materials in areas subject to excavation or dredging; (6) obtain a Water Quality Certificate from the Commonwealth Environmental Quality Board (EQB) when sufficient information on water and sediment quality and a wetlands mitigation plan were available.

3.00 AFFECTED ENVIRONMENT. Synopsis: The Río Puerto Nuevo arises in the wet hills south of San Juan, where average annual rainfall is up to 80" (2000 mm). The basin is under suburban residential and light commercial use up to headwaters; downstream it drains progressively more urbanized and paved areas until it reaches tidewater. Upstream, most land use is for separate single-family residences on small land lots. There are a few larger open spaces, including some

grassy pasture, the stream rights-of-way (generally a mixture of exotic and native grasses and such exotic trees as African tulip, immortelle, albizias, poinciana and other fast-growing species) and playing fields, especially baseball diamonds. The mid-reaches of the main river pass through the University of Puerto Rico's Agricultural Experiment Station, an area of grassy fields and wooded paths almost completely surrounded by densely developed and paved areas including small industries, housing developments, shopping strips, highways and roads, and medium to high rise apartments. Below the Experiment Station the river crosses a series of residential developments and flows under Las Américas Expressway before entering the large green spaces of Luís Muñoz Marín Park. To the north (downstream) of this park, the river runs through a nearly sterile artificial channel past the Municipal Coliseum and Hiram Bithorn Stadium, under Roosevelt Avenue and past the large Nemesio Canales public housing project. Here the river reaches the high tide limit, crosses under the De Diego Expressway and turns sharply to the east. This turn marks the re-routing undertaken in the 1950's, to allow the construction of the Puerto Nuevo dock and industrial area. The river banks from De Diego Expressway to the intersection of Martín Peña channel are rather steep. They support scattered white and black mangrove cover down to the old landfill bridge, and a narrow, linear stand below this point. In Martín Peña channel, cover consists of solid mangrove stands on both bulkheaded channel sides up to the mouth.

Most of the river channel has been highly altered by clearing and grubbing, rechanneling, paving, or other disturbance. Significant resources include historic structures, green areas and corridors, wildlife habitats, native wildlife (mostly represented by bird species), threatened and endangered species, wetlands (estuarine mangroves), and recreational areas. These are described briefly below. The mudflat habitats described in the Biological Assessment appended to the FEIS (Attachment A) were destroyed by an unrelated project. New mudflats, created in compensation, lie northeast of the Puerto Nuevo channel route. Recently expanded during a channel maintenance dredging, they have replaced acreage lost.

3.01 CULTURAL RESOURCES. A cultural resources reconnaissance was conducted in 1980 to determine the potential for locating cultural resources in the Rio Puerto Nuevo Flood Control Project Area. (A Cultural Resources Reconnaissance of Five Projects in Puerto Rico). The report recommended further examination of three areas. One, the historic Norzagaray Bridge, will not be affected by the project. The remaining two areas encompassed approximately 27.8 hectares (68.7 acres) and were subjected to a more intensive field investigation (A Cultural Resources Reconnaissance and Survey of the Rio Puerto Nuevo Flood Control Project, San Juan, Puerto Rico, prepared by Garrow and Associates, Inc., February 1989). No significant resources were found in most of the areas examined. The majority of the land has been disturbed by urbanization

or agriculture. One site was deemed eligible for the National Register of Historic Places (NRHP). This site includes Hacienda San José, an early to mid-nineteenth century sugar processing plant, and old water filtration works.

3.02 AESTHETIC RESOURCES. Because of the dense urbanization of metropolitan San Juan, where about half of Puerto Rico's 3.9 million residents live, green spaces are at a premium. Land lots of single family houses tend to be very small and are generally occupied up to zoning limits by structures. Community parks, required by Planning regulations in each new housing development, have traditionally been interpreted as playing fields (generally, a baseball diamond or basketball court). In this context, green spaces are especially important to the quality of both the human and the natural environment. The main channel and tributaries of the Puerto Nuevo provide vital green corridors from their headwaters, through the large parks of the mid-river, to the mangrove-lined estuarine channels leading to the bay. Although not all residential communities have incorporated the stream channels into community public spaces (some merely fence them out of their backyards), others, including University Gardens in Río Piedras, have landscaped the river bank and use these public lands for passive recreation. The strips of green along both banks provide a wildlife corridor between larger habitat areas like the Botanic Garden and Experiment Station and other areas like the large Muñoz Marín Park downstream, while they afford human residents some visual relief from an otherwise concrete-dominated landscape.

3.03 BIOLOGICAL RESOURCES. Wildlife diversity is moderate to low along the Puerto Nuevo, even in upstream reaches. Upland areas are generally a mixture of abandoned pastures, suburban or rural housing and new suburban developments, some very dense. The largest area of tree-covered wildlife habitat along the upper river is found inside the grounds of the University of Puerto Rico Agricultural Experiment Station. The Station, in addition to housing the President of the University of Puerto Rico, agriculture and forestry libraries and laboratories, preserves, on its extreme south side, a small stand of native mesic forest dominated by *algarrobo* Hymenea courbaril. It also includes, to the south of Highway 1, a small botanic garden, collections of bamboo and palm species, and, north of Highway 1, some experimental fields used for test and demonstration plots. An enlarged botanical garden is planned for this sector; it appears on San Juan Soil Conservation District maps as prime farmland although its present use is public rather than agricultural. Other green areas along the lower main river include the large Luís Muñoz Marín Park (off Piñeiro Avenue) and, north of the De Diego Expressway, small but significant stands of black, white and red mangroves. Wildlife resources are mainly associated with these green areas and with the green strips that directly line the middle river. These strips serve as wildlife corridors for small land animals, particularly amphibians, lizards and non-flying invertebrates. In addition to well-known feral urban fauna like city pigeons,

cats, dogs, mongoose, rats and mice, open green areas also support a considerable avian population dominated by seed, nectar and insect-eaters, including finches, bananaquits, grassquits, kingbirds, ground and zenaida doves, European rock doves, anis and others. At least one pair of red-tailed hawks generally patrols the lower river, usually nesting somewhere on the grounds of the Experiment Station. The Station, especially the south parcel, and the University of Puerto Rico main campus (nearby but not affected by the project) provide the best avian forest habitat in urban San Juan, due mainly to the large numbers of mature trees preserved there. Any green space, however, offers some wildlife habitat. Exotic bird species are common and are often associated with the wooded or grassy parts of the river corridor; they may include whydahs, many species of finches, parakeets, conures and some introduced parrots. Migratory birds often seen, even in the city, include waterthrushes, peregrine falcon, warblers, kingfishers and the spotted sandpiper. Herpetofauna includes the large exotic toad Bufo marinus, the white-lipped frog, and lizards including the common grass anole, the tree anole Anolis cristatellus and the ground lizard Ameiva exsul.

The mangrove forests at the mouth of the Puerto Nuevo and other remnant stands along the old river channel are the most important wildlife habitat area under the project footprint. These estuarine forests support a variety of insect life, both in the canopy and on the ground. They provide cover, shade, elevated perches and food for a great diversity of bird species, including residents, transient migrants and regular winter residents. Martín Peña Channel and Puerto Nuevo River mangroves, though reduced in area compared to earlier years, still provide significant habitat for resident birds and invertebrates. All of the locally resident waders (herons, egrets and rails) can be readily observed in the area (Refer to Biological Assessment, Appendix A, for a list of bird species observed). In the autumn, remnant sand and mudflats on the western bay shore adjacent to the river are visited by flocks of shorebirds, including western and least sandpipers, dowitchers, yellowlegs, turnstones and several plover species. The mudflat area, recently refurbished, is reduced functionally in comparison to the pre-1987 condition, however, and shorebirds are no longer observed by the hundreds, as they were prior to the dredging and bulkheading of Martín Peña channel. The upper Puerto Nuevo tidal reach, above the Martín Peña junction, never yielded high census counts, probably because the mangroves occurred as a thin line immediately adjacent to the shore.

Fish fauna of the Puerto Nuevo is depauperate in the tidal reaches, probably a reflection of poor water quality and low dissolved oxygen levels. Surveys conducted by the Department of Natural Resources in 1982 (O. Díaz *et al.* 1983) identified 8 species of largely estuarine fish in the lower channel near the bay, including small tarpon, snook and several mojarra species. Upstream fish fauna includes the introduced Tilapia as well as other common species like bigmouth sleeper, guppies, mosquitofish and white mullet.

3.04 ENDANGERED SPECIES. In informal consultation with the U.S. Fish and Wildlife Service (FWS), the yellow shouldered blackbird (Agelaius xanthomus, E) and the brown pelican (Pelecanus occidentalis, T) were identified as listed species whose known range includes the project area, while endangered sea turtles were identified by the National Marine Fisheries Service (NMFS), but not by FWS, as present in the area.

After evaluating the habitat requirements and/or population status of the above species, the U.S. Army Corps of Engineers determined that no significant impact on these species would occur due to the authorized project. Brown pelicans are known to loaf and roost in all mangrove areas around San Juan's many bays and lagoons. In the early 1980's when mangrove cover was greater both east and west of the Puerto Nuevo River mouth, large flocks of these pelicans commonly rested on the channel mouth mangrove trees. In 1987, mangroves were cut back on both sides of the combined Martín Peña channel - Puerto Nuevo River mouth for the San Juan Ferry Project (the former "Agua-Guagua" project, now called "Acua-expreso"). Later still, in late September, 1989, hurricane Hugo severely damaged these trees. After the hurricane a mangrove die-back occurred throughout northeastern Puerto Rico, thought to be a belated consequence of salt burn or bark stripping caused by hurricane winds, compounded by subsequent drought stress. The Puerto Nuevo mangroves have regenerated well and by early 1993 they had stems and shoots up to 25 feet tall, but shoots are still thin and apparently not strong enough to support pelicans. In early May, 1991, the Martín Peña channel ferries began operation. Now, constant passenger ferry traffic through the channel interferes with pelican fishing in the bay at the channel mouth. Fewer pelicans now use the river mouth than in the early 1980's, undoubtedly because of all of the above changes. A few resting pelicans were observed on mangroves during brief field visits in October and December, 1991 and pelican guano was found on the tops of the concrete bulkheading on both sides of the channel, indicating that the birds may be using channel king piles as substitute resting sites. The birds that rest near the channel mouth probably feed in adjacent San Juan Bay and opportunistically use any sturdy, elevated support to rest between fishing, for they can also be seen on channel navigation towers and buoys.

One yellow-shouldered blackbird nest was observed in a royal palm tree in Parque Central adjacent to the Martín Peña channel in 1979-1980, and a search in the mangroves subsequently found more birds. (FWS Biological Assessment 1980, Attachment A). This nest had been under observation by DNR personnel at the time. (J. Moreno, PR DNR Endangered Species Coordinator, telcom. 11/21/91). It is probable that blackbirds nested in the Puerto Nuevo mangroves up until the late 1970's, since mangroves are a favorite habitat. The Yellow-shouldered blackbird, once common in coastal Puerto Rico, began to suffer a dramatic population decline in the 1970's, leading to its designation as endangered in 1976.

Experts believe its precarious status is due to nest parasitism by the shiny cowbird, a recent invader of the Caribbean. The islandwide blackbird population was decreasing in 1980. In spite of energetic recovery efforts, including cowbird control practices, the blackbird population has not recovered significantly nor expanded into former habitat areas. Sightings outside of the southwestern Puerto Rico core habitat are now unusual. The birds disperse widely after the nesting season and they can basically appear almost anywhere in Puerto Rico, including San Juan. Although blackbirds have been sighted on several occasions during the 1980's in the greater San Juan area, none are known to have nested in Martín Peña or Río Puerto Nuevo since 1982, in spite of repeated and intensive searches by ornithologists in this area, which is highly accessible and visible. No blackbirds were observed in Puerto Nuevo or Martín Peña mangroves during October and December, 1991, field visits.

The National Marine Fisheries Service identified endangered sea turtles as species of concern on the Puerto Nuevo Project. The Corps initiated consultation on endangered marine turtles under the Endangered Species Act in June, 1991. Three species of sea turtles (leatherback, green and hawksbill) are commonly observed in waters adjacent to the north coast of Puerto Rico: The endangered leatherback (*Dermochelys coriacea*) is seen mainly during its nesting season (March-June) and is believed to return to northern waters. It does not typically enter shallow river estuaries or backwaters. The endangered green turtle (*Chelonia mydas*) nests very rarely in Puerto Rico but is quite commonly observed in nearshore waters as juveniles and subadults (Rathbun *et al.* 1985). The hawksbill (*Eretmochelys imbricata*) is also endangered and is often observed in nearshore waters near reefs and soft coral bottoms. Of these species, subadult green turtles (10-12" diameter) are sometimes observed in Puerto Rican estuaries including Culebra's bays and Boca de Cangrejos. In its letter response to informal Section 7 consultation in July, 1991, NMFS stated that sea turtles may occur in the Puerto Nuevo channel (Attachment A). However, recent consultation with local experts indicated that no species of marine turtle uses Martín Peña channel waters (PR DNR and USFWS, December 1991 telcom and verbal consultation). No turtle sightings have been reported. Additional information on Río Puerto Nuevo water chemistry and habitat suitability was provided NMFS in March 1992; concurrence with the U.S. Army Corps of Engineers determination that no turtles were likely to be present inside the Channel or River was received on March 26, 1992. It is recognized that all three of the above marine turtle species may be present, seasonally or all year, in the surface waters of the designated Offshore Disposal Site. Standard precautions applicable to dredge operators at offshore disposal sites in waters inhabited by sea turtles will be observed.

3.05 WETLANDS. Freshwater wetlands remnants exist in protected areas, including the Botanical Garden and Muñoz Marín Park, but none are to be impacted by the project. However, the mangrove-dominated tidal wetlands found

along the Puerto Nuevo and in adjacent basins are extremely valuable in both human and wildlife terms, as they represent the last remnant of a once extensive forest that stretched from the present center of Cataño, along the whole south shore of San Juan Bay, in a solid, gently curving wall that reached Santurce. Some of these lands once formed part of the San Juan Insular Forest, but most have been filled to create uplands (for port or airport use) or removed to widen open water channels. A large percentage of the City of San Juan's public infrastructure, including the municipal landfill, animal shelter, Municipal Public Works Department, Nemesio Canales housing project, the Ochoa ferry terminal, parts of Parque Central, the central Puerto Nuevo Sewage Treatment Plant, and the entire Puerto Nuevo port facilities (docks, parking areas and road network) were built over dredged and deposited fill in what once were the Martín Peña-Río Puerto Nuevo mangroves. Both banks of the present lower Puerto Nuevo River, below Highway PR-22 (De Diego Expressway) were originally mangrove (tidal) wetlands. The triangle parcel between Puerto Nuevo and Martín Peña channels ("Disposal Area # 1") is an old (diked) dredge materials disposal area, while the San Juan Municipal landfill, which now forms a low hill bounding the opposite Puerto Nuevo bank, was established in a mangrove swamp.

The remnants of this mangrove forest are now confined to the bay shore just east and west of the joint Martín Peña - Puerto Nuevo channel mouth, lining the Martín Peña channel east to the Barbosa Avenue bridge, as basin stands around Tres Monjitas channel (Hato Rey), in the Bechara area (including Disposal area 2 of this project) and as several isolated stands near Kennedy Avenue. The 1980 Biological Assessment (Reproduced in Attachment A, Coordination) prepared under the Fish and Wildlife Coordination Act for the Puerto Nuevo Survey Report by the Fish and Wildlife Service, identified the remnant mangroves as highly significant wetlands, in spite of their limited structural development. According to this study, most are secondary or new growth over recent delta deposits. The downstream end of the stand was dominated by red mangroves, while black and white mangroves became dominant in upstream progression.

The "Constitution Bridge Mudflats" (an area encompassing both unvegetated and mangrove-dominated shallows) is the name locally given to the mangrove stands located on both sides of the channel, downstream from the Kennedy Avenue bridge. This site was recognized by Commonwealth planning and resource agencies in the early 1970's as an area requiring special management. However, The Coastal Zone Management Plan for Puerto Rico, approved in 1978, recognized the site as a Coastal Natural Reserve while noting that development of the "Martín Peña Channel project" (ultimately called "Acua-Expreso:" the Martín Peña ferry project) would be given priority over preservation (Puerto Rico Coastal Management Programs and Final EIS, 1978). It also stated that mangroves were invading former mudflats and converting the entire site to

mangrove, reducing its value for sea-and shorebirds. The southwest side of the Constitution Avenue Bridge site is still a "priority acquisition site" on the Puerto Rico Natural Heritage Program's priority wetlands list, as well as appearing on the Fish and Wildlife Service Southeastern Wetlands Priority List. According to the Puerto Rico Ports Authority, this agency has registered title to the west-side mangroves and will preserve them as mitigation for other projects (refer to Appendix A).

Today, white and black mangroves dominate the entire stand. Unlike red mangroves, these species can regenerate after cutting or breakage. Examination of old maps and aerial photos shows that mangroves were completely absent on the bay side of Kennedy Avenue in 1950, when the Constitution Bridge crossed a shallow cove of San Juan Bay. Essentially all of the mudflat and mangrove acreage north of this bridge has grown out over river sediments deposited during the past 35 years. In the 1950's the Río Puerto Nuevo, which once reached San Juan Bay near the west end of the present Puerto Nuevo docks, was diverted into Martín Peña; this must have increased the suspended sediment load and accelerated the mudflat-building process. The mudflats first described by H. Raffaele (1976, 1979) in the mid-1970's were, unknown to him, less than 20 years old. The area had already been altered by fill deposited for Central Park and the Puerto Nuevo docks (east and west side of the bridge, respectively) when the Final Coastal Zone Management Plan was approved (1978). Almost the entire northeastern spit was removed by the 1987 Martín Peña dredging, yet the spit appears to have rebuilt through consolidation of fine sediments and mangrove colonization between 1987 and the present. The trees are already regenerating vigorously after weathering the 90+ mph winds of Hurricane Hugo in September 1989, and the recently completed first maintenance dredging of Martín Peña channel has added new fine material on which more mangrove stands can be expected to grow. It seems reasonable to conclude that shoaling in this area has been a continual process, somewhat aided and accelerated by manmade fills, and that it will continue into the foreseeable future. Mangrove acreage (vegetated mudflats) is expected to increase, while unvegetated mudflat acreage is expected to decrease.

Tidal wetlands provide many benefits in addition to their wildlife habitat value. As noted, the mangrove trees are capable of extremely rapid growth, during which their extensive superficial root systems stabilize fine sediments and absorb some of the excess nutrients from the water column. Although pollution and high turbidities limit the fish nursery functions of these stands, they do export large quantities of particulate and dissolved organic matter to San Juan Bay and the nearshore Atlantic. Dense stems and pneumatophores serve as a strainer, settling coarse floating material out of channels and encouraging sedimentation. These mangroves are still foraging and resting habitat for many species of

northern migrants, including warblers, waterthrushes, kingfishers, bitterns and rails.

3.06 AIR QUALITY. The western part of the metropolitan San Juan basin is a non-attainment area. The major causes of air pollution are two oil-fired electric generating plants (Palo Seco and Puerto Nuevo), personal and commercial motor vehicles emitting hydrocarbons, particulates and sulfur compounds, and marine-derived aerosols. Although the predominant trade winds blow strongly from the east during most of the year, periods of calm, downslope ("land breeze") early morning winds and thermal inversions can cause episodes of moderate air pollution.

3.07 WATER QUALITY. The quality of water in the lower Puerto Nuevo channel has been described in reports of the Puerto Rico Environmental Quality Board (Lebrón *et al.* 1977) as poor. This waterway is in violation of local and federal standards for total and fecal coliforms, turbidity and other parameters most of the time. As described in the 1980 FWS Biological Assessment (Attachment A), several major storm sewers empty into either the Puerto Nuevo or Martín Peña channel. Runoff from the municipal landfill also reaches the river, as does storm drainage from the Matadero Industrial Park (drained by Margarita Creek). Water quality at the offshore disposal site is good (refer to Paragraph 3.08).

3.08 EXISTING OFFSHORE DISPOSAL SITE. The San Juan Offshore Disposal Site is located in the Atlantic Ocean, about 2 miles north of Isla de Cabras. (Fig EA-1, following page). This designated offshore disposal site was previously used for marine disposal of dredged material from San Juan Harbor and part of the materials dredged from Martín Peña channel. Water depth is 700 to 1,200 feet. Water and sediment samples collected for the Rio Puerto Nuevo Project were tested according to regulations promulgated under Section 103 of the Marine Protection Research and Sanctuaries Act. Results indicated the site is capable of accepting the material proposed for offshore disposal.

3.09. NOISE. The entire length of the river and its tributaries lie in an area characterized by the high ambient noise levels typical of city roads and freeways, truck traffic, and urban life. Exceptions are upstream segments that pass through residential areas.

3.10 HAZARDOUS AND TOXIC WASTE. The San Juan municipal landfill is located on a site northwest of the curve of the Puerto Nuevo, south of Avenida Kennedy and north of the junction with Caño Martín Peña. At an earlier design



Figure EA-1
San Juan Harbor Navigation Project
PROJECT AND OFFSHORE
DISPOSAL AREA LOCATIONS

U.S. Army Corps of Engineers
 Jacksonville District

stage it appeared that the project would cross a corner of this site. Realignment of the channel for hydraulic reasons allowed it to be routed to the southeast, away from the area. Although the municipality also used the triangular parcel across the river (the first disposal area, see GDM Plate S-2), preliminary investigations indicated that this site contains only clean material (including deposits of material from earlier dredging) and concrete rubble. No areas known to contain hazardous and toxic waste are believed to lie under the project footprint, either in upstream or downstream reaches.

3.11 COASTAL BARRIER RESOURCES. Puerto Rico was added to the Coastal Barrier Resources System by the 1990 amendments to the Coastal Barrier Resources Act. No designated Coastal Barrier segments lie in the project area.

3.12 PRIME AND UNIQUE FARMLAND SOILS. The Prime and Unique Farmlands Soils map for the San Juan Soil Conservation District (U.S. SCS 1982) shows two areas of prime farmland soils along the project: all the soils of the University of Puerto Rico Agricultural Experiment Station at Río Piedras (now dedicated to a Botanical Garden, small research plantings and University buildings and structures) and the soils of Luís Muñoz Marín Park in Hato Rey. Both parcels are already dedicated to public use. Neither of these parcels is now being used for commercial agriculture, nor is it remotely likely that either will ever be so used in the future. A form AD-1006 was exchanged with the Soil Conservation Service, with an assessment of the impact of channel construction over 28 acres of the soils (refer to Attachment A, Coordination). Although SCS made no comment on present soil use, the Corps has requested that these parcels be removed from the "Prime Farmland Soils" classification when the map is next revised.

3.13 RECREATION. Recreation opportunities along the river and its tributaries are limited to the large parks operated by the University of Puerto Rico (the "Jardín Botánico" or Botanical Garden, on the Experiment Station Grounds south of Highway 1 in Río Piedras ward) and Puerto Rico National Parks Trust (Luís Muñoz Marín Park on Piñeiro Avenue in Hato Rey ward and Parque Central or Central Park in Santurce) and to neighborhood ball courts and paths. Bicycling is a popular activity, but it is perceived as somewhat dangerous on city streets with their heavy traffic, and generally undertaken only on holidays when traffic is light, or in specially escorted large groups. The two large parks noted above are presently separated by more than a mile of high speed highways and busy streets. Bike paths are a rarity in San Juan.

There is a large concentration of people living in the San Juan metropolitan area interested in bicycling for recreation or willing to use bicycles as a means of transportation. This group has grown in size and will continue to grow over the next quarter century (Puerto Rico State Comprehensive Outdoor

Recreation Plan [SCORP]). In fact, many kinds of active outdoor activity have grown in popularity as people become more exercise-conscious. Biking, walking and jogging are activities that now generate a demand for developed paths or trails in excess of the available resources. The Puerto Nuevo project links the two large green areas of the University Experiment Station and Muñoz Marín Park, providing an unique opportunity for linkage and an alternate connector separate from vehicular traffic. The Puerto Nuevo Project Bicycle Path and Linear Park will be part of an overall system that will eventually stretch into old San Juan from a site south of the Botanic Gardens.

4.00 ENVIRONMENTAL IMPACTS DUE TO THE PROJECT. Synopsis: a total of 20 acres of mangrove wetlands will be removed in the lower Puerto Nuevo and Margarita channels. The project will cross a parking area associated with the Hacienda San José site, which was assessed as significant, and archeological data recovery will be necessary at this site. Large sections of grassy or shrub-covered sloping banks will be replaced by concrete vertical-walled channels in upstream and midstream reaches. A linear park and bicycle path paralleling the channel improvements is planned in cooperation with the Department of Natural Resources. This park will provide visual relief from the concrete walled channel and maintain greenbelt corridors. Construction of the project will generate 7.5 million cubic yards of material. Contract 1 will generate 2.8 million cubic yards, of which 2.5 million cubic yards are to be disposed of in the ocean. Disposal areas have been designated for upstream stages. Dredged material generated under Contracts 1 and 2, in excess of that disposable on land and eligible for offshore disposal, after testing, will be deposited at the designated offshore disposal site. Old concrete king pile and panel materials removed during the widening of Martín Peña channel will be disposed of at an upland site, probably the municipal landfill. Material excavated during later stages will be deposited at Disposal Area 1 (Plate S-2) and Disposal Area 2 (Plate S-8). A borrow site has not yet been identified for upstream construction, but use of a commercial source is planned. There are active quarries in reasonable proximity. If no commercial source is identified, additional documentation for this activity will be completed under the National Environmental Policy Act (NEPA) when the borrow site is identified at the appropriate stage in project development. Dewatering in conjunction with channel improvements will not result in point discharges into wetlands other than the main channels themselves; NPDES permits will be obtained, if necessary, at appropriate construction stages. No lands containing toxic or hazardous waste are known to exist along the project route, which does not intersect the sanitary landfill along the north shore of the Puerto Nuevo as earlier alignments threatened to do. The project will not significantly impact known threatened or endangered species or their habitats, coastal barriers, or significant estuaries. Mitigation for wetlands losses will be achieved by mangrove creation and enhancement along the tidal channel of the Puerto Nuevo, as well as adjacent to Disposal Area 2 (north of Caño Margarita). The University of Puerto Rico

Botanic Garden and Luís Muñoz Marín Park soils are mapped as Prime Farmlands in the San Juan Soil Conservation District, and consultation has been initiated with SCS on the project footprint through these areas.

4.01 CULTURAL RESOURCES IMPACTS. Cultural resources surveys found no significant resources in most of the areas examined intensively. The majority of land has either been disturbed by urbanization or sugar cane fields. The State Historic Preservation Officer (SHPO) agreed with the assessment of significance for the Hacienda San José Site, which includes a nineteenth century sugar processing plant and old water filtration works. The standing structures of this site will not be affected, but there will be some impacts to the parking lot near the water works and to an adjacent diked area. Additional archeological surveys and data recovery will be necessary. A mitigation plan will be developed in consultation with the SHPO. Mitigation will be completed prior to construction, in compliance with the Archeological and Historic Preservation Act, as amended, and with Executive Order 11593. In a letter dated May 19, 1992, the SHPO concurred with this plan.

4.02 AESTHETIC IMPACTS. As noted, replacement of vegetated earthen slopes of the existing channel by vertical-walled concrete or concrete-faced sheet pile structures could have a negative impact on the visual environment of the residential and public areas abutting the river. However, plans developed in cooperation with the Commonwealth Department of Natural Resources and the Fideicomiso de Parques Nacionales (P.R. National Parks Trust) call for construction of a linear park and bikeway, to become part of a network of linear parks stretching from south of the Botanic Gardens to Old San Juan. The cost-shared portion of the bikeway will follow the channel right of way from south of Highway 1 in the Agricultural Station to Parque Luís Muñoz Marín in Hato Rey. (Refer to GDM Plate R-1). Visual screening of the concrete channel will be provided with berms and ornamental vegetation. Large trees will be preserved wherever feasible.

4.03 EFFECTS ON BIOLOGICAL RESOURCES. No lasting significant impacts are expected on fish resources or wildlife of upland areas. As noted in Paragraph 3.03, species present are typical of urban and suburban areas. Existing fish fauna will be displaced to adjacent undisturbed areas during construction; but populations are expected to recover once structures are in place. The linear park and bikeway, to be planned and planted with suitable ornamentals, can become an asset to bird observation as well as the recreational life of the city. However, habitat for species requiring shallow banks, such as the native freshwater turtle, will diminish along the project route. Due to the highly urban character of all surrounding lands, this loss is considered insignificant.

Dredging will increase depth and frequency of flushing in the tidal reaches of the main river and the new Margarita channel. This should increase habitat for salt water and estuarine fish, and the greater volume of water in the channels should assist in flushing contaminants from urban storm drainage out of the system. Growth is expected to be rapid in the replanted mangrove strips, due to high nutrient availability.

4.04 EFFECTS ON THREATENED OR ENDANGERED SPECIES. The Corps determined that dredging and ocean disposal of dredged materials would have no effect on marine turtles. This determination was based on information indicating no marine turtle presence in the channels to be dredged and adoption of standard conditions to avoid impacts at the offshore disposal site. NMFS concurred with this finding in March, 1992 (Appendix A), providing standard conditions for disposal operations at the offshore site. Dredging will be mechanical on this project. In the tidal section, a clamshell or bucket dredge will operate from a barge. Upstream, the same type of equipment will operate from channel banks. No scientific data or observations suggest that sea turtles regularly or even occasionally enter the Puerto Nuevo River or Martín Peña channel estuarine zone.

No significant impacts are expected on either the brown pelican or the yellow shouldered blackbird as a result of the proposed tidal channel widening, even though 16 acres of mangroves will be destroyed. The reason for the Corps' conclusion of no significant impact is that only a few pelicans use this stand as a resting area, and no blackbirds have been seen there since 1981. There is no designated critical habitat for either the pelican or the blackbird in San Juan Bay. The Puerto Rican population of brown pelicans nests on an offshore island near Vieques, and on some cays near La Parguera in southwestern Puerto Rico, but not in or near San Juan (Collazo and Klaas 1985). Although the mangroves at the river mouth were sometimes used by large groups of pelicans in the early 1980's, only a handful of birds appear to rest in the area at present. Existing mangroves were damaged in 1987 by channel widening and again in 1989 by Hurricane Hugo, and have not fully recovered their structure, although they are growing vigorously. Furthermore, pelican fishing in the channel immediately outside the Puerto Nuevo mouth is now somewhat impeded by the constant ferry traffic through the channel itself. The yellow shouldered blackbird apparently nested in these mangroves in the late 1970's, and one nest was found in 1980, but the bird has since disappeared from the area except as an occasional visitor. (J. Moreno, P.R. DNR, 1991 telcom.). Disappearance of the yellow shouldered blackbird as a nesting species from the north coast is not directly related to habitat changes in Martín Peña channel, since it was gone in 1983, when Department of Natural Resources biologists conducted extensive and intensive searches for birds and nests, during data collection for the ferry channel project

(Díaz et al., 1983). FWS concurred with the Corps determination of no adverse impact on August 5, 1992.

4.05 EFFECTS ON WETLANDS. No significant effects on riparian or floodplain wetlands are expected as a result of project construction. Basically, the Puerto Nuevo River and its major tributaries drain a basin that has been almost totally paved-over during the past half century. Adoption of a vertical-walled channel section allows the new channel to be built largely within the present course by deepening, rather than widening, the river's footprint. The few parklike areas along the river will remain or be enhanced. Tidal wetlands (mangroves) will be affected, however. Planimetry over 1990 survey maps, spot checked against aerial photographs and by walkovers of doubtful areas, showed that 15.9 acres of mangroves will be cut away by channel widening planned under Contract 1, from the river mouth to the De Diego expressway bridge (Attachment B, Mitigation Plan, Table 1). An estimated 4 additional acres will be lost along the Margarita channel route and in the adjacent disposal area, under Contract 2. The estimate of 16 acres impact during Contract 1 is a considerable reduction from the estimates cited in the FWS Biological Assessment (Attachment A). The reasons for the decrease in mangrove area (and the present project's impact) are (1) some acreage of mangroves was lost from both the northeast and southwest banks of the Puerto Nuevo, north of Constitution Bridge, when the "Agua-Guagua" ferry route was dredged in Martín Peña channel during 1987 and 1991; (2) the channel of the present project has been slightly realigned to the east, reducing impacts on existing mangrove wetlands on the north(west) bank upstream from Constitution Bridge; (3) it appears that the landfill itself has expanded into the mangroves somewhat on its southeast and south sides; (4) Margarita channel and parts of the old Puerto Nuevo River were cleaned by the municipality in the late 1980's. Some mangrove stands were cleared or reduced during this cleaning and grubbing.

It also appears that prior estimates of mangrove coverage may have been in error. Planimetry of the parcel southwest of Constitution Bridge (the "Constitution Bridge Mudflats"), in Ports Authority property, showed an area (in mangroves and mudflats) of only 7.5 acres, not 7.5 ha as estimated in earlier documents.

During Contract 2, about 4 acres of mangrove wetlands will be removed to construct the new Margarita channel and its tie-in to the Puerto Nuevo estuary, and by deposit of dredged material over Disposal Site 2. Most of the rest of Disposal Site 2 was described by FWS in 1980 as "marginal" land dominated by a mix of wetland and upland species; this description still applies to most of the site, which supports a dense vegetation that includes exotic albizias, grasslands, leather ferns and other species. At the suggestion of the mitigation panel consulted in October, 1991, the area near the proposed disposal area (the "Rupert Armstrong"

parcel) was examined. It was determined that a total of 15.7 acres are available for enhancement and replanting to mangroves.

The mitigation plan proposed in this document (Attachment B) proposes creation of 30 acres of mangrove, to replace the 20.5 acres removed by channel widening, in two stages. Under Contract 1, which will cover the main river channel up to the De Diego Expressway, 16 acres of mixed (white, black and red) mangroves will be destroyed. Replanting strips, illustrated in Plate S-2, will be to red mangroves downstream from the Constitution Bridge, white and black mangroves above this bridge and along the northwest bank upstream from the landfill; about 14.1 acres of mitigation will be built on project lands during Contract 1. During Contract 2 the remaining mitigation acreage (16.7 acres) will be prepared and planted. Planting techniques and spacing are detailed in the mitigation plan (they vary, depending on the species planted). Standard monitoring requirements applicable to EPA-endorsed wetlands Individual Permits will apply: monitoring will be for five years, and achievement of 80% cover will denote success. Given the abundant rainfall and high nutrient status of this estuary, only inadequate prior grading and leveling are likely to impede successful wetlands establishment; problems with establishing cover are expected to appear during the initial 2 year period, and would require remedial action.

4.06 EFFECTS ON AIR QUALITY. No significant impacts on air quality should occur as a result of the project. Equipment operated by contractors will be in compliance with all federal and Commonwealth emissions standards.

4.07 EFFECTS ON WATER QUALITY. Dredging in the river channel will cause transient increases in suspended solids and turbidity, possibly leading to lowered dissolved oxygen levels. These parameters will return to without-project levels or improve due to removal of sediment oxygen demand when the project is finished. Deepening and widening of the channel will increase tidal flushing of the estuary. Contractors will be required to comply with all applicable Federal and Commonwealth Water Quality Regulations, including preparation of a Plan for Control of Erosion and Sedimentation (Plan CEST).

Water Quality Certification (WQC) will be requested from the Commonwealth of Puerto Rico. The Corps has reviewed the WQC criteria and standards and is coordinating the project with PR EQB. All present indications are that certification will be granted. When the mitigation plan is accepted and material sampling results are available, sufficient information will be available to allow for application for a WQC. NPDES permits are required for channel clearing and grubbing and may be required for dewatering discharges. This documentation will be prepared at the appropriate contract stages.

4.08 EFFECTS OF DISPOSAL ON THE OFFSHORE DISPOSAL SITE. All eligible materials from the lower (tidal) portions of the Rio Puerto Nuevo and the Margarita Channel are destined for offshore disposal in the San Juan Ocean Dredged Material Disposal Site (ODMDS). The San Juan ODMDS is a designated ODMDS located approximately one-and-one-half miles offshore from San Juan Harbor. Though most of the material planned for disposal is virgin material, EPA expressed concerns about the suitability of the material. The Section 103 evaluation report was submitted to EPA in August, 1992, and concurrence from EPA for ocean disposal of 3.3 million cubic yards of this dredged material was received in October, 1992 (Attachment D).

Most of the excess excavated material that would be removed from channel bottoms and sides in upstream areas (and disposed of in upland sites) is virgin material. This material is expected to present no problems. No known contaminated areas occur along upstream reaches of the project. Should new information concerning such areas arise, testing will be conducted according to applicable regulations and supplementary environmental documentation will be prepared for the disposal site and methods chosen.

4.09 EFFECTS ON AMBIENT NOISE. The noise level along many reaches of the river and its tributaries is already rather high. This is especially true in the reaches covered under Contracts 1 and 2. No special noise abatement precautions are believed necessary in areas where no residences occur, as is true of the river downstream of the Las Américas bridges. However, in residential areas all applicable regulations of the Environmental Quality Board regarding maximum noise levels and hours of operation will be strictly followed.

4.10 IMPACT ON TOXIC AND HAZARDOUS WASTE SITES. Preliminary concerns with this item centered on the possibility of excavating material buried in the municipal landfill adjacent to the lower reaches of the river. Initial design documents showed the excavation cutting through the landfill significantly at one bend in the alignment. Design changes were made that eliminated a great deal of this problem by avoiding the landfill. Review, to date, on information from the upper reaches of the project indicates that modifications will be made primarily within the confines of the existing channel boundaries. No information has been found showing areas that may contain or may have been contaminated with hazardous and toxic wastes.

Borrow required for upper reach channel improvements will probably be obtained from a commercial source (existing quarry), eliminating the likelihood of using prior contaminated material.

4.11 IMPACT ON COASTAL BARRIERS. No designated Coastal Barrier Reserves occur along the project.

4.12 IMPACT ON PRIME AND UNIQUE FARMLAND. The channel crosses two areas mapped as "Prime Farmland" in the San Juan District. A total of 28 acres will be converted to channels, in Luís Muñoz Marín Park and on the north side of the University of Puerto Rico Experiment Station. A form AD-1006 was exchanged with the Soil Conservation Service in San Juan. There will be no impact on existing agriculture, since both parcels are public lands dedicated to recreation and education. The Corps of Engineers requested that the Service consider reclassifying the impacted parcels to reflect their current status as public lands dedicated to educational and recreational use rather than agriculture.

4.12 RECREATIONAL DEVELOPMENT. The bikeway plan is described in detail in Chapter N (Recreation) of the General Design Memorandum, and Figure R-1 shows the proposed bikeway route. The Puerto Nuevo bicycle path and linear park will be a major link in the bicycle and linear park system being planned as part of the 500th anniversary celebration of the discovery of the Americas in 1992. The Department of Natural Resources has committed to this flood control project and has signed a letter of intent to cost share in its completion. Completion of the bikeway system will greatly improve safe biking opportunities in metropolitan San Juan.

5.00 ENVIRONMENTAL COMMITMENTS.

The Corps and contractors commit to avoiding, minimizing or mitigating for adverse effects during construction activities by including the following commitments in the project contract specifications:

(1) Avoid any potential impact to marine turtles at the offshore disposal site. The Contractor will conduct a short information program for its employees regarding pertinent aspects of sea turtle protection. This program will include appropriate materials to familiarize all employees involved in offshore disposal with sea turtles, habits, endangered status, and associated penalties. The contractor will instruct all personnel associated with the project about the presence of endangered turtles and the need to avoid collisions with them.

(2) Dredge personnel and Corps dredge inspectors will post a lookout on vessels when operating near or in the Offshore Disposal Area to aid in locating sea turtles. All personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing any endangered species which are protected under the Endangered Species Act of 1973, as amended, and the Marine Mammal Protection Act of 1972.

(3) There are no known recent observations to suggest that yellow shouldered blackbirds presently use the mangroves in the vicinity of the Puerto Nuevo River estuary. A sight survey was conducted during the winter '91-92

season, with negative results. If nesting birds are found during construction, all activity will be stopped immediately and consultation on this species will be re-initiated with the Boquerón Field Office, U.S. Fish and Wildlife Service.

(4) Detailed archeological survey and data recovery operations will be conducted in the parking lot area of the Water Filtration Plant site prior to beginning construction on this river segment. Survey operations will be fully coordinated with SHPO and the property owner, Puerto Rico Aqueducts and Sewers Authority (PRASA).

(5) A mangrove mitigation plan (Attachment B) is being circulated with this Environmental Assessment and General Design Memorandum. This mitigation plan has been sent to all cooperating resource agencies. The Corps is committed to seek complete replacement of mangrove functional values on the project. Mitigation will be entirely on site, will be by creation and restoration of mangroves and it will involve grading to no more than +0.4 foot msl. Planting will be as follows: red mangroves on 1 m centers north of Constitution Bridge and around Parque Central; black and white mangroves (broadcast sewn) along the Puerto Nuevo above the Martín Peña junction; white and black or black mangroves near Margarita Creek and the Rupert Armstrong parcel. Monitoring will continue for five years and require 80% survival in the red mangroves; 80% cover will be required for the black/white mangrove plantings. A total of 30 acres of mangrove wetlands is proposed for creation or enhancement.

6.00 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

6.01 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 AS AMENDED (NEPA). A Draft Environmental Impact Statement was circulated in 1984. The Final EIS was filed in December, 1985. This Environmental Assessment (EA) updates compliance of the project with NEPA and other environmental laws and regulations. The project was authorized in the Water Resources Development Act of 1986. An EPA letter of January 1986 requested that the Corps re-evaluate wetlands mitigation during the design phase; more specifically, that the Corps consider constructing mudflats for mitigation, and look for alternatives to preservation of the Constitution Bridge west parcel to reach 1:1 replacement of wetlands functions. This Environmental Assessment includes a new wetlands mitigation plan that does not count preservation of the west parcel as part of the mitigation, and discusses post authorization changes in the project and the natural and man-made environment. The EPA's request for consideration of mudflat creation has been addressed: the mudflats, removed during channel widening for the ferry project in 1987, have been replaced by created mudflats at a site immediately to the east. No additional space is available near the project. The present project will not destroy mudflat acreage.

6.02 ENDANGERED SPECIES ACT OF 1973 AS AMENDED (ESA). Informal consultation was initiated with the U.S. Fish and Wildlife Service on June 13, 1991. Formal consultation concluded on August 5, 1992, when a letter of concurrence with the U.S. Army Corps of Engineers Determination of No Significant Impact was issued by FWS. The Service identified two endangered avian species, the brown pelican and the yellow shouldered blackbird, as formerly present and potentially vulnerable to project impacts. The Corps provided response in the preliminary EA. The yellow shouldered blackbird no longer nests in the San Juan area and the brown pelican roosts in other areas of the bay, for the reasons noted in EA Paragraph 3.04. Contractors will be advised of the potential presence of these species, and work will stop and consultation will be re-initiated if nests of either species are found. However, all available information indicates that such an outcome is highly unlikely.

The National Marine Fisheries Service was consulted on impacts to marine turtles at the ODMDS site. A Biological Assessment and determination of no significant adverse effects were submitted to NMFS in July of 1991. A letter of conditional concurrence was received on September 12, 1991, and a letter stating concurrence was received on March 26, 1992 (Attachment A). The U.S. Army Corps of Engineers and its contractors will implement the recommended precautionary measures to avoid any adverse impact on sea turtles at the ODMDS site.

6.03 FISH AND WILDLIFE COORDINATION ACT, AS AMENDED. A Biological Assessment was prepared by the U.S. Fish and Wildlife Service (FWS) for the project Environmental Impact Statement. Re-coordination with FWS began in September, 1991. A Coordination meeting, primarily to discuss wetlands mitigation issues, was held in San Juan on October 1, 1991. This meeting was attended by representatives of the Department of Natural Resources, Fish and Wildlife Research Area, U.S. EPA Caribbean Field Office, FWS (Boquerón Field Office), and the Corps (Planning Division). The condition of existing stands of mangroves along the river was discussed (floristics, structure, wetlands function and wildlife habitat value). Based on this group assessment, a mitigation ratio of 1.5:1 was recommended, on the understanding that 5-10 years would be required to reach full canopy closure and habitat value for the newly created stands, and that some residual loss of function was likely, because circulation or sheet water flow would be somewhat restricted behind the bulkheads.

The mitigation plan discussed at Attachment B shows a projected wetlands loss of 20 acres of mixed mangrove and black mangrove stands. The loss will be replaced by 30 acres of planted mixed and black mangroves. The Service stated its acceptance of the mitigation plan in a Coordination Act letter dated August 4, 1992. Coordination will continue through completion of the First and Second

Feature Design Memoranda, plans and specifications, and construction and monitoring of the mitigation areas.

6.04 ARCHEOLOGICAL AND HISTORIC PRESERVATION ACT, AS AMENDED. The project will be in full compliance with this law, and with Executive Order 11593, prior to construction. A mitigation plan will be developed in consultation with the SHPO, for archeological data recovery in the identified significant site. The Puerto Rico SHPO has agreed to this approach (Attachment A, Coordination).

6.05 CLEAN WATER ACT OF 1972, AS AMENDED. The project is now in full compliance with the Clean Water Act and Puerto Rico's Water Quality Standards Regulation, as amended. A water quality certificate (WQC) was received from the Puerto Rico Environmental Quality Board (EQB) on May 21, 1993.

Should NPDES Permits be required for dewatering activities during construction of channel improvements, documentation will be prepared and permits applied for at the appropriate contract stages. All known dewatering activities will either occur within the channel with discharge to the channel, or, if offsite, as in Disposal Areas 1 & 2, discharge will be to the channel.

6.06 CLEAN AIR ACT OF 1972, AS AMENDED. The Corps and its contractors will comply with all provisions of this law and with regulations of the Commonwealth of Puerto Rico Environmental Quality Board, Air Quality Division. No Federal permits will be required for this project.

6.07 COASTAL ZONE MANAGEMENT ACT OF 1972, AS AMENDED. The project was evaluated in accordance with Puerto Rico Planning Board guidelines for Federal projects in the coastal zone of Puerto Rico, pursuant to Puerto Rico's approved Coastal Zone Management Plan, and determined to be consistent with this Plan (Attachment C). The CZMP recognizes coastal flood hazards as an area of serious government concern. The Puerto Nuevo project is an approved flood control project of the government of Puerto Rico, as reflected in the Master Flood Control Plan of 1989 (PR DNR, 1989). The Puerto Rico Planning Board (PRPB) concurred with the consistency determination in August, 1992.

6.08 FARMLAND PROTECTION POLICY ACT OF 1981. Consultation with the San Juan Office, USDA Soil Conservation Service, was begun in May, 1992, with submission of a Form AD-1006. Twenty-eight acres of prime farmland soils will be impacted, but these soils are on sites permanently dedicated to public use (parkland and University property). Since mapped Prime Farmlands on the project route are no longer in agricultural use and are incapable of returning to this use, The Corps has determined that no impact on agricultural productivity

will occur, and has notified SCS that it recommends revision of the San Juan Soil District maps.

6.09 WILD AND SCENIC RIVER ACT OF 1968, AS AMENDED. This law is not applicable. There are no designated Wild and Scenic river reaches in Puerto Rico.

6.10 MARINE MAMMAL PROTECTION ACT OF 1972, AS AMENDED. No impacts on species protected under this law are likely. Therefore, this project is in compliance.

6.11 FEDERAL WATER PROJECT RECREATION ACT, AS AMENDED. The principles of the Federal Water Project Recreation Act (PL 89-72) as amended, have been fulfilled by considering recreation potential and complying with the recreation cost sharing criteria.

6.12 RESOURCE CONSERVATION AND RECOVERY ACT OF 1976. Information presently available indicates that no items regulated under this law are either proposed for disposal or affected by this project.

6.13 TOXIC SUBSTANCES CONTROL ACT OF 1976. Information presently available indicates that no items regulated under this law are either proposed for disposal or affected by this project.

6.14. EXECUTIVE ORDER #11990, PROTECTION OF WETLANDS. Twenty acres of mangrove wetlands will be affected by the project (most will be converted to open water channels; about 3.5 acres, located in Disposal Area 2, will be converted to uplands). A Wetlands Mitigation Plan providing for the creation of 30 acres of mangroves by grading and replanting lands adjacent to the channel and disposal site is included in GDM Appendix B. The Río Puerto Nuevo Project is water-related; the present plan and channel alignments reflect the smallest possible mangrove wetlands impact consistent with providing 100 year flood protection, and provide for protection of the highest-value remaining mangrove stand near the river mouth (the Constitution Bridge West parcel), while replacing impacted mangrove stands at a 1.5:1 ratio. This project is in compliance with the goals of the above Executive Order.

6.15 EXECUTIVE ORDER #11988, FLOODPLAIN MANAGEMENT. Most of the channel alterations that form the essence of this project will occur in the flood plain of the Puerto Nuevo/Río Piedras. This floodplain is sited at the core of the developed San Juan metropolitan area. The purpose of the project is not to make additional areas available for development, since no such areas exist along the project route, but rather to avoid serious and recurring damage to developed

properties and hazard to human safety as a result of floods along the river. This project is in compliance with the goals of the above Executive Order.

6.16 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT. A section 103 environmental evaluation of the proposed dredged material has been completed in compliance with MRPSA and forwarded to EPA, Region II. The Corps determined that this material is suitable for disposal at the designated ocean disposal area; EPA stated its concurrence on October 13, 1992 (refer to Attachment D).

7.00 COORDINATION. This EA, including a Proposed Finding of No Significant Impact (FONSI), was circulated in Draft form to agencies and interested publics in beginning in June, 1992. The FONSI was signed on July 30, 1992. Refer to Attachment A (Coordination) for a list of receiving agencies. A Spanish language summary was submitted to the Puerto Rico Environmental Quality Board (EQB) in August, 1992. EQB accepted the EA on November 4, 1992. The draft wetlands mitigation plan was provided to the following cooperating agencies: Puerto Rico Department of Natural Resources, Technical Guidance Division (Research Area) and Design Division, Flood Control Area; U.S. EPA, Water Division, San Juan Field Office and Environmental Impacts Branch, Region II; U.S. Fish and Wildlife Service, Boquerón Field Office, Puerto Rico; National Marine Fisheries Service, Environmental Branch, Panama City.

The Draft EA constituted part of interagency endangered species coordination. Conditional concurrence on the Corps determination of no impact on endangered marine turtles was received from NMFS prior to Draft EA circulation, in March 1992. Concurrence from FWS on species under this agency's jurisdiction was received on August 5, 1992.

Coordination with the SHPO will continue. SHPO approved a later date for recovery of cultural materials from upstream historically significant sites, in a letter dated May 19, 1992, shortly prior to circulation of the Draft EA. This recovery will be completed in consultation with SHPO prior to project construction.

7.01 COMMENT AND RESPONSE. Attachment A (Coordination) includes a copy of the letter of transmittal of the preliminary EA and a list of the recipients. Comments were received from U.S. EPA (Marine and Wetlands Protection Branch, Environmental Impacts Branch), FWS (Boquerón Field Office), National Marine Fisheries Service (NMFS), Puerto Rico DNR, Puerto Rico Environmental Quality Board, Puerto Rico Planning Board, Puerto Rico Electric Power Authority, Puerto Rico Ports Authority, and Aqueduct and Sewer Authority (2 letters). Comments, keyed to originating agency, are summarized and responded

to below. A more detailed response to the U.S. EPA letter is included in Attachment A.

1 (U.S. EPA, 2 letters): EPA requested clarification of the quantities of material to be ocean-and land-disposed and more discussion of beneficial uses of dredged and excavated materials on uplands, as, for instance, agricultural soil amendment. It also questioned why environmental assessment of post-authorization project changes led to a Finding of No Significant Impact (FONSI) rather than a Supplement to the Final EIS, .

Response: a letter response was forwarded to US EPA, Region II, Environmental Impacts Branch, on April 5, 1993. The letter response is included in Attachment A (Coordination). The Corps' evaluation of post-authorization project changes showed that these changes would most probably lead to a reduction rather than an increase in environmental impacts, and that remaining adverse impacts could be adequately mitigated for on or immediately adjacent to the project; therefore, a FONSI was the appropriate document. A comparison of quantity estimates of dredged and excavated material in the present GDM versus the Study Report showed that total (dredged + excavated) material volume has decreased slightly, while more material than previously estimated was found eligible for ocean disposal. This information is discussed in revised EA Paragraphs 2.05 (Post-authorization Design Changes), 4.08 (Impacts of offshore disposal) and Attachment D (Section 103 Report). Some of the dredged material may be suitable for mudflat creation or substrate improvement in the mangrove creation areas, and it will be so used to the maximum extent practical; but a large volume of material will still require ocean disposal. None of the soil in the tidal channels would be suitable for agricultural use due to salt content.

2. (National Marine Fisheries Service, NMFS, 3 letters): NMFS emitted conditional endangered species concurrence in 1991 and modified its concurrence to remove sea turtle monitoring conditions at the dredging site in early 1992, as documented in the preliminary EA. Additional comments on the EA and wetlands mitigation plan were received in July 1992. NMFS would prefer that wetlands mitigation by creation be accomplished prior to or concurrently with the construction project causing the impacts. NMFS also requested additional information on details of mangrove planting and grading of the site.

Response: The revised Wetlands Mitigation Plan is responsive to NMFS' comments. Timing of mangrove creation and planting is discussed explicitly (mitigation areas will be built during the same Contract as the channel excavation and bulkheading, but must occur after the dredging is done and the bulkheads are in place on each segment). The Corps welcomes additional input on the mitigation plan, and will continue close coordination with interested parties.

3. (U.S. Fish and Wildlife Service, FWS, 2 letters): FWS considered the revised wetlands mitigation plan "acceptable" but requested that the Corps continue to consider creating additional mangrove wetlands habitat on the area seaward of the Kennedy Ave. Bridge, with the rationale that this area offers the best potential for tidal flushing and wildlife habitat creation. FWS also concurred with the Corps' determination that the project would not cause adverse impacts to listed endangered species.

Response: The Corps concurs that tidal flushing will be most favorable for creation of red mangrove habitat near the channel mouth; if planting of mangroves over the mudflats created for the earlier Martín Peña channel is acceptable to USEPA and DNR, the co-sponsor, this possibility will be explored further during development of the first Feature Design Memorandum for the project. This would allow beneficial use of some of the dredged material to be removed from the tidal channel, since further raising and lateral expansion of the mudflat may prove necessary.

4. (Puerto Rico Environmental Quality Board), letter of acceptance and translation): EQB accepted the EA/FONSI as adequate, allowing application for a Water Quality Certificate. The Corps and its cooperators will continue to obtain permits and coordinate with the Board as required. The WQC was issued on May 21, 1993.

8.00 PUBLIC INVOLVEMENT. A series of public meetings and hearings was held on the Environmental Impact Statement previously circulated for this project. This Draft Environmental Assessment was available for a thirty (30) day public review. No public comments were received.

9.00 LIST OF PREPARERS. This EA was prepared by: Barbara Cintrón, Biologist and principal author; USACE; Robert Pennington, Biologist, USACE; Annon Bozeman, Recreation Planner, USACE; Rona Mazer, Anthropologist, USACE; James McAdams, Environmental Engineer, USACE.

10.00 REFERENCES

Cardona, Julio E. and M. Rivera. 1988. Critical Coastal Wildlife Areas of Puerto Rico. Puerto Rico Department of Natural Resources, Research Area, Wildlife Section. Report for the Coastal Zone Management Program (Task 7.3). 84 pp., maps.

Collazo, J.A. & E. Klaas. 1985. Status and ecology of the brown pelican in the Greater Puerto Rican Bank region. Final report to the Puerto Rico Department of Natural Resources. Iowa Cooperative Fish and Wildlife Research Unit. Iowa State University, Ames, Ia.

Díaz, O., J.A. Colón and B. Cintrón. 1983. Inventory of the flora and fauna of Martín Peña Channel. Report by the Technical Assessment Division, P.R. Department of Natural Resources, for the P.R. Highways Authority "Agua-Guagua" project. San Juan, P.R. 65 pp., tables and figs.

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Puerto Rico Department of Natural Resources and National Oceanic and Atmospheric Administration (NOAA). 1978. Puerto Rico Coastal Management Program and Final Environmental Impact Statement. San Juan, P.R. Appendix C, p. C-1.

Raffaele, H., Duffield, J.M. and J. Moreno. 1979. Critical Wildlife Areas of Puerto Rico. Puerto Rico Department of Natural Resources, Planning Area, Division of Wildlife Planning. San Juan, P.R. 89 pp., maps.

Rathbun, G., T. Carr, N. Carr and C.A. Woods. 1985. The distribution of manatees and sea turtles in Puerto Rico, with emphasis on Roosevelt Roads Naval Station. Draft Report prepared by the U.S. Fish and Wildlife Service and the Florida State Museum for the Atlantic Division, Naval Facilities Engineering Command, Norfolk, Va.

U.S. Army Corps of Engineers, Mobile District. A Cultural Resources Reconnaissance of Five Projects in Puerto Rico. Ms. on File, U.S. Army Corps of Engineers, Jacksonville, Fl.

ATTACHMENT A
COORDINATION

Letter of transmittal of the preliminary EA and FONSI to interested agencies.



REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019
June 26, 1992

TO ADDRESSEES ON THE ATTACHED LIST:

Enclosed is a copy of the Draft Environmental Assessment prepared for the Rio Puerto Nuevo Flood Control Project in San Juan and Guaynabo, Puerto Rico, for your review and comment. The project was the subject of a Final Environmental Impact Statement filed in December of 1985, and was authorized by the Water Resources Development Act of 1986. The Environmental Assessment documents continued project compliance with environmental laws, regulations and Executive Orders. A Preliminary Finding of No Significant Environmental Impact (FONSI) is included in the document.

In order to be considered, your comments should be submitted to the above address within 30 calendar days of the above date.

Sincerely,

A handwritten signature in cursive script, reading "A. J. Salem", is positioned above the typed name.

A. J. Salem
Chief, Planning Division

Enclosure

RIO PUERTO NUEVO, PUERTO RICO

MAILING LIST

Hon. Rafael Hernandez Colon Governor of Puerto Rico La Fortaleza Box 52 San Juan Puerto Rico 00901	Secretary P.R. Department of Agriculture P.O. Box 10163 Santurce PR 00908
Commonwealth of Puerto Rico Office of the Governor Federal Affairs Office La Fortaleza San Juan PR 00901-1793	Executive Director PR Land Authority PO Box 9745 Santurce PR 00908
Commowealth of Puerto Rico Office of the Governor Infrastructure Coordinator La Fortaleza San Juan PR 00901	Secretary PR Department of Education PO Box 759 Hato Rey PR 00919
President Puerto Rico Environmental Quality Board PO Box 11488 Santurce PR 00919	Executive Director PR Ports Authority GPO Box 2829 San Juan PR 00936-2829
President Puerto Rico Planning Board PO Box 41119 Minillas Sta San Juan PR 00940-9985	Administrator PR Economic Development Admin PO Box 2350 San Juan PR 00936
Director, Neg de Usos de Terrenos Puerto Rico Planning Board PO Box 41119, Minillas Sta Santurce PR 00940	Secretary PR Department of Housing PO Box W Rio Piedras PR 00928
Director, Commonwealth of PR Office of Budget and Management Box 3228 San Juan Puerto Rico 00904	Director Rural Housing Administration PO Box 2390 Hato Rey PR 00919
Administrator PR Permits and Regulations Admin PO Box 41179 Minillas Sta Santurce PR 00940	Executive Director Public Buildings Authority Box 41029 Santurce PR 00940
Secretary PR Department of Natural Resources PO Box 5887 Pta de Tierra Sta San Juan PR 00906	State Historic Preservation Officer La Fortaleza PO Box 82 San Juan PR 00901
	Executive Director PR Electric Power Auth GPO Box 4267 San Juan PR 00936-4267

President Puerto Rico Telephone Co GPO Box 998 San Juan PR 00936	Director, Center for Investigations Institute of Puerto Rican Culture Box 4184 San Juan PR 00905
Administrator Municipal Services Administration P.O. Box 70167 San Juan, Puerto Rico 00936	Puerto Rico Conservation Foundation O'Neill #11, Altos Hato Rey PR 00918
President, Puerto Rico Senate PO Box 3431 San Juan Puerto Rico 00904	Puerto Rico Conservation Trust P.O Box 4747 San Juan PR 00902-4747
President, Puerto Rico House of Representatives PO Box 2228 San Juan Puerto Rico 00901	President PR Engineers and Surveyors Assn GPO Box 3845 San Juan PR 00936
Secretary Puerto Rico Department of Health Call Box 70184 San Juan Puerto Rico 00936	Natural History Soc of PR Box 1036 GPO San Juan PR 00936
Executive Director Puerto Rico Land Administration GPO Box 36-3767 San Juan PR 00901	District Chief US Geological Survey GPO Box 4424 San Juan PR 00936
Superintendant Puerto Rico Police Department GPO Box 70166 San Juan PR 00936	Field Supervisor Caribbean Field Office US Fish and Wildlife Service PO Box 491 Boqueron PR 00622
President Puerto Rico Telephone Company GPO Box 998 San Juan PR 00936	Supervisor US EPA Caribbean Field Office 1413 Fernandez Juncos Ave Podiatric Center Suite 2A Santurce PR 00909
President PR Industrial Development Company GPO Box 2350 San Juan PR 00936	Director Caribbean Area Office USDA Soil Conservation Service PO Box 364868 San Juan PR 00936-4868
Secretary PR Department of Transportation and Public Works PO Box 41269 Minillas Sta Santurce PR 00940	National Marine Fisheries Service Environmental Assessment Branch 3500 Delwood Beach Road Panama City FL 32407-7499
Secretary PR Dept of Recreation and Sports PO Box 3207 San Juan PR 00902	

National Marine Fisheries Service
Habitat Conservation Div F-SER 1
9450 Koger Blvd
St Petersburg Fl 33702

Commander (OAN)
Seventh Coast Guard District
909 SE 1st Avenue
Brickell Plaza Federal Bldg.
Miami FL 33131-3050

Regional Director
U.S. Fish and Wildlife Service
75 Spring Street SW
Atlanta, Ga 30303-3376

Puerto Rico Resident Commissioner
US House of Representatives
427 Cannon House Office Bldg
Washington DC 20515

Chief Environmental Impacts Branch
Environmental Protection Agency
26 Federal Plaza Rm 400
New York NY 10278-0001

Director Dept of the Interior
Office of Environmental Proj Review
Rm 4241 19th and C St NW
Washington DC 20240

Director Off Federal Activities
Environmental Protection Agency
401 M St SW
Washington DC 20024-2610

Federal Maritime Commission
Environmental Impact
1100 L St NW
Washington DC 20005-4013

Responses to the preliminary EA and mitigation proposals.

Documents are arranged in the following order: Federal Agency comments grouped by agency; Commonwealth of Puerto Rico agency comments grouped by agency. Responses follow letters of comment.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

JACOB K. JAVITS FEDERAL BUILDING

NEW YORK, NEW YORK 10278

0 1992

Salem
Planning Division
Sonville District
Army Corps of Engineers
Box 4970
Sonville, Florida 32232-0019

Mr. Salem:

Environmental Protection Agency (EPA) has reviewed the preliminary environmental assessment (EA) for the Rio Puerto flood control project. The preliminary EA's preferred alternative involves construction of 1.66 miles of bulkheaded azoidal channel and 9.54 miles of concrete rectangular dike to achieve 100-year flood protection along the Rio Puerto in Puerto Rico.

The proposed project would generate 7.5 million cubic yards of material. Some of this material would be designated for upland disposal; the portion eligible for offshore disposal would be sited in the San Juan dredged material disposal site (DMDS). Implementation of the preferred alternative would also require loss of 20 acres of mangroves; however, the preliminary EA uses a 1.5:1 replacement for the mangroves lost as a result of the project. Based on our review of the preliminary EA, we have the following comments.

The proposed action was first described in an August 1984 draft environmental impact statement (EIS). The design phase of the project was initiated after the close of the final EIS comment period. It is apparent from our review of the preliminary EA that the proposed project is significantly different from the project evaluated in the final EIS. Most notably, the project identified in the preliminary EA will generate more than five times the volume of excavated material as the project discussed in the final EIS. In light of these modifications, we request that the U.S. Army Corps of Engineers (ACE) provide an explanation as to why an EA was prepared for the proposed project, not a supplemental EIS.

It should be noted that during our review of the preliminary EA, we received additional information from the ACE regarding the material to be excavated from the Rio Puerto Nuevo and Margarita channels. Based on our review of this information, we believe that excavated material could be considered as dredged material and therefore, be regulated by the ACE under Section 103 of the

2

Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972. Nevertheless, the preliminary EA does not characterize the material to be excavated, nor discuss the volumes to be upland and ocean disposed.

Moreover, although the preliminary EA states that a 103 evaluation has been forwarded to EPA Region II, we have not received or reviewed a Section 103 evaluation for this proposed project. Accordingly, we recommend that the ACE provide a Section 103 evaluation in future project documentation that includes: a demonstration that there is no practicable alternative to ocean disposal; evidence that the material proposed for ocean disposal is dredged material; chemical and biological test results on the material proposed for ocean disposal; the quantity of material proposed for ocean disposal; and a discussion of disposal options for any excavated material that is found to be unsuitable for ocean disposal.

In a related matter, we believe that a portion of the 7.5 million cubic yards of excavated material could be used to benefit upland areas within Puerto Rico. For example, this material could potentially be used to replenish soils that have undergone erosion, or as an effective landfill cover at the San Juan Landfill. Accordingly, in addition to the ocean disposal alternative, we recommend that project documentation discuss the feasibility of beneficial use of the excavated materials.

In conclusion, EPA has environmental concerns regarding the implementation of this project based on insufficient information provided in the preliminary EA. Accordingly, we recommend that the information outlined above be provided in a supplemental environmental document prepared pursuant to the National Environmental Policy Act (NEPA). Moreover, we request that the supplemental NEPA document explain the ACE's rationale for issuing an EA as opposed to a supplemental EIS for this proposed action.

If you have any questions, please contact me at (212) 264-1892 or John Filippelli, Chief, Federal Activities Section, at (212) 264-6723.

Sincerely yours,

Robert W. Hargrove
Robert W. Hargrove, Chief
Environmental Impacts Branch

Response to EPA August 10, 1992, letter:

1. (Rationale for EA/FONSI as appropriate NEPA document).

Response: Based on our review of changes in the project since the Final Environmental Impact Statement was filed in December, 1985, and after conducting an Environmental Assessment of these changes, the U.S. Army Corps of Engineers made a Finding of No Significant Impact for the following reasons:

A. Most post-authorization project changes will lead to reduced environmental impacts. The overall volume of excavated material has not increased threefold, as stated in your letter. The Draft EA, following the 1991 GDM, reflects our intention to dispose of a larger portion of the total material offshore. The Draft EA erroneously reported a total volume of 7.2 million cubic yards (dredged + excavated materials). The correct total, as stated on P. 87 of the General Design Memorandum, is 6.5 million cu. yd. The total volume stated in the 1985 FEIS (Table EIS-2, Plan B, the 100-year plan) was almost identical. Material volumes were expressed in the EIS in metric units. To review: the Revised Final Survey Report/FEIS estimated that 0.99 million m³ (1.3 million cubic yds) would be ocean-disposed, while 4.02 million m³ (5.2 million cubic yds) of other excavated materials would require land disposal, yielding a grand total of 6.5 million cubic yds of excess material for land or ocean disposal. The 1991 GDM estimated that a total of 6.5 million cubic yards of excess materials would be generated; 2.8 million cubic yards of dredged material from the main channel and 0.7 million cubic yards from Margarita channel would be ocean-disposed (a total of 3.5 million cubic yards); the remaining 3 million cubic yards would be disposed of on land. However, based on environmental testing, we now intend to dispose of 3.3 million cubic yards of dredged materials (0.4 m cubic yds from Margarita Channel, downstream of Station 22+00, and 2.9 million cubic yards from the main channel, up to Station 88+33) at the ODMDS, as stated in our 103 evaluation report. There has been a nearly threefold increase in the volume of materials proposed for ocean disposal, but the total estimate of excess excavated materials has not changed from the 1985 survey report.

B. Changes in the project due to design refinements include reductions of the upstream footprints in the main channel and tributaries, in comparison to the project described in the FEIS and authorized by WRDA 1986. These reductions were achieved through elimination of several upstream debris basins, plus width reductions in upper channels due to the high-velocity design, which will be built inside existing channel footprints. Reduction of the project footprint will lead to a lesser impact on roads, bridges, residential and commercial buildings. While the project's footprint over mangroves has also been reduced slightly in comparison to the authorized project, due to re-alignment of the main channel, mangrove mitigation areas have been increased to 30 acres. This change is in

response to recommendations of an interagency committee convened in October, 1991, attended by Ms. Teresa Rodríguez of EPA San Juan. The mitigation ratio will be 1.5:1 as recommended by your agency, among others. The FEIS and authorized project would have replaced only 13.5 acres, even assuming that "protecting" the existing 7.5 acre parcel northwest of the Kennedy Ave bridge would have been "counted" as mitigation. In fact, the old plan really proposed creation of only 6 acres of new mangrove stands, for a ratio of far less than 1:1.

C. Tests conducted on the dredged material proposed for ocean disposal were favorable. The material passed all chemical and biological tests and will not adversely affect the offshore disposal site. EPA concurred with the U.S. Army Corps of Engineers determination in a letter dated October 13, 1992.

D. We have received Federal and Commonwealth agency concurrences with the Draft EA and FONSI. The Puerto Rico Planning Board and DNR have stated that the project is still consistent with the approved Coastal Zone Management Plan. FWS and NMFS have concurred with the Corps determination that the project will not affect any endangered or threatened species; additionally both agencies have accepted the mitigation plan, offering suggestions for its improvement in detail. These suggestions have been incorporated into the plan, a copy of which is hereby provided as Enclosure 1. The State Historic Preservation Officer (SHPO) has accepted our plan to defer further cultural resource studies at the PRASA Rio Piedras laboratory (the old filtration plant) until a subsequent stage of project development.

E. No new environmental quality, cultural or historic resources or resource-related public issues have been described or discovered in the Puerto Nuevo watershed since FEIS filing; furthermore, no additional impacts to known resources are projected on the basis of the known project changes. On the contrary, the quality of the existing (without-project) environment has further declined since FEIS filing, due to continued urban development of adjacent lands (New San Juan Center), shrinkage of endangered species ranges, operation of a ferry in Martín Peña channel, and other natural and human induced disturbances in this highly urban area.

2. Characterization of the material to be excavated; volume to be disposed of in the ocean.

Response: The Section 103 Evaluation (Enclosure 2) briefly discusses the material proposed for ocean disposal. The technical report, on file in your Marine and Wetlands Protection Branch, provides details. Additional details are available in the geologic sections contained in Appendix G to the General Design Memorandum. We have provided a copy of this GDM as Enclosure 3. Page 87 of the GDM ("Disposal of Excavated Materials") states that 3.5 million cubic

yards will be ocean-dumped. We currently estimate disposal of 3.3 million cubic yards in the ocean, as follows: 2.9 million cubic yards from the main channel, from the river mouth up to Station 88+33; and an additional 0.4 million cubic yards from Margarita Channel, between Stations 0+00 to Station 22+00.

3. Request for a copy of the Section 103 (MPRSA) Evaluation Report.

Response: The report is attached as Enclosure 2 to this letter.

4. Consideration of beneficial uses of the excavated material.

Response: The Corps considered all potential beneficial uses of the material to be dredged from subtidal channels and from upstream reaches. For this purpose, the material was divided into material from the tidal channels (salty sediments) and material from more upstream reaches. The tidal channel sediment material is not suitable for beneficial upland uses such as those described in your letter, because it is composed mostly of fine particles, with some peat, highly plastic organic clay and muck. Some of it, including the fill to be removed from the main channel on its east side, upstream of Martín Peña, might be so used, and this possibility will be explored; but volumes involved are too large to use it all for this purpose. These soils are too salty to add to agricultural soil. A further drawback to this alternative is that the entire river basin proposed for this project supports no significant agriculture -- it is a densely populated urban watershed. This is one of the reasons why ocean disposal has been proposed for materials excavated from the tidal channels. All potential beneficial uses of the tidal channel material were given due consideration during preconstruction engineering and design, including the potential to create mudflats in San Juan Bay using the material. However, San Juan Harbor is the busiest port in the Caribbean and suffers from insufficient width and depth in its existing navigation channels, subject of another Corps of Engineers study now underway. The only logical site for additional mudflat creation would have been the shallows area located just east of the common channel mouth, north of Parque Central. This area has already been filled to capacity by man-made mudflats built in partial mitigation for the maintenance dredging of the Martín Peña ferry channel, as related in the mitigation plan. No other suitable area could be identified in San Juan Bay.

Materials excavated from fresh water reaches of the Río Piedras might be suitable, in part, for beneficial uses. The most likely beneficial use would be as cover in the municipal landfill. This potential use will continue to be considered. The problem with using the materials as an agricultural amendment is that the entire watershed up to the end of the project is densely developed. Specifically, any nearby once-eroded agricultural soils have been converted to residential and commercial development. It is probable that only a small part of the total volume of material to be generated might be needed as landfill cover, since the San Juan

landfill is nearing its design capacity, and a replacement will no doubt be located in uplands above the upstream end of the project. The beneficial use of these materials will be constrained by transportation costs.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

JACOB K. JAVITS FEDERAL BUILDING

NEW YORK, NEW YORK 10278

3 1992

Mr. [redacted], Chief
[redacted] Division
Environmental Resources Branch
Jacksonville District Corps of Engineers
Box 4970
Jacksonville, Florida 32232-0019

Re: Salem:


We received the final report on sediment and bioassay tests performed in compliance with Section 103 of the Marine Protection, Research and Sanctuaries Act for the Rio Puerto Nuevo Control Project.

We reviewed the testing results and have determined that the material below Station 22.00 in the Margarita Tributary is suitable for ocean disposal and would not result in an adverse impact on the marine environment. We agree with our staff's determination that the material upstream of Station 22.00 cannot be disposed of in the ocean.

4-12
This determination is limited to the Section 103 evaluation of material for ocean disposal and does not represent the Environmental Protection Agency's (EPA) approval for the material. You are reminded that additional concerns raised in the letter of August 10, 1992 must be addressed.

If you have any questions concerning the August 10, 1992 letter, please contact Robert Hargrove, Chief of the Environmental Resources Branch, at (212) 264-8556. For questions regarding the Section 103 determination you may call Daniel Forger, Chief of the Ocean Programs Section, at (212) 264-5172.

Sincerely,


Daniel Vicario, Chief
Wetlands Protection Branch

Greg Pennington
Jacksonville COE

Response to the October 13, 1992, EPA letter: EPA has accepted the Corps determination that dredged materials from the Puerto Nuevo channel are suitable for ocean disposal at the designated offshore site. Environmental concerns raised in the August letter have been addressed by separate letter (see above) and in this revised Environmental Assessment.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9450 Koger Boulevard
St. Petersburg, Florida 33702

July 24, 1992

Mr. A. J. Salem
Chief, Planning Division
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Salem:

The National Marine Fisheries Service (NMFS) has reviewed the Preliminary Environmental Assessment for the Rio Puerto Nuevo and Guaynabo, Puerto Rico, dated June 1992.

If implemented, the currently proposed project would eliminate approximately 20.5 ac of mangrove wetlands. The original project design has eliminated approximately 33.0 ac of mangrove wetlands. To compensate for the mangrove loss, a total of 33.0 ac of mangrove wetlands would be created/restored along the Rio Puerto Nuevo channel and adjacent to the Mangrove disposal area. If successful, the proposed mitigation would adequately compensate for project impacts to the National Marine Fisheries Service trust resources. Although the mitigation plan includes monitoring and success criteria, we found the plan of time frames for initiating the mitigation.

In view of the above, we concur with the proposed mitigation plan and recommend that mitigation be implemented prior to, or concurrent with, project construction where possible. For those portions of the mitigation which cannot be implemented until project construction is complete, we recommend that the mitigation be initiated within one year of completing the construction.

Thank you for the opportunity to review this document. If we can provide additional assistance, please contact Ms. Shelley Du Puy at the City Branch Office at 904/234-5061.

Sincerely,

Edwin J. Mager, Jr.

Edwin J. Mager, Jr.
Assistant Regional Director
Habitat Conservation Division

CC:
F/S302



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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9450 Koger Boulevard
St. Petersburg, Florida 33702

March 26, 1992 F/SEO13:EH

Mr. A. J. Salem
Chief, Planning Division
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Salem:

This responds to your letter of March 20, 1992 in which you request that we remove or modify conditions mentioned in our September 12, 1991 letter to you re: improvements for flood control for the Rio Puerto Nuevo drainage basin, San Juan, Puerto Rico.

We have reviewed the November 1991 draft Environmental Assessment provided and concur with your determination that populations of endangered/threatened species under our purview would not be adversely affected by the proposed project. We agree that the precautionary measures listed in your July 2, 1991 letter are adequate to minimize potential impacts of the proposed project to listed species, and that a turtle observer need not be stationed on the barge while it is dredging the river. We understand that all conditions applicable to offshore disposal of dredged materials will be strictly observed. Further, we are satisfied with the mitigation measures proposed to offset the destruction of mangrove habitat.

This concludes consultation responsibilities under Section 7 of the ESA. However, consultation should be reinitiated if new information reveals impacts of the identified activity that may affect listed species or their critical habitat, a new species is listed, the identified activity is subsequently modified or critical habitat determined that may be affected by the proposed activity.

If you have any questions regarding this matter please contact Eric Hawk, Fishery Biologist, at (813) 893-3366.

Sincerely,

Charles A. Orave

Charles A. Orave
for Andrew J. Kemmerer
Regional Director



Response to NMFS letter of July 24, 1992: Mitigation of wetlands habitat loss by creation of new mangrove areas will take place during construction contracts 1 and 2; part of the total mitigation acreage will be constructed in each contract. The draft Plan has been revised to specify the time frame for construction. Ideally, after each channel segment is dredged and bulkheaded, grading and planting of mangroves can begin. However, it may be desirable to allow up to 1 year, as suggested in your letter, to take advantage of seasonal availability of propagules. The co-sponsor's Forest Service Area is closely monitoring and contributing to development of the mitigation plan, and will make a decision soon on whether head-starting of propagules may be desirable. We intend to continue coordination with NMFS as the plan develops.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
CARIBBEAN FIELD OFFICE
P.O. BOX 491
BOQUERON, PUERTO RICO 00622

August 4, 1992

Salem
Planning Division
Corps of Engineers
1970
Gainesville, Florida 32622

Re: Draft Environmental
Assessment, Rio Puerto
Nuevo GDM

Salem:

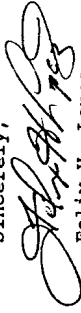
Interested agencies of the Department of the Interior have
the above referenced document. Our comments are issued in
accordance with the Fish and Wildlife Coordination Act (48
U.S.C. 661 et seq.).

The Corps has been working for some time with the Corps on the
Nuevo Flood Control project. The project has changed
substantially since the initial concept and we are pleased to see that
the wetlands have decreased with the new design. We have
reviewed the draft EA and mitigation plan. We find both to be well
thought out and informative. We request that you excuse the delay of
response but workload and prior commitments made an earlier
review impossible. After carefully reviewing the proposed
mitigation plan we want to express concern with the fact that 6.7
acres of mangrove wetlands downstream of the Kennedy Ave.
retention pond will be eliminated while only 2.4 acres will
be retained on site. This means a loss of over 4 acres that
will be eliminated. What remained of the Constitution Bridge
wetlands on the northeast bank of the Puerto Nuevo.
Additional acreage will be created along the new Margarita
we believe that more effort should be placed on the area
of the Constitution Bridge. In previous meetings the
ability of not only preserving but enhancing and expanding the
wetlands on the northwest banks of the Puerto Nuevo was
discussed. Although EPA did not agree with the concept of mere
retention, a combined preservation/enhancement scheme would be
acceptable.

Most of the wildlife values of the project area center on the lower
mangrove wetlands of Constitution Bridge. Because these mangroves
are adjacent to San Juan Bay, water quality is better and habitat
value increases. These mangroves also form one of the few
remaining mangrove fringes in San Juan Bay. Although the current
mitigation plan is acceptable, the Corps should continue to examine
the possibility of expanding its mitigation in the lower portion of
the Puerto Nuevo below the Constitution Bridge.

If you have any questions please call.

Sincerely,



Felix H. Lopez
Acting Field Supervisor

fhl

cc: DNR, San Juan
COE, San Juan
EPA, New York
EPA, San Juan
NMFS, Panama City
EOB, Terrestrial Ecology Division
ARPE, San Juan
PRPB, San Juan

A-16



United States Department of the Interior

FISH AND WILDLIFE SERVICE
CARIBBEAN FIELD OFFICE
P.O. BOX 491
BOQUERON, PUERTO RICO 00622

August 5, 1992

J. Salem
Planning Division
Corps of Engineers
Box 4970
Orlando, Florida 32232

Mr. Salem:

is concerning the flood control project for the Rio Puerto drainage basin, San Juan, Puerto Rico. We have assigned Log 92-092 to this activity and would appreciate your referring in any future correspondence. Based on the information received, we concur with the Corp's determination of no significant impacts on either the brown pelican (*Pelecanus occidentalis*) or the endangered blackbird (*Agelaius xanthomus*) as a result of the project activity.

does not constitute a Biological Opinion as described under section 7 of the Endangered Species Act and no further action is required. If additional modifications are made in the project or additional information indicating potential impacts to listed species become available, consultation should be reinitiated.

Sincerely,

Vance P. Vicente
Acting Field Supervisor

A-18

Response to FWS letter of Aug. 4, 1992: Mitigation will continue to be coordinated closely with FWS and EPA. The reason for not pursuing the Constitution Bridge West parcel is that it is already owned and held in conservation by the Puerto Rico Ports Authority, an agency of the Commonwealth of Puerto Rico. We cannot claim it as a "mitigation" parcel if it is already protected. Some enhancement work on this parcel might be appropriate in connection with a Ports Authority project needing wetlands mitigation, but it has no connection to the Puerto Nuevo River channeling. It was created as "made land" during the Puerto Nuevo dock construction (by deposit of materials over bay bottom) and has always belonged to the Ports Authority.

Junta
de Calidad
Ambiental

noviembre de 1992

DADA-2839-92

Santos Rohena Betancourt
Secretario
Departamento de Recursos Naturales
Estado 5887
San Juan, Puerto Rico 00906

Atención: Sr. Pedro L. Ruberté
Área Control Inundaciones

Re: EA 92-0059 (DRN)
PROYECTO CONTROL INUNDACIONES
RIO PUERTO NUEVO
SAN JUAN, PUERTO RICO

Respetado señor Secretario:

La Junta de Calidad Ambiental ha analizado el documento ambiental
relacionado para el proyecto de referencia.

Además que al presentar el mismo su instrumentalidad ha
sido con la fase de evaluar el posible impacto ambiental de
acción propuesta, de acuerdo con el Reglamento sobre
Evaluaciones de Impacto Ambiental del 4 de junio de 1984. No
obstante, para cumplir a cabalidad con dicho Reglamento y por
consiguiente, con la Ley sobre Política Pública Ambiental, Ley Número 9
de junio de 1970, según enmendada, deben poner en efecto
las recomendaciones indicadas en el documento, solicitar y
obtener los permisos de las agencias correspondientes. Asimismo,
deberá cumplir con las siguientes recomendaciones:

Utilizar todas las medidas de control de ruido necesarias
durante la fase de construcción del proyecto, para
garantizar la tranquilidad y bienestar general de los
residentes de las áreas adyacentes. Las obras de
construcción deben realizarse durante el período diurno.

Las actividades de operación no deben generar niveles de
ruido que sobrepasen los límites de 65 dB(A) medidos en el
predio receptor, conforme al Reglamento para el Control de
la Contaminación por Ruido.

Recomendamos se de la mayor ponderación en los aspectos
geotécnicos en el tramo que se ensanchará del canal
adyacente al Parque Central, de manera que no se creen áreas
de inestabilidad y hundimiento en esta zona.

Hon. Santos Rohena Betancourt
EA 92-0059 (DRN)
Página 2
4 de noviembre de 1992

4. Se deberá realizar las evaluaciones arqueológicas, previo al
movimiento de tierra, según requerido por la Oficina Estatal
de Preservación Histórica, en su comunicación del 19 de mayo
de 1992.

5. Deben solicitar de esta Junta un Certificado de Calidad de
Agua.

6. Obtener permiso del Cuerpo de Ingenieros de los Estados
Unidos.

7. Previo a dar comienzo a la construcción o efectuar algún
movimiento de tierra, deben obtener de esta Junta los
siguientes permisos:

- a- Permiso Fuente de Emisión (PFE) para el polvo fugitivo
durante la etapa de construcción.
- b- Para realizar una Actividad Generante de Desperdicios
Sólidos (Forma DS-3).
- c- Plan para el Control de la Erosión y Sedimentación de
los Terrenos (CEST).

Agradecemos su cooperación por mantener y conservar la calidad de
nuestro ambiente.

Cordialmente,

And

Pedro A. Maldonado Ojeda
Presidente

Mr. Carlos Rohena Betancourt
Secretary, PR Department of Natural Resources

Mr. Pedro L. Ruberté
Flood Control Area

Subject: EA 92-0059 (DRN)
FLOOD CONTROL PROJECT
RIO PUERTO NUEVO
SAN JUAN, PUERTO RICO

Environmental Secretary

The Environmental Quality Board has analyzed the environmental impact statement submitted for the above referenced project.

We understand that, upon its submission, your agency has completed the phase of evaluating the potential environmental impacts of the proposed action, in accordance with our Regulation for Environmental Impact Statements of June 4, 1984. However, to comply with this regulation, and, ultimately, with Law No. 57 of June 18, 1970, as amended (PR Environmental Policy Law), you must follow all the recommendations in the environmental impact statement, and obtain all required permits from corresponding agencies. You should also comply with the following recommendations:

Use all necessary noise control measures during the construction phase of the project that may be necessary to guarantee the tranquility and welfare of residents of adjacent areas. Construction activities must occur during daytime hours. Construction activities should not generate noise levels greater than 65 dB(A), measured at the edge of adjacent properties, as required by the Noise Control Regulation.

We recommend the most careful consideration be given to geological considerations during the widening of the canal section adjacent to Central Park, so that no unstable areas or areas prone to collapse are created in this zone.

The archeological studies must be done before excavation begins, as required by the SHPO officer in his letter of May 1, 1992.

You must apply for a Water Quality Certificate from this

agency. Obtain a permit from the Corps of Engineers (not applicable).

7. Before construction start-up or before any earthmoving activities commence, you must obtain the following permits from this Board:

- a- Permit for a source of aerial emissions (PFE) (air pollution permit) for the fugitive dust that will be generated;
- b- Permit to carry out a solid-waste generating activity (Form DS-3);
- c- Plan for controlling the Erosion and Sedimentation of Lands (Plan C.E.S.T.).

We thank you for your cooperation in maintaining and conserving the quality of our environment.

Cordially,
Pedro A. Maldonado Ojeda
President

Response to PREQB letter: EQB has accepted the finding of no significant impact. The Corps and its partner, the Commonwealth Department of Natural Resources, will continue to obtain permits as required. The Water Quality Certificate was obtained on May 21, 1993.

The remaining letters are endorsements and/or requests for continued close coordination with the Corps as the project develops. This coordination is ongoing.



United States
Department of
Agriculture

Soil
Conservation
Service

Caribbean Area
PO Box 364868
San Juan, PR 00936-4868



DEPARTMENT OF NATURAL RESOURCES

July 1, 1992

Mr. A. J. Salem
Chief, Planning Division
Department of the Army
Jacksonville District Corps of Engineers
PO Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Salem:

Re: Draft Environmental Assessment
Rio Puerto Nuevo Flood Control Project
San Juan and Guaynabo, Puerto Rico

This letter is in regards to the above mentioned project.

According to your maps the soil identified in this area was
Frequent Saline (Hy). This soil is on the Hydric Soil
List of the Caribbean Area and is considered a hydric soil.

(Hy) is a hydric soil, EPA and the Fish & Wildlife
Service will need to be notified in regards to any proposed
manipulation of this area.

If you should have any questions, or would like to discuss
this further, please feel free to contact us at your
convenience.

Sincerely,

Shirley C. Dubee
SHIRLEY C. DUBEE
Acting Staff Soil Scientist

Conservation Service
in the
Department of
Agriculture

AN EQUAL OPPORTUNITY EMPLOYER

August 13, 1992

Mr. A. J. Salem
Chief, Planning Division
Jacksonville District
Corps of Engineers
P.O. Box 4970
Jacksonville, Fla. 32232-0019

Dear Mr. Salem:

Re: Draft Environmental Assessment (DEA)
Rio Puerto Nuevo Project

We have reviewed the above referenced document submitted with
your letter of June 26, 1992.

We understand that there may be a significant environmental
impact specially on the mangrove wetlands along the course of
the Rio Puerto Nuevo, where most of the work will take place.
However, we also find that such impact should be adequately
offset by the measures presented in the Mitigation plan appended
to the DEA.

Our Department concurs with all the recommendations presented in
the DEA and the Mitigation Plan, and does not anticipate
environmental impacts of a greater magnitude that those
mentioned above.

From an ecological point of view, the DEA for the Rio Puerto
Nuevo Flood Control Project is acceptable.

Cordially yours,

Santos Rohena Betancourt
Santos Rohena Betancourt
Secretary

JA
JAA/HMD/mvm

Muñoz Rivera Ave., Stop 3, San Juan, P.R. / Box 6887, P.R. 00906

COMMONWEALTH OF PUERTO RICO
PUERTO RICO ELECTRIC POWER AUTHORITY

SAN JUAN, PUERTO RICO



G.P.O. Box 4297
SAN JUAN, PUERTO RICO 00944-4297

U.S. Army Corps of Engineers
Page 2
September 8, 1992

September 8, 1992

Certified Mail P 285 784 582

Army Corps of Engineers
Army Engineer District
Box 4970
Conville, FL 32232-0019

Attention: A.J. Salem
Chief, Planning Division
Environmental Studies Section

Re: Amen:

We refer to your letter dated June 26, 1992, in which our
Agency is requested to comment on the Draft Environmental
Assessment (EA) for the Rio Puerto Nuevo Flood Control Project.
The document contains a letter from our Agency addressed to
Edward E. Middleton, Chief, Engineering Division,
Conville District, Corps of Engineers and dated October 26,
1991. This letter outlines a conceptual estimate for the
relocation of transmission and distribution lines which will be
conducted by your proposed project.

There are still several issues regarding the relocation of
transmission lines which need to be addressed. We expect that
prior to the actual work, all new rights-of-way needed for
continued electrical service in the area will be defined. We
are available to answer any questions regarding proposal measures
for suitable construction.

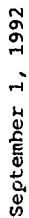
Besides this, we have no issues of an environmental nature
to comment upon.

Any and all future plans related to this project should be
coordinated with Mr. José I. Torrrens, Assistant Superintendent,
Engineering Division, Civil Engineering Department at the above
letterhead address.

Cordially,

Orlando Angleró
Orlando Angleró
Director, Planning and
Environmental Protection

A-24



Number Nine Route 4, Shadwell, N.E. 100, 10000-2000

A-25-

Estado Libre Asociado de Puerto Rico
AUTORIDAD DE ACUEDUCTOS Y ALCANTARILLADOS

UNIDAD DE COMUNICACIONES

22 AUG 81 11:05

26 de agosto de 1992

P. R. AQUEDUCT AND SEWER AUTHORITY

RE: REPLY TO LETTER OF 26 AUGUST, 1992 LETTER RE PUERTO NUEVO EA)

We refer to your cover letter of 26 June of 1992 and the accompanying Preliminary Environmental Assessment.

We wish to add the following to our earlier letter of August 1991. In this letter we requested you initiate close coordination with our Operations area to avoid interrupting water and sewer services in the project area, once the project is under construction.

We further wish to inform you that on the grounds of Hacienda La San José, site of the old water filtration plant mentioned in the Environmental Assessment, we operate offices and our Central Laboratory. These buildings may be affected by project construction. We request that you maintain close coordination with PRASA's Laboratory Area beginning early in project construction, to prevent inconveniencing our lab workers and affecting the continuity of services.

We appreciate your continued consultation with us on this project.

Sincerely,

Eng. Wilfredo Freytes Colón
Acting Chief
Planning Department, PRASA

The letter includes four photos, labeled: "warehouse", "back side structures", "central laboratory" and "flow monitoring section".

Sr. A. J. Salem
Jefe, División de Planificación
Cuerpo de Ingenieros de los E. U.
P.O. Box 4970
Jacksonville, Florida 32232-0019
Estimado señor Salem:

RE: SAN JUAN, PUERTO RICO
EVALUACIÓN AMBIENTAL PRELIMINAR
CUERPO DE INGENIEROS
PROYECTO CONTROL DE INUNDACIONES
RIO PUERTO NUEVO - CANALIZACION

Nos referimos a su carta del 26 de junio de 1992, con la cual nos acompaña el documento ambiental que se menciona en el asunto.

Debemos aclarar que en nuestra carta del 10 de agosto de 1992, indicamos que los servicios de agua y alcantarillado podían verse afectados con el proyecto y que debe existir una estrecha relación entre su agencia y el Area de Operaciones de la Autoridad de Acueductos durante el proceso de construcción del mismo.

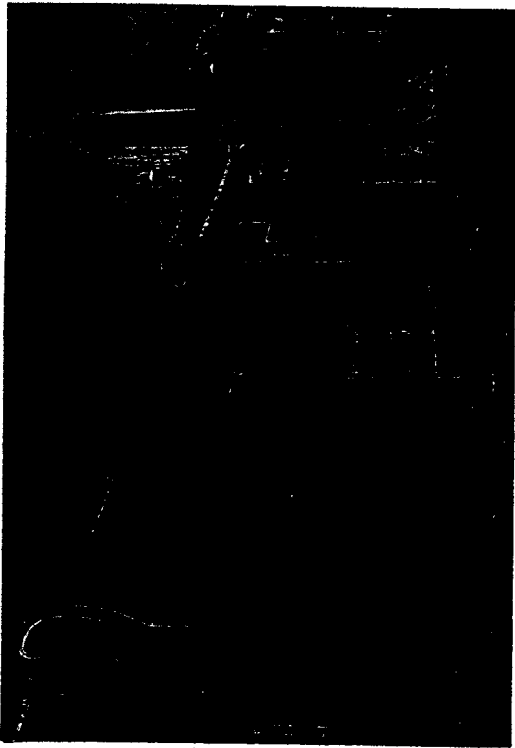
Además, deseo informarle que en los predios de la Hacienda San José donde se ubicó una antigua planta de filtración de la Autoridad de Acueductos, existen oficinas y el Laboratorio Central que podrían afectarse con el proyecto. Una estrecha coordinación debe hacerse también con el Area de Laboratorios en la fase temprana del proyecto, para prevenir algún inconveniente a nuestros empleados y evitemos así puedan afectarse las labores que allí se realizan.

Agradecemos su interés en consultarnos.

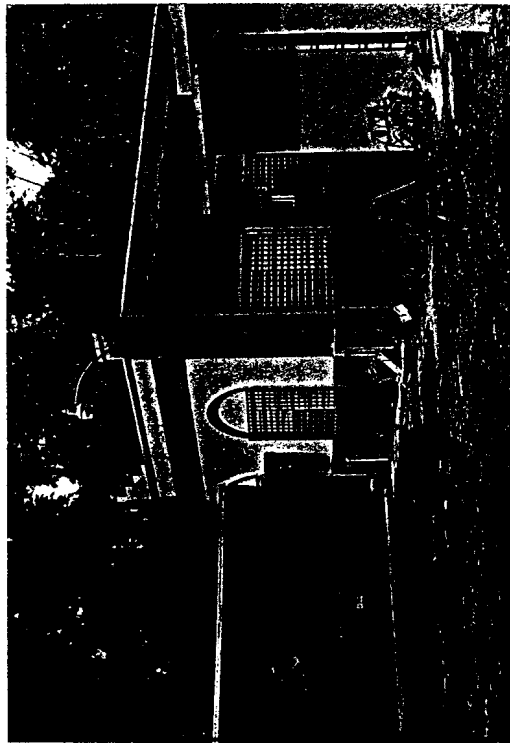
Atentamente,



Ing. Wilfredo Freytes Colón
Jefe Interino
Departamento de Planificación



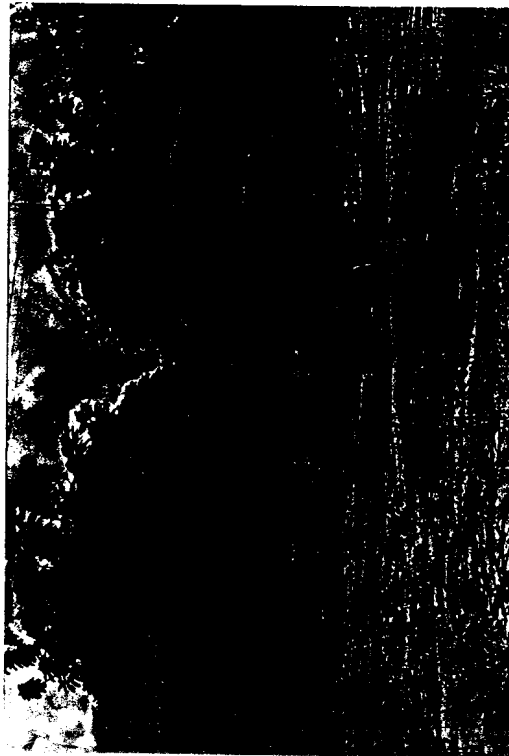
LABORATORIO CENTRAL



SECCION DE ESTUDIOS FITOMETRICOS



ALMACEN



PORTE DE ATRAS DE LAS ESTRUCTURAS

Interagency coordination letters included in the Draft EA (post-authorization interagency coordination)



OFICINA DEL GOBERNADOR

FORTALEZA

SAN JUAN DE PUERTO RICO

MARIANO GERARDO CORONAS CASTRO
DIRECTOR / OFICIAL
Control No. 92-1598

May 19, 1992

Mr. J. Salem
Department of the Army
Fort Belvoir District Corps
Engineers
Box 4970
Fort Belvoir, Florida 32232-0019

SHPO #10-13-88-08 RIO PUERTO NUEVO FLOOD CONTROL PROJECT, SAN JUAN,
PUERTO RICO

Mr. Salem:

We received your letter dated March 16, 1992 in which you inform us the design for this project has been completed. According to your letter, Hacienda San José and the old filtration works will not be included by the final design.

As you mention that construction and earthmovement will occur in the area of the Puerto Rico Aqueduct and Sewer Authority (PRASA) parking lot and adjacent ponds. We agree that a more detailed study should be carried out in this area and that it should be developed in consultation with your staff.

The fact that the work in this area is not scheduled to be carried out until after the year 2002, we will accept your request that the cultural and archaeological resources studies be postponed until that time.

It is clear that this does not constitute an endorsement and that all cultural resources investigations must be completed, reviewed and approved by our Office before construction or earthmovement can be carried.

Mr. A. J. Salem
May 19, 1992
Page No. 2

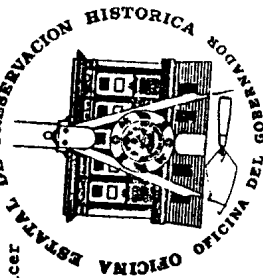
If you have any questions concerning our comments, please do not hesitate to contact us. Your interest and cooperation in helping to protect Puerto Rico's archaeological and historical resources are appreciated.

Cordially,

M. F. T.

LUIS F. IRIZARRY RAMIREZ

Mariano G. Coronas
State Officer



MGCC/mro

cc: Eng. Carmelo Oñez
COE - San Juan

Eng. María M. Irizarry
Executive Director
PRASA

Mr. Santos Rohena Betancourt
Department of Natural Resources

ATTACHMENT B
MITIGATION PLAN

ATTACHMENT B

WETLANDS MITIGATION PLAN

1. Summary. The Rio Puerto Nuevo Project will impact about 20 acres of mangrove wetlands (16 acres in the river and Margarita Canal and an additional 4 acres in Disposal Area 2). This is a smaller footprint than the 33.5 acres estimated in the 1984 Survey Report and Environmental Impact Statement (EIS). The footprint reduction is due to slight changes in channel alignment and to prior removal of some of the mangroves by other unrelated projects. GDM Plates S-2 and S-8 show an overlay of project features on an aerial photograph of the lower channel. The thickest mangrove stands are found between the common channel mouth and Kennedy Avenue bridge (Plate S-2). These are the "Constitution Bridge" mudflat mangroves discussed in Commonwealth planning documents and the Coastal Zone Management Plan. Almost 7 acres of mangroves will be removed by channel widening in this sector, all on the northeast side of the channel (Table 1, site 1). Another 1.4 acres of mangroves will be removed along Parque Central (Table 1, Site 2). The stands at Sites 1 and 2 are dominated by red mangrove, but white and black mangroves are also present. Upstream from this point the River diverges from Martín Peña channel and follows its own man-made bed, which is relatively steep sided. Only the southeast bank of the channel, near the fork, has a stand of significant size (Table 1, Site 3: 5.6 acres.) The rest of the river channel, up to the entrance of the Margarita tributary, has only a narrow, white mangrove dominated stand 1-2 trees deep along northwest bank and interrupted and patchy cover on the southeast bank (Sites 4, 5 and 6, Table 1). Patchy stands also occur along the north side of Margarita Creek and in Disposal Area 2 (Site 7, Table 1). Four more acres of these mangroves will be impacted in Margarita channel and the edge of Disposal Area 2.

The impacted mangrove area was remeasured in 1991 by planimetry over computer plots of the channel route, using new surveys, at a scale of 1" = 50' (1:600). Mangrove and forest cover mapped by surveyors was checked against topography and color stereo photographs and field-checked by a staff biologist in December, 1991. The field check allowed separation of areas mapped as "dense woods" into mangrove (wetland) and other wooded (upland) cover. Table 1 reports existing mangrove coverage and proposed mitigation.

The mitigation plan proposed in this document will achieve a 1.5:1 replacement of the 20 acres to be removed. Thirty (30) acres of mangrove wetlands will be created on project lands, as follows:

a) Red mangrove strips will be replanted along the northeast side of the improved common channel after widening, behind the concrete bulkheads, both east and west of

the Kennedy Avenue (Constitution) Bridge, up to and through Parque Central, using mature red mangrove propagules on 1 m centers (4,000 seedlings/acre) at an elevation of 0.0-0.1 feet msl. The replanting strip west of Kennedy Avenue will provide 2.4 acres when mature (Table 1, Site 1). The Parque Central strip will provide 1 acre (Table 1, Site 2). These strips are also illustrated on GDM Plate S-2 as an overlay of an aerial photo, and shown in greater detail on Plate S-22 (included).

b) In the Puerto Nuevo River proper, planting strips will line both sides of the improved channel behind the bulkheads, up to the upstream limit of concrete king pile and panel bulkheads (about Station 57+00). The recommended species composition is red mangroves at sites 3 and 5, and a mixture of white and black mangroves at the remaining sites (4, 6 and 7). Black and white mangroves will be sown at greater density (8,000/acre), since their germinated propagules are smaller. Selection of white and black mangroves is based on lower average water salinities ((O. Díaz *et al.* 1983) and observations of existing pioneer mangrove vegetation on this river segment (J. Colón & B. Cintrón, unpub). The soil surface will be graded to +0.1 to +0.4 feet msl, to reflect the slightly lower flooding tolerance of these two species. The mitigation strips to be built will offer a wider area for mangrove colonization than is currently present along this river stretch (the existing banks are too steep sided to support more than a single or, at most, double file of mangroves). Mangrove planting strips are illustrated on Plates S-23 and S-24.

c) In the Margarita Channel mitigation area, lands will be graded down adjacent to the old Puerto Nuevo River channel and disposal site, and black and white mangrove propagules will be broadcast-sown. (Plates S-25, S-38). Site 8 (Sta. 75 to Sta 91, Plate S-25) is on the north bank of Margarita Creek and provides 3.8 acres. Site 9 (Sta 0.00 to Sta 21.0; Plate S-38) is near the old Puerto Nuevo River channel, north of Margarita. A roughly rectangular parcel, 275 x 2050 feet, provides another 12.2 acres.

Present plans call for creation of at least 14 acres of replacement mangrove wetlands during Contract 1; the remaining 16 acres will be created as part of Contract 2. *Wetlands site preparation will begin after each segment of channel is dredged and bulkheaded, and initial planting shall be completed before construction proceeds to the next stage.*

2. Status of prior mitigation plans. The U.S. Department of Interior, Fish and Wildlife Service (FWS) and the U.S. Environmental Protection Agency (EPA) submitted comments on the mitigation plan included in the EIS. (FEIS Attachment A: Coordination). That plan called for preservation of 18.5 acres (7.5 hectares) of existing mangroves (the Constitution Bridge west parcel) via their acquisition and designation as a Commonwealth Natural Reserve, and replanting of 15 acres (6 ha), in narrow strips, along the north banks of Margarita and Puerto Nuevo channels, upstream of the landfill. The plan was based on previous Corps estimates of a project impact of 29.5 acres of mangrove along the river channel and 4 acres to be removed in Disposal Area 2, for a

total 33.5 acres (13.5 ha), and on Corps calculations, based on trapezoidal channel cross-sections, that only 15 acres or 6 ha suitable for replanting would be available directly on project lands.

During a 1991 interagency meeting to discuss the mitigation plan for the Puerto Nuevo project, both FWS and EPA expressed concerns over loss of the "Constitution Bridge" mudflats, (mangroves west of Kennedy Ave.) and urged that part of the mitigation be by mudflat re-creation. EPA objected additionally to the preservation component of the original mitigation plan. EPA requested consideration of full replacement of the estimated 33.5 acres through a combination of mangrove replanting and mudflat creation. EPA's position was that mere preservation of an existing high value wetland would not achieve the national no net loss goal. FWS objected to planting mangrove propagules on a trapezoidal channel bank inside the Puerto Nuevo channel, and recommended that a larger on-site planting area be created along the channel by grading adjacent lands flat, creating a bench on the north side upon which mangroves could be planted. This suggestion has essentially been accepted and incorporated into project plans, with use of a flat bench on both sides of the Puerto Nuevo channel outside the king pile-and-panel bulkheads, within the limits of existing land uses.

It was decided to re-coordinate the mitigation plan when new surveys and computer-aided plots of project features indicated an opportunity for greater on-site mitigation acreage. By this time the San Juan ferry project, whose first stage was finished in 1987, made the mud flat re-creation issue moot. Mud flats that would otherwise have been removed by the Puerto Nuevo project were lost due to widening the Martín Peña Channel for the ferries, and mitigated for by mudflat creation in the "Anegado" area of San Juan Bay at this time. These mudflats were rebuilt and expanded in 1991, along with the first maintenance dredging of the ferry channel.

3. Re-Coordination of wetland mitigation. A biologist from the U.S. Army, Corps of Engineers, with assistance of the local sponsor, set up a one-day workshop of wetlands biologists representing FWS (Boquerón Field Office), U.S. EPA (Caribbean Field Office), and the local sponsor's Research Secretariat and Fish and Wildlife Technical Guidance Division. The meeting, held on October 1, 1991, was hosted by DNR in San Juan. Participants discussed existing wetlands values, project impacts, and mitigation options.

The Corps presented the original mitigation plan and requested input on functional and habitat values of the wetlands to be impacted. The group also discussed mitigation opportunities on the project in the context of changes in the existing environment and the project footprint. The Corps showed that no additional mudflats would be removed by the Puerto Nuevo Project, but expressed a willingness to consider mudflat creation if a suitable area near the project could be identified without interfering with navigation in San Juan Harbor.

The preservation element of the old plan was discussed. EPA stated that this option is undesirable, since it generally leads to a net wetlands loss. EPA generally approves this option only in the case of highly endangered and valuable wetlands. EPA deemed the parcel in question adequately protected by existing law, regulations, and local land use plans. The Department and the Corps had received written communication from the Puerto Rico Ports Authority (the owner of the parcel) indicating that the parcel was slated to be preserved by them, as prospective mitigation for other projects to be undertaken by this agency. FWS expressed a strong interest in permanent preservation of this parcel, but like EPA did not want it to be considered "mitigation" for mangrove destruction elsewhere on the project; the Department of Natural Resources' biologists noted that this parcel, though legally "protected", was still a priority parcel for acquisition on the Natural Heritage list, and was felt to be threatened by commercial pier construction plans for San Juan Bay. However, the DNR was more concerned with preserving the parcel in perpetuity than in acquiring title to it. The re-measured mangrove cover on the plot in dispute was found to be less than estimated. Mangrove cover is only about 7.5 acres (only 3 ha). The issue of how to deal with the Constitution Bridge West parcel was not resolved; all agencies desired some additional action to preserve the parcel, but the Corps was urged to find "full replacement acreage" elsewhere on or near the project. Therefore, it was the recommendation of most participants that the preservation component of the old mitigation plan be dropped. This implied that a new mitigation plan would be required.

c). The group considered available information and valuation methods to determine an appropriate replacement ratio for wetlands to be impacted. FWS representatives observed that HEP evaluations would probably not yield useful information, in light of their experience with these models in Puerto Rico. It was noted that the stands, though thin in some areas and patchy at the upriver end, still provide significant migratory and resident bird habitat and other wetlands functions, including nutrient uptake, sediment filtering and production export. The highest value mangroves were those seaward of the Constitution (Kennedy Avenue) Bridge. The group, after discussion of a range of replacement ratios, agreed that greater than 1:1 replacement was needed. The final recommendation, by consensus of wetland biologists in the group, was 1.5:1. This ratio is based on the following understanding: recently replanted mangroves do not reach full canopy closure, even in wet and nutrient-rich environments, for 4-5 years in Puerto Rico, while full structural development may require close to 15 years. Planting a greater acreage will compensate in part for the lower structural development of the "new" stands. Additionally, because some of the mitigation acreage will be planted behind concrete bulkheads, where openings for water flow will be widely spaced, some of the water quality functions of the created mangroves may be slightly reduced, in comparison to a natural stand.

d). An even higher replanting ratio (e.g., 2:1 or 3:1) was considered excessive. Existing mangrove coverage is thin and patchy in the Puerto Nuevo River beyond Martín Peña channel. Along this artificial channel stretch, in many places coverage is a single

line of trees, backed up against a steeply rising bank consisting of old dredged material. Replacement stands, built over a flat-graded bench, could ultimately produce higher quality habitat.

e). It was recommended that species planted in the upper estuary reflect present species dominance and water chemistry, (that is, stands should be a mix of black and white mangroves, not red mangroves).

This Mitigation plan addresses each of the above points.

4. Project Impact. As agreed upon during the coordination workshop, project wetlands impact was recalculated based on actual survey maps overlain by the project features. Planimetry of wetlands was done at a scale of 1:600 for the first phase of the project, and at scales ranging from 1:2400 to 1:20,000 for other areas (mostly the Margarita Creek wetlands).

Stage 1 of the project (widening and bulkheading of the channel from the joint Martín Peña/Puerto Nuevo river mouth to the Highway 22 crossing) will remove 15.9 acres of mangroves, consisting of a mixed stand northeast of the Highway 2 bridge, two small stands southeast of the bridge in Parque Central, and the mangroves lining both sides of the Puerto Nuevo channel proper, beginning at its junction with Martín Peña, up to Highway 22. These stands are dominated by mixed white, black and red mangroves near the mouth, then by mixed black and white mangroves, and finally, by a thin line of white mangroves upstream.

Improvements to Quebrada Margarita and use of the adjacent disposal area (Disposal Area 2, Plate S-8) will inevitably remove an additional 4 acres of white and black mangroves.

Mangrove impacts have decreased in comparison to former estimates because (1) slight alterations in the channel alignment and use of the vertical-walled concrete pile and panel bulkhead reduced project wetlands impact; (2) A considerable acreage along the common Martín Peña- Puerto Nuevo Channel was lost in 1987 when the channel was widened for the "Acua-expreso" Ferry system, and has already been mitigated for by creation of mudflats north of the channel mouth; c) the "Constitution Bridge mudflats" mentioned briefly in the FEIS, no longer exist. This area, designated "Coastal Zone Natural Reserve #1", is clearly described in Appendix C of the Puerto Rico Coastal Management Program (DNR and NOAA 1978). The mudflats were located north and west of the Kennedy Ave. bridge (Constitution Bridge) in an area now colonized by mangrove forest, up to the mouth of Martín Peña-Puerto Nuevo channel. Aerial photographs from the mid-1960's and early 1970's show that San Juan Harbor extended to the bridge itself, and that intertidal, mostly unvegetated mudflats accreted from river-borne sediments deposited out at the head of the bay. As deposits built up and additional fill was added during expansion of the Puerto Nuevo docks (on the west side)

and Central Park (on the east side), mangroves began to colonize the flats, converting them into forested wetlands. All of the remaining mudflats and some of these young mangroves were removed during the 1987 ferry route dredging, which widened Martín Peña Channel at its mouth. Due to the mudflat creation in 1987 and 1991, there is now more mudflat acreage adjacent to the Central Park mangroves than existed naturally in 1980. The Puerto Nuevo channel will abut the newly created mudflats. The side adjacent to the new bulkhead will probably naturally become colonized by mangroves.

5. Status and habitat value. Mangroves along the joint channel were affected by 1987 dredging and 1991 re-dredging of the ferry channel, as noted in the Environmental Assessment, Paragraphs 3.05 and 4.05 (Wetlands Resources and Impacts, respectively). These stands as well as Puerto Nuevo river channel mangroves were defoliated and broken in 1989 by Hurricane Hugo. Their value as roost areas for large birds like pelicans is temporarily somewhat reduced. However, they are recovering vigorously and remain high value habitat for wading birds. All of the species of waders cited in the 1983 Díaz *et al.* report are still readily observed. Shorebird use of the intertidal mud areas inside the channel proper ceased when these areas were eliminated by bulkheading in 1987. Inside the Puerto Nuevo channel, later censuses (J. Colón & B. Cintrón, unpub.) found little shorebird use. Banks are steep along both sides of this artificially created segment, reflecting prior excavation and probable side-casting of excavated material. Mangrove coverage (upstream of the power line crossing south of the landfill) is basically a one-tree wide line of white mangroves on the north bank, with a few outliers. The triangular or "Y" shaped parcel located between De Diego Expressway, the River and Martín Peña channel (Disposal Area 1, Plate S-2) is largely a hummocky upland covered by guinea grass, wild sugar cane and "merker" grass, with abundant albizia and castor bean bushes. Thick mangroves occupy the "point" of the triangle between channels, and also line both waterways as narrow stands. Construction of the Puerto Nuevo channel will remove all of the mangroves lining the south side of the river, and some of the adjacent upland. A planting strip for mangroves will be established behind the south shore bulkhead along this parcel.

The Martín Peña mangrove habitat was described by O. Díaz-Marrero and others in 1983. Mangrove stands provide foraging, resting and reproductive habitat for a number of native and migratory species, particularly insectivorous birds like bananaquits and warblers, and crustacean feeders such as night herons, rails and least bitterns. Waterthrushes are common during winter months, as are kingfishers. In addition to birds, invertebrates are common and include fiddler crabs, land crabs, and the small mangrove-canopy crab *Aratus*.

No endangered species except for the brown pelican have been observed in this channel in recent years. The nesting yellow-shouldered blackbirds that used Central Park in the early 1980's ceased nesting activities prior to the Martín Peña dredging (J. Moreno, Telecom 11/91). No marine turtles have ever been observed in the joint

channel, the river, or even in this section of San Juan Bay, according to published reports.

6. Replanting and restoration options. The 1991 interagency mitigation committee cited above suggested that the Corps explore the New San Juan Center (Hato Rey) mitigation parcels for other sites capable of restoration, should insufficient land appear to be available in the project area, so that a 1.5:1 mitigation ratio could be achieved. On site, the following options were suggested:

Suggestion (a). Explore the feasibility of creating mudflats adjacent to existing mudflats.

Resolution: Study of a plot submitted by the contractor for the Acua-Expreso maintenance dredging (showing recent mitigation area expansion) and comparison of this map with a project map for this unrelated project showed that the entire "Anegado" area available for mudflat creation has now been filled. These mudflats were inspected visually on October 3, 1991 and again in early December, 1991. They were already in use by wading birds. Further mudflat creation is likely to interfere with small boat entrance and exit from Central Park, or with the Graving Dock navigation channel in San Juan Bay. More important, these newly restored mudflats provide habitat where it was desired, in compensation for a project that removed a considerable mudflat area, both up-channel and at the channel mouth. Since the Puerto Nuevo project will not remove mudflats, this type of mitigation acreage is not considered necessary. Mudflats appear to be an ephemeral habitat type at best. Except under strong wind and wave influence, they quickly become covered with mangrove seedlings which convert open ground to a shrubland in a matter of months in moist climatic zones.

Suggestion b). Examine the following project areas for lands suitable for restoration: (i) the "triangle parcel"; (ii) lands adjacent to Margarita channel; (iii) lands adjacent to disposal area 2; (iv) off-site lands.

Response: Options (i), (ii) and (iii) have been chosen. The "triangle parcel" already contains some mitigation acreage along its north side (part of the Agua-expreso mitigation). The rest of the parcel, after channel widening and planting of a 60-foot wide strip outside the bulkhead, must be diked for disposal of dredged materials to be generated in later contracts. This land is destined for eventual development as a regional park, in coordination with the City of San Juan. Lands adjacent to the Margarita channel, especially near the old Puerto Nuevo River channel, are believed suitable for restoration, especially since drainage improvements required to connect the "new" Margarita and "old" Margarita channels with the improved Puerto Nuevo will involve grading. Additionally, the width of the mangrove replanting strip behind the bulkheads can be varied. A combination of these options will allow achievement of a full 30 acres. Table 1 shows acreages lost and projected mitigation sites along the project.

This plan represents a virtual adoption of the suggestions contained in the FWS letter of October 1, 1984.

Suggestion c) (response to coordination of an earlier version of this Plan): Increase mangrove mitigation acreage in the common Martín Peña-Puerto Nuevo channel (west of Kennedy Ave. bridge), since these mangroves are the ones with the highest wildlife habitat value (FWS, 1992).

Response: As explained, the Ports Authority parcel (7.5 acres of mangroves) is committed to protection. Refer to Appendix A (EA Coordination): letters from the Ports Authority and its representatives of December 4, 1991 and September 1, 1992. This agency has endorsed the Puerto Nuevo River project mitigation plan. The only way in which a greater mangrove acreage could be created west of Kennedy Avenue Bridge would be to widen the planting strip northeast of the new channel. While this would increase mangrove cover, it would be at the expense of the mudflat mitigation acreage that presently occupies the area. DNR planning documents and the CZMP note that the mudflats provide habitat for migratory shorebirds that normally don't use mangroves. We would like to achieve a balance between mudflat and mangrove cover in the area.

Suggestion d): Please be specific about timing and sequencing of creation of the mangrove mitigation areas. (NMFS, EPA).

Response: The work on the channel improvements has been divided into contracts. All of the mitigation acreage falls inside Contracts 1 and 2. Work is now scheduled to begin on Contract 1 (up to Station 67+00) in 1994. This contract includes building the mitigation acreage up to Station 57+00 on the southeast bank (the limit of king piles) and up to Station 64+00 on the northwest bank, a total of about 14 acres. The remaining mitigation parcels would be created as part of Contract 2. We understand the desire to get mitigation acreage "in place" prior to the destruction of the existing stands, but on a project like the Puerto Nuevo channel improvements, where mitigation will be built along the channel itself, this would be impossible. The mitigation sites can be built in sequence after the king pile and panel bulkheads are installed and the backfill is placed. Prior to this time the habitat will not exist. Details of the first segment of mitigation will be provided in Feature Design Memorandum (FDM) 1, along with more detailed project drawings. A copy of FDM 1 will be provided to all agencies who cooperated in developing the mitigation plan.

7. Mangrove Planting Plan.

Scope. The work will consist of furnishing all necessary labor, equipment and materials and performing final site preparation work and mangrove planting in the specified areas along the channels. The work also includes the removal of material and debris encountered during construction, and any other work incidental to completion of the planting.

Site preparation. Site preparation will consist of the complete removal and disposal of all material and debris to the lines and grades indicated on project drawings. All materials will be disposed of in an approved manner and in an approved area. Sites to be prepared include mangrove replanting strips behind the bulkheads along the east shore of the Puerto Nuevo-Martín Peña channel, along both shores of Puerto Nuevo channel up to Margarita channel and Las Americas Expressway (Plate S-2), and a large strip north of the improved Margarita channel, adjacent to Disposal Area 2 (Plate S-8).

Success in mangrove planting depends on initially creating the proper elevation above datum, to assure frequent flooding and flushing. The elevation of the planting sites will be between 0.0 ft and 0.4 ft mean sea level and this elevation may be graded from waterline to most distal point from the channel throughout the planting area, except in the area to the west of Kennedy Ave Bridge, where fill may be required in some areas. The planting sites will be discontinuous, constructed on each side of the channel, as shown in general view in Plates S-2 and S-8, and in greater detail in Plates S-22 through S-25. Planting sites under Contract 1 will total 14 acres. Gaps to 0.0 m msl will be left in the bulkhead panels at intervals to allow water to flow into and out of the mangroves with the tides.

Care will be taken not to damage any existing mangroves or other wetlands vegetation adjacent to the planting sites, when present. The contractor will survey the planting site to assure that the proper elevations have been obtained. Surveys will consist of cross-sections at 100 m intervals with elevations taken at 5 m spacing along the sections. The survey, in plotted plan to scale 1:600, shall be furnished prior to planting mangroves.

Plant materials. The mitigation planting will consist of red, black and white mangrove propagules (seedlings) collected from Piñones Commonwealth Forest or another nearby site, to be determined by the Department of Natural Resources (DNR). DNR, the Commonwealth sponsor for this project, will direct the contractor to appropriate collection areas and monitor this activity. The respective acreages are shown by species dominance in Table 1. Red mangrove material will be planted on 1 m centers over 7.2 acres; about 28,800 propagules will be needed. White and black mangrove seedlings, if available, will be planted on 0.5 m centers. Approximately 7 acres of mixed mangroves will be sown in Contract 1, requiring 56,000 propagules. The contractor will be responsible for obtaining all necessary permits required for harvesting mangrove propagules from the local sponsor, the Department of Natural Resources. Peak season for harvesting propagules of all species is late summer and early fall, i.e., August, September and October, but some propagules are available at any season. The contractor will monitor the season and availability of the propagules. The Corps and the local sponsor reserve the right to monitor the grading and planting and modify methods if necessary.

Collection and storage. Care will be taken to protect propagules from damage. Propagules can be stored in plastic buckets or garbage pails covered with moist burlap, styrofoam containers, or in wet burlap or plastic sacks at a cool temperature for up to 48 hours prior to planting. It is recommended to collect only the number of propagules that can be planted within 1-2 days, so as to avoid heat and/or sun damage during storage and transport.

Planting. Red mangrove propagules should be planted vertically, on 1 m centers, with the thicker (hypocotyl) end down, to about 1/3 the total length of the propagule. White and black propagules (seedlings) can be broadcast-sown if small seedlings are available at a high density at collection sites; a density of about 20 propagules/ m² is recommended if recently sprouted black or white mangrove seedlings are used. Alternatively, and if available, larger (10-15" tall) white and black mangrove seedlings can be planted on 0.5 meter centers. Planting will be monitored by Corps and/or DNR biologists and their instructions will be followed by the contractor. Planting can begin as soon as site grading has been completed subsequent to installation of the bulkheading and deposit of backfill. Only fresh propagules should be planted (see above).

Plant Establishment Period. The plant establishment period will begin on the date when all propagules are in place as specified. As specified by the Environmental Protection Agency (EPA), the full establishment period is five (5) years. However, errors in elevation will manifest themselves in seedling mortality, usually within the first year. Long term success requires establishing a complete canopy cover (taken to be >80% canopy closure), regardless of individual plant survival. Plantings will be inspected every three months during the first year by the contractor, and gaps due to mortality will be filled with new plants. After one year, mitigation areas will be inspected and evaluated by a U.S. Army Corps of Engineers biologist in coordination with DNR. If survival has fallen below 80% in red mangrove areas, or large gaps have formed in white and black mangrove areas, an evaluation of species and site will be made and it will be determined what replanting is necessary based on coordination with interested resource agencies. Replanting will be done to bring cover back up to 80%. If canopy cover is complete in five years the project will be considered successful regardless of individual tree survival.

Local expertise is available at the Department of Natural Resources, both at the Marine Research Section, Research area, or DNR Forest Service, for restoration of mangrove and other coastal ecosystems. The Department is the local sponsor for the Puerto Nuevo flood control project, and its Forest Service has expressed a continuing interest in mitigation plan development. This mitigation plan was approved by the Secretary of Natural Resources on August 13, 1992.

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TABLE 1
ACRES (HA) OF MANGROVE WETLANDS
UNDER THE FOOTPRINT OF PUERTO NUEVO CHANNEL,
BY SITE, AND PROPOSED MITIGATION.

Site	DESCRIPTION OF SITE	MANGROVE AREA IMPACTED		ACRES TO BE CREATED
		Acres	Hectares	
1	NE side of Martín Peña, W. of Kennedy Ave. bridge	6.7	2.7	2.4 (red)
2	N side channel E of Bridge, in Parque Central	1.4	0.5	1.0 (red)
3	Triangle, E side Pto. Nuevo, S. of Martin Peña channel (upstream as far as STA 45, power line crossing).	5.6	2.3	2.6 (red)
4	E bank Pto Nuevo, upstream from STA 45 (power line crossing), up to STA 57.5 (end king pile section).	0.9	0.4	1.9 (b&w)
5	W bank Pto. Nuevo, from Kennedy Ave bridge upstream as far as power line crossing.	0.9	0.4	1.2 (red)
6	W. bank Pto. Nuevo, from power line crossing to beginning Margarita channel.	0.4	0.2	5.0 (b&w)
7	Margarita channel and Disposal area 2 Channel Adjacent to disposal area; old P.N. River	0.5	0.2	3.8 (b&w)
		3.5	1.4	12.9 (b&w)
TOTALS		19.9	8.1	30.8