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JOURNEY REPORT
RIO PUERTO NUEVO
PUERTO RICO



ENVIRONMENTAL IMPACT STATEMENT

Río Puerto Nuevo Survey Investigation
San Juan, Puerto Rico

The responsible lead agency is the U. S. Army Engineer District,
Jacksonville, Florida

ABSTRACT

This statement examines various responses and methods of meeting problem in the Río Puerto Nuevo basin, San Juan, Puerto Rico, and presents plans developed in the course of a survey investigation conducted under Section 204 of the Flood Control Act of 1970 at the request of the Commonwealth of Puerto Rico. The study area covers part of the San Juan Metropolitan Area (SJMA). Most of the area is highly developed with residential, commercial, institutional and infrastructure facilities comprising the economic core of the SJMA. The plans considered both nonstructural and structural alternatives. Three final plans evolved from eight preliminary flood-control alternatives investigated for the main river and four alternatives considered for its principal tributary streams. The plans include enlargement, straightening and lining the Río Puerto Nuevo, Quebrada Margarita, Quebrada Josefina, Quebrada Doña Ana, and Quebrada Buena Vista channels for the 25-year, the 100-year or Standard Project Flood (SPF) level of protection designated as Plans A, B and C respectively. All plans incorporate an environmental plan, environmental and cultural resources management program, and a bikeway recreation plan. A no-action alternative was also developed to reflect the most probable conditions without a project.

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Note: Information, figures, maps and other material presented in the Feasibility Report, Río Puerto Nuevo Survey Report Investigation, and its appendices are incorporated by reference in the Environmental Impact Statement.

ENVIRONMENTAL IMPACT STATEMENT

Río Puerto Nuevo Survey Investigation

San Juan, Puerto Rico

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ENVIRONMENTAL IMPACT STATEMENT

Río Puerto Nuevo Survey Investigation San Juan, Puerto Rico

1.00 SUMMARY

1.01 Major Conclusions and Findings. This document presents an environmental analysis of four alternatives developed under the authority of Section 204 of the Flood Control Act of 1970 during a study of flooding problems in the Río Puerto Nuevo basin at San Juan, Puerto Rico, at the request of the Commonwealth of Puerto Rico. Three alternatives were selected from all those considered for detailed investigation and comparison with the base conditions. The base conditions with which the future impacts of the alternatives are compared is the most probable future of the area without the project. In the course of this process, a National Economic Development Plan and a selected plan were identified.

1.02 Rationale for the NED Plan. The NED plan is that one which addresses the planning objectives and satisfies the planning criteria in a way that reasonably maximizes the net economic benefits consistent with the federal objectives of protecting the nation's environment pursuant to national environmental statutes, applicable executive orders, and other federal planning requirements. Plan B, which outlines channel construction to protect against the 100-year flood, is designated as the NED Plan. This plan generates 13 percent net benefits over plan C, which is the second plan in ranking under the National Economic Development criteria.

1.03 Rationale of the Tentatively Selected Plan. The impact assessment process showed that plan B, which calls for channel construction to protect against the 100-year flood occurrence, would best meet study objectives, particularly as they relate to the economic and human environment characterizing the study area. This plan maximizes national economic development benefits, regional development and is the most consistent with local guidelines and regulations.

1.04 Section 404(b) Evaluation Report. A Section 404(b) Evaluation Report is included as Attachment A to this document.

1.05 Section 103 Evaluation. This evaluation is included as Attachment B. Further evaluations will be conducted during the final design stage prior to construction to meet EPA Region II requirements.

1.06 Coastal Zone Management Consistency: Through consideration of the information presented in this report and draft EIS, the Corps of Engineers has determined that the proposed action is consistent with the Puerto Rico Coastal Zone Management Program. This document will be coordinated through circular A-95 procedures for determination of consistency by the PR Planning Board pursuant to 15 CFR 930.

1.07 Areas of Controversy. Two principal areas of controversy arose during the investigations. The controversies and suggested resolutions are identified and described in the following paragraphs.

1.08 Channel Alignment. The Commonwealth Government, through the Department of Natural Resources, had proposed plans of improvements for the Rio Puerto Nuevo based on a 1973 design. Since the design was prepared, however, The San Juan Sanitary landfill invaded the channel's right-of-way. The Commonwealth had insisted originally in maintaining their previous alignment but since the coordination of this report has realized the need to follow the alignment proposed by the Corps.

1.09 Constitution Bridge Wetlands. Another area of controversy has been the potential project impacts on Constitution Bridge mangroves and mudflat area. This area was identified as one of 26 natural reserves proposed as part of the Coastal Zone Management Plan for Puerto Rico but no management plan has been implemented. The channel excavation proposed in the Federal study on the Rio Puerto Nuevo will result in losses of mangroves and productive mudflats. However, all proposed construction plans include measures to offset the mangroves destroyed adjacent to the Constitution Bridge mangroves on the banks of the stream and the Puerto Nuevo port facilities as well as providing for the implementation of a resources management program for the area. The proposed replanting of 6 hectares of mangroves would provide for streambank protection and reduce to 7.5 hectares the net loss of mangroves. The establishment of a Commonwealth forest or preservation area of 7.3 hectares would limit future wharf expansion into the Constitution Bridge mangroves. This action would serve to mitigate most of the losses of wetlands and insure their future preservation.

1.10 Unresolved Issues. There are no unresolved issues.

1.11 Relationships of Plans to Environmental Requirements. Table 1 shows the status of plans in relation to different environmental requirements.

2.00 NEED FOR AND OBJECTIVES OF ACTION

2.01 Study Authority. The study is conducted under authority of Section 204 of the 1970 Flood Control Act, which authorizes the Secretary of the Army, acting through the Chief of Engineers, to cooperate with the Commonwealth of Puerto Rico in the preparation of studies and plans for the development and management of water and related land resources throughout its territory. In a letter dated 4 January 1978 to the District Engineer, the Governor of Puerto Rico requested the initiation of the study as soon as possible, and has subsequently demonstrated interest and expressed the need for completion of the study.

2.02 Public Concerns. Flooding problems along the Río Puerto Nuevo became a major public concern following the floods of June 1970. The Commonwealth initiated studies for the resolution of the flooding problems, primarily in the Bechara industrial area, Puerto Nuevo, University Gardens and Villa Nevares sectors. Construction was not initiated because of lack of local funds. Residents of the area, however, continued to voice strong concerns related to both overbank flooding and local drainage problems. They expressed the belief that channel cleaning of the Río Puerto Nuevo and Quebrada Margarita, through the removal of sediment, debris and major vegetation, would help resolve the problems associated with periodic flooding in the area but not those resulting from large floods. Solving the problems resulting from large floods would require major flood-control works along the Río Puerto Nuevo and its major tributary streams. The need to improve the storm-sewer systems of various residential sectors was also identified as an urgent concern.

2.03 Planning Objectives. The general goal underlying flood plain management in the study area is to guarantee the general public welfare and continuous use of the area's private and public infrastructure. Specifically, the objectives guiding this study are the following:

1. Safeguarding the lives of the persons living within the flood plain of the Río Puerto Nuevo and its tributaries.

2. Minimizing potential financial and personal property losses from inundation damages.

3. Minimizing disruption of economic and social activities within the study area.

4. Revitalizing of the area's urban core and enhancing opportunities for further economic development.

5. Facilitating use of existing infrastructure in the Study Area.

6. Management of the existing habitat of valued species at the Constitution Bridge mangrove area.

7. Reducing of streambank and channel erosion along the Río Puerto Nuevo.

8. Expanding of water-oriented and other recreation facilities along the river corridors.

3.00 ALTERNATIVES

3.01 Alternative Plans Eliminated from Further Study. During the plan formulation process, eight alternatives were developed for the main Río Puerto Nuevo channel and four alternatives for the principal tributary stream (Quebrada Margarita, Quebrada Josefina, Quebrada Doña Ana, Quebrada Buena Vista, and Quebrada Guaracanal). The alternatives eliminated during the intermediate planning stage are described in the following paragraphs. Additional material is provided in section II. B.2, Development of Preliminary Alternatives, Appendix B, Plan Formulation.

3.02 Alternative 1. This alternative provides channel improvements with a conveyance capacity limited to that provided by the existing Las Américas Expressway bridge as a means of avoiding its replacement. The alternative was eliminated because its level of protection against a flood of the magnitude of occurring every five years was not considered sufficient for protection of the study area.

3.03 Alternative 5. This plan combines a Standard Project Flood (SPF) channel from San Juan Harbor to the Ramón Nevares development and a 100-year flood channel for the upstream reach to the Winston Churchill bridge. A system of levees are needed at the proposed Botanical Gardens site to collect the excess floods from the 100-year channel. The size of the levees and the potentially disastrous effects of possible breaching were determined to be of such magnitude as to justify elimination of the alternative from further consideration.

3.04 Alternative 6. This alternative provides the same channel scheme as Alternative 5 with the use of a detention basin at the proposed Botanical Gardens site. The size of the detention basin, its effects on adjacent developments and considerable hydraulic drop from the upstream channel were the main criteria for eliminating this plan from further consideration.

3.05 Alternative 7. Under this alternative, a 100-year channel would be constructed from San Juan Harbor to the Ramón Nevares development and a system of levees provided to collect and direct the upstream overflows into the proposed channel. Because of the size of the levees and the reduced level of protection to the San Gerardo area, the plan was not considered for further study.

3.06 Alternative 8. This plan is identical to Alternative 7 except its level of protection would be the SPF. It was eliminated from further consideration for the same reasons as Alternatives 5 and 7.

3.07 Alternative 12. This plan would provide transition improvements to Quebrada Margarita, Quebrada Josefina, Quebrada Doña Ana and Quebrada Buena Vista from the existing modified channel to the improvements proposed for the Río Puerto Nuevo. They were eliminated from further consideration as separate alternatives and incorporated as part of the improvements of the main channel.

3.10 Plans Considered in Detail. Three plans were considered in detail. They consist of combinations of the alternatives not screened out. The numbering of those alternatives is included in parentheses only for this section.

3.11 No-Action Alternative. This alternative would not provide any structural measures and the suggested non-structural measures applicable would be institutional or management-oriented. Because of the highly developed character of the area, application of Planning Board Regulation 13 on Building in Floodable Lands would be nonapplicable for other than major expansions to existing structures. High reliance would be placed on the current federally subsidized flood-insurance program and implementation by Commonwealth and municipal civil defense of an effective temporary evacuation plan. A periodic stream-channel-

cleanout program could maintain a conveyance capacity for a 5-year flood. Continuous streambank erosion may require channel cleanout on an annual basis and pose threats of collapse to adjoining structures. This maintenance program would be implemented by the Commonwealth Department of Natural Resources. The Constitution bridge mangroves would yield to harbor improvements unless they are designated as a preserve and the area is fenced to mark its boundary and insure against continued dumping of fill material.

3.12 Plan A, 25-Year Channel (Alternative 2). This plan consists of channel improvements from the outlet of the Río Puerto Nuevo in San Juan Harbor to Winston Churchill Avenue, about 10 kilometers upstream, to convey the 25-year flood discharge under future conditions. The reach from San Juan Harbor to the vicinity of the junction of the Río Puerto Nuevo with Quebrada Margarita would be lined with vertical concrete sheet pilings and mangrove plantings along most of the 1.5 km. reach. A trapezoidal channel with rip-rap and mangrove protection would follow to the De Diego Expressway bridge and along Quebrada Margarita to downstream of its junction with the same expressway. The Río Puerto Nuevo continues as a high-velocity, rectangular, reinforced concrete channel. There would be a debris basin from the Lomas Verdes Avenue to Winston Churchill Avenue. For Quebrada Margarita, a rectangular reinforced concrete channel would be built from just below its junction with the De Diego Expressway to the Caparra Interchange. Improvements to Quebrada Josefina include a rectangular reinforced concrete channel from its junction with the Río Puerto Nuevo for a length of 2.3 km. along the Reparto Metropolitano development. Improvements to Quebrada Doña Ana would be a rectangular reinforced concrete channel from its junction with Quebrada Josefina for a length of 0.9 km. Quebrada Buena Vista would be diverted from PR Hwy 21 along the proposed Botanical Gardens to its junction with the Río Puerto Nuevo with a EIS-5 1.7 km. rectangular reinforced concrete channel. A debris basin is included for Quebrada Guara canal almost immediately upstream from its junction with Río Puerto Nuevo. A bicycle corridor is provided along the channel's right-of-way from the San Juan Regional Park to Lomas Verdes Avenue. The acquisition and designation of the Constitution Bridge mangrove as a Commonwealth Forest together with the mangrove plantings along the lower channel banks and their maintenance through periodic cuttings are to mitigate the net destruction of 7.5 hectares of mangroves.

3.13 Non-Federal Responsibilities. Implementation of the plan would involve specific non-Federal responsibilities as follows:

a. Provide without cost to the United States all lands, easements, rights-of-way, and relocations necessary for the construction, and subsequent operation and maintenance of the project including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of spoils and necessary retaining works.

b. Accomplish without cost to the United States all alterations and relocations of highway bridges, buildings, streets, storm drains, utilities, and other structures and improvements. Acquire and operate as part of the Commonwealth Forest system the Constitution Bridge mangrove.

c. Hold and save the United States free from damages due to the construction works except damages due to the fault or negligence of the United States or its contractors.

d. Assume operation and maintenance of the project and project facilities, including the management of the mangroves planted along the channel.

e. Prior to initiation of construction enact ordinances and promulgate regulations to prevent obstruction and encroachment on the channels and other project works which would reduce their flood carrying capacity or hinder maintenance and operation; and, control development in the project area to prevent an undue increase in the flood damage potential.

f. Publicize floodplain information in the areas concerned and provide this information to zoning and other regulatory agencies for their guidance and leadership in preventing unwise future development in the floodplain and in adopting such regulations as may be necessary to insure compatibility between future development and protection levels provided by the project.

g. At least annually, inform affected interests regarding the limitations of the protection afforded by the project.

3.14 Federal Responsibilities. The Federal Government would assume responsibilities to construct the project as described.

3.15 Plan B, 100-Year Channel (Alternative 3). This plan follows the same alignment and scheme as the improvements proposed for Plan A but provides conveyance for the 100-year flood. It includes the same mangrove plantings and outdoor recreation measures recommended under Plan A.

3.16 Non-Federal Responsibilities. The same responsibilities as in Plan A apply.

3.17 Federal Responsibility. The same responsibilities as in Plan A apply. Costs allocations between Federal and non-Federal interest are summarized in Table 3 of the main report.

3.18 Plan C, Standard Project Flood Channel (Alternative 4). This plan is basically the same as Plan B with the main difference being the channel's increased conveyance capacity for the SPF. It incorporates the same mangrove plantings and outdoor recreation measures as Plan A.

3.19 Non-Federal Responsibilities. The same responsibilities as under Plan A apply.

3.20 Federal Responsibilities. The same responsibilities as in Plan A apply.

3.21 National Economic Development (NED) Plan. Plan B is defined as the NED plan. Significant contribution to the planning objectives and economic efficiency defined in terms of maximization of net benefits consistent with the federal objective of protecting the environment pursuant to national environmental statutes and executive orders were the basic criteria followed in the designation of the NED plan. Plan B generates 13 percent more net benefits than Plan C, which is the second one in ranking under the National Economic Development criteria.

3.22 Selected Plan. Plan B is the designated NED plan and its level of protection is the one agreeing most with Commonwealth policy on degree of protection against flooding.

323 Comparative Impacts of Alternatives. For purposes of comparison, the future conditions without a project (no action alternative) and the three plans studied in detail are displayed in Table 2. Additional comparative information is included in Appendix B (Plan Formulation) and in the Environmental Effects section of this statement (para. 5.00).

4.00 AFFECTED ENVIRONMENT

4.01 Environmental Conditions. The Río Puerto Nuevo basin is a highly urbanized sector of the San Juan Metropolitan Area. The watershed has a drainage area of 63 square kilometers with a gently sloping plain near its coast and a moderately hilly area in its southern upstream portion. Close to 75 percent of the basin is already urbanized. Population of the study area for 1980 is 240,000 inhabitants. The low reaches of the study area include over 10,000 single housing units, dozens of high-rise condominiums, 0.73 square kilometer of ports facilities, a 508,000 kw electric power generating plant, a 3.1 cubic-meters-per-second wastewater treatment plant, the P. R. Aqueduct and Sewer Authority Operation Center for the San Juan Region, the San Juan Public Works Operations Center, the San Juan sanitary landfill, 149 hectares of municipal and recreational facilities and more than 139,000 square meters of commercial space, the General Post Office facilities and other institutional buildings. The upper reaches are predominantly residential and commercial. There is one minor earth-filled dam and reservoir for water supply with a yield of 0.26 cubic meters per second. Portions of some of the principal tributary streams have been provided with reinforced concrete-lined channels, primarily along densely developed areas. The present alignment of the lower Río Puerto Nuevo and its common outlet into San Juan Harbor with the Caño de Martín Peña are the result of construction. These actions, as well as provision of the dumps and sanitary landfill operations and wharf-frontage construction have been the results of actions since the late 1950s. Considerable wetlands areas were destroyed as a result of the actions, although portions of the San Juan mangrove forest have been re-established.

4.02 Cultural Resources. The National Register of Historic Places does not list any sites in the project impact area. Two structures, however, have been identified as potentially eligible for inclusion in the Register. The General Norzagaray bridge on P. R. Hwy 1 over the Río Piedras was completed in 1855 and is probably the most complete and interesting bridge currently in use and preserved from the Spanish colonial period. A dam associated with the Río Piedras Water Filtration Plant, which may predate the turn of the century, may deserve investigation for inclusion in the Register. Additional coordination with the State Historic Preservation Officer, the National Register, and the Advisory Council on Historic Preservation to determine the eligibility of these structures for the register will be conducted. Coordination with the State Historic Preservation Officer and the National Park Service, Department of the Interior, has been conducted regarding the presence of known items of historic or archeological significance. Although no archeologic resources have been identified, two specific areas have been recommended for detailed investigation during postauthorization studies. These are the Las Américas Park development and the Agricultural Experiment Station grounds where the proposed University of Puerto Rico's Botanical Gardens are to be developed. More detailed information is contained in Appendix G (Recreation, Cultural, and Natural Resources).

4.03 Flora. The area of greatest ecological value is the riparian vegetation between the stream's outlet and the De Diego Expressway, the majority of which is secondary-succession mangrove. A total of 115 hectares of mangroves exist along the lower Río Puerto Nuevo, Quebrada Margarita and Caño de Martín Peña up to the Martín Peña bridge. Both stream banks have been colonized with dense stands of mangroves. Adjacent to the water are red mangroves succeeded by a mixture of white mangroves, black mangroves, and buttonwood. Waterward of these mangroves at the outlet are productive mudflats as evidenced by the large number of avian species using these as feeding grounds. Upstream, along the Quebrada Margarita from its junction with the Río Puerto Nuevo, are fresh-water wetlands with vegetation characterized by mixed sedges and cattail.

4.04 Fauna. The most important resource value of the Río Puerto Nuevo is its contribution to wildlife habitat. The mangroves and wetland areas below the Constitution Bridge provide one of the best avian habitats within metropolitan San Juan. More than 70 species of birds have been recorded in the area with concentrations exceeding 5,000 having been frequently reported. The island's largest roost of Louisiana or tricoloured heron and second largest roost of snowy egrets are found in this area. A nesting rookery of cattle egrets is well-established in the mangroves. Other species which have been observed in the mangroves include the yellow-crowned night heron, great blue heron, both the least and American bitterns, and marsh hawk. Shore birds, gulls, and terns can almost always be observed in great numbers on the mudflats. The significance of the fisheries resources along the Río Puerto Nuevo can be considered minimal because of its polluted condition. The Constitution Bridge mangroves and mudflats were identified as one of 26 Natural Reserves under the Coastal Zone Management Program, although no official designation has been made.

4.05 Threatened or Endangered Species. Species considered threatened or endangered by the U.S. Fish and Wildlife Service whose ranges encompass the project area include the brown pelican and the yellow-shouldered blackbird. There is no designated critical habitat in the project area.

4.06 Water Supply. Since the early 1950s, the main source of water supply in the San Juan Metropolitan Area is the Lago Loíza reservoir. Ground water in San Juan has played a declining role in water supply since the completion of the Loíza reservoir project. Ground-water yield is limited because the aquifers are small and susceptible to salt water intrusion. During the severe droughts of the mid 1960s, the P. R. Aqueduct and Sewer Authority (PRASA) developed an emergency drilling program to provide sufficient ground-water supply to supplement surface-water supplies and meet the needs of the metropolitan area. After the drought, many of these well systems were abandoned and the water needs of the metropolitan area are mainly satisfied with the surface-water supply systems. Since the mid-1970s, some of these well systems are used during dry periods and for minor local water consumption. At present, there are 19 deep wells in the Río Puerto Nuevo basin, of which 15 are owned by PRASA and 4 by University of Puerto Rico Agricultural Station (UPRAES). Of these, only 4 are in use, 7 are available for potential use, and 8 are completely useless. The UPRAES operates 3 deep wells for irrigation and experimental purposes. These wells are used 3 to 4 days during the week with a yield of 3.2

to 4.4 liters per second (50 to 70 gpm). PRASA operates one deep well, which is located within the San Juan Municipal Sports Complex area. This well is used during dry periods to supplement surface-water supplies for the residents of Río Piedras. The Río Piedras filter plant, which is used only during extreme dry periods, is the only surface-water supply system within the Río Puerto Nuevo lower basin.

4.07 Water Quality. The water quality of both the Río Puerto Nuevo and the Caño de Martín Peña can only be characterized as extremely poor. In general, conditions may be classified as anaerobic. Bottom sediments are organic and anoxic and characterized by odors of methane and hydrogen sulfide, that primarily results from discharge of untreated sewage into the waterway. However, implementation of Commonwealth programs for sewage treatment and control of pollution point sources could favorably affect this resource in time.

4.08 Air Quality. The lower end of the Río Puerto Nuevo basin is classified as a nonattainment area under the national ambient air quality standards since primary standards are exceeded.

4.09 Noise. Considering that the study area is one of high urban development and commercial activities, background noise is considered representative of such human activity.

4.10 Recreation. Recreational facilities in the project area are limited mainly to small parks, playing fields, basketball and tennis courts. However, the Commonwealth is engaged in developing more extensive recreational complexes at Las Américas Park and at the proposed University of Puerto Rico Botanical Gardens in the Agricultural Experiment Station area. Water-oriented recreation is minimal due to the poor water quality which curtails establishment of fisheries and inhibits water-contact recreation but does constitute a potentially valuable resource with proper management. Another area of high potential as a recreational/educational resource is the Constitution Bridge mangroves/mudflat area. Designation of this area as a national reserve would preserve this area for future generations. An accompanying management program, including measures to allow easier access to the area now reachable only by boat, would enhance its value as a public resource.

5.00 ENVIRONMENTAL EFFECTS

5.01 Cultural Resources: Base Conditions and No-Action Plan. Under base conditions and the no-action alternative, utilization of the two structures identified as having historical value will continue. They are, however, exposed to potential damage from high discharges since their respective conveyance capacities are for high-frequency, low-volume floods. The General Norzagaray bridge has a conveyance capacity for the 5-year flood. Low-frequency floods could damage the structure through severe streambank erosion resulting from high water velocities. Although no assessment is available of the waterworks diversion structure, it is possible that the weir's capacity is significantly lower than the degree necessary to safely pass low-frequency floods.

5.02 Cultural Resources and Plans A, B and C. Because of the need for larger flow conveyance at P. R. Hwy 1, a new bridge is proposed to the southwest of the Norzagaray Bridge. The new channel alignment would leave the bridge undisturbed and would divert all Río Puerto Nuevo stream flow from the Norzagaray Bridge. Channel construction would also avoid the Río Piedras waterworks diversion structure, leaving it unused. A drop structure to be constructed in the sector will also allow diversion of water for the water treatment plant.

5.03 Flora (Wetlands) Base Conditions and No-Action Alternative. Unless action is taken under the Coastal Zone Management Program or the Commonwealth Forestry Law, it is expected that most of the mangrove areas on the lower Río Puerto Nuevo and Caño de Martín Peña area will yield to development if current local plans by the Municipio of San Juan and the Puerto Rico Ports Authority are carried forward. Should these plans result in filling or discharge of material into wetlands, they would be subject to Corps permitting authority under Section 404 of the Clean Water Act. Similar pressures for development are materializing along the Quebrada Margarita fresh-water wetlands. With no change in existing conditions, the remaining wetland areas would continue to be adversely affected by drainage, tidal flushing, and water-quality problems.

5.04 Flora (Wetlands) and Plans A, B and C. These plans would result in the destruction of 13.5 hectares of existing mangroves and mudflats. The plans would, however, create 6 hectares of mangroves as part of channel streambank protection and preservation of the 7.3 hectares of the Constitution Bridge mangroves resulting in a net loss of 0.2 hectares. This would assist the Commonwealth in establishing a management program for the Constitution Bridge Natural Reserve as a mitigative measure. These 7.3 hectares of wetlands would be protected by a 630 meters long chain-link fence along its landward sides. There would be a definite improvement in drainage and stream flow and increased tidal flushing as a result of the modified channel with accompanying favorable effects in overall water quality and wetland habitat. The increased channel capacity and tidal flushing would be of benefit also to the Quebrada Margarita wetlands with its mangrove plantings along the modified channel as well as the overall Río Puerto Nuevo estuary. This would enable full implementation of the recommendations of the Coastal Zone Management Program for the area. Channel construction measures under these plans would result in some losses to noncritical vegetation.

5.05 Fauna: Base Conditions and No-Action Alternative. Elimination of the mangrove area would result from developmental pressures, depressing productivity and removing this habitat for avian resources.

5.06 Fauna and Plans A, B and C. The preservation of the Constitution Bridge mangrove area and improvements to the water quality of the Río Puerto Nuevo channel would improve habitat conditions. An unquantified number of benthic and terrestrial invertebrates would be lost due to excavation and construction and aquatic biota would be exposed to temporary stress during the construction period, although these would flourish during the life of the project.

5.07 Threatened and Endangered Species: Base Conditions and No-Action Alternative. The two species considered threatened or endangered by the U.S. Fish and Wildlife Service would be affected if development encroaches on the Constitution Bridge mangroves and mudflats.

5.08 Threatened and Endangered Species and Plans A, B and C. Channel construction would result in a temporary disruption of the habitat, which is utilized to some degree by the threatened species. There would be immediate impact in the loss of 13.5 hectares of mangroves and mudflats. Long-range improvement in productivity and wildlife habitat quality are expected as the planted mangrove area matures and the natural reserve is adequately managed. It is expected that the sediment load from the Río Puerto Nuevo and the ebb flow of the tides would fully reestablish the mudflat area. Periodic channel clean-up and high flows will maintain the capacity of the flood control channel. The projected improvement in the stream's water quality, flushing activity and increased levels of dissolved oxygen (refer to Par 5.11) would further improve this habitat.

5.09 Water Supply: Base Conditions and No-Action Alternative, Plans A, B and C. The base conditions and the no-action alternative are not expected to impose a significant effect on the present net water budget. Channel construction would result in the relocation of two deep wells, which at present are available for potential uses, and the elimination of two deep wells, which at present are completely useless. As was indicated in paragraph 5.02, channel construction would also avoid the Río Piedras waterworks diversion structure, but an intake structure to be constructed in that sector would allow diversion of water for the treatment plant.

5.10 Water Quality: Base Conditions and No-Action Alternative. Under present and the most probable future (No-Action Alternative) conditions, it is expected that degradation of water quality will continue in the Río Puerto Nuevo.

5.11 Water Quality and Plans A, B and C. Channel construction would improve overall storm-water drainage and flow as well as increase tidal flushing activity and levels of dissolved oxygen. Sediment load is expected to be reduced because of reduced streambank erosion along the length of the modified channel. All of the plans would cause temporary adverse impacts on water quality due to turbidity generated by construction activity.

5.12 Air Quality and Transportation Network: Base Condition and No-Action Alternative, Plans A, B and C. No effect or change to the airshed's quality is expected as a result of adoption of any of the alternatives. Any improvement or change would be based on efforts to improve the general national ambient air quality standards. Minor adverse effects would be expected during traffic congestion caused by floods. Climatic conditions could help minimize these impacts with particulate washout. Minor effects during stream-channel maintenance operations are so small as to be unquantifiable considering the airshed's quality. No major effect on the airshed's quality is expected during the project life except minor effects during channel construction and maintenance operations. Largest effects expected are related to construction activities. Disruption in traffic-flow patterns and reduced velocities along principal expressways and roads would cause increased emissions from motor vehicles. Disruption caused by construction of Plan B or Plan C would be the greater because of the need to replace the two Río Puerto Nuevo bridges on the Las Américas Expressway. Temporary works will be required during project construction to maintain traffic, at reduced rates, within affected highways and streets during bridge reconstruction. Required relocation will follow established federal requirements.

5.13 Noise: Base Conditions, No-Action Alternative and Plans A, B, and C. The base conditions and the most probable future under the no-action alternative are not expected to have a significant effect on the area's noise environment. Current land-use categories in the study area show noise levels on the order of 55 dBA to 70 dBA while the predicted noise levels associated with the Las Américas Expressway vary between 77 and 82 dBA. The implementation of either Plan A, B, or C would result in a significant increase of noise levels during construction. After construction, noise levels would not be expected to be increased significantly by implementation of any of the plans.

5.14 Recreation: Base Conditions and No-Action Alternative. Neither of these alternatives would reduce the project area's recreational resources.

5.15 Recreation and Plans A, B and C. Plans A, B and C would operate to enhance the area's recreational resources by restoring and assisting in preserving the Constitution Bridge mangrove/mudflat habitat through compensative planting and formal designation of the area as a Natural Reserve. The expected improvements in streamflow and tidal flushing provided by the plans would help to improve the existing water quality and favorably affect the potential for water-oriented recreation. Finally, the provision for the bike-way corridor common to all the plans would enhance recreational opportunities for area residents as well as contribute to energy savings as an alternative to motorized transportation. Possibilities for development of large parcels of land for the University of Puerto Rico Botanical Gardens, the Las Américas Park and the thematic park would be enhanced significantly (refer to Appendix G).

6.00 LIST OF PREPARERS. People primarily responsible for the preparation of this document are listed on Table 3.

7.00 PUBLIC INVOLVEMENT.

7.01 Public Involvement Program. Federal, Commonwealth, and local government agencies were directly involved in the study. Various formulation and impact-assessment meetings were held with agencies actively involved in the study effort. Specifically, close coordination was established with the Office of the Governor, Office of the Resident Commissioner in Washington, D.C., and the Mayor of San Juan. An initial public meeting was held on 16 March 1978 to obtain public views and concerns in identifying flooding problems and damages in the study area. Public views obtained during the public-involvement program are discussed in Appendix H.

7.02 Required Coordination. Required coordination with Federal and Commonwealth agencies under the various applicable environmental laws, policies, and regulations was accomplished by correspondence and meetings beginning in 1978 and continuing through the present. The Draft Feasibility Report and the Draft Environmental Impact Statement will be circulated to Federal, Commonwealth, and local governmental agencies and to interested organizations for review and comment. A final public meeting will be held to discuss the findings of the study and the recommended solutions to the flooding problems of the Río Puerto Nuevo basin. The public meeting will also seek comments from the participants.

7.03 Statement Recipients.

National Marine Fisheries Service
U.S. Fish and Wildlife Service, Jacksonville
U.S. Geological Survey, San Juan
Federal Highway Administration, San Juan
U.S. Environmental Protection Agency, San Juan
U.S. Environmental Protection Agency, New York
U.S. Environmental Protection Agency, Washington, D.C.
U.S. Department of Housing and Urban Development, San Juan
U.S. Forest Service, San Juan
U.S. Soil Conservation Service, San Juan
National Oceanographic and Atmospheric Administration, Office of Coastal
Zone Management, Washington, D.C.
Federal Emergency Management Agency, New York
Federal Insurance Administration, New York
Office of the Governor
P.R. Planning Board
P.R. Environmental Quality Board
P.R. Department of Natural Resources
P.R. Department of Transportation and Public Works
P.R. Department of Recreation and Sports
University of Puerto Rico
P.R. Office of the Civil Defense
P.R. Office of Cultural Affairs
Office of the Mayor of San Juan
San Juan Office of Budget and Planning
San Juan Department of Public Works
New Center of San Juan Corporation

7.04 Public Views and Responses. In the course of coordination with Federal, Commonwealth, and local government agencies, and in response to concerns expressed by residents and representatives of industrial and commercial interests in the study area at public hearings, it became apparent that the level of property damage, threat to life and health, and general disruption cause by periodic flooding under existing conditions posed problems requiring urgent solution. Although there was general agreement that the area's top priority was alleviation of flooding, specific areas of concern were identified as requiring attention in design and implementation of a flood-control project. These special concerns included the need to protect and preserve environmentally valuable areas along with archeological and historic resources and to minimize possible conflicts with local development plans relating to recreational and transportation facilities. These views are incorporated in the planning process and reflected in the proposed project (refer to Appendix H).

7.05 Comments and Responses to the Draft Environmental Impact Statement. Following are the comments provided to the Draft Environmental Impact Statement and their responses. The individual letters are included in Annex 2 to Appendix H, Public Involvement.

7.06 Comment: Because the impact to the highway system within the San Juan Metropolitan Area will result in considerable traffic disruption and the Commonwealth of Puerto Rico has used Federal-Aid Highway Funds on similar projects, there is a need to involve the Federal Highway Administration early in the process to avoid unnecessary delays and eliminate environmental review duplication. There is a need to consider other viable schemes to control the floods which would not require the replacement of the existing bridges as well as to include a discussion of schemes to maintain traffic flow during construction. ((Federal Highway Administration, Dept. of Natural Resources).

Response: The decision on the use of Federal-Aid Highway Funds is one that corresponds to the Commonwealth Government. However, the DEIS was modified to respond to the specific needs of the Federal Highway Administration. The severity of the floods in the highly urbanized setting as well as the underdesign bridge capacities to convey the floodwaters required the replacement of so many bridges. All bridges along the principal highway system requiring replacement have adequate areas to allow for traffic diversion during construction, although most will require lower maximum velocities to be established.

7.07 Comment: There is a need to develop an erosion and sediment control plan to be implemented during construction (Soil Conservation Service, P.R. Environmental Quality Board).

Response: A plan to control erosion and resultant sedimentation within the channels will be developed during the design stage prior to construction since it is an activity beyond feasibility stage. The plan is dependent on many details developed during the final design stage.

7.08 Comment: The destruction of mangroves should be minimized, maintaining as much as possible the existing mangrove fringe along the north bank of the Río Puerto Nuevo and Quebrada Margarita. Additional details of the mangrove plantings are needed. (U.S. Fish and Wildlife Service, P. R. Environmental Quality Board, The New World Caribbean Zoo, Department of Natural Resources).

Response: Because of the existing physical constraints posed by the San Juan Sanitary Landfill and the De Diego Expressway, the channel alignment was set, thus requiring the removal of existing fringe mangrove. To mitigate this mangrove destruction, and to improve the channel aesthetics and bank protection and stabilization, mangroves will be planted along the banks in as much length as possible. Final design slope requirements for the banks will be developed during the design stage. Current plans call for planting a 3,000 m by 20 m fringe bordering Río Puerto Nuevo and Quebrada Margarita. There are no other areas within the project for additional plantings which do not involve substitution of one wetland for another.

7.09 Comment: There is a need to create a man-made mudflat near the Cosntitution Bridge area since the existing mudflats will be eliminated with the construction of the channel. (U.S. Fish and Wildlife Service, Department of Natural Resources).

Response: The creation of a man-made mudflat will be studied in detail during the design stage. This analysis will consider current plans by the P.R.

Department of Transportation and Public Works to create such a mud-flat area as part of the Agua-Guagua project which is scheduled to be under construction during early FY-85.

7.10 Comment: There is a need to reduce the impact to the existing aqueduct and sewer lines in the project area. (P.R. Aqueducts and Sewers Authority).

Response: The construction of the proposed channel network will require the relocation of a number of existing aqueduct and sewer pipes, as identified in Appendix D. The design will consider their relocation and modification to insure their continuous service.

7.11 Comment: There is a need to conduct limited but intense surveys to insure the location of any buried cultural resources along the channels rights-of-way. Also, every effort should be made to preserve the General Norzagaray Bridge as well as the structures associated with the Río Piedras Waterworks (P.R. State Historic Preservation Office).

Response: As stated in the feasibility report, detailed cultural resources surveys will be performed during the project design stage. Also, the channel alignment was modified so as to leave intact both the General Norzagaray Bridge and the Río Piedras Waterworks.

7.12 Comment: A number of structures, primarily transmission lines, will be affected by the project (P.R. Electric Power Authority).

Response: It is recognized that a number of electric power transmission lines will require relocation. Specific lines to be relocated will be considered during the design stage.

7.13 Comment: The proposed flood control measures may affect HUD aided housing developments located in the area. The report should also include a relocation plan. (U.S. Department of Housing and Urban Development).

Response: Structures which will require relocation have been identified but a final determination will be made following the final design of the flood control work. This effort will require that the local sponsor develop a detailed relocation plan, since this is an item of local responsibility.

7.14 Comment: Upland disposal areas will require land treatment to reduce the potential fugitive dust problem. The project will require, prior to initiation of construction, permits for sources of emission and solid waste.

Response: Coordination will be made during the design stage to develop the required information for the control of fugitive dust and the required permits to be obtained by the local project sponsor.

7.15 Comment: Consideration should be given at including the P.R. Senate in the coordination and programming efforts of project implementation. (P.R. Senate).

Response: The P.R. Senate will be maintained informed and invited to participate in efforts by the Corps dealing with project coordination.

7.16 Comment: There is a need to discuss the effects of the proposed project on the ground water resources of the area and possible salt water intrusion. (Department of Natural Resources).

Response: The DEIS discusses these impacts in Par 4.06 and 5.09.

17.17 Comment: Compliance with the Marine Protection, Research, and Sanctuaries Act is not specifically addressed (U.S. Environmental Protection Agency).

Response: Compliance with the Marine Protection, Research and Sanctuaries Act of 1972, as shown in draft report page EIS-14, Table-1, will be accomplished during design for construction phase. Bioassays are available from Rio Puerto Nuero in the vicinity of its intersection with Martin Pena Canal. However, new bioassays and chemical analysis may be accomplished during the design activities performed after authorization and funding of the project. The final design specifications would be the document which would make reference to or contain the procedure for obtaining an ocean dumping permit.

17.18 Comment: Leachate from upland disposal material must be tested for suitability for release to ambient waters (U.S. Environmental Protection Agency).

Response: Results of elutriate tests of sediments to be dredged are presented in Table G-6 (Appendix G, p G-33), and are discussed in Section B page G-32.

17.19 Comment: Maps detailing locations and areas of mangrove communities to be removed and areas to be planted should be provided.

Response: Plate D-15 shows the general areas. Final alignment and design of mitigation areas will be done during the design phase, which follows planning.

TABLE 1
 RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION REQUIREMENT STATUTES
 AND OTHER ENVIRONMENTAL REQUIREMENTS

FEDERAL STATUTES	NO ACTION ALTERNATIVE	PLAN A			PLAN B			PLAN C			
		25-YEAR CHANNEL			100-YEAR CHANNEL			SIF CHANNEL			
Archeological and Historic Preservation Act, as amended, 16 U.S.C. 469 et seq	F	F	F	F	F	F	F	F	F	F	F
Clean Air Act as amended, 42 U. S. C. 7401, et seq	F	F	F	F	F	F	F	F	F	F	F
Clean Water Act, as amended (Federal Water Pollution Control Act) 33 U. S. C. 1251 et seq	F	F	F	F	F	F	F	F	F	F	F
Coastal Zone Management Act, as amended 16 U. S. C. 1451 et seq	F	F	F	F	F	F	F	F	F	F	F
Endangered Species Act, as amended 16 U. S. C. 1531, et seq	F	F	F	F	F	F	F	F	F	F	F
Estuary Protection Act 16 U. S. C. 1221, et seq	F	F	F	F	F	F	F	F	F	F	F
Federal Water Project Recreation Act, as amended 16 U.S.C. 460-1 (12), et seq	F	F	F	F	F	F	F	F	F	F	F
Fish and Wildlife Coordination Act, as amended U. S. C. 661, et seq	F	F	F	F	F	F	F	F	F	F	F
Land and Water Conservation Fund Act, as amended 16 USC 4601-4601-11, et seq	F	F	F	F	F	F	F	F	F	F	F
Marine Protection Research and Sanctuaries Act 32 U. S. C. 1401, et seq	N/A	C	C	C	C	C	C	C	C	C	C
National Historic Preservation Act, as amended	F	F	F	F	F	F	F	F	F	F	F

TABLE 1
 RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION REQUIREMENT STATUTES
 AND OTHER ENVIRONMENTAL REQUIREMENTS
 (CONTINUED)

<u>FEDERAL STATUTES</u>	<u>NO ACTION ALTERNATIVE</u>	<u>PLAN A 25-YEAR CHANNEL</u>	<u>PLAN B 100-YEAR CHANNEL</u>	<u>PLAN C SRC CHANNEL</u>
National Environmental Policy Act, as amended, 42 U. S. C. 4321, et seq	F	F	F	F
Rivers and Harbors Act 33 USC 401, et seq	N/A	N/A	N/A	N/A
Watershed Protection and Flood Prevention Act 16 U.S.C. 101, et seq	N/A	N/A	N/A	N/A
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq	N/A	N/A	N/A	N/A
Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq	F	F	F	F
Executive Orders Memoranda, etc.				
Flood Plain Management (E.O. 11988)	F	F	F	F
Protection of Wetlands (E.O. 11990)	F	F	F	F
Environmental Effects Abroad of Major Federal Action (E.O. 12114)	N/A	N/A	N/A	N/A
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum, 30 Aug 76)	F	F	F	F
<u>COMMONWEALTH OF PUERTO RICO STATUTES</u>				
Environmental Policy Act 12 LPRR 1121, et seq	F	F	F	F
Planning Board Organic Act 23 LPRR 22, et seq	F	F	F	F
Forestry Act 12 LPRR 193, et seq	F	F	F	F

TABLE 1
 RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION REQUIREMENT STATUTES
 AND OTHER ENVIRONMENTAL REQUIREMENTS
 (CONTINUED)

COMMONWEALTH OF PUERTO RICO STATUTES	NO ACTION ALTERNATIVE	PLAN A 25-YEAR CHANNEL	PLAN B 100-YEAR CHANNEL	PLAN C SFC CHANNEL
Water Law	F	F	F	F
12 LPRA 1502, et seq				
Department of Sports and Recreation Organic Act Law 126 of 13 June 1980	F	F	F	F
Mangrove Protection Policy Resolution 74-21 of 9 Oct 1974	F	F	F	F
Permits				
Water Quality Certification	N	F	F	F
EQB Regulation				
Fugitive Dust	F	C	C	C
EQB Regulation				
Noise	F	F	F	F
EQB Regulation				
Solid Waste Disposal	F	C	C	C
EQB Regulation				
Earth Extraction and Movement 28 LPRA 206, et seq	F	F	F	F
Construction in Floodable Areas Planning Board Regulation 13	F	F	F	F

Legend:

- F = Full Compliance
- P = Partial Compliance
- C = Compliance Prior to Construction
- N = Non Compliance
- N/A = Not Applicable

TABLE 2
COMPARATIVE IMPACTS OF ALTERNATIVES

	NO ACTION-ALTERNATIVE (WITHOUT PROJECT CONDITIONS)	PLAN A 25-YEAR CHANNEL	PLAN B 100-YEAR CHANNEL	PLAN C SFP CHANNEL
Cultural Archeologic	No resources identified	No resources identified	No resources identified.	No resources identified.
Historical	Historical structures identified are exposed to damage from low-frequency floods.	Channel alignment will not disturb historic structures and diverts stream flow from them	Same as Plan A	Same as Plan A
Flora Wetlands	Possible destruction of wetland areas due to development.	Destruction of 13.5 hectares of mangroves. Addition of 6 hectares of planted mangroves as streambank protection and establishment of the Constitution Bridge natural reserve for a net loss of 0.2 hectares.	Same as Plan A	Same as Plan A
Fauna Avian & Fisheries	Possible loss of feeding and nesting areas to development.	Improvement of habitat. Temporary disruption of habitat.	Same as Plan A	Same as Plan A
Federal Threatened & Endangered Species	Possible loss of feeding and possible nesting areas to development.	Long-range improvement of habitat. Temporary disruption.	Same as Plan A	Same as Plan A

TABLE 2
COMPARATIVE IMPACTS OF ALTERNATIVES
(CONTINUED)

NO ACTION-ALTERNATIVE (WITHOUT PROJECT CONDITIONS)	PLAN A			PLAN B			PLAN C		
	25-YEAR CHANNEL			100-YEAR CHANNEL			SPF CHANNEL		
Noise	No significant effect.	No significant effect except during construction.	Improvement to water quality from better drainage, increased tidal flushing and dissolved oxygen level. Reduced sediment load.	Same as Plan A.	Same as Plan A.	Same as Plan A.	Same as Plan A.	Same as Plan A.	Same as Plan A.
Water Quality	Continuing degradation of water quality.			Same as Plan A.	Same as Plan A.	Same as Plan A.	Same as Plan A.	Same as Plan A.	Same as Plan A.
Land Use	Continuous urban sprawl.		Densification of present development and restrained urban sprawl. Efficient utilization of existing infrastructure.	Same as Plan A.	Same as Plan A.	Same as Plan A.	Same as Plan A.	Same as Plan A.	Same as Plan A.
Solid Waste	No significant effect.		Same 4,280,000 cubic meters of excavated material will be generated. Some 90,000 cubic meters of dredged material for ocean dumping. Excavated material to be disposed off in two upland sites and as backfill along the channel.	Same 4,019,000 cubic meters of excavated material will be generated and about 985,000 cubic meter of dredged material for ocean dumping. Same disposal for excavated material as in Plan A.	Same 4,019,000 cubic meters of excavated material will be generated and about 985,000 cubic meter of dredged material for ocean dumping. Same disposal for excavated material as in Plan A.	Same 4,019,000 cubic meters of excavated material will be generated and about 985,000 cubic meter of dredged material for ocean dumping. Same disposal for excavated material as in Plan A.	Same 4,019,000 cubic meters of excavated material will be generated and about 985,000 cubic meter of dredged material for ocean dumping. Same disposal for excavated material as in Plan A.	Same 4,019,000 cubic meters of excavated material will be generated and about 985,000 cubic meter of dredged material for ocean dumping. Same disposal for excavated material as in Plan A.	About 5,585,000 of excavated material will be generated for upland disposal and approximately 1,115,000 cubic meters of dredged material for ocean dumping. Same disposal for excavated material as in Plan A.

TABLE 2
COMPARATIVE IMPACTS OF ALTERNATIVES
(CONTINUED)

	NO ACTION-ALTERNATIVE (WITHOUT PROJECT CONDITIONS)	ELAN A 25-YEAR CHANNEL	ELAN B 100-YEAR CHANNEL	ELAN C SFF CHANNEL
Transportation	Disruption of traffic during floods.	Replacement of 22 bridges. Disruption of traffic flows from residual flooding.	Replacement of 22 bridges. Enhanced opportunity for mass transportation.	Replacement of 22 bridges. Enhanced opportunity for mass transportation.
Economics				
Annual Cost (in \$ million)	N/A	19.2	21.6	26.5
Annual Residual Damages (in \$ million)	N/A	3.4	1.2	0.9
Annual Benefits (in \$ million)	N/A	37.7	54.1	55.1
B/C	N/A	2.0/1.0	2.5/1.0	2.1/1.0
Social	Continuous flooding threat and fear for life and property. Substantial deterioration of quality of life. No educational, cultural and recreational opportunities created. Increased potential for disease transmission. Continued utilization of large proportion of personal income for flood related expenses. Annual funding required for emergency and evacuation services.	1,508 temporary and 808 permanent jobs created. Reassigns income to higher priority needs. Threat to life, health safety minimally reduced. Families stranded during floods. Increased potential for transmission of diseases. Provides recreational opportunities with proposed bikeway and Constitution Bridge Natural Reserve.	Creates 1,697 temporary and 1,051 permanent jobs, most of them for blue-collar workers. Enhances efficient utilization of available income. Reduces flood threat. Eliminates stress and anxiety. Reduces disease vectors. Enhances opportunities for development of Parque Las Américas, the Botanical Gardens, and the proposed bikeway system. Educational program at Constitution Bridge area. Maximizes utilization of existing facilities.	Creates 2,404 temporary and 1,128 permanent jobs. Enhances utilization of available income. Eliminates flood threat and associated stress and anxiety. Eliminates disease vectors related to floods. Enhances opportunities for the development of Parque Las Américas, the Botanical Gardens, the bikeway system and the Constitution Bridge area. Maximizes utilization of existing facilities. Educational program at Constitution Bridge area.

TABLE 2
COMPARATIVE IMPACTS OF ALTERNATIVES
(CONTINUED)

NO ACTION-ALTERNATIVE (WITHOUT PROJECT CONDITIONS)	PLAN A 25-YEAR CHANNEL	PLAN B 100-YEAR CHANNEL	PLAN C SEF CHANNEL
Recreation	No effects.	Same as Plan A.	Same as Plan A.
	Creation of 9 kilometers of bikeway corridor and enhanced opportunities for the development of the Botanical Gardens, Las Americas Park, the San Juan Regional Park and the Constitution Bridge Natural Reserve.		

TABLE 3

LIST OF PREPARERS

<u>NAME</u>	<u>DISCIPLINE/EXPERTISE</u>	<u>EXPERIENCE</u>	<u>ROLE IN PREPARING EIS</u>
Dr. Gerald Altmar	Biology	EIS studies and consulting: 5 years, Ohio, and 9 years Jacksonville District	Supervision 5 years, Ohio, and 6 years Jacksonville District
Dr. Emilio M. Colón	Engineering/Civil Environmental	2 years water resources consultant, 2 years natural resources planning, P.R. Department of Natural Resources, 8 years water resources planning, Jacksonville District.	Study Manager Formulation of Alternatives Assessment of Impacts
Dr. Thomas Hart	Marine Biology	3 years environmental investigations Florida Department Environmental Resources, 1-1/2 years EIS studies Jacksonville District.	EIS Coordinator Natural Resources
Mr. José A. Martínez	Economics	3 years water resources planning, P.R. Department of Natural Resources, 9 years economics, Jacksonville District	Formulation of Alternatives, Assessment of Impacts
Mr. Robert Pace	Biology	2 years biology consultant, 1 year biological technician, National Marine Fisheries Service 2 years biologist, Jacksonville District.	Environmental
Mr. Ernie Seckinger	Archeology	3 years Mobile District	Cultural Resources
Ms. Lillian Vega	Economics	12 years water resources planning economics, Jacksonville District.	Formulation of Alternatives, Assessment of Impacts

SAJPD-ES

26 January 1982

Mr. Donald J. Hankla
Area Manager
U.S. Fish and Wildlife Service
15 North Laura Street
Jacksonville, Florida 32202

Dear Mr. Hankla:

Pursuant ~~to~~ the requirements of Section 7 of the Endangered Species Act, we have considered the impacts of the proposed Rio Puerto Nuevo flood-control project on the listed species furnished us by the U.S. Fish and Wildlife Service on 30 October 1979.

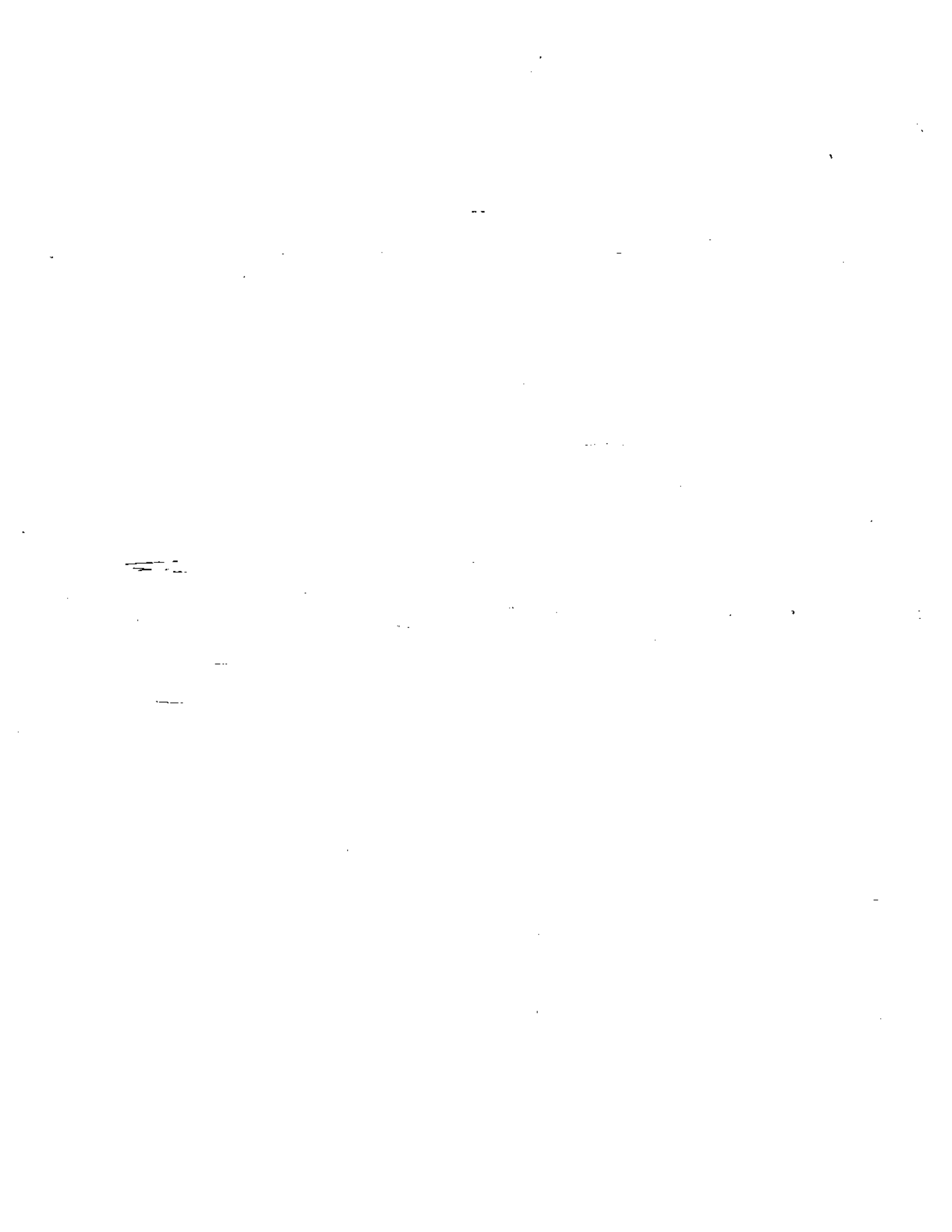
Investigations conducted during preparation of the draft environmental impact statement, including an environmental assessment by the U.S. Fish and Wildlife Service, found that brown pelicans utilize the area in the vicinity of the Constitution Bridge for foraging and roost on an inlet adjacent to the mud-flats north of the bridge. The Yellow-shouldered blackbird has been observed in the mangroves in the Constitution Bridge area and the presence of nests verified. We have determined that the impact of the project, should it be implemented, on the brown pelican and the Yellow-shouldered blackbird would be minimal and temporary. Adoption of the proposed mangrove-planting compensation plan and management plan for preservation of the Constitution Bridge Natural Reserve will ensure that there will be no significant lasting impact on either of the two listed species. The attached copies of the draft environmental impact statement and the pertinent findings from the Rio Puerto Nuevo Survey Investigation are provided for your information.

This completes coordination under Section 7 of the Endangered Species Act unless new information should indicate the action may significantly affect listed species or their habitats, or the proposed action is substantially modified in a manner that would affect its impacts on listed species, or a new species is listed that may be affected by the action, or you request consultation.

Sincerely,

2 Incl
As stated
CF: ~~LDJE~~ P.R.-V.I.

A. J. SALEM
Acting Chief
Planning Division



SECTION 103 OCEAN DISPOSAL EVALUATION REPORT

RIO PUERTO NUEVO SURVEY INVESTIGATION SAN JUAN, PUERTO RICO

1. Description of action. About 4.8 million cubic meters of material will be excavated from the lower reaches of the Rio Puerto Nuevo and its tributary, the Quebrada Margarita. About 3.7 million cubic meters will be placed in two mainly upland sites and about 985,000 cubic meters will be placed in an EPA-designated offshore disposal site.
2. Description of the disposal area. The disposal area is an EPA-approved site in the Atlantic Ocean off the northern coast of Puerto Rico about 2 nautical miles north-northwest of San Juan Harbor. The site measures about 6,000 feet by 6,000 feet and is centered at 18°30'40"N, 66°09'00"W.
3. Description of material. Predominantly sandy, silty clay and organic silt.
4. Environmental testing results. A complete ecological evaluation of the proposed discharge of material excavated from the lower reaches of the Rio Puerto Nuevo and the Quebrada Margarita in the offshore disposal site will be performed before construction begins. Bioassay data from an ecological evaluation of dredged material from the Martin Pena Canal Project, which included testing of material from a site near the confluence of the canal with the Rio Puerto Nuevo, showed a statistically significant adverse difference in the survival rates of brown shrimp exposed to the solid phase of dredged material, compared to controls. Tissues of hard clams exposed to dredged material showed no bioaccumulation of cadmium or other metals. The Martin Pena Canal studies did not determine the effects of the dilution factor involved in the disposal of material at the ocean site where the average depth is 292 meters.
5. Need for ocean disposal.
 - a. Alternatives and selection rationale. Alternatives to the selected disposal site included upland areas. Available upland sites were committed to the bulk of the material to be excavated in completing the project and to future maintenance dredging. Other upland sites were unavailable because of environmental constraints, because of the highly developed character of the area, or because they were not within economical transporting distance. The ocean disposal site selected was chosen because it is approved by the EPA.
6. Environmental impacts.
 - a. Esthetics. Some turbidity is expected at the disposal site during discharge of excavated material, but this would be of a short-term nature.
 - b. Recreation resources. No effect is expected.

- c. Commercial marine resources. No effect is expected.
 - d. Navigation. No significant effect is expected.
 - e. Water quality. Water quality could be temporarily adversely affected during disposal operations but water depths, ocean currents, and other dispersion factors would insure that such effects would be of short duration.
 - f. Historical and archeological resources. No impacts are expected.
 - g. Endangered species. No impacts are expected.
7. Impact of the proposed disposal on other uses of the ocean. The disposal site has been approved for receiving excavated material by the EPA. No impacts on other uses of the ocean are expected.
8. Determinations and findings. I have reviewed the project files, Environmental Impact Statement and the ocean disposal evaluation report. The proposed ocean disposal will present.
- a. No unacceptable adverse effects on human health and no significant damage to the resources of the marine environment;
 - b. No unacceptable adverse effect on the marine ecosystem;
 - c. No unacceptable adverse persistent or permanent effects due to the dumping of the particular volumes or concentrations of these materials; and
 - d. No unacceptable adverse effect on the ocean for other uses as a result of direct environmental impact.

ATTACHMENT A
SECTION 404(b) EVALUATION REPORT
RIO PUERTO NUEVO SURVEY INVESTIGATION
SAN JUAN, PUERTO RICO

1. Project Description.

a. Location. The project is located in the San Juan metropolitan area of Puerto Rico in the Rio Puerto Nuevo basin and involves the Rio Puerto Nuevo and its tributary streams, the Quebrada Margarita, Quebrada Josefina, Quebrada Dona Ana, Quebrada Bueno Vista, and Quebrada Guaracanal.

b. General description. The project consists of a study of water and related land resources problems along the Rio Puerto Nuevo and its tributaries and to develop a plan for solving the problems. The study recommends channel widening, realignment, and bank stabilization measures along the river and its tributaries. Excavated material will be placed in an EPA-approved offshore disposal site, two upland disposal sites one, or used in construction.

c. Authority and purpose. The project is authorized under Section 204 of the Flood Control Act of 1970 (PL 91-611).

d. General description of dredged and fill materials.

(1) The material to be excavated consists of peat, clay, silt, sand, gravel, weathered silt stone, and weathered limestone.

(2) Quantity of material proposed for discharge. A total of 3.7 million cubic meters of excavated material will be placed in two upland disposal sites, one of which contains some wetlands.

(3) Source of material. Material to be discharged will come from channel excavation of the upper portion of the Rio Puerto Nuevo and its tributaries.

e. Description of the proposed discharge site.

(1) Location. The proposed disposal site containing some wetlands, designated disposal site 2, is located on the north side of the Quebrada Margarita near its junction with the Rio Puerto Nuevo (see attached map).

(2) Size. The discharge site is about 10 hectares in size.

(3) Type of site. The discharge site is composed of previously disturbed grassed upland and some stands of white and black mangroves. The wetlands at disposal site 2 apparently do not perform important wetland functions such as detrital export to estuaries, groundwater recharge, or provide important habitat. The area has been highly degraded by illegal dumping of trash.

(4) Type of habitat. The discharge site contains a mixture of habitat types, including the grassed upland sparsely wooded by tall albahia trees, black and white mangrove stands portions of which are vegetated with leather fern characteristic of wetland conditions, and transitional areas with a mixture of upland and wetland vegetation.

(5) Timing and duration of discharge. To be determined on completion of detailed design.

f. Description of disposal method. Material excavated by dragline and backhoe would be transported to the proposed site by truck for discharge.

2. Factual Determinations.

a. Physical substrate determinations.

(1) Substrate elevation and slope. Substrate at the discharge site is at ground level with elevations varying around 5.0 feet mean sea level with a slight slope toward Quebrada Margarita.

(2) Sediment type. Sediment types at the discharge site include sandy, silty clay, and organic silt.

(3) Fill material movement. The discharge material will be placed within an existing dike and allowed to settle.

(4) Physical effects on benthos. The discharge site has no standing water but is subject to periodic flooding. The existing dike will be repaired before placement of fill. This will preclude outmigration of mobile benthic organisms. They and other benthic organisms will be covered by the discharge material.

b. Water circulation, fluctuation, and salinity determination. There would be no significant effects on these factors.

c. Suspended particulate/turbidity determinations.

(1) Expected changes in suspended particulates and turbidity levels at the discharge site. No effects.

(2) Effects on chemical and physical properties of the water column. There will be no effects on light penetration, dissolved oxygen, or esthetics as far as the water column is concerned. No toxic metals, organics or pathogens will be introduced into the water column.

(3) Effects on biota.

(a) Primary productivity and photosynthesis. Placement of fill will result in the loss of about 1.4 hectares of mangroves, cover some wetland vegetation and convert some wetland, estimated at less than an acre, into upland with resulting small scale losses of productivity.

(b) Wildlife and aquatic species. The discharge site is surrounded by an urban/industrial complex and is used for illegal dumping of trash. This discourages development of significant wildlife populations at the site. There are no aquatic species present.

d. Contaminant determinations. Discharge material will be similar to material at the receiving site. There will be no introduction, increase or relocation of contaminants.

e. Aquatic ecosystem or organism determinations. The fill materials meet the exclusion criteria. Therefore, no further chemical/biological interactive testing is required.

(1) Effects on sanctuaries, refuges, wetlands, or vegetated shallows. No sanctuaries, refuges, or vegetated shallows are present. A small amount of wetlands will be converted to upland.

(2) ~~Threatened and endangered species.~~ There would be no significant effect on listed species.

(3) Other wildlife. See 2C(3)(b). Some terrestrial organisms and invertebrates unable to burrow through the fill material would be lost.

f. Proposed disposal site determinations.

(1) Determination of compliance with applicable water quality standards. The discharge of fill material will not violate commonwealth water quality standards.

(2) Potential effects on human use characteristics. There will be no effect on municipal or private water supplies or on recreational or commercial fisheries or water-related recreation. Esthetics would be temporarily affected by the construction activity. There are no parks, national or historical monuments, national seashores, wilderness areas, research sites, or similar preserves in the area of discharge.

g. Determinaton of cumulative impacts on the aquatic ecosystem. The proposed discharge will have no cumulative impacts that would impair water resources or significantly affect the productivity and water quality of the existing equatic ecosystem.

3. Findings of Compliance or Noncompliance with the Restrictions on Discharge.

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. No practicable alternative exists that meets the study objectives that does not involve discharge or fill into waters of the United States.

c. The discharge of fill materials will not cause or contribute to, after consideration of disposal site dilution and dispersion, violations of any applicable Commonwealth water quality standards for Class III waters. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. The placement of fill materials will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.

e. The placement of fill materials will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity, and stability, and recreational, esthetic, and economic values are not expected.

f. On the basis of the guidelines, the proposed disposal sites for the discharge of fill materials are specified as complying with requirements of the Section 404(b)(1) guidelines.

