ENVIRONMENTAL ASSESSMENT

October 2003

Rio Culebrinas

At Aguada and Aguadilla, Puerto Rico

Section 205 Detailed Project Report

U.S. Army Corps
of Engineers
Jacksonville District

RIO CULEBRINAS AT AGUADILLA AND AGUADA, PUERTO RICO
DETAILED PROJECT REPORT
ENVIRONMENTAL ASSESSMENT

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1.00 SUMMARY

A feasibility study of flooding in southwestern Aguadilla and Espinar ward, Aguada, has led to the proposal of a structural solution to the frequent flooding caused by overflow of Río Culebrinas into Caño Madre Vieja. The proposed project includes two earthen levees, to be built parallel to the north and south banks of Caño Madre Vieja. Other project features are: a short cutoff channel, to connect two meanders of the stream where the Aguadilla Levee will interrupt it, four drainage structures, interior drainage channels, and a borrow area located in Aguada. Additional features would include three paved road ramps across the levees. The project would require about 110,000 cubic yards of fill, of which about 30,000 cubic yards would come from the cutoff and drainage channels and the rest from the borrow site at nearby Tablonal Quarry. Levees would be earthen, between 1 to 3.6 meters high, with 1(v) on 2.5 (h) side slopes and a 3-meter wide crest. Excavated material unsuitable for levee construction would be stored temporarily on site and used to top-dress the levees after structural construction is complete. The recommended project would provide protection against 1% recurrence probability flooding (the "100 year" return frequency flood).

Impacts of the proposed project on water quality, air quality, noise, visual aesthetic resources, wildlife habitat and endangered species are expected to be minimal. The proposed project levees would cover a corner of an existing mangrove stand and small areas of palustrine emergent wetlands (wet meadows). Total projected impacts will be to 1.5 acres of emergent prairie wetlands. Project channels would create approximately 9.6 acres of new open water and emergent wetlands.

Archeological deposits associated with the Iglesia de Espinar and deposits at PCI Site 1 will be adversely affected. In coordination with the State Historic Preservation Officer (SHPO), archeological data recovery will be undertaken to mitigate adverse effects. The Iglesia de Espinar ruins will be protected by the project from future flooding. A Phase II archeological assessment will be conducted on archeological deposits at site PCI 2.

2.00 INTRODUCTION

2.01 Authority and Prior Studies. This study and proposed project were developed under the authority of Section 205 of the 1948 Flood Control Act, as amended. A reconnaissance report on flooding problems in the study area was completed in 1991. This Detailed Project Report and Environmental Assessment discuss the results of a feasibility-phase study. The study covered lands in Espinar Ward ("barrio") in the Municipality of Aguada, and Victoria Ward in the Municipality of Aguadilla. The study area is located in the northwestern part of the island of Puerto Rico. The wards are located along the south and north banks, respectively, of Caño Madre Vieja, a tributary branch of Rio Culebrinas. The recommended project would be built using Federal funding combined with funds contributed by the Municipalities of Aguada and Aguadilla, and the Puerto Rico Department of Natural and Environmental Resources (DNER).

2.02 Study Area Setting. Caño Madre Vieja is a 2.1-kilometer (1.3 miles) long tributary of Río Culebrinas, is an old river outlet of the major west slope river, Rio Culebrinas that flows across the study area and discharges into Aguadilla Bay. This small intermittent stream is the political boundary dividing the municipalities of Aguadilla and Aguada. Both, the mouth of Caño Madre Vieja and the Río Culebrinas, 1.5 kilometers (0.88-mile) to the south, have sandbar restrictions. Río Culebrinas is one of the major Puerto Rican rivers, draining the northwestern limestone region around Aguadilla, as well as an extensive area of interior highlands in the vicinity of Moca, Las Marías, and San Sebastián (See Figure EA-1). The study/project area comprises low-lying lands located between the north bank of the main channel of the Río Culebrinas and the southernmost fringes of the city of Aguadilla. Both streams drain to the Aguadilla Bay. The last, coastal segment of the drainage is a wide, nearly flat floodplain bordered on the north by a limestone escarpment and the Jaicoa mountain range, and on the south by the Cadena San Francisco mountain range. The topography of the coastal part of the valley is virtually flat. "Caño Madre Vieja" is actually an old mouth of the meandering Culebrinas River, from which it branches about 2.1 km (1.3 miles) upstream of the project area. Water from the main river channel is impeded from entering Madre Vieja during low flow periods by a natural levee on the main River's north bank. When river levels rise in response to high rainfall events, this levee is overtopped and the river "spills over" into Madre Vieja channel, flooding the Espinar and Victoria neighborhoods.

The Madre Vieja Channel is itself a widely meandering stream, which carries little or no flow during dry periods, with the exception of local storm run off and local seepage from groundwater originating in the high Aguadilla limestone escarpment. The main River mouth and the Channel mouth are partially blocked during the dry season by sandbars. These bars are continually deposited by longshore sand drift, during the dry season. Rainy-season floods wash the sandbars out.

The coast in this region is a series of sandy beaches backed by a narrow, low dune berm. A long mangrove-lined slough parallels the berm behind the coastal dune. East of the mangrove stand, there are fairly extensive emergent wetlands on the Espinar side of the channel. The affected neighborhood on the north side is the Victoria ward of Aguadilla,

a long-established residential area consisting of closely spaced houses, a school and public parkland. Espinar ward of Aguada consists of more widely spaced individual residences. Lands right along the channel are former sugar cane lands, now fallow.

2.03 Problem Definition. The affected low-lying neighborhoods are flooded when heavy basin wide rainfall causes the Rio Culebrinas to rise in its coastal segment, sending floodwaters down the Madre Vieja channel. This channel also receives runoff from the high limestone escarpment located to the northeast of the project area. Flood damages occur to neighborhood houses when water enters the ground floor of these structures.

2.04 Study Goals and Objectives. The study's purpose was to develop feasible alternatives for reducing the existing flooding problems without causing adverse impacts to the communities, the environment, and the existing infrastructure of the area. Feasible alternatives are those that are cost effective, efficient and in compliance with applicable Federal and Commonwealth guidelines and regulations.

The specific goals are to protect lives, reduce property losses, avoid adverse effects on natural and socioeconomic resources of the region, and maximize net National Economic Development (NED).

3.0 DESCRIPTION OF THE PROPOSED ACTION

The proposed project action is building two flood control levees to separate the last downstream segment of Caño Madre Vieja from adjoining residential communities. The levees would extend from high ground inland on the landside of the coastal berm, north and south of Caño Madre Vieja, northwest on the high ground on both sides of the channel, to the coastal berm. The northern levee is referred to as the Aguadilla Levee, and the southern levee is referred to as the Espinar Levee. Levees would prevent recurring flooding damages. The total length of both levees would be approximately 3.3 kilometers.

The Aguadilla levee would begin at high ground near Highway 2 and extend toward the Northwest for about 1.8 kilometers to end at the high ground near Yumet Avenue. A 4 meter deep, 43 meter wide (with 4 meter right-of-way on each shore), 60 meter long Caño Madre Vieja cutoff channel would be constructed at Caño Madre Vieja to reconnect a stream meander that would otherwise be obstructed by the Aguadilla levee. Refer to Section 4.04, Recommended Plan and to Figure EA-6.

The Espinar levee would begin at high ground at the southern end of the Espinar Community and extend to the east and then to the Northwest for about 1.5 kilometers to end before reaching the Coastal Barrier Segment PR-75. A levee spur will tie at high ground in the Espinar Community. The alignment of Espinar levee was adjusted to avoid, to the maximum extent feasible, cultural resources associated with the church and ruins located in Espinar.

Both levees would have an average structural height of 2.5 meters, 1 on 2.5 side slopes, an average levee base of 16 meters, and a levee crest width of 3 meters. (The ultimate height of the levees may be greater, as it is planned to dispose of excess excavated material, if any, as top dressing on the levee crest). The interior drainage facilities would consist of a 1 meter deep and 7 meter wide drainage channel along the protected side of each levee. Total right-of-way will include 5 meters on the flooding or unprotected side and 20 meters (including the drainage channel 9 meters from the levee) on the protected side of the levee.

One one-way drainage structure would be constructed at the Espinar Levee near the levee spur to provide drainage of interior channels into Cano Madre Vieja. Three one-way drainage structures would be constructed along the Aguadilla levee to provide drainage of interior channels into Cano Madre Vieja. Drainage structure outlets would be connected to Cano Madre Vieja.

The work would require about 110,000 cubic yards of fill of which about 32,000 cubic yards would come from the cutoff and drainage channels and the rest from the commercial borrow site at nearby Tablonal Quarry (See Figure EA-6).

4.00 ANALYSIS OF ALTERNATIVES

The range of alternatives considered varied from no-action (no flood control project would be constructed) through four non-structural and four structural alternatives.

4.01 No Action. The no action alternative would allow the existing and prospective flooding condition to continue. These damages will increase in the future as residences become denser in Espinar and Victoria Wards.

4.02 Non-Structural Alternatives. Applicable non-structural measures could include channel maintenance, flood insurance, temporary or permanent evacuation, and flood plain management through strict enforcement of flood plain development regulations (Planning Board Regulation Number 13). Some of these measures are already available.

Channel maintenance consists primarily of remaoval of trash, debris, and sediments from the existing stream channel. The National Flood Insurance Program is administered by the Federal Flood Insurance Administration. Flood insurance has been available in Puerto Rico for many years, but relatively few residents participate. Temporary evacuation of persons and personal property from flood-prone area can be effective when operated in conjunction with reliable flood warning system, but no warning system is in operation for the Rio Culebrinas basin. Permanent evacuation involves land purchase, removal of buildings and infrastructure, and relocation of population. Flood plain management regulates all new development and expansion of, or improvements to, existing developments in flood-prone areas. This measure will have limited effect in reducing flood damage to existing development.

4.03 Structural Alternatives. The four structural alternatives considered included flood proofing, multipurpose reservoirs, channel improvements, and levees and/or floodwalls.

Flood proofing is a structural change which allows floodwaters to rise around or within a structure with little or no damaging effects to the structure. This is difficult to implement on a large number of structures and therefore is not considered any further.

The construction of a multipurpose reservoir could reduce flood levels by holding back peak flows until downstream flood plain conditions permit a controlled release of stored floodwaters. They can also be effective in fulfilling other water resources needs such as water supply and recreation. Previous USACE studies identified several potential reservoir sites in the upper Rio Culebrinas. The relatively small size of all the potential reservoir sites within the Rio Culebrinas basin would have little effect on reducing flood stages in the lower flood plain. Therefore, the multipurpose reservoir alternative was not considered any further.

Channel improvements for Rio Culebrinas along a straight alignment from Highway 2 towards the ocean would provide effective flood control to the entire lower flood plain. Any type of channel improvement would require an improved outlet and some type of velocity-control measures and channel revetment. An improved outlet to the ocean would require revetments to stabilize it and perhaps also jetties to protect it from coastal sand movements. Widening and deepening the present Rio Culebrinas channel and route realignment practically throughout the lower flood plain would provide flood control to the entire flood plain. Any channel improvement alternative should also include an adequate schedule for maintaining the channel free of vegetation or other obstructions. The substantial channel improvements required for Rio Culebrinas could adversely impact the stream habitat of the native river shrimp and the natural water flow into the adjacent estuary and swamp. Since the required channel work will provide no net benefits, while causing an adverse impact to environmental resources in the flood plain, the channel improvement alternative was not considered any further.

Levees and floodwalls preclude floodwaters from entering damage-susceptible areas. They are considered in detail because of the physical and natural conditions of the area, and also because they appear to be the most practicable, acceptable, and efficient flood control measure for the study area. The physical conditions of the detailed study area are as follows, the urban development is located to just one side of the flood plain, for most reaches there is sufficient available open space between the river and the urban area to accommodate the levee, and levee construction materials are readily available in the area. Levees could provide low cost and effective flood protection to the town of Aguadilla and the community of Espinar. Therefore, flood control levee alternatives are considered the only practicable, acceptable, and efficient flood control measure for the Rio Culebrinas lower flood plain. Three alternative levee alignments were developed into two preliminary plans, a short levee alignment and a twin levee alignment. The most cost effective and environmentally acceptable plan identified during the preliminary plan formulation process was then examined in detail during the final plan formulation process.

Preliminary Alternative 1

This alternative considers a single earthen levee from Highway 2 to the high ground at Espinar community. Alternative 1 would completely exclude flooding from the Caño Madre Vieja coastal flood plain. This alternative would protect the entire urban area of Aguadilla and Espinar against the 100-year flood, but would also deprive coastal emergent wetlands and mangroves of most of periodic riverine flooding. Refer to Figure EA-2.

This alternative would entail a levee footprint of approximately 2.33 hectares (5.76 acres) of farmland, of which approximately 1.97 hectares (4.87 acres) are in upland pastures and approximately 0.36 hectares (0.89 acres) are wet pasturelands. Secondary impacts would include the probable future elimination of approximately 31.5 hectares (77.8 acres) of agricultural lands by urban development, and potential impacts to freshwater wetlands, as well as stress to the mangroves due to deprivation of periodic fresh-water flushing. Unless there is no other practicable alternative, this alternative would violate the intent of E.O. 11988.

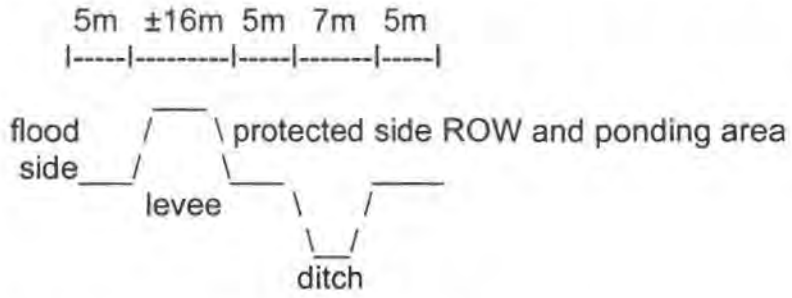
Preliminary Alternative 2

This alternative considers two levees, one protecting the urban area of Aguadilla, and one protecting the community of Espinar. This alternative would allow Caño Madre Vieja to continue acting as a floodway, while flood proofing coastal communities. The vacant agricultural land in the flood plain between the levees would not be protected. Refer to Figure EA-3.

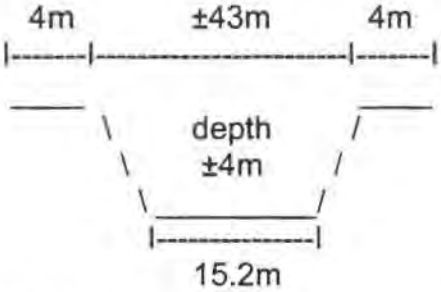
This alternative would eliminate by direct impact (footprint of the levee) approximately 4.75 hectares (11.7 acres) of farmland, of which approximately 2.2 hectares (5.4 acres) are in upland pastures and approximately 0.6 hectares (1.5 acres) are wet pasturelands (palustrine emergent wetlands). The remaining 1.95 hectares (4.8 acres) consist of uplands not dedicated to pasture lands. Based on a worst case analysis for impacts to the mangrove swamp forest, where the edge of the levee is aligned along the adjacent landowners' fence, approximately 0.2-acres (0.1 hectares) would be eliminated. This alternative would also cutoff approximately 980 meters of live stream from the Caño Madre Vieja.

To facilitate the identification and description of this alternative the two-levee alternative was divided in two sections, the Aguadilla Levee and the Espinar Levee. The Espinar Levee total right-of-way acreage, including 1 ramp, would be (1,500 meters long + 266 meters long for the Western spur) x 36 meters wide = 67,108 square meters = 16.58 acres. The Aguadilla Levee total right-of-way acreage, including 2 ramps, would be (1,800 meters long) x 38 meters wide = 68,400 square meters = 16.90 acres. As shown below, the typical levee right-of-way includes the levee and drainage channel footprint, ramps, and a maintenance easement on both sides.

1 acre = 43,560 sq. ft. or 4,047 sq. m. 1 ha = 2.47 acres or 10,000 sq.m.



Last, the Caño Madre Vieja cutoff channel would be approximately 60 meters long and 4 meters deep as shown on the typical cross section below. Permanent right-of-way covers about 60 meters long x 51 meters wide = 3,060 square meters = 0.8 acres.



Based on the preliminary plan formulation analysis, the two levee alternative is only practical, acceptable, and feasible flood control alternative that warrants to be examined in details as part of the final plans.

Final Alternative 1

This alternative combines 3.3 kilometers of levees, a small cutoff channel, three road ramps, and interior drainage facilities protecting the southwestern section of the town of Aguadilla and the community of Espinar, in Aguada, against the 50-Year flood from Río Culebrinas. The general right-of-way alignment and features of final alternative 1 are shown in Figure EA-4.

The Aguadilla Levee would begin at high ground near Highway 2 and extend towards the north for about 1.8 kilometers to end at high ground near Yumet Avenue. An approximate 60 meters long, 4 meters deep, and 43 meters wide Caño Madre Vieja cutoff channel would be constructed at Caño Madre Vieja to reconnect a stream meander to be obstructed by construction of the Aguadilla Levee. The proposed interior drainage channel would reconnect the meander interrupted by the levee. The Espinar levee would begin at high ground on the southern end of the Espinar Community and extend to the east and then to the north for about 1.5 kilometers to end just south of Coastal Barrier (CB) segment PR-75. The final plans considered a previously impacted portion of CB segment PR-75 as the northernmost tie up site for the Espinar levee. The recommended plan eliminated all

proposed work within the CB segment PR-75. This was done in order to comply with the stipulations of the Coastal Barriers Resources Act (CBRA) and the Coastal Barriers Improvement Act of 1990 (CBIA). These Acts prohibit the expenditure of Federal funds to enhance the infrastructure of a designated CB area in such a way to stimulate development of a CB. Both levees would have an average height of 1 meter, 1 vertical on 2.5 horizontal side slopes, and a levee crest of 3 meters. The interior drainage facilities would consist of a 1 meters deep and 7 meter wide drainage channel along the protected side of each levee. One two-way drainage structure would be constructed at the north end of the Espinar Levee and three one-way drainage structures would be constructed along the Aguadilla Levee. Drainage structure outlets would drain into to Caño Madre Vieja.

Final Alternative 2

This alternative considers the same project features as described for Final Alternative 1, but it provides a 100-year level of protection levees. The proposed 100-year levees would have an average height above ground of about 2 meters, 1 on 2.5 side slopes, and a levee crest of 3 meters. The general alignment and features of Final Alternative 2 are similar to Final Alternative 1 and are shown in Figure EA-4.

Final Alternative 3

This alternative considers the similar Aguadilla Levee features as described for Final Alternative 1 and Final Alternative 2, but it would be higher and wider providing protection for the Standard Project Flood (SPF). The proposed SPF Espinar Levee alignment would be twice as long, higher, and wider than the levee alignment considered for Final Alternative1 and Final Alternative 2. The SPF levee alignment would begin north of the mouth of Río Culebrinas and extend to the south, to the east, and then to the north, around the community of Espinar, for about 3.3 kilometers to end at an existing rock jetty just south of the existing mouth of Caño Madre Vieja. The proposed SPF levee would have an average height above ground of about 3.0 meters, 1 on 2.5 side slopes, and a levee crest of 3 meters. The general alignment and important features are shown on Figure EA-5.

4.04 Recommended Plan.

Final Alternative 2 with modifications to the Espinar Levee for avoiding impacts to the Coastal Barrier segment PR-75 is the recommended plan. It maximizes the National Economic Development (NED) benefits. The recommended plan combines 3.3 kilometers of levees, a small cutoff channel, three road ramps, and interior drainage facilities protecting the town of Aguadilla and the community of Espinar, in Aguada, against the 100-year flood. The general alignment and important features of the recommended plan are shown on Figure EA-6, and typical cross sections are shown on Figure EA-7.

The recommended plan would substantially reduce the flooding problems in the detailed study area. The construction of a 100-year protection levee, interior drainage facilities and a small cutoff channel would take about 19.6 acres of lands and would require about 110,000 cubic yards of fill of which about 32,000 cubic yards would come from the

cutoff and drainage channels and the rest from the commercial borrow site. The plan would provide flood protection for about 550 acres of urban area. The recommended plan would not provide flood protection to vacant lands in the flood plain, nor would it significantly affect flood flows or timing in Caño Madre Vieja.

The proposed work will entail the disposal of approximately 1,000 cubic yards of spoil fill. Most will be disposed of within the right-of-way of the levees, on top or on the sides' slopes as top soil. Any spoil fill or debris that cannot be disposed of in that manner will be disposed of in the municipal landfill in use by the municipalities of Aguadilla and Aguada at the time the work takes place.

5.00 AFFECTED ENVIRONMENT

5.01 Vegetation and Wildlife. Most of the lands in the river valley area are now fallow unimproved pasture, but much of the area was planted in sugar cane for many decades. Prior to its agricultural use, climax vegetation would have been an open-crowned semi-deciduous hardwood forest of mixed species. More recently, land use has included use as cattle pasture and for sand extraction (shallow quarrying). Cattle grazing have limited tree and shrub vegetation to a few sporadic patches or riverbank stands of facultative wetland trees. The large marsh, called Cayures Swamp, and shown on Figure EA 2) located on the south bank of the Culebrinas River in Aguada, is reportedly used by special concern species including the masked duck and possibly West Indian whistling duck, but no recent sightings of these species are known to biologists of the Commonwealth Natural Heritage ("Patrimonio") program. The recommended plan avoids work in this area.

Espinar Community is surrounded by low, nearly level flood plain lands. Much of this land, formerly planted in sugar cane, has reverted to mixed (upland) grassland and wet grassland. To its west, and south of the mouth of Caño Madre Vieja, the low sandy beach berm is backed by a narrow mangrove swamp. The berm and mangroves is a designated Coastal Barrier segment (PR-75/75P). The landward edge of PR-75 coincides with the landward (eastern) side of the mangrove wetlands in Espinar. The land North of the Caño (designated PR-75P) has been developed into a city park with recreation on commercial facilities. A wet swale extends inland from the mangrove swamp. Vegetation in the swale is a mix of wetland grasses, herbs and salt-tolerant shrubs, including *Mimosa casta, Lonchocarpus dominguensis, Machaerium lunatum*, and *Thespesia populnea*.

The area around Espinar does not support a very diverse or unusual assemblage of wildlife. The mixed pasture and emergent wetlands of Caño Madre Vieja do not appear to be significant habitat, as indicated by field observations and the Fish and Wildlife Coordination Act Report. Green-backed heron fish and rest in the mangrove, and cattle and snowy egrets visit the shallow water areas to feed. In general, wildlife consists of common lizards and frogs, human tolerant species of birds (including kingbirds, grackles, bananaquits, and grassquits), rats and mice, and mongoose. Crustaceans include fiddler crabs and the blue land crab, *Cardisoma guanumi.*

Human impact is prevalent throughout the area. Only occasional birds and crab burrows are noticeable. Other animals seen include cattle and domestic cats and dogs. No endangered, threatened, or special concern species (species listed in the DNER Natural Heritage inventory) are known from the immediate project lands.

5.02 Fishery Resources. The U.S. Fish and Wildlife Service (USFWS) identified freshwater river shrimp (*Macrobrachium carcinus*) as an aquatic species of concern and expressed concern that whatever alternative chosen, careful consideration be given to water flow which could impact the stream habitat of this migratory freshwater shrimp. Both the Río Culebrinas and Caño Madre Vieja are well known for their populations of this native river shrimp, which are caught and sold locally. However, the flood control features under consideration would not significantly affect flows or stages of either Río Culebrinas or Caño Madre Vieja and would not obstruct passage of these migratory organisms. On July 7, 1999, the USACE determined that the proposed work would take place inland of any existing designated Essential Fish Habitat (EFH) under jurisdiction of the National Marine Fisheries Service (NMFS), and would not affect it. This determination was coordinated with NMFS by letter on July 7, 1999. On August 4, 1999, NMFS stated that it had no comments or recommendations to offer. The recommended plan avoids impacts to aquatic species in the study area.

5.03 Coastal Barriers. The sandy coastal berms south and north of the mouth of Caño Madre Vieja are Coastal Barrier Segments PR-75 and PR-75P, respectively (refer to Figure EA-1). The mangrove-vegetated area along Espinar beach falls within Coastal Barrier PR-75. The coast in this region is a series of sandy beaches backed by a narrow, low dune berm, no more than 2-3 m high, and readily overwashed by storm swells. A long mangrove-lined slough parallels the berm behind the coastal dune. East of the mangrove stand, there are fairly extensive emergent wetlands on the Espinar side of the channel. Even farther East, the land rises again, and this is where the residences of Espinar ward are located. Barrier segment PR-75 is still largely undeveloped. The vegetation of the sandy berm is composed of a mix of native and exotic trees. The latter include coconut palms and tropical almonds (natives of Southeast Asia). The mangrove lined slough is fairly narrow and shallow (refer to Photos 11 and 12 of the DCAR, Attached). A 28-acres multi family housing development presently named "Costa de Marfil" is being proposed within CB segment PR-75, the proposed private housing development will consist of 240 apartments and 10 luxury villas, recreation facilities, and extensive parking facilities.

The "P" designation area near Parque Colón on the East side of the stream mouth indicates that the segment is considered protected by State or local regulations. This area is not subject to Federal restrictions. It is not known how this segment was included within the Coastal Barrier System, as it is a city park complete with a running track, public beach area, boat and passive play area dominated by several large, exotic shade trees (including one enormous fig tree that was converted to a tree house by the municipal architect). This park area has been subjected to extensive manipulation and shoreline stabilization after its designation but prior to beginning of the studies reported here. Alterations in this barrier included construction of two rock jetties, recreational and associated parking facilities, and

the construction and periodic maintenance dredging of a relocated Caño Madre Vieja outflow channel. However, as noted in the USFWS CAR, a small stand of mangrove also backs this segment and appears to be near the footprint of the Aguadilla Levee.

5.04 Wetlands. Along the footprint of the Aguadilla Levee is an emergent palustrine freshwater wetland. It is dominated by facultative wetland grasses including *Bracharia purpurascens* with 10% or less depressional wetlands. A similar situation exists along the Espinar Levee, except for a 100-foot by 70-foot area of mangrove swamp found at the Coastal Barrier. This is dominated by 90% red mangroves over 40 feet in height. The meander loop cut between both levees is dominated by 90% mature white mangrove.

The mangrove dominated slough running parallel to the coast behind the sand berms is shown on Photos 11 and 12 of the USFWS CAR. Red mangrove (*Rhizophora mangle)* dominates the channel and is backed by white and black mangroves. This slough is not flushed by all tides, as the mouth of the Caño becomes blocked by a sandbar with some frequency. However, storm tides and extreme Spring tides provide salt water flushing, while draining from the uplands provides fresh water input. Additionally, high storm waves can overwash the protective sand dune and add to the salt content of the mangrove soils. Conversely, during flood periods the water of the slough may be essentially freshwater. The estuarine nature of the area is shown by the presence of some less salt-tolerant species, such as leather fern.

5.05 Prime and Unique Farmland Soils. The principal soil associations found in the study and project area are Coloso-Toa and Bejucos-Jobos soils are found in the lower flood plain; the coastal berms are mapped as Cataño sandy soils Coloso soils were intensively used for sugar cane, and are prime farmland soils. In this area it appears that there are many inclusions of the wetter Bajuras soils. A form AD-1006 (enclosed in the coordination correspondence) has been prepared and will be coordinated with the Natural Resources Conservation Service (NRCS) for the project footprint.

5.06 Cultural Resources. The Río Culebrinas valley is a very important area in the prehistory and history of Puerto Rico. The area was inhabited throughout the Ceramic age of prehistory, demonstrated by archeological sites containing Saladoid and Ostionoid series ceramics. A nine kilometer (5.4 mile) stretch of coastline encompassing the study area is the conjectured 1493 landing site of Columbus. Sir Francis Drake visited the area in 1595. The Iglesia de Espinar, identified as the "ruins of the Hermitage of Inmaculada Concepción of Barrio Espinar, Aguada" on the property's draft National Register form, is one of Puerto Rico's earliest churches and is located adjacent to the Espinar Levee. The church was originally constructed in 1526. Numerous sugar producing haciendas and sugar mills were established in the river floodplain in the 19th and 20th Centuries.

A cultural resources survey was performed on the project area in 1999 (Cinquino et. al. 1999). The investigation identified four archeological sites. Two of the sites, PCI 1 and archeological deposits associated with the Iglesia de Espinar, are eligible for inclusion on the National Register. An additional site, PCI 2, is potentially eligible for the National Register, and Phase II testing is necessary. The fourth site, PCI 3, is not significant.

5.07 Water Quality. Río Culebrinas and Caño Madre Vieja are Class SD - Surface Waters. Class SD waters are intended for use as a raw source of public water supply, propagation and preservation of desirable species as well as primary and secondary contact recreation. Primary contact recreation is precluded in any water containing pathogenic organisms. A review of USGS Water Resources Data (Curtis, R. E., Jr., Z. Aquino, R. J. Vachier, P. L. Diaz, 1991 Water Resources Data Puerto Rico and the U. S. Virgin Islands, USGS-WDR-PR-90-1, 530pp.) revealed that Río Culebrinas water quality parameters measured near Aguada, two kilometers southwest of Aguadilla, are generally within water quality standards for Class SD waters. However, during unusually high flows certain constituents do exceed established standards. For example, iron (86,000ug/l) and zinc (130ug/l) concentrations measured in May 1990 were the highest recorded in Puerto Rico for the 1990-water year. There is no standard for iron but zinc exceeded the standard by 80 ug on this occasion.

5.08 Hazardous, Toxic and Radiological Waste. Review of the Aguadilla, Puerto Rico, U. S. Geological Survey (USGS) map indicates that urbanized or modified areas with potential for Hazardous, Toxic and Radiological Waste (HTRW) contamination are negligible in the study area. The predominant land use is agricultural and poses little or no HTRW threat. There appear to be no landfills, industrial waste treatment plants, light industries, or other facilities likely to generate HTRW. A civil works audit as defined in ER-1165-2-132 for HTRW materials was conducted in May 1995, and updated in May 1999. No signs of potential HTRW problems were identified and no sites with potential for contamination with HTRW were found. Furthermore, no contamination due to hazardous and toxic waste spills is known to be in the study area.

5.09 Air Quality. The general work area is dedicated to agriculture. Therefore, sources of air pollution are minimal and limited mostly to motor vehicles. Air quality is currently within acceptable EPA standards. There are no non-compliance air quality basins or air-sheds included within the proposed work area.

5.10 Aesthetic Resources. Existing visual aesthetic resources found in the Río Culebrinas flood plain are comprised of pasturelands, sugar cane fields, and croplands of the Caño Madre Vieja Channel Basin. A mature stand of shade trees is located along the floodplain on the northwest side of the intersection of Highway 111 and Highway 115. Dense mangroves can be found near the coast on each side of the channel basin, which possess aesthetic value. The mature coconut palms along the golden sandy beach are also an aesthetic element, but they are outside the immediate project area.

5.11 Noise. The area is a rural municipality, where natural noise levels are low, except in the immediate vicinity of highways.

5.12 Socio-Economic Conditions. The 16 "barrios" (wards) of Aguadilla and 18 of Aguada support populations of 63,511 persons and 39,536 persons, respectively. The local economy depends mainly on light manufacturing and local tourism. Other commercial activities of importance are fishing and, to a much lesser degree, small-scale agriculture.

6.00 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

There would be temporary adverse impacts on air quality, water quality, and aquatic life from clearing, excavating and compacting materials during the construction of levees and channels. No net loss of wetlands is expected.

In the Aguadilla area, residual flooding would cover about 54 acres outside the proposed project right-of-way. Of those, 16 acres are vacant\wetland\parks, and 38 acres are streets\houses\back yards. Urban area residual flooding in most areas would be very shallow nuisance flooding of about 1 foot.

In the Espinar area, residual flooding would cover about 36 acres outside the total project Right-of-way. Of these, 35 acres are vacant wetlands and 1 acre consists of back yards. Back yard flooding is very shallow at less than 1 foot.

6.01 Biological Resources. Total impacts of the project on biological resources are limited to the levee and channel footprints. Neither the timing, volume or duration of flooding on Caño Madre Vieja or Río Culebrinas would be affected by the proposed flood reduction features; therefore, no life stages of migratory stream organisms will be affected. After preliminary discussions with USFWS, the Western (Espinar) levee has been modified to avoid impacting CB segment PR-75, therefore, no mangrove stands will be affected by the levee.

6.02 Coastal Barriers. The proposed work will not result in an increase in the development of the area of Coastal Barrier segment PR-75P. This area has already been developed by the Municipality of Aguadilla.

The Coastal Barrier Resources Act and the Coastal Barriers Improvement Act preclude the use of Federal funds to construct any kind of infrastructure or protection works in a Coastal Barrier area. The intent is to prevent the use of Federal dollars for activities (such as protection from flooding) that may lead or be construed as possibly leading to the development of Coastal Barrier areas. None of the exceptions contemplated in that act apply to this work. For this reason, work within Coastal Barrier segment PR-75 was modified for the recommended plan and the Espinar Levee will end before penetrating Coastal Barrier segment PR-75.

6.03 Wetlands. Project completion will directly impact approximately 1.5 acres of emergent wet prairie currently used as pasturelands. These were assessed to have a total biological value of 1 unit, using the Wetlands Rapid Assessment Procedure Methodology (WRAP). The score was 0.48 for the pasture. Mitigation for unavoidable project impacts, if needed, would include enhancement of 1 acre of emergent wet prairie.

The USACE estimates that project completion will also result in the construction of drainage channels parallel to the levees. These will have an average width of approximately 7 meters (21 feet) and will run for the entire length of the levees. This will create approximately 21 x 9,723 = 204,183 square feet or 4.69 acres of habitat for fish and amphibian species.

The total footprint of the project is 34.98 acres, 16.58 in the Espinar Levee and 16.90 acres in the Aguadilla Levee. Direct biological impacts to 1.5 acres of emergent prairie will accrue. Additionally the remainder of the project will impact 33.48 acres of pasturelands. The 1.5 acres area has a WRAP score value of 0.76, and the remaining footprint has a value of 0.33. The total biological function impacted is equivalent to 12.28 acres of pristine wetland.

The only permanent ponding area along the Aguadilla Levee to be provided by the project would be within the protected side ROW {20 m (wide) x 1,836 m (long)= 9 acres}. The 9 acres ponding is already included in the total ROW.

The only permanent ponding area along the Espinar Levee to be provided by the project would be within the protected side ROW {20 m (wide) x 1,600 m (long)= 8 acres}. The 8 acres ponding is already included in the total ROW.

The drainage canals planned for the Espinar and Aguadilla levees will result in the creation of 6.7 acres of wetlands and waters of the United States. Water depths in these will vary from –2 to –4 feet. The USACE estimates that approximately ½ of that acreage will be colonized by wetland plants and will become vegetated shallows useful for wading birds, and other fish, amphibian and invertebrate species. The remaining half of the acreage will also be of value as habitat and spawning ground for various aquatic species expected to colonize the area through its connection to existing water bodies. Additionally, the approximately 60 meter long by approximately 43 meter wide cutoff channel planned for approximately the halfway point between both levees, will result in the creation of an additional 0.9-acre of waters of the United States. The biological functional equivalence loss of 13 units of biological function would be offset by the creation of more than 13.4 units of biological function in wetlands and waters of the United States.

Any dredged spoil will be placed on top of the levees after they are constructed to specification. Excavated material that cannot be used because of any specific physical characteristic, will remain in the borrow pit site or be disposed of in the adjoining municipalities authorized solid waste landfills, operating at the time of project construction.

If any of the vacant lands within the residual flooding area are to be developed with or without the project, then Puerto Rico Planning Board Regulation 13 will require the developer provide an H&H analysis and to provide the area with some kind of flood improvements to eliminate existing river flooding or with project residual flooding (which is less than river flooding). The recommended course of action in this case is not to develop in any of the residual flood areas.

6.04 Prime and Unique Farmland Soils. The Recommended Plan would eliminate by direct impact approximately 4.75 hectares (11.7 acres) of farmland, of which approximately 2.2 hectares (5.43 acres) are in pasture production and approximately 0.6 hectares (1.5 acres) of wet pasturelands. The Recommended Plan would disconnect approximately 980 meters of live stream from the Caño Madre Vieja.

The remainder of the footprint of both levees (33.1 acres, or 13.4 hectares) traverses land that for more than 100 years has been dedicated to sugarcane cultivation and is currently used as pastureland. It is currently colonized by upland grasses. The Río Culebrinas and Caño Madre Vieja themselves are at a lower elevation than the surrounding lands. Additionally, extensive development exists adjacent to both confines of the work area. Therefore, development acts as a containment berm for any water flow from the north or south into the area bound by Río Culebrinas and Caño Madre Vieja. The rivers influence on the surrounding area would be limited to its immediate adjacency and any area inundated during flooding events. This would not ensure a continuous hydroperiod that would facilitate re-colonization by wetland species. If agricultural activity were to cease in the area bound by the Río Culebrinas and Caño Madre Vieja, it would not be expected to revert to wetlands.

The area is predominantly rural, with both small-scale commercial and subsistence agriculture existing on site. Coordination with the Natural Resources Conservation Service (NRCS) was initiated on September 29, 1999, and concluded on November 1, 1999. Although the NRCS identified approximately 13.0 acres of prime and unique farmland and 7.0 acres of statewide and local important farmland. However, on January 10, 2000, when the NRCS reply was received, Ms. Carmen Santiago of the NRCS stated that for scores over 160 (combined sections V and VI), at least 2 other alternatives should be rated and scored, unless there were overriding reasons to have only 1 alternative. In this case, with a borderline score of 162, she stated that our explanation in the Environmental Assessment (EA) and the "Reason for selection" part of Form AD-1006 was sufficient.

6.05 Cultural Resources. Archeological deposits associated with the Iglesia de Espinar and deposits at PCI Site1 will be adversely affected. Archeological data recovery will be undertaken to mitigate adverse effects. The Iglesia de Espinar ruins will be protected by the project from future flooding. A Phase II archeological assessment will be conducted at PCI 2.

6.06 Water Quality. Based on this preliminary analysis the Recommended Plan should not result in violations of water quality standards. Water quality will not be adversely impacted by this project, and Commonwealth water quality standards will be met. Contaminants will not be introduced by clean fill material that may become suspended or dissolved in the river water during the construction operations. Short-term increases in the turbidity are expected during the construction phase of the project; however, the system will re-establish itself as a productive part of the overall ecosystem. No long-term surface water quality problems will result.

6.07 Hazardous, Toxic or Radiological Waste (HTRW). No sources of HTRW have been identified in the area either with or without the project. Therefore, the proposed work will have no effect in the amount of HTRW in the work area.

6.08 Air Quality. With the project, the area will remain as a predominantly agricultural area. Therefore, the project will not result in any changes in air quality. Exhaust emissions from construction machinery will be negligible. Therefore, no adverse effects on air quality will result from the implementation of the proposed project. Fugitive dust may be generated by the excavation and deposition of fill material, as in the construction of levees. All dust and pollution suppression measures and equipment required under Federal and Commonwealth laws and regulations will be utilized during project construction.

6.09 Aesthetic Resources. The contention structures themselves will be harmoniously incorporated into the aesthetic appearance of the area. The quality of the aesthetically pleasing green areas where the work will take place will not be compromised by discordant project results.

6.10 Noise. At project completion, the area will remain rural and exhibit minimum noise. The proposed work will have no effect on current noise levels. Any noise due to construction will be temporary.

6.11 Effects on Community Cohesion and Socio-Economic Well-Being. The proposed work will result in enhanced community cohesion and socio-economic well being. This will be brought about by the enhanced opportunities for development and creation of employment sources both by the work itself and by the enhanced investment climate when the risk of property loss is abated. This will benefit community cohesion, when community members are no longer forced to migrate to other areas in search of employment.

6.12 Unavoidable Impacts and Irretrievable Commitments of Resources. None expected. Project impacts on biological values of existing wetland habitat will be mitigated for.

6.13 Cumulative and Secondary Effects. The project will result in the protection of the delimited area from further flooding damage. This will not result in a stimulus to the subsequent development of the area, as the local government will commit to non-development of the area adjacent to the protected sides of the levees.

6.14 Relationship Between Short Term Use of the Environment and Long Term Productivity. The project does not propose use of the environment as such. However, the use of a tract of land to provide the levee and channel footprints, if construed as "use," will be offset by the productivity benefits that will come to the area protected from flooding. These benefits will accrue both to the socio-economic component (whose life and property will be secured) and the biologic environmental component (since both existing wetland values, and the habitat values of agricultural and other rural areas will be protected from destruction through flooding).

7.00 COMMITMENTS

A Phase II archaeological investigation of any impacted sites will be performed during the plans and specifications phase prior to construction. A mitigation plan for cultural resources that might be impacted will be developed in coordination with the SHPO. Mitigation will be completed prior to project construction.

Pertinent USFWS recommendations for this project would be incorporated before completion of the final report. A concurrence with the USACE determination of consistency with the Puerto Rico Coastal Management Program will be sought from the Puerto Rico Planning Board (PRPB) when coordination of the recommended plan through this EA is complete and public comments have been received. This is in accordance with PRPB policy.

The government of Puerto Rico must commit to the non-development of the area comprised between the currently developed protected side of the levees and the levees themselves.

The recommended plan has been modified by deleting all proposed work within CB segment PR-75. This was in order to comply with the stipulations of the Coastal Barriers Resources Act and the Coastal Barriers Improvement Act of 1990. These Acts prohibit the expenditure of Federal funds to enhance the infrastructure of a designated Coastal Barrier area in such a way to stimulate development of a Coastal Barrier.

8.00 COMPLIANCE WITH LAWS EXECUTIVE ORDERS AND REGULATIONS

8.01 National Environmental Policy Act of 1969, as amended. Environmental information on the project has been compiled and this draft. Will be circulated prior to finalization in accordance with the National Environmental Policy Act.

8.02 Endangered Species Act of 1973, as amended. In the scoping process for this project, the USACE made a determination of no impact on any federally listed endangered or threatened species. The National Marine Fisheries Service concurred by letter dated August 8, 1995. A new Coordination Act Report (CAR) was received by the USACE on November 30, 1999. This document did not identify any endangered or threatened species in the work area, nor identified any impacts to the critical habitat of any endangered or threatened species.

8.03 Fish and Wildlife Coordination Act of 1958, as amended. In response to the requirements of this Act, the USACE has and will continue to maintain continuous coordination with the USFWS during all stages of the planning and construction process. Biologists from USFWS and DNER will continuously review the process. A CAR was received by the USACE on November 30, 1999. The USFWS recommended installing a

larger diameter two-way culvert to maintain hydrology to the mangrove channel parallel to the coastal barrier; that the wetlands in the protected side of the dikes be protected possibly by sitting the planned drainage culverts at an elevation such that the wetlands themselves are not drained into the flooding side of the dikes. The USFWS recommended mitigation through the development of additional estuarine and freshwater wetlands with the floods levees. The USACE decided to incorporate to the project design the recommendations of the USFWS regarding keeping the levee out of the Coastal Barrier segment PR-75, and coordinate this decision with the USFWS.

8.04 National Historic Preservation Act of 1966, as amended. Cultural resource Investigations and consultation with the Puerto Rico State Historic Preservation Officer (SHPO) are in compliance with the National Historic Preservation Act of 1966, as amended (P.L. 89-665), the Archeological and Historic Preservation Act (P.L. 93-291), and 36 CFR Part 800.

8.05 Clean Water Act of 1972, as amended. The study is in partial compliance. A Section 404(b) Evaluation has been completed and is presented in Attachment C. Full compliance will be achieved with issuance of a water quality certificate (WQC) from the Environmental Quality Board of Puerto Rico. WQC issuance is expected, but Commonwealth procedures require application to begin after NEPA coordination is completed, not before.

8.06 Clean Air Act of 1972, as amended. No significant emissions as defined in air quality regulations will be generated on the project, and no air quality permits will be required. Full compliance will be achieved with receipt of comments on the EA from the U.S. Environmental Protection Agency.

8.07 Coastal Barriers Improvement Act of 1990. The coastal berm originally proposed for tie-in of the Espinar Levee is designated Coastal Barrier (CB) segment PR-75. The part of the levee that impacts a small portion of CB segment PR-75 was originally considered as essential to the successful attainment of the human protection goals of this project, at the 100-year flood level. However, the Coastal Barrier Resources Act and the Coastal Barrier Improvement Act preclude the use of Federal funds to construct any kind of infrastructure or protection works in a CB area. The intent is to prevent the use of federal Dollars for activities that may lead to the development of Coastal Barrier Areas (such as protection from flooding). None of the exceptions contemplated in that act apply to this work. Therefore, all work within CB segment PR-75 has been deleted from the project.

8.08 Coastal Zone Management Act of 1972, as amended. At this time the study and recommended plan have been determined to be in compliance with the major programs and objectives of the Puerto Rico Coastal Management Program. Concurrence from the Puerto Rico Planning Board (PRPB) will be sought when the public comment period on this EA has closed.

8.09 Farmland Protection Policy Act of 1981. Coordination with the NRCS was concluded on January 10, 2000. No further coordination is required.

8.10 Resource Conservation and Recovery Act of 1976, as amended, and Toxic Substances Control Act of 1976, as amended. No items regulated under these laws or other laws related to hazardous, toxic or radiological waste substances have been discovered. None are considered likely to exist in the study and project area.

8.11 Executive Order 11990, Protection of Wetlands. This Order requires that Federal Agencies avoid impacts to wetlands unless there are no practicable alternatives. It further requires that Federal Agencies minimize losses to the beneficial values of wetlands and preserve and enhance the beneficial values of wetlands. The recommended plan is in compliance with this Executive Order.

8.12 Executive Order 11988, Floodplain Management. The work is in compliance with this order. The project is located in a floodplain area where there are currently residences and permanently occupied structures. The project will result in protection of the inhabited areas adjacent to the floodplain area from further flooding.

8.13 Executive Order 12898, Environmental Justice. This Order prohibits disproportionately adverse Federal project effects on minority and low-income populations. The principal beneficiaries of the recommended improvements are the farmers, industrial, commercial agricultural workers, and associated persons who currently occupy the floodplain area. This is considered to be a low-income demographic group. The injection of 4 million dollars in Federal funds and matching sponsor funds into the local economy will significantly stimulate the local economy.

9.00 COORDINATION AND PUBLIC COMMENT

Environmental scoping was begun on February 26, 1991, during the Reconnaissance level studies. Additional scoping with Commonwealth and Federal agencies took place via letter dated July 14, 1995. Responses were received from the Office of the Governor of Puerto Rico, Puerto Rico Department of Agriculture, Puerto Rico Department of Natural and Environmental Resources, Puerto Rico Land Administration, Puerto Rico Planning Board, Administración De Servicios Municipales, Municipio de Aguadilla, Colegio De Ingenieros y Agrimensores De Puerto Rico, Puerto Rico Industrial Development Company, Oficina Estatal De Preservación Histórica (State Historic Preservation Office SHPO), and U.S. Fish and Wildlife Service. No adverse comments were noted in the responses received. After new regulations pursuant to the Magnuson-Stevens Fishery Resources July 6 and 7, 1999, prompted NMFS comments regarding no effects to EFH.

This Report and EA will be coordinated with all major Commonwealth agencies and to concerned Federal agencies in Puerto Rico and on the mainland for public review during at least a 45-day period, to comply with requirements of the National Environmental Protection Act and the Puerto Rico Coastal Management Program.

10.0 LIST OF EA PREPARERS

Esteban Jiménez, Biologist, Barbara B. Cintrón, Biologist, David McCullough, Archeologist, Jorge M. Tous, Civil Engineer.

11.0 REFERENCES

Cinquino, Michael A., Robert J. Hanley, Michele H. Hayward, Frank J. Schieppati, Hugh Tosteson. Cultural Resource Survey of the Rio Culebrinas Flood Protection Project, Municipio of Aguadilla, Puerto Rico. Panamerican Consultants, Inc., Buffalo Branch Office, 36 Brunswick Road, Depew, New York 14043. July 1999.

Section 205, Reconnaissance Report, Río Culebrinas at Aguadilla, Puerto Rico, U.S. Army Corps of Engineers, Jacksonville District, March 1992.

12.0 FINDING OF NO SIGNIFICANT IMPACT (FONSI).

I have reviewed the Detailed Project Report (DPR) and Environmental Assessment (EA) prepared for Río Culebrinas at Aguadilla and Aguada, Puerto Rico. The recommended plan in the DPR is the proposed action. I conclude that the proposed action will have no significant impact on the quality of the human environment. This conclusion is based on information analyzed in the DPR and EA. It also reflects pertinent information obtained from other agencies and special interest groups having jurisdiction by law and/or special expertise, and on comments and recommendations obtained after coordination of the DPR. Reasons for this conclusion are, in summary,

1. There will be no adverse impacts to endangered species of flora or fauna, wetlands or significant fish and wildlife populations or habitats. Recommendations of the US Fish and Wildlife Service regarding the Coastal Barrier PR-75, have been adopted.

2. Water quality will not be adversely affected. Puerto Rico water quality standards will be met and a Water Quality Certificate (WQC) will be obtained from the Puerto Rico Environmental Quality Board.

3. Archeological deposits associated with the Iglesia de Espinar and deposits at PCI Site 1 will be adversely affected. Archeological data recovery will be undertaken to mitigate adverse effects. The Iglesia de Espinar ruins will be protected by the project from future flooding. A Phase II archeological assessment will be conducted on archeological deposits at site PCI 2.

4. The USACE has determined that the project is consistent with the Puerto Rico Coastal Management Program. A Determination of Consistency is included in this EA. Puerto Rico Planning Board concurrence with the determination is expected, because no significant coastal resources will be affected, and no Puerto Rico or Federal agency has objected.

5. A level-1 survey and assessment for the presence of hazardous, toxic or radiological waste materials (HTRW), updated in 1998, indicated no known or suspected materials in the project footprint.

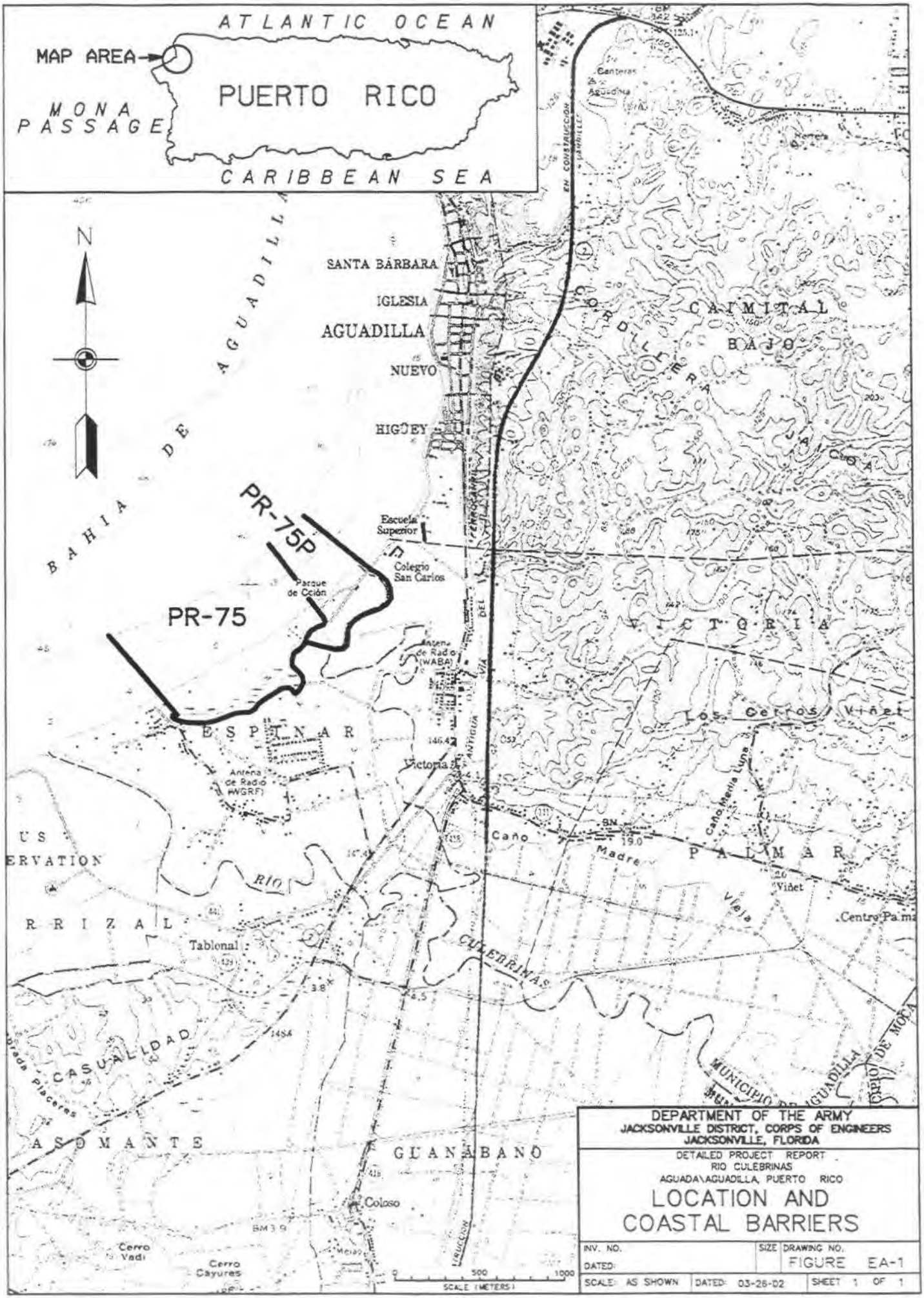
6. Public benefits include reduction flooding and damage to buildings and furnishings, improvement of public health and safety and elimination of other losses caused by flooding in this watershed, up to a return frequency of 1%. Adverse effects are temporary, will occur during construction, and include incidental noise and vehicular exhaust fumes. Construction activities will be planned, scheduled and sequenced to minimize adverse effects.

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

1 June 2004
Date

ROBERT M. CARPENTER
Colonel, Corps of Engineers
Commanding

13.0 FIGURES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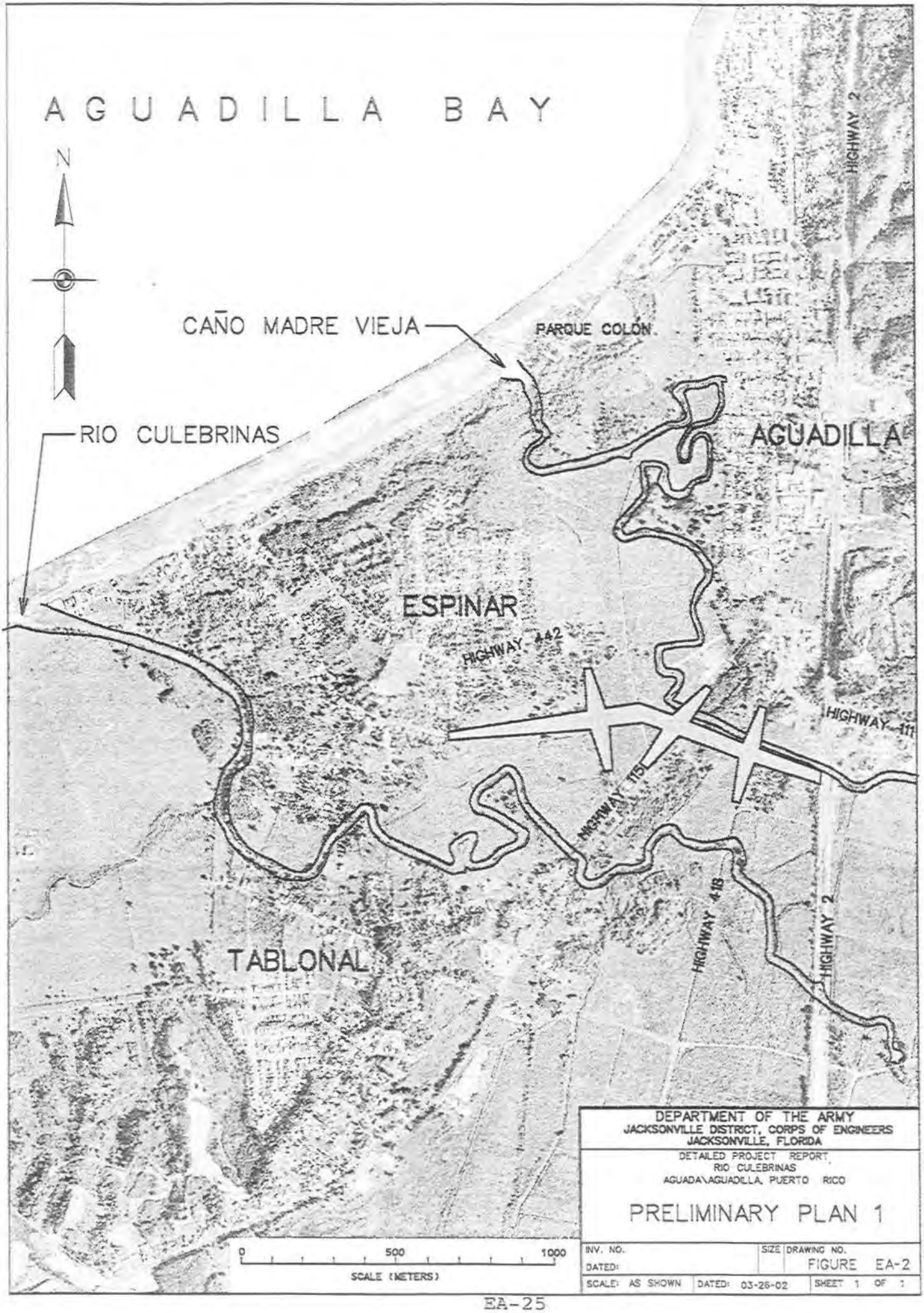
SCALE (METERS)
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA
DETAILED PROJECT REPORT
RIO CULEBRINAS
AGUADA\AGUADILLA, PUERTO RICO
LOCATION AND COASTAL BARRIERS
INV. NO.
DATED:
SIZE
DRAWING NO.
FIGURE EA-1
SCALE: AS SHOWN
DATED: 03-26-02
SHEET 1 OF 1



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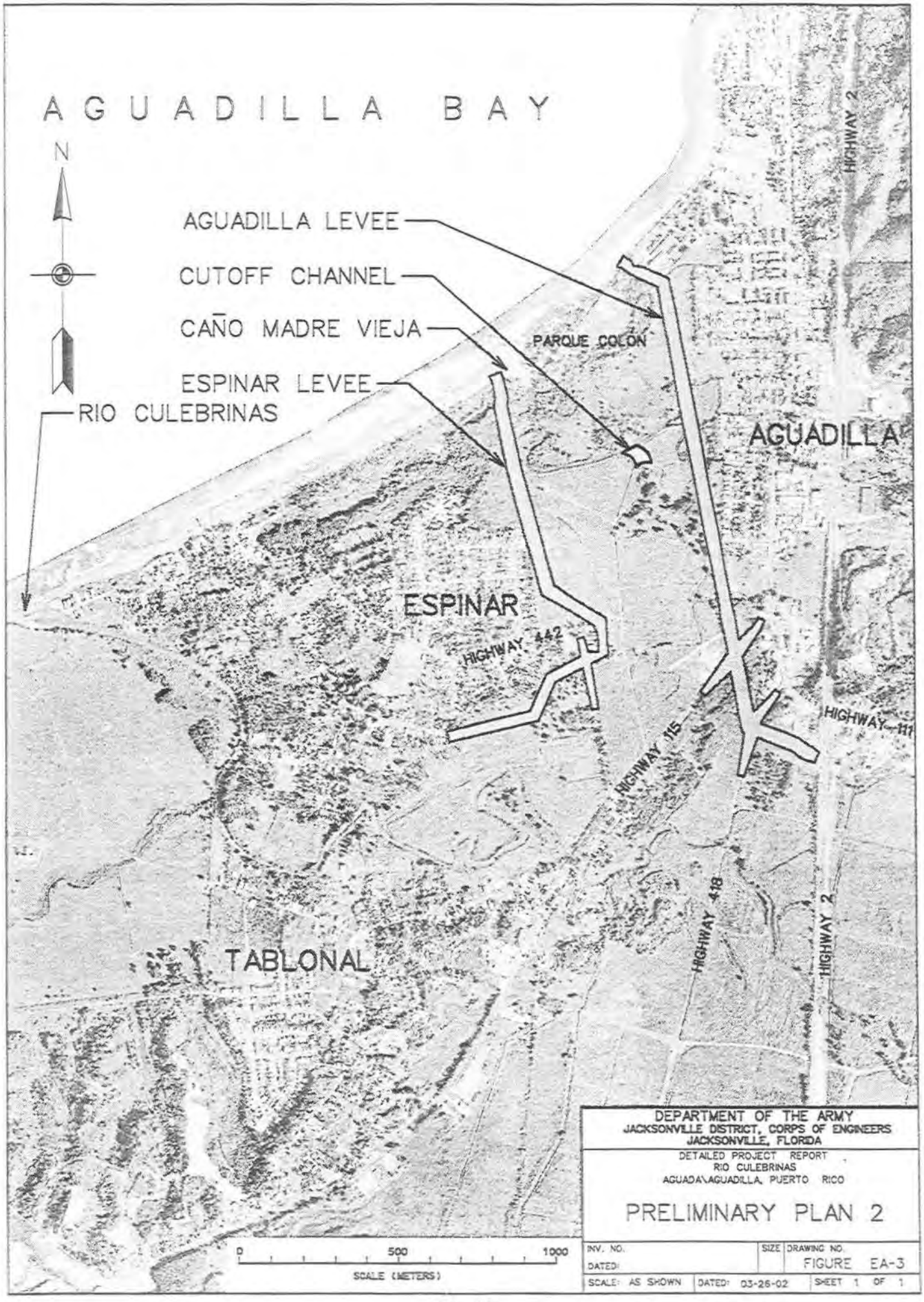
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

DETAILED PROJECT REPORT
RIO CULEBRINAS
AGUADA\AGUADILLA, PUERTO RICO

PRELIMINARY PLAN 1

INV. NO.		SIZE	DRAWING NO.
DATED:			FIGURE EA-2
SCALE: AS SHOWN	DATED: 03-26-02		SHEET 1 OF 1



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DETAILED PROJECT REPORT
RIO CULEBRINAS
AGUADA\AGUADILLA, PUERTO RICO

PRELIMINARY PLAN 2

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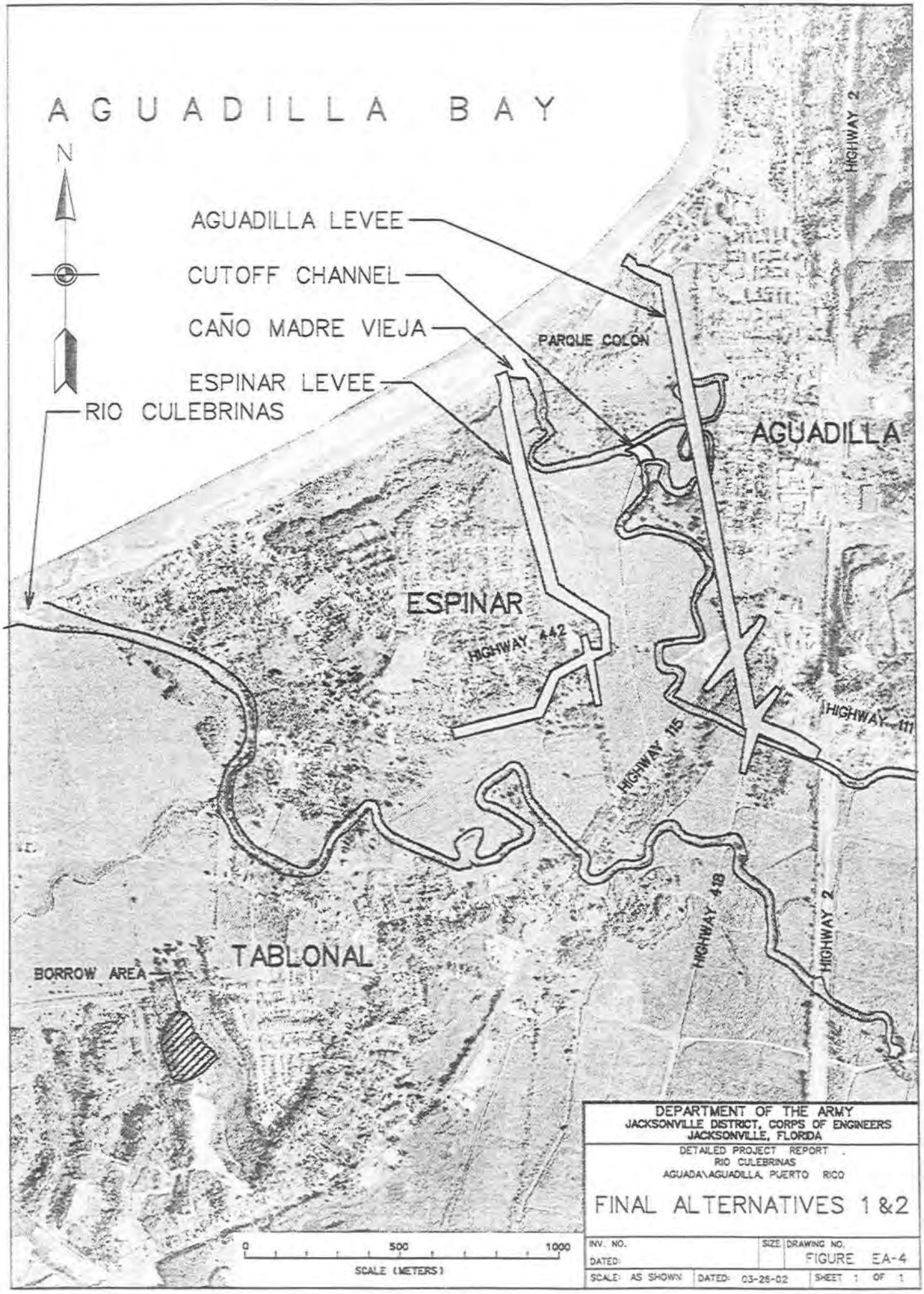
DATED:		FIGURE EA-3
SCALE: AS SHOWN	DATED: 03-26-02	SHEET 1 OF 1



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JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

DETAILED PROJECT REPORT
RIO CULEBRINAS
AGUADA\AGUADILLA, PUERTO RICO

FINAL ALTERNATIVES 1 &2

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DATED:			FIGURE EA-4
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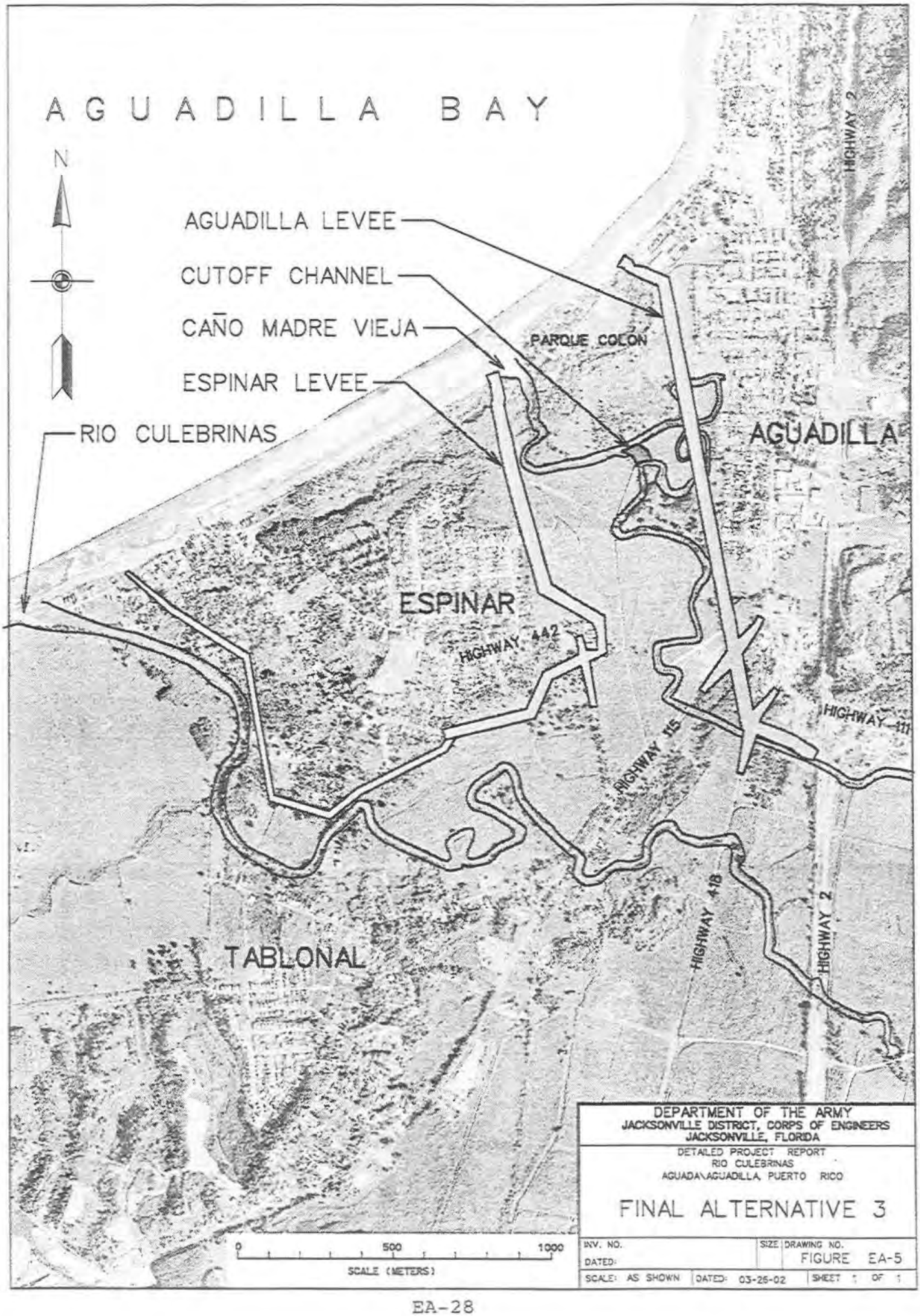

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DETAILED PROJECT REPORT
RIO CULEBRINAS
AGUADA\AGUADILLA, PUERTO RICO

FINAL ALTERNATIVE 3

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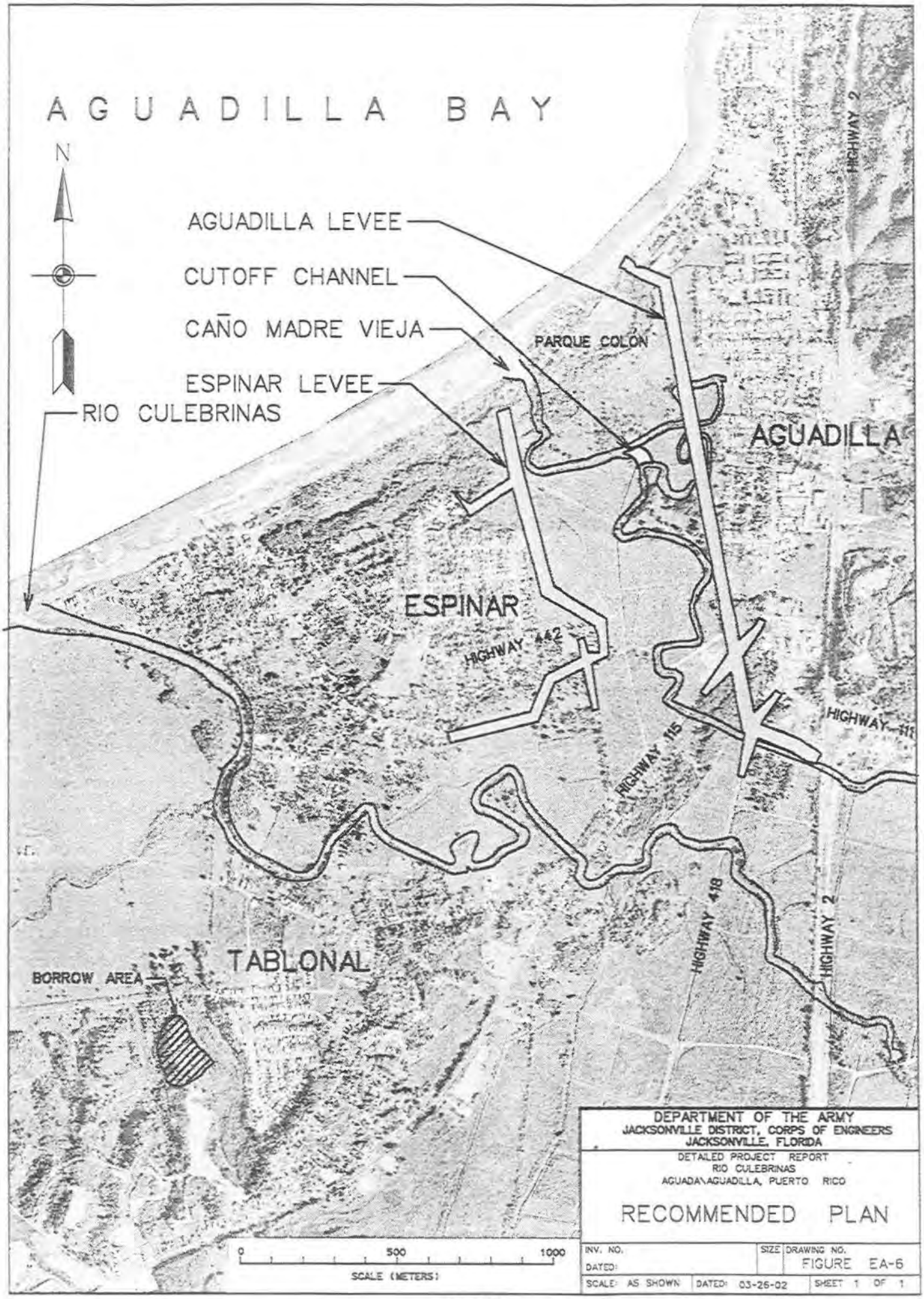

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JACKSONVILLE, FLORIDA

DETAILED PROJECT REPORT
RIO CULEBRINAS
AGUADA\AGUADILLA, PUERTO RICO

RECOMMENDED PLAN

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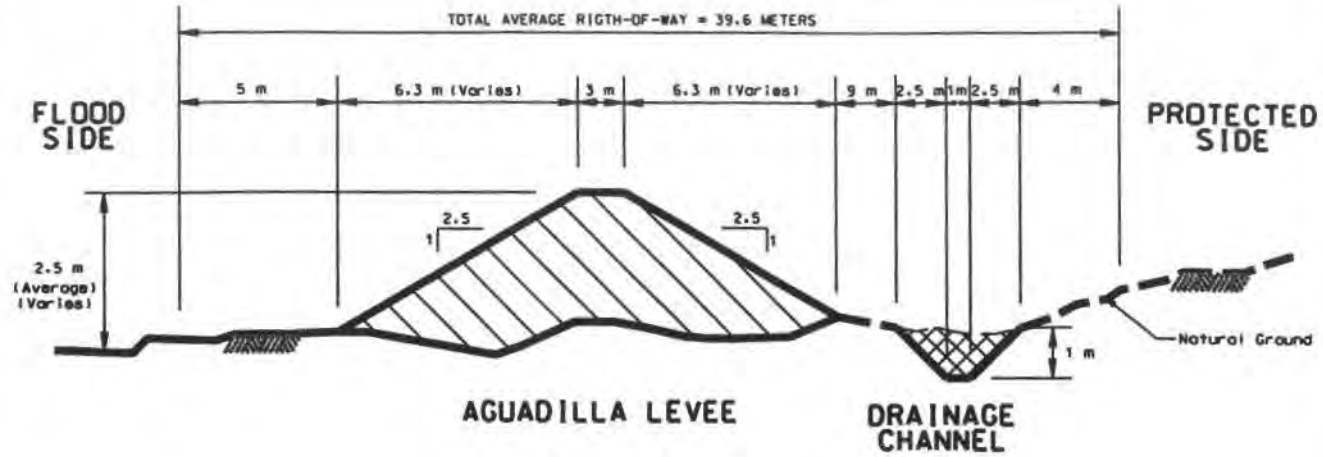

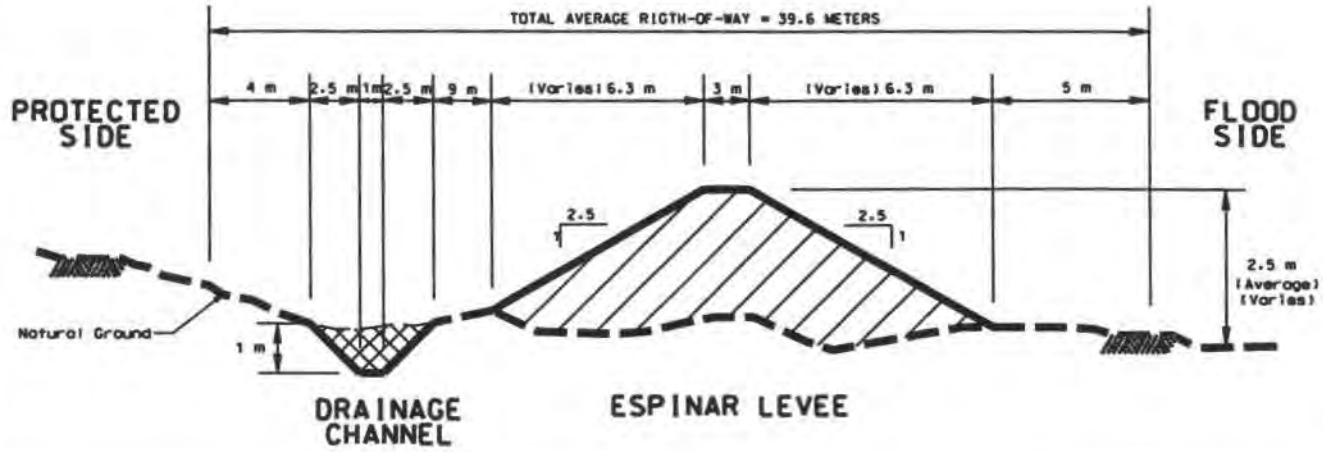

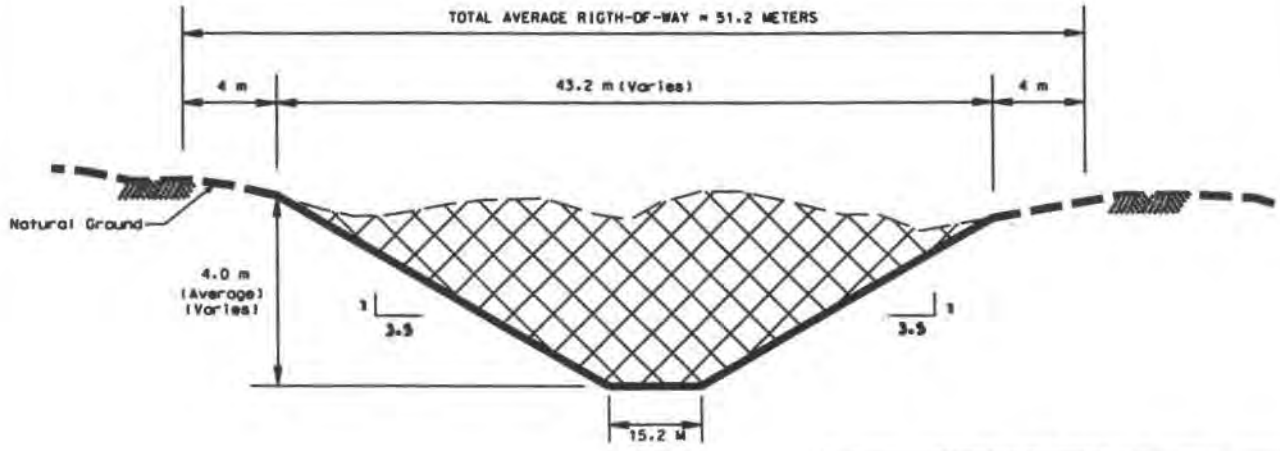

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JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

DETAILED PROJECT REPORT
RIO CULEBRINAS
AGUADA\AGUADILLA, PUERTO RICO

TYPICAL CROSS SECTIONS

INV. NO.		SIZE	DRAWING NO.
DATED:			FIGURE EA-7
SCALE: NTS	DATED: 03-25-02		SHEET

14.0 EA ATTACHMENTS

A. PUBLIC AND AGENCY COORDINATION AND COMMENTS

B. FISH AND WILDLIFE COORDINATION ACT REPORT

C. CLEAN WATER ACT SECTION 404 (b)(1) EVALUATION AND MITIGATION PLAN

D. COASTAL ZONE MANAGEMENT ACT COORDINATION – Certification of Compliance with PR Coastal Management Plan and Application for Concurrence from PR Planning Board.

E. SITE VISIT MEMORANDUM AND WRAP SCORE SHEETS

A. PUBLIC AND AGENCY COORDINATION AND COMMENTS

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive N.
St. Petersburg, Florida 33702
(727) 570-5317, FAX 570-5300

August 22, 2002 F/SER4:LC

James C. Duck
Chief, Planning Division
Department of the Army, Corps of Engineers
PO Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Duck:

The National Marine Fisheries Service (NMFS) has reviewed your letter dated July 29, 2002, regarding the proposed flood protection project along the Culebrinas River and Caño Madre Vieja, south of Aguadilla, Puerto Rico. Your letter was in response to our June 3, 2002, comments and Essential Fish Habitat (EFH) conservation recommendations regarding the project.

We appreciate the efforts of the Corps of Engineers (COE) to further explain project design parameters and to respond to our EFH conservation recommendations. However, the NMFS remains concerned about the direct impacts to EFH in the project area, the indirect and cumulative effects to EFH due to alterations of the hydrology and water quality in associated freshwater portions of the Cano Madre Vieja and Culebrinas River system, and the cumulative impacts of twin levee construction. Also, we continue to oppose the replacement of 3200 linear feet of channel that is tidally influenced for a portion of this length with a 200 linear foot cut-off channel.

The potential impacts on this project's long-term viability also should be given much greater consideration by the COE and the local sponsors, the municipalities of Aguada and Aguadilla. Success of this project relies on a commitment to ensure that the area remains an open floodway, free from development. As the area is currently used for agriculture and sand extraction, floodway designation would not affect the current land uses. However, allowing implementation of the plans for a marina/residential project that would require the modification of the levees and the Cano Madre Vieja channel or construction of the beachfront development in the area of Espinar that would affect floodway utility, ultimately would reduce or eliminate the project's flood control benefits.

We are pleased that the COE is considering stream and wetland mitigation to replace areas directly impacted by fill for levee construction. If project construction is pursued, a detailed mitigation plan, coordinated with the NMFS, should be included in final project documents and incorporated into the

project design. As a part of that plan, sediment and erosion control measures also should be specified, as should measures to mitigate the impacts of hydrologic alterations on mangrove and other estuarine wetlands.

In summary, we find that our EFH conservation recommendations have been only partially addressed. We urge your consideration of the above comments. If the future integrity of the floodway cannot be ensured, we believe alternative means of flood control be considered.

Questions related to the proposed project and marine fishery resource issues should be addressed to Dr. Lisamarie Carrubba at 787/851-3700.

Sincerely,

Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Boqueron Field Office
Carr. 301, KM 5.1, Bo. Corozo
P.O. Box 491
Boqueron, PR 00622

August 5, 2002

Mr. James C. Duck
Chief, Planning Division
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Re: Culebrinas River/ Caño Madre Vieja
Flood Control Project, Aguadilla/Aguada
Draft Detailed Project Report and EA

Dear Mr. Duck:

Based on your July 25, 2002 letter responding to our comments on the Draft Detailed Project Report and EA for the Culebrinas River flood control project, we continue to have concerns for some aspects of this project which we believe are critical to the future functions of the flood control project and appropriate consideration of wetland and river impacts. This letter constitutes additional coordination under the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*)

As stated in our previous letter, we understood that the original single-levee alternative was discarded because it would not be effective without serious modifications to the Culebrinas River, however this was not adequately discussed in the EA, and the impression from reading the document is that the alternative (as shown in the EA) was largely discarded because of serious environmental impacts. The complete reasons for discarding this alternative should be clarified in the EA, since the alternative, as presented would otherwise appear to be the least impacting alternative. This would help address potential future inquiries on why this alternative was not selected.

We reiterate that references to WRAP should be removed from the EA. WRAP is a subjective technique that acquires objectivity by a team determination of the wetland types and impacts, and this assessment technique has not yet been approved for the Caribbean. The WRAP technique developed for Florida is currently being revised to apply to the Caribbean, and we are working with the Corps Regulatory office in San Juan on this revision. In the meantime, the Corps

Regulatory Division has refused to accept WRAP determinations presented by private consultants. In addition to criteria in WRAP that are particular to the mainland (presence of mammals, different plant species, etc.), a major concern about the WRAP techniques is its inadequacy to evaluate impacts to streams or shorelines. These are both linear features and have other functions associated with them that are not included (but should be) in the Florida derived WRAP techniques. Evaluating areas left for internal drainage outside of the floodway is not appropriate for mitigating the loss of functions in a flowing estuarine stream reach. Given that it has not been approved for use here and is under trial and revision, we believe that a WRAP assessment, particularly done by a single individual is inappropriate. While FWS biologists were present during the site visit, they were not participating in any WRAP assessment that was done. In addition to these concerns, as an estuarine area, potential impacts to Essential Fish Habitat should be evaluated with NMFS.

We are pleased that the Corps is considering stream mitigation to replace the estuarine stream area that would be lost due to the east dike. The mitigation, however, should be incorporated into the project design, and be included in the final Detailed Project Report and EA. We assume this mitigation would be accomplished within the floodway for the project. In addition to the possibility of creating additional meanders, our office would consider restoration of riparian forest along the stream as suitable mitigation for some of the impacts. Over-sizing the cut-off channel (or any meanders to be created as mitigation) should not be necessary, as the river channel is sized now to carry the bankfull flows and the area is not within the areas to be protected by the dikes. If the purpose of over-sizing the channel is to provide some fill for the dikes (as was the case for the La Plata flood control project), other alternatives, such as removal of material from small upland areas within the dikes to provide additional wetlands would be possible.

There should be some restrictions on development within the wetlands to be left on the "protected" sides of the dikes. Our understanding is that maintenance of these wetland areas is important in providing flood storage for internal drainage from the developed areas. If maintenance of these wetland systems is not part of the project, they should be considered as part of the indirect and secondary impacts of the project. While these areas might provide replacement functions for some of the wetlands to be impacted, they should not be considered as mitigation for the 980 meter long estuarine stream meander that would be cut off.

Probably the most critical concern we have for this project is the future viability of the project if the floodway is not protected. We continue to strongly recommend that the area between the dikes be designated officially as a floodway and be protected from future development. According to the information in the EA, this area is not yet developed, and the farming and sand extraction activities being carried out in the area would not necessarily be affected. As we pointed out, however, there are plans for a marina/residential project in the area between the two dikes, and there is another beach development in the unprotected shoreline of Espinar that already has had a Corps wetland violation action against it. The marina/residential project would involve dredging the mouth and channel of Caño Madre Vieja, as well as either dredging or filling much of the wetlands.

Your letter states that "the cost of placing the entire floodplain or floodway under conservation easement would make this a prohibitively costly project at the expense of the lives and health of the inhabitants of Aguadilla and Aguada (Espinar)." We do not believe that the cost/benefits analysis of a project should be biased by removing elements (floodway protection) that are likely to be crucial to the future of the project, including continued flood protection for the target communities. The marina/residential project is apparently being supported by both Municipalities that are also supposed to be local sponsors for the flood control project. We continue to question the viability and appropriateness of a federally funded flood control project for which the local sponsors have conflicting intentions. We agree that designation of the area as "Zona 1" is a Planning Board responsibility, but they should be willing to do this as part of the local sponsor's contribution to the project. It should be an integral and necessary part of the project.

We continue to recommend that the draft EA and Detailed Project Report be revised to fully address these concerns. Thank you for the opportunity to comment on this action.

Sincerely yours,

James P. Oland
Field Supervisor

bby
cc:
Mun. Aguadilla
Mun. Aguada
USFS, IITF, San Juan
DNER, Flood Control, San Juan
COE, Jorge Tous, San Juan
COE, Dr. Loren M. Mason, Jacksonville
COE, Dennis W. Barnett, Atlanta
EPA, San Juan
EQB, San Juan
NMFS, Boquerón
PRPB, San Juan
ARPE, Aguadilla

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CORREO GENERAL
SAN JUAN, PUERTO RICO 00936-4267

July 31, 2002

Mr. James C. Duck
Chief, Planning Division
Department of the Army
Jacksonville District Corps of Engineers
P. O. Box 4970
Jacksonville, Florida 32232-0019

DRAFT OF DETAILED PROJECT REPORT AND ENVIRONMENTAL ASSESSMENT
RIO CULEBRINAS, AGUADA-AGUADILLA

The proposed project does not have a significant impact on our Irrigation, Dams or Reservoirs Systems.

Our Engineering Division will evaluate the projected right-of-way to determine if any other PREPA facilities were considered in the preliminary design.

Sincerely,

Julio A. Torres Correa
Head-Irrigation Services, Dams
and Reservoirs Division

MAP/mgl

c: Engr. Edwin Rivera Serrano
Engineering Director - PREPA

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

REPLY TO
ATTENTION OF

JUL 29 2002

Planning Division
Environmental Branch

Mr. Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
Southeast Regional Office
9721 Executive Center Drive N.
St. Petersburg, Florida 33702

Dear Mr. Mager:

This letter is in reply to yours of June 3, 2002, in reference to the Culebrinas River Flood Control Project. Your letter was written under Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). It was received in this office on July 1, 2002. In the letter you expressed several concerns, which are addressed as follows:

1. The single levee alternative was one of the original alternatives considered and discarded at the onset of the design evaluation project. This option would have left the community of Espinar vulnerable to flooding from the South West and would have required the Westward extension of a channel extending throughout the edge of the community and tying to the Culebrinas River. The alternative would have been extremely expensive and would have entailed high impacts to the existing environmental resources in the area. This option was discarded in the first stages of the planning process of this project. A copy of the drawing for that alternative was included with the EA drawings in order to make them consistent with those of the main report, but that alternative had already been discarded at the beginning of the planning process, and was only listed for historical purposes.

2. The entire levee footprint and the enclosed floodway area are either under tidal influence or under that of the Caño Madre Vieja or Culebrinas Rivers. The footprint and floodway were considered to be wetlands and waters of the United States, although the entire area is a mosaic of wetlands and uplands, due to the agricultural and grazing activity that has taken

place in the area. Please advise if you disagree with this determination of considering the entire area as wetlands.

3. The projected cut off channel at Caño Madre Vieja was designed at a larger magnitude of width than other occurring channels because it is expected to fill in to the same gage as all others in the area. The river is expected to resume its meandering paths.

4. Continued coordination for mitigation is carried out with your agency and other Federal and Commonwealth regulatory and environmental agencies.

5. The U.S. Army Corps of Engineers (Corps) is not authorized to either acquire property or place it under restriction. The Corps considers that the cost of placing the entire floodplain or floodway under conservation easement would make this a prohibitively costly project at the expense of the lives and health of the inhabitants of Aguadilla and Aguada (Espinar). Any development attempted between the levees would have to go through a Federal and Commonwealth permitting process, where it would be unlikely that a permit would be given to build in a floodway. It must be noted also that the Corps has no part in the designation of an area as a floodway. This is a task of the Puerto Rico Planning Board.

6. You state in your letter that the project area wetlands are within the tidally-influenced estuarine system of Caño Madre Vieja and are considered EFH. However, the part of Caño Madre Vieja that will be crossed by the levee, and which you assume to be EFH, is the northernmost extreme double meander of the Caño Madre Vieja. A research of the Puerto Rico Fisheries Management Plan (October 1998) failed to show the area designated as EFH or a HAPC. This meander is situated approximately one kilometer away from the estuary of the Caño Madre Vieja, and supports isolated mangrove specimens instead of the mangrove stands found near the river's estuary. This would indicate that the salinity gradient at that upstream location is not sufficient to support a growth of mangrove vegetation that will provide habitat and harborage for commercially or recreationally important marine species. The elimination of the "U" shaped meander will be accompanied by the reestablishment of connection between both ends of the Caño on the flooding side (West) of the Aguadilla

levee. The flow of estuarine saltwater will then reach farther than 1 kilometer upstream in the Caño Madre Vieja. The result will be increased mangrove colonization of the riverine margins upstream and increased habitat for your species of concern. The alternate solution of curving the levee to conform to the Caño's Eastern bank throughout the meanders, would result in an irregular and ineffective levee, and will not result in the preservation of significant fisheries habitat. The Culebrinas River, which flows to the West of the Espinar (Aguada) area, floods the lower elevation areas where the levee is planned precisely to protect those areas from flooding. The waters of the Culebrinas River will still have a means of egress between the two levees and into the flood plain. To the Corps' knowledge, no commercial or recreational resources in the Culebrinas River would be affected.

This concludes our response under Section 305(b)(4)(B) of the MSFCMA. The Corps requests the concurrence of the NMFS with its determinations. Please feel free to contact either our Jacksonville office at (904) 232-2115 or our San Juan office at (787) 729-6893, to address any other questions or issues that you may have.

Sincerely,

James C. Duck

James C. Duck
Chief, Planning Division

levee. The flow of estuarine saltwater will then reach farther than 1 kilometer upstream in the Caño Madre Vieja. The result will be increased mangrove colonization of the riverine margins upstream and increased habitat for your species of concern. The alternate solution of curving the levee to conform to the Caño's Eastern bank throughout the meanders, would result in an irregular and ineffective levee, and will not result in the preservation of significant fisheries habitat. The Culebrinas River, which flows to the West of the Espinar (Aguada) area, floods the lower elevation areas where the levee is planned precisely to protect those areas from flooding. The waters of the Culebrinas River will still have a means of egress between the two levees and into the flood plain. To the Corps' knowledge, no commercial or recreational resources in the Culebrinas River would be affected.

This concludes our response under Section 305(b)(4)(B) of the MSFCMA. The Corps requests the concurrence of the NMFS with its determinations. Please feel free to contact either our Jacksonville office at (904) 232-2115 or our San Juan office at (787) 729-6893, to address any other questions or issues that you may have.

Sincerely,

James C. Duck
Chief, Planning Division

bcc:
CESAJ-DS-PD (Tous)
CESAJ-DP-I (Gonzalez)

7/29/02
Jimenez/CESAJ-PD-EP/ej/2115
Acosta/CESAJ-PD-EP
Mason/CESAJ-PD-E 7/29/02
Duck/CESASJ-PD
PM 7/29/02

L:/GROUP/PDEP/JIMENEZ/CULEBRINASMSFCMA

Planning Division
Environmental Branch

JUL 2 5 2002

Mr. James P. Oland
Field Supervisor
U.S. Fish and Wildlife Service
P.O. Box 491
Boqueron, PR 00622

Dear Mr. Oland:

This response is in reference to the US Fish and Wildlife Service (FWS) letter dated June 3, 2002.

You indicate concerns as to why Preliminary Alternative 1 was eliminated. We must point out that the particular single levee alternative was one of the original alternatives considered and discarded at the onset of the design evaluation project. This alternative would have left the community of Espinar vulnerable to flooding and would have required the Westward extension of a channel extending throughout the edge of the community and tying to the Culebrinas River. This would have been extremely expensive and would have entailed high impacts to existing environmental resources, as it would not have been doable without modifications to the Culebrinas River. This alternative was discarded in the first stages of the planning process of the project. It was included in the Environmental Assessment drawings to be consistent with the drawings presented in the overall Detailed Planning Report. These drawings were only included as historical documentation.

Also, your concern to acquire a number of houses in the Aguada side would have been unrealistic, as this would have disrupted considerably the existence of a community with an existence numbered in the hundreds of years. It would have disrupted the community we intended to protect.

As previously indicated the projected cut off channel at Caño Madre Vieja was designed at a larger magnitude of width than other occurring channels because it is expected to fill in to the same gage as all others in the area. The river is expected to resume its meandering paths.

The Corps maintains a continued coordination for mitigation with your agency and all other regulatory agencies. The Corps believes the areas of river cut off by the levee will be able to reestablish their meandering paths within the confines of the floodway. However, the Corps agrees with the idea of mitigating further by structurally creating more meanders in that area.

The wetland rapid assessment (WRAP) methodology, although in this case not weighted particularly for the Caribbean, was used in order to establish a quantitative rather than solely an area-based quantitative baseline for the mitigation. It must be remembered that USFWS biologists were present at the time of the site visit on October 1999, and were consulted as to the possible values according to the WRAP's scales. The procedure does not mandate an interagency evaluation. It can be done individually. The often seen cooperatively produced WRAP scores come from an attempt on the part of the agencies involved, and the non-governmental contractors, to reach a consensus score, not necessarily the most accurate one, up front for mitigation work. Again, the methodology does not mandate a cooperative effort, and in this case was used to quantify the possible value of the project footprint. The entire impact area was considered to be wetlands and mitigation in the form of new meanderings is considered on the basis of acreage ratios and not WRAP scores.

The Corps considers that the cost of placing the entire floodplain or floodway under conservation easement would make this a prohibitively costly project at the expense of the lives and health of the inhabitants of Aguadilla and Aguada (Espinar). Any development attempted between the levees would have to go through a Federal and Commonwealth permitting process, where it would be unlikely that a permit would be given to build in a floodway. It must be noted also that the Corps has no part in the designation of an area as a floodway. This is a task of the Puerto Rico Planning Board.

Please feel free to contact either our Jacksonville office at 904-232-2115 or San Juan office at 787-729-6895 to address any other questions or issues that you may have.

Sincerely,

James C. Duck
Chief, Planning Division

bcc:
CESAJ-DS-PD (Tous)
CESAJ-DP-I (Gonzalez)

Jimenez/CESAJ-PD-EP/ej/2115 7/24/02
Acosta/CESAJ-PD-EP
Mason/CESAJ-PD-E
Duck/CESASJ-PD

L:/GROUP/PDEP/JIMENEZ/CULEBRINAS USFWS

COMMONWEALTH OF PUERTO RICO

HIGHWAY AND TRANSPORTATION AUTHORITY

June 26, 2002

Mr. James C. Duck
Chief, Planning Division
Department of The Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

DRAFT DETAILED PROJECT REPORT (DPR)
AND DRAFT ENVIRONMENTAL ASSESSMENT
RIO CULEBRINAS, AGUADILLA-AGUADA, PUERTO RICO

Dear Mr. Duck:

Reference is made to your communication of April 29, 2002, related to this matter.

At present the Construction Improvement Program of this Authority includes the following projects in the reference area:

1. AC-011529 – Widening and Improvements PR-115, from La Victoria Sector in Aguadilla, km 28.0, to Aguada Town Entrance, km 24.3 (Including Bridge Widening Over Culebrinas River).

2. AC-041803 – Replacement of Bridge #1142, km 0.52, Over Culebrinas River.

The reference project should be coordinated with our projects. For additional information please contact Eng. Wilma Yunes in the Design Area at 787-721-8787, extention 1457, or our Office of Highway Systems at 787-721-8787, extention 1512.

Cordially Yours,

Irma M. García
Director
Planning Area

6710-OF-ARR
0205073001001

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JUN 14 2002

Mr. James C. Duck
Chief, Planning Division
Environmental Branch
Department of the Army
Jacksonville District Corps of Engineers
PO Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

RE: A STUDY TO DETERMINE THE FEASIBILITY OF PROVIDING A FLOOD CONTROL PROJECT FOR THE RIO CULEBRINAS IN THE VICINITY OF AGUADILLA AND AGUADA, PUERTO RICO – PROJECT REPORT AND ENVIRONMENTAL ASSESSMENT

We acknowledge receipt of your letter and attached subject Report dated April 29, 2002, requesting our comments on the proposed flood control project. After review of the Report and Assessment documents we inform that no land presently owned by the Puerto Rico Land Administration (PRLA) is located inside the Culebrinas River and Madre Vieja Creek's flooding and drainage zone delineated by the construction of the Aguadilla and Bo. Espinar levees. The Puerto Rico Land Administration owns a small parcel inside the Espinar community which could remain flood protected when the respective levee is constructed.

Sincerely,

Juan Vaquer Castrodad
Executive Director

PO BOX 363767 • SAN JUAN, PR 00936-3767 • #171 AVE. CARLOS CHARDON, SUITE 101 • SAN JUAN, PR 00918-0903 • T. 753-9300 • F. 250-7150 • WWW.TERRENOS.PRSTAR.NET

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REV. 1/01

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PO Box 364267
San Juan, Puerto Rico 00936-4267

June 7, 2002

Mr. Jack C. Duck, Chief
Planning Division
US Army Corps of Engineers
PO Box 4970
Jacksonville, Florida 32232-0019

Attention: Planning Division, Special Projects Section

Dear Mr. Duck:

RE: Draft Detailed Project Report and Environmental Assessment
Flood Protection Work Along Río Culebrinas and Caño Madre Vieja
South of Aguadilla, Puerto Rico

The Puerto Rico Electric Power Authority (PREPA) has evaluated the above referenced document and has no comments from the environmental standpoint. The project should have minimal impact if it is carried out as described.

It is our understanding that there are some concrete and wooden poles in the area that would be impacted by the project. On a letter dated July 25, 2001, Ms. Barbara Tracy, Attorney for the Corps Real Estate Division, requested certain documents (deeds, easements, permits) in order to determine the cost of relocating the structures. In response, our Department of Distribution Engineering in Mayagüez requested a meeting and a visit to the site with a representative from the Corps to discuss the future expansion of our infrastructure in the area, and to determine the nature of the property rights and easements. As of this date, there has been no meeting between the parties.

We recommend that the impact of the project on our infrastructure be included in the Environmental Assessment, and that a meeting be held as soon as possible, so that the project can continue without delay. To coordinate the meeting please contact Eng. Eric Carlo, Department Supervisor, Distribution Engineering in Mayagüez, at (787) 805-8425. Also, the Corps should contact Eng. Roberto A. Torres, Superintendent of Distribution Engineering, at (787) 772-6503, for more information regarding the documents needed to complete the Project Evaluation Questionnaire.

If you have any questions, please contact Eng. Jaime A. Plaza, Head, Environmental Protection and Quality Assurance Division, at (787) 289-4959.

Cordially,

by: Jaime A. Plaza

Héctor M. Alejandro, Director
Planning and Environmental Protection

Enclosure

Cordeco Northwest Corp.

P.O. Box 610
Aguada, PR 00602
Tel. 787-819-9347
Tel\Fax. 787-819-0534

June 4, 2002

Mr. James C. Duck
Chief Planning Division
U.S. Army Corp of Engineers
PO Box 4970
Jacksonville, Florida 32232-0019

Re: Rio Culebrinas \ Caño Madre Vieja Flood Control Project
in Aguadilla-Aguada, Puerto Rico

Dear Mr. Duck:

Cordeco Northwest is the owner of the land that would be most affected by the proposed Rio Culebrinas Flood Control Project. Taking into account the flood control project together with the fact that there is an existing breakwater at the entrance to Caño Madre Vieja we have devised a proposal that we believe would be beneficial to most of the parties involved.

We propose to build an inland marina in the area between the levees. A channel would be dredged from the Caño Madre Vieja entrance to our property where an interior boat basin would be dredged out. The breakwater at the entrance would have to be improved. We are going to be using Moffat & Nichol a well known coastal engineering firm from Tampa, Fla. to design the breakwater and inner basin. Moffat & Nichol was the firm principally involved in the design of Atlantis Resort a state of the art megayacht marina in Paradise Island, Bahamas.

In our proposal we are modifying the location of the western Espinar levee in order to salvage land from the flood zone to allow for the development of the Marina Facilities, a hotel and touristic residential units (see included aerial pictures). We have carried out hydrologic studies, which prove that the modification is a feasible option.

This marina and hotel complex would provide sorely needed Marine infrastructure facilities for the region. There are no comparable full service marina facilities on the western coast. Our facilities would serve to provide

access to the rich natural resources off the western coast and would also provide recreational facilities to local and foreign tourists and residents.

The project during construction and after completion would have a strong economic impact in the region creating eventually over 1500 jobs. This proposal would optimize the use of the land which otherwise remain a floodplain between the levees in your proposal.

We have proposed to the to use the dredged material from the Inland Basin as the construction material for the levees. The soil testing that we have carried out confirms that the material if properly compacted is a suitable material for the construction of the levees. Cordeco would be responsible for the building of the levees with the sponsorship, support and collaboration of the Municipalities of Aguada & Aguadilla.

The mayor of Aguada and members of the legislature are coordinating an interagency meeting between local and federal government agencies and other entities in order to discuss, coordinate and give positive forward impulse to our proposal. Our proposal would provide for a better use of the land and would provide significant economic benefits for the region. We believe we have a solid feasible proposal that would provide a win-win benefits to all the parties involved.

We would like an additional 30 days to see how the interagency meetings develop prior to submitting final comments to your flood control project.

Sincerely,

Thomas C. Cordero
President

CC Ing. Jorge Tous, USACOE

Miguel A. Ruiz Hernández
Alcalde

Estado Libre Asociado de Puerto Rico
Gobierno Municipal de Aguada
Aguada, Puerto Rico

June 4, 2002

James C. Duck
Chief Planning Division
Department of the Army
Jacksonville District Corp of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

RE: Río Culebrinas / Caño Madre Vieja Flood Control Project in Aguada, P.R.

Dear Mr. Duck:

We are in the process of organizing an interagency meeting among several government agencies, mayors, senators, representatives and local community leaders to discuss and see how we can move forward a proposal by a local private entity, Cordeco Northwest Corp. to create an inland marina and tourism destination point for the Northwestern region of the Island.

This is a project that would have a large economic impact in the region. It is expected to create upwards if 1,500 jobs as well as creating marine infrastructure for the region, which would attract more local and external tourists to the area. Cordeco has proposed as part of the Marina's construction to use the material coming from the dreeding of the inland basin to build the levees. They have offered to construct the levees as a private initiative with the sponsorship and collaboration of the Aguada and Aguadilla Municipalities.

In light of the above, we are requesting 30 more days in order to thoroughly evaluate the results of the interagency meeting before submitting final comments to your project.

Sincerly,

Hon. Miguel A. Ruiz Hernández
Mayor

C.c. Ing. Jorge Tous, USACOE

Dirección Postal: P. O. Box 517, Aguada, Puerto Rico 00602
Tel. 787-868-6400 • Fax 787-868-4600

Cordeco Northwest Corp.

P.O. Box 610
Aguada, PR 00602
Tel. 819-9347
Fax. 819-0534

28 de mayo de 2002

Dr. Hermenegildo Ortíz Quiñones
Presidente
Junta de Planificación de Puerto Rico
PO Box 41119
Estacion Minillas
San Juan, Puerto Rico 00940

2002 MAY 29 PM 4:24

Re: Consulta Número 2002-26-0119-JPU
Proyecto Turístico Residencial
Carr. Est. Núm. 422, Bo. Espinal
Aguada, Puerto Rico.

Pub. Reconsideración

Solicitud de ~~Reapertura~~ y Enmienda

La Junta de Planificación, (en adelante la "Junta") en su reunión del 10 de abril de 2002, acordó archivar sin perjuicio la consulta de epígrafe por las siguientes razones:

> "Toda vez que el proyecto ubica en zona inundable y tomando en consideración las obras propuestas por el Cuerpo de Ingenieros del Ejercito de los Estados Unidos, para el control de inundaciones. Una vez las obras de control de inundaciones se realicen y la parte proponente demuestre mediante los estudios correspondientes que los terrenos se encuentran fuera de la zona susceptible a inundaciones, podrá solicitar reapertura y esta Junta considerar la misma en sus méritos."

El desarrollo propuesto, pretende de la ubicación de un proyecto turístico residencial, en una finca de 230 cuerdas aproximadamente, que radica en la carretera estatal número 422, en el Barrio Espinal de Aguada, la misma consiste en lo siguiente:

> 1) La formación de nueve (9) solares residenciales de aproximadamente 1,750 metros cuadrados y 61 villas turísticas residenciales tipo "cluster", dos (2) condominios turísticos con (90) apartamentos y dieciocho (18) "penthouses ."
>
> 2) Se construirá un hotel tipo "courtyand" para doscientas (200) habitaciones, un hotel de tres (3) o mas estrellas de trescientas (300) habitaciones.

3) Se instalará un "dry stack" para doscientos (200) botes y un edificio para la reparación de botes, motores , ect., (marine facilities) y salones escolares para instruir estudiantes en las artes turísticas del yatismo (operación y mantenimiento de botes etc.).

4) Una marina de 250 muelles en una primera etapa y 250 muelles en una segunda etapa.

En vista del acuerdo del 10 de abril de 2002, tomado por Junta, solicito a nombre de Cordeco Northwest Corp., que se reabra dicha consulta y que se enmiende la misma para tomar en cuenta que Cordeco Northwest estaría dispuesta a hacer la obra de mitigación de inundaciones propuesta por el Cuerpo de Ingenieros del Ejercito de los Estados Unidos en conjunto con el dragado de la marina. Por favor consideren los siguientes puntos:

1. Los predios donde se propone la construcción de la Marina, ubican entre los municipios de Aguada y Aguadilla, y entre la construcción de dos diques propuestos por el Cuerpo de Ingenieros del Ejercito de los Estados Unidos, como medida de control de inundaciones. Véase estudio anejo, redactado y aprobado por el Cuerpo de Ingenieros, el cual pretendemos se incluya como parte de la evidencia a ser evaluada en esta consulta de ubicación.

2. Que dichos diques serán de aproximadamente unos 3,300 metros de largo, con un canal piloto de 60 metros y facilidades de drenaje interior.

3. Cordeco Northwest propone construir los dos diques con el material resultante del dragado a realizarse para la construcción de la marina de acuerdo a los parámetros del Cuerpo de Ingenieros, financiando de esta forma un proyecto de mitigación ambiental y de inundaciones que se estima que cueste unos $4,548,000.00 y que de otra manera carecería de financiamiento. Esto sería un ahorro para el gobierno y aseguraría que la obra se haga rapidamente. El Cuerpo de Ingenieros favorece esta iniciativa privada, por considerarla de beneficio para la comunidad.

4. Hemos hablados con los alcaldes de Aguada y Aguadilla y estos estan en la mejor disposicion de expropiar los terrenos que no sean de Cordeco Northwest para la construcción de los diques. Cordeco Northwest permitiría la construcción de los diques sobre sus terrenos.

5. El dique del lado de Aguada será modificado para sacar fuera de zona inundable un terreno adicional de aproximadamente 55-65 cuerdas para un desarrollo turístico, residencial, y comercial.

6. Que la construcción de los diques, así como el de la Marina, ayudarán a rescatar aproximadamente a unas 703 estructuras residenciales de la comunidad Espinal y urbanizaciones de Aguadilla.

7. Que la aprobación de la marina ayudará enormemente a agilizar la construcción de los diques y reforzará las medidas de control de inundaciones del sector.

8. Los estudios hidrológico-hidráulico que sometimos demuestran este hecho.

9. Que nos proponemos cumplir con el reglamento sobre Zonas Susceptibles a Inundaciones (Reglamento de Planificación Número 13) especialmente con las secciones 6.01, Desarrollos en la Zona 1, las cuales rezan de la siguiente manera .

> "1. A partir de la fecha de vigencia del correspondiente mapa de zonas susceptibles a inundaciones, no se permitirá en esta zona la ubicación de nuevos obstáculos, tales como: estructuras, relleno, mejoras sustanciales y otros desarrollos, a menos que se demuestre, que se han evaluado otras alternativas de ubicación fuera de áreas inundables y que éstas no son viables y que mediante la realización de un estudio hidrológico - hidráulico que utilice las mejores prácticas de ingeniería y metodologías aplicables, que el propuesto obstáculo no resultará en aumento en los niveles del cauce mayor durante un evento de descarga de una inundación base. Si ésto probara ser factible, toda nueva construcción o mejora sustancial cumplirá con los requisitos aplicables para mitigar los efectos de las inundaciones etc.

10. Sección 11.02. Desarrollos a considerarse como excepciones:

> "La Junta o el Administrador de Reglamentos y Permisos, según corresponda, podrá considerar desarrollos propuestos en zonas susceptibles a inundaciones como excepciones cuando los mismos tiendan a propiciar una reducción en el riesgo de inundación del área o resulten en un beneficio neto a la comunidad.

Pull Reconsideration ~~reapertura~~ Por todo lo antes dicho, entendemos que la Honorable Junta puede considerar esta solicitud de y enmienda favorablemente, ya que la marina requiere de unas obras que ayudaran no solo a controlar los efectos de la zona inundable, sino que también es compatible con esta, y que el material que necesitan los diques se pueden dragar del área en donde se pretende la marina, mientras esta cumple con todos los procesos evaluativos y reglamentarios establecidos por ley y la Honorable Junta.

Cordialmente,

Thomas Cordero
Presidente
Cordeco Nortwest Corp.

ESTADO LIBRE ASOCIADO DE PUERTO RICO
DEPARTAMENTO DE EDUCACIÓN
SECRETARIA AUXILIAR DE PLANIFICACIÓN Y DESARROLLO EDUCATIVO

May 23 2002

Mr. James C. Duck
Chief, Planning Division
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

We received your letter, regarding the Draft Detailed Project Report and Draft Environmental for the flood protection work along the Río Culebrinas and Caño Madre Vieja, south of Aguadilla, Puerto Rico.

We consider that this project is very important for the development of this area and have our endorsement under the following conditions:

- The access to any school in the area should not be affected.
- All necessary steps will be taken, so that the teaching-learning process would not be affected.
- Students, teachers, and the school community security will be insured during the development of the project.

Cordially,

José A. González Guzmán, Ed. D.
Assistant Secretary

P.O. BOX 190759, SAN JUAN, PUERTO RICO 00919-0759 * TEL. (787)759-2000 EXTS. 3289, 3291 * FAX: (787) 751-2874

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
Caribbean Area State Office
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Tel. 787-766-5206
Fax. 787-766-5987

May 17, 2002

Mr. James C. Duck
Planning Division
Environmental Branch
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Duck:

SUBJECT: Río Culebrinas, Aguadilla-Aguada, Puerto Rico
Draft Detailed Project Report and Environmental Assessment

After a thorough review of above named EA report and noting that the Farmland Protection Policy Act of 1981 was clearly addressed, we have no further environmental concerns.

For more information please contact Félix A. Latorre, Water Resources Planning Specialist at 766-5206, Ext. 234.

Sincerely,

JUAN A. MARTÍNEZ
Director

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
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JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

APR 29 2002

TO THE ADDRESSEES ON THE ENCLOSED LIST:

The Jacksonville District, U.S. Army Corps of Engineers, is enclosing the Draft Detailed project Report (DPR) and Draft Environmental for the flood protection work along the Río Culebrinas and Caño Madre Vieja, south of Aguadilla, Puerto Rico (Enclosure 1).

We welcome your views, comments and information about resources, study objectives and important features within the described work area, as well as any suggested improvements. Letters of comments or inquiry should be addressed to the letterhead address to the attention of Planning Division, Special Projects Section and received by this office by June 4, 2002.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

Planning Division
Environmental Branch

APR 29 2002

TO THE ADDRESSEES ON THE ENCLOSED LIST:

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Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

bcc: CESAJ-DP

4-29-2002
Jimenez/CESAJ-PD-EP/2115
Acosta/CESAJ-PD-EP
Dugger/CESAJ-PD-E
Strain/CESAJ-PD-P
4-29-02
Duck/CESAJ-PD

L:/GROUP/PDEP/JIMENEZ/Transmittal Letter for Draft Cul DPR and EP

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San Juan PR 00902-2228

Mrs Carmen Rios
President
Comite Pro Turismo y Ambiente de Ayuda
Bo Espinar
Buzon 1344
Aguada PR 00602

Gobierno Municipal de Aguadilla
Apartado 1008
Aguadilla, PR 00605
Tel. (787) 891-1005

Hon. Carlos Méndez
Alcalde

June 4, 2002

James C. Duck
Chief Planning Division
U.S. Army Corp of Engineers
P.O. box 4970
Jacksonville, Florida 32232-0019

Re: Río Culebrinas Flood Control Project in Aguadilla – Aguada, Puerto Rico

Dear Mr. Duck:

We are currently evaluating a proposal by a private entity, Cordeco Northwest, Inc., to develop an Inland Marina entering through the Caño Madre Vieja jetty which when complete will have a capacity for 500 wet slips and 200 drystacks. Along with the Marina they are intending to create a tourism destination which will eventually create over 1500 employment opportunities and compliment our Aguadilla Waterfront revitalization project currently under construction.

Cordeco has offered as part of their project to use the material resulting from the dredging operations for the Inland Marina as the fill material for the levees. They are proposing to build the levees privately with the sponsorship and collaboration of the Municipality.

With the above in mind, we are requesting an additional 15 days in order to thoroughly evaluate the above proposal before submitting final comments to your project.

Sincerely,

Carlos Méndez Martínez
Mayor

cc : Ing. Jorge Tous, USACOE

PD

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Boqueron Field Office
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P.O. Box 491
Boqueron, PR 00622

June 3, 2002

Mr. James C. Duck
Chief, Planning Division
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Re: Culebrinas River/ Caño Madre Vieja
Flood Control Project, Aguadilla/Aguada
Draft Detailed Project Report and EA

Dear Mr. Duck:

The interested agencies of the Department of the Interior have reviewed the above referenced proposed Planning Division flood control project Draft Detailed Project Report (DPR) and Environmental Assessment (EA). Our comments are issued in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*)

The Service previously commented on this project on several occasions, the most recent being the Coordination Act Report (CAR, November 1999) produced by this office and included in the EA. In the CAR, the Service noted that the plan being proposed at the time had some elements within a Coastal Barrier, and commented that the evaluation of the project only considered the direct impacts of the levee footprints, and not the indirect, secondary or cumulative wetland, stream, or estuarine impacts of the project. The Service also made some recommendations including recommendations for locating mitigation for unavoidable wetland or stream impacts.

The original 1992 Section 205 Reconnaissance Report (RP) considered a variety of alternative means of dealing with the flooding in the area (relocation of the community, evacuation procedures for floods, etc.) as well as two alternative structural designs for flood control. The selected alternative, at that time, was discussed in the DPR/EA as Preliminary Alternative 1. In the time between the RP and the current EA, the Service had sporadic coordination with the Corps involving various modifications to the originally proposed alternative and then the two dike alternative. Before discussing the new recommended plan, it would be useful to review the alternative plans in the original document and those included in the current EA.

The 1992 RP preferred alternative was the construction of a single levee, mostly in uplands, that would divide the drainages of Caño Madre Vieja and the Culebrinas River below PR-2. This plan included some small interior drainage channels to direct waters either to the Culebrinas or Caño Madre Vieja, but did not require alterations to either of the river channels. Caño Madre Vieja would still have received local drainage waters including areas upstream of PR-2. These areas also receive some flood waters from the Culebrinas River, probably as a result of over-bank flooding above PR-2 possibly due to the Margarita Dam (sugar mill and now water supply diversion dam). The RP indicated that this alternative might impact up to 173 acres of wetlands through flood protection, and require the acquisition of 11 structures and 117 acres of "flowage easements". Our understanding (supported in the Detailed Project Report) is that further evaluation indicated that this alternative would require the acquisition of hundreds of structures in the Tablonal community due to the projected increase in the Culebrinas River flood levels, and that this alternative was largely discarded because of this and increased costs and environmental impacts if the Culebrinas River was channelized to reduce flooding in Tablonal Community. Nevertheless, the EA section of the same document indicates that this alternative was discarded because it would not comply with E.O. 11988 to protect floodplains (thus encouraging development of agricultural and wetland areas) as well as deprivation of freshwater flooding to wetlands. It is unlikely that the extensive wetlands in the lower portion of Caño Madre Vieja depend upon the estimated 25 year flood waters from over-banking of the Culebrinas below PR-2 to maintain hydrology. The reasons for discarding Preliminary Plan I should be specific and consistent between the Detailed Project Report and Environmental Assessment. Otherwise, if Preliminary Plan 1 could be carried out without modifications to Caño Madre Vieja or the Culebrinas River, it would obviously be the least impacting alternative with respect to the Service's trust resources.

The final and preferred alternatives in the EA consist mostly of modifications of the alternative of two dikes, one on either side of Caño Madre Vieja, to prevent flooding to western Aguadilla and the eastern portion of Espinar, effectively turning Caño Madre Vieja into a permanent floodway for the Culebrinas River.. All of these alternatives would result in direct impacts to wetlands greater than those of Preliminary Plan 1, including the elimination of about 980 linear meters of estuarine river wetlands and impacts to wetlands remaining on the protected sides of the dikes.

The new recommended plan is very similar to previous and alternative plans with the exception that the western levee was shortened so that it would not intrude into the Coastal Barrier, and a wing levee located just outside the Coastal Barrier was added to prevent back-flooding of the community. The small wing levee would be located mostly on wetlands, and would cross a small creek previously identified as being lined by mangroves. It is not clear if this area is included in the direct wetland impacts. Plate C-1 indicates that a one-way culvert would be placed in the main levee to continue providing drainage to the wetlands that would be cut off by the wing levee, but this would not continue to allow for tidal back-flooding up that stream or movement of aquatic organsims upstream. We realize that preventing heavy backflow during flood events is the purpose of the wing levee, but believe that it will fundamentally change some functions of the upper portion of the small stream and encourage filling by the community of that wetland unless the area is protected as an internal ponding area.

The east levee cuts off a large meander of Caño Madre Vieja that probably lies within the estuarine reaches of the stream (fiddler crabs were seen by the river within this meander). Apparently, the mitigation that would be offered for unavoidable impacts to wetlands by the project would be the creation of ponding areas on the protected side of the levees. These ponding areas would drain through one-way culverts into Caño Madre Vieja. We do not agree that the proposed mitigation is appropriate for replacement of the flowing estuarine river reach that would be eliminated. In the CAR, we recommended that mitigation for unavoidable impacts be done within the unprotected (floodway) portion of Caño Madre Vieja.

The EA includes a wetland rapid assessment (WRAP) evaluation of the project area to evaluate the "functions and values" of the areas to be impacted. WRAP has not yet been approved for the Caribbean, and it is generally carried out as a team, not individual effort. WRAP is supposed to be used to evaluate impacts within kind for wetlands. The evaluation did not account for lost riparian, riverine, and estuarine functions from the elimination of 980 linear meters of active stream. It also did not evaluate indirect and secondary impacts of the project, but focused on the direct footprint impacts of the levees. The EA should evaluate loss of some functions for wetlands that would be on the protected side of the levees, and loss of linear stream. While linear stream would be difficult to replace, there is ample room for restoration of riparian stream functions in the floodway area through riparian native forest restoration along Caño Madre Vieja, tributary channels, and the pilot channel to be created. Since the whole area is to be a floodway, there should be no reason to maintain these channels through periodic dredging as has been done in the past. The floodway area would also be an appropriate site for enhancement of wetlands (in some cases creation or slight deepening) to provide some waterfowl habitat and improve the sedimentation/filtration functions of the area.

We do not understand the reasons for the dimensions of the pilot channel, since it appears to be much larger in cross-section than the existing stream channel. Removing large meanders often results in steepening the stream gradient and encouraging degradation of the streambed upstream of the site and aggradation downstream. The effects of elimination of the river meander, including changes in stream gradient, possible impacts of this, and how these impacts would be minimized or avoided should be discussed. The Corps should evaluate the possibility of maintaining part of the meander at this site, instead of elimination of the entire meander.

We recommend that Caño Madre Vieja be officially designated as a floodway, which we understand would place it in "Zona 1", precluding future development within this floodway. The area was included in the original proposal for the Aguada Agricultural Reserve, and while flooding would occasionally damage crops, some agricultural use is not inconsistent with a designated floodway. We believe, however, that major development within a floodway for a flood control project built with public funds should not be allowed. A large hotel/marina/tourism project is being proposed at least partially within the floodway area, and has apparently also received the endorsement of at least one of the municipalities sponsoring the flood control project (see enclosed articles on Discovery Bay Marina and the public hearing for the Aguada Agricultural Reserve). We assumed that the use of Caño Madre Vieja as a floodway for the Culebrinas River would require the acquisition of "flowage easements" (similar to the "flowage easements described in the 1992 RP for the then preferred alternative directing most of the water

through the Culebrinas River). While the EA states that the recommended course of action for the "residual flooding areas" is not to develop these areas, it leaves the possibility open based on compliance with Regulation 13 of the Puerto Rico Planning Board, requiring a Hydrological/ Hydraulic Study of the area. While zoning may not be the prerogative of the Corps, it is within the jurisdiction of the Planning Board and/or the local sponsor municipalities.

Summary

We do not agree that the Detailed Project Report and Environmental Assessment accurately details the reasons for discarding Preliminary Alternative 1. This alternative, as shown, would not require any modifications to either of the river channels, would have minimal wetland impacts, and be less expensive than any of the other alternatives. Our understanding was that this alternative, as drawn and without major modifications to the Culebrinas River, was discarded because it would not provide adequate flood protection and would require the acquisition of a large number of structures. This reasoning, if accurate, was not stated in the documents. The reasons for discarding Preliminary Alternative 1 should be clarified and should be consistent between the two parts of the document.

The impacts to wetlands and a flowing estuarine river reach have not been accurately assessed and do not include the indirect and secondary impacts to these systems. As a result, the mitigation proposed does not address the loss of functions, particularly to the estuarine river meander to be cut off, and potential impacts of shortening the river channel and increasing the stream gradient. We continue to recommend that the full impacts of the project be properly assessed and that any mitigation for unavoidable impacts be conducted within the floodway area of the project.

The project floodway should be designated to preclude development. If this requires acquisition of flow easement rights, this should be included in the project. It is particularly troubling that the local sponsors for the flood control project appear to view a major development project within this floodway favorably. If the floodway cannot be protected from development, we question the use of federal or other public funds for flood control in that area.

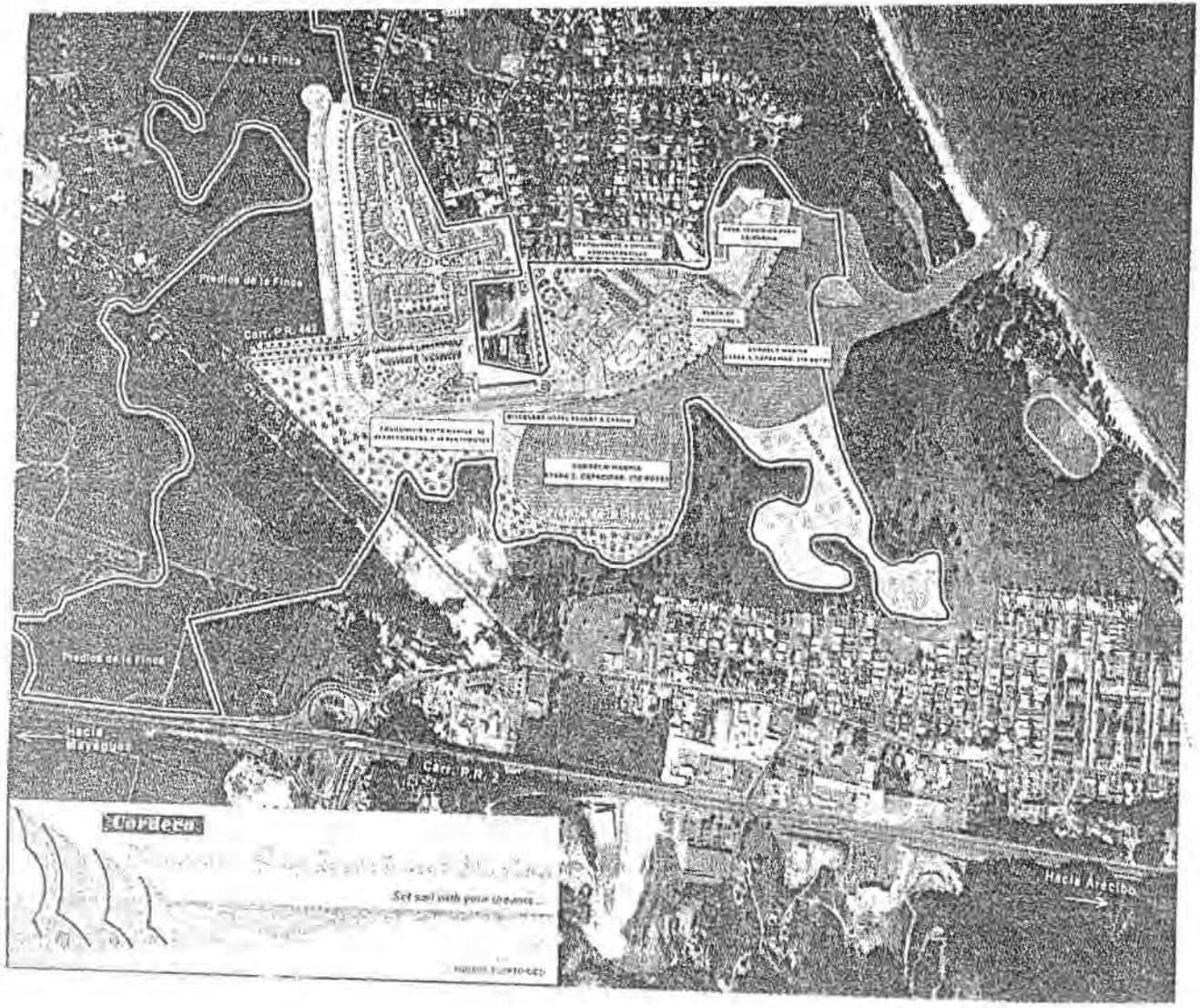
We recommend that the draft EA and Detailed Project Report be revised to fully address these concerns. Thank you for the opportunity to comment on this action.

Sincerely yours,

James P. Oland
Field Supervisor

bby
cc:
Mun. Aguadilla

Mun. Aguada
DNER, Flood Control, San Juan
COE, Jorge Tous, San Juan
EPA, San Juan
EQB, San Juan
NMFS, Boquerón
PRPB, San Juan
ARPE, Aguadilla



Discovery Bay Marina

Por Marta A. Rodríguez López

En la colindancia entre los pueblos de Aguada y Aguadilla, el Cuerpo de Ingenieros ha propuesto la creación de dos diques para la prevención de inundaciones en las comunidades aledañas. Como alternativa y para un mejor aprovechamiento del terreno, se ha propuesto la modificación de dichos diques para construir una marina.

Los terrenos, 300 cuerdas, están destinados en la actualidad a la extracción de arena y siembra de pastos para consumo ganadero.

Se ha desatado una controversia sobre cómo afectaría la creación de esta marina a la región agrícola del Valle Coloso. Los estudios realizados por el

Continúa en la próxima página

Discovery Bay Resort & Marina...

Cuerpo de Ingenieros para la creación de los diques y estudios posteriores utilizados para comprobar la viabilidad del proyecto en la zona, indican que el desarrollo del área no afectará en forma alguna la productividad del Valle.

Discovery Bay es un proyecto que, se espera, se desarrolle en tres fases, la primera la construcción de una marina con capacidad para 250 embarcaciones y un desarrollo comercial con restaurantes y tiendas. La segunda fase contempla la creación de un hotel mediano, unas 150 habitaciones. Por último, la tercera fase contempla la expansión de la marina y la construcción de villas turísticas, y dos condominios. Todo esto, armonizando con el entorno y utilizando los recursos naturales de la zona como atractivo y educación sobre nuestra cultura.

El área oeste de Puerto Rico se encuentra desprovista de instalaciones náuticas, exceptuando los clubes de Cabo Rojo y Lajas, que se encuentran llenos a capacidad.

Este desarrollo abriría las puertas al tránsito internacional de embarcaciones de lujo, provenientes de Estados Unidos, Bahamas, República Dogubernamentales, como el Servicio de Aduanas y los Vigilantes del Departamento de Recursos Naturales y Ambientales, ya que les proveerá una plataforma de salida en dicha zona.

El impacto económico de este desarrollo, sería importante generando más de 1,500 empleos directos e indirectos. También tendría repercusión en el turismo local. Dando lugar a un desarrollo turístico en un área de riqueza cultural incalculable. El proyecto convertiría la región noroeste de la Isla en uno de los ejes turísticos más importantes del Caribe.

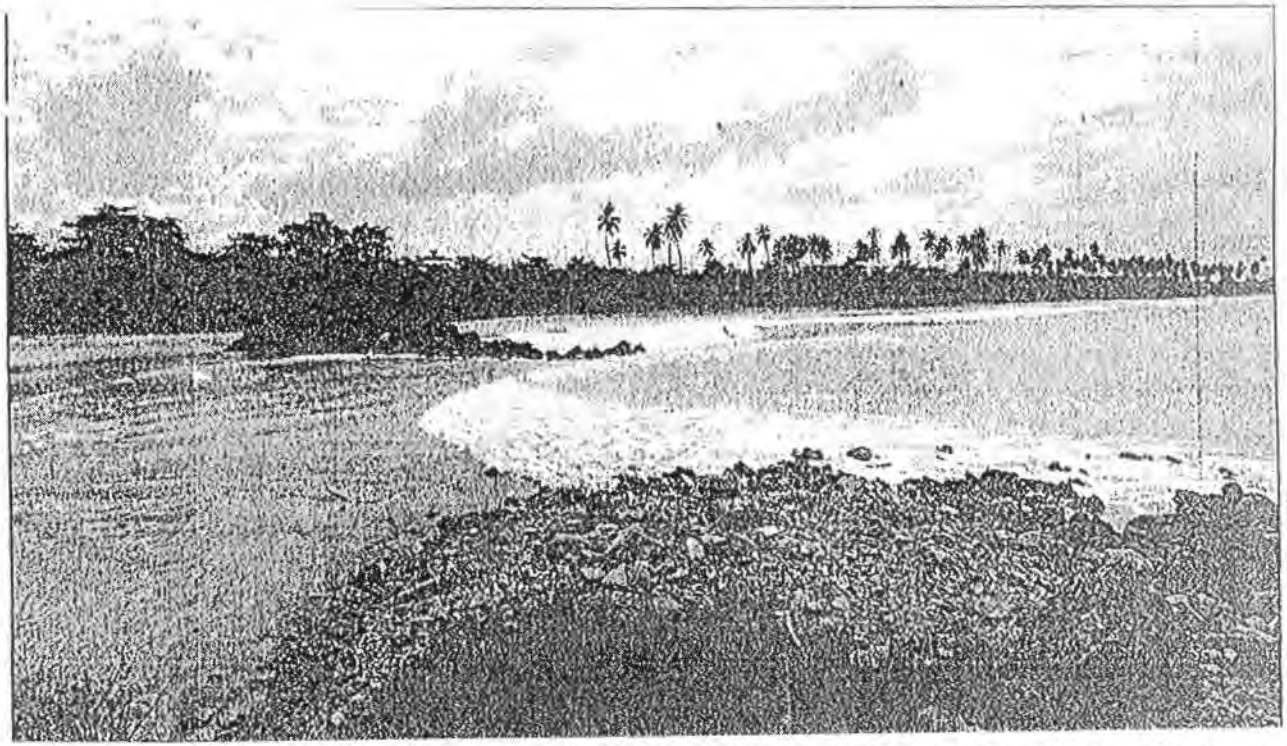
En el plano deportivo, el proyecto abre las puertas a un sin fin de posibilidades náuticas que en este momento no son posibles por la inexistencia de instalaciones; como los torneos de pesca internacionales, así como regatas en el oeste de la Isla.

Discovery Bay cuenta con el apoyo de líderes comunitarios, políticos y religiosos de los municipios aledaños, que ven el mismo como una oportunidad para el progreso económico y turístico, en armonía con la naturaleza dando lugar a una mejor calidad de vida para los residentes de la zona.

En la próxima edición de La Regata, conoceremos más sobre este proyecto que pondrá a todos a mirar hacia el oeste olvidado.

olémica a a vista por n proyecto urístico

Gladys Nieves Ramírez
nieves@elnuevodia.com



Jorge A. Ramírez Portela

Area de la colindancia entre Aguada y Aguadilla donde se construiría parte del Discovery Bay Resort and Marina.

UADA - Pese a la férrea oposición de los ambientalis- alcaldes y legisladores del oeste respaldan sólida- e el proyecto Discovery Bay Resort and Marina, que ruirá en las costas de Aguada la empresa Cordeco iwest Corp.

ntras los ambientalistas aseguran que no cederán en cha por evitar que se separen 500 cuerdas de la iesta reserva agrícola en el Valle de Coloso para el :cto, el alcalde de Aguada, Miguel Ruiz, ve el mismo una tabla de salvación para la economía de la zona paso importante en los planes de convertir el oeste destino turístico internacional.

ngeniero a cargo del complejo, Antonio Hernández a, y el presidente de Cordeco Northwest Corp., ny Cordero Armstrong, dijeron que hasta que no se ruya un proyecto como el que ellos visualizan el seguirá siendo olvidado internacionalmente.

sotros tenemos una gran visión para esta región, que área muy histórica, y parte de la idea es integrar la ra de la zona al turismo", manifestó Cordero y có que invertirían unos $100 millones en el proyec- le esperan genere 500 empleos.

DISCOVERY Bay Resort & Marina estaría enclavado na finca de 230 cuerdas en el barrio Espinar de da, entre la comunidad de Espinar y las urbanizacio- arcía, Victoria y el residencial Aponte de Aguadilla. Los terrenos están en el cauce inundable del río Culebrinas y el caño Madre Vieja, que colinda con Aguadilla. La propuesta incluirá una marina para 500 embarcaciones de distintos tamaños, un casino y hotel de unas 200 habitaciones, 92 villas residenciales, dos condominios, una plaza de actividades y área comercial y un estacionamiento para 400 vehículos.

También comprende una escuela de turismo y artes marinas, donde se proveerán adiestramientos en todo lo relacionado con el mantenimiento y operación de embarcaciones. Cordero sostuvo que para fomentar el ecoturismo construirán un paseo tablado y sembrarán manglares y arboledas. Destacó que el proyecto también podría integrarse a la reserva agrícola.

"Estamos aquí para decir que estamos a favor del valle agrícola y creemos que el proyecto se puede integrar al resto del valle", declaró Cordero durante una presentación del proyecto la semana pasada.

Destacó que, según las proyecciones hechas, necesitan crear un destino náutico en la zona antes de construir el hotel, que sería promovido mundialmente.

LA HISTORIA Ermita de Espinar, una de las primeras en construirse en Puerto Rico y donde murieron los primeros mártires cristianos, quedaría en el centro del complejo y servirá como u de sus principales atractivos, al igual que la villa pesquera.

La vía de acceso de Espinar se ensancharía, según Cordero, y se establecerá un acceso controlado.

El ingeniero Hernández aseguró que la marina traería gran beneficio económico, no sólo a Aguada, sino a los pueblos aledaños de Aguadilla, Rincón e Isabela, que no cuentan con instalaciones para servir a las embarcaciones.

Destacó que los terrenos donde se construirá el complejo son afectados por las inundaciones, por lo que no son buenos para la agricultura. Agregó que el Cuerpo de Ingenieros de Estados Unidos evalúa la posibilidad de construir dos diques para ayudar a proteger las comunidades en el área.

La marina se construirá tierra adentro, por la desembocadura del caño Madre Vieja, para protegerla de huracanes, indicó Hernández. Destacó que se diseñará un sistema flotante de muelles que se ajustará al nivel de las aguas producidas por las inundaciones.

Los empresarios destacaron que la marina hace falta en una zona rica en pesca deportiva como el islote de Desecheo, isla de Mona y la costa noroeste.

SIN EMBARGO, reconocieron que sus planes dependen de la decisión que tome la Junta de Planificación con respecto a la reserva agrícola, por lo que nticipa una batalla sin cuartel con los ambientalistas.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive N.
St. Petersburg, Florida 33702
(727) 570-5317, FAX 570-5300

June 3, 2002 F/SER4:LC:rr

James C. Duck
Chief, Planning Division
Department of the Army, Corps of Engineers
PO Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Duck:

Please reference your April 29, 2002, letter regarding the Draft Detailed Project Report (DPR) and Draft Environmental Assessment (DEA) prepared by the Jacksonville District for flood protection work along the Culebrinas River and Caño Madre Vieja, south of Aguadilla, Puerto Rico. The study was authorized under Section 205 of the Flood Control Act of 1948 and is sponsored by the municipalities of Aguada and Aguadilla. The views, comments, and information about resources, study objectives, and important features within the described work area, as well as suggested improvements to the DPR and DEA, were requested from the National Marine Fisheries Service (NMFS).

Alternatives considered for the project included structural and non-structural methodologies, but the Corps of Engineers (COE) determined that a structural alternative was necessary to alleviate flooding in the community of Espinar and in southern Aguadilla. Of the structural alternatives identified, a levee system was determined to be the most effective means of controlling flood waters. Two levee designs were considered. The first was a single levee south of Espinar that would protect it and the town of Aguadilla from flood waters of the Culebrinas River. The second was a twin levee system; one levee running along the western border of Aguadilla and the other to the east and south of Espinar. The twin levee system was selected as the preferred alternative and modified to avoid construction on the designated coastal barrier north of Espinar by shortening the levee length and adding a short levee north of the community. The preferred alternative would result in direct impacts to 0.5 acre of mangrove forest for the Aguadilla levee and 1.5 acres of herbaceous wetlands for the Espinar levee. The DEA also indicates that the preferred alternative levee will further impact 35.55 acres of wet prairie currently used as pasture. None of the acreage estimates are verified because a wetland delineation was not performed.

In contrast to the preferred alternative, the alternative to build a single levee would not involve direct impacts to wetlands. Further although the DEA concludes that this levee would have unacceptable impacts on mangrove and herbaceous wetlands associated with Caño Madre Vieja, our evaluation indicates that this conclusion may not be correct. Flood waters from the Culebrinas River reach the

Caño Madre Vieja system only during extreme events so the mangrove system is supported by hydrological factors other than periodic flooding. Thus, we do not believe that the single levee design will change current conditions enough to impact the mangroves. In addition, the proposed single levee includes drainage structures to ensure that water flows between the Culebrinas River floodway and the Caño Madre Vieja system would continue. Accordingly, the NMFS believes that hydrologic alterations will be far greater under the twin levee design due to direct impacts of wetland fill, elimination of a 3,200-foot double meander system, destruction of estuarine wetlands associated with the Caño Madre Vieja channel, the replacement of this channel with a 200-foot-long by 140-foot-wide cut-off channel, and conversion of wetland areas in the protected areas of the levees to drainage channels and ponding areas.

The DEA states that the COE concluded in a letter dated July 7, 1999, that there would be no project impacts to Essential Fish Habitat (EFH) because the project would take place inland of areas designated as EFH. NMFS responded by letter dated August 4, 1999, that should additional information be made available indicating that the project may adversely impact EFH as designated by the Caribbean Fishery Management Council (CFMC), EFH consultation as directed by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) would be required. In fact, project area wetlands are within the tidally-influenced estuarine system of Caño Madre Vieja and are considered EFH. Estuarine wetlands of the project area are designated by the CFMC as EFH Habitat Areas of Particular Concern (HAPCs). HAPCs are subsets of EFH that are rare, particularly susceptible to human-induced degradation, ecologically important, or located in an environmentally stressed area.

Estuarine wetlands along Caño Madre Vieja extend as far as the double meander that the COE is proposing to eliminate, as evidenced by the presence of salt-tolerant vegetation and fiddler crabs within this portion of the system. Mangroves are present along the channel just downstream of the meander. Mangrove forest also extends behind the dune line adjacent to the town of Aguadilla, at the mouth of Caño Madre Vieja, and along the tributary to Caño Madre Vieja north of the community of Espinar. Extensive herbaceous wetlands also are associated with Caño Madre Vieja, especially in the area of the Espinar community. The Culebrinas River, which will not be directly affected by levee construction, also has its estuary within the project area. This area of the estuary consists of herbaceous and forested wetlands dominated by mangroves. No direct impacts to the river are contemplated in the preferred alternative, but the river will be affected by hydrologic alterations related to the construction of the Espinar levee. The area is an important resource for local fisherman as both Caño Madre Vieja and the Culebrinas River contain commercially and recreationally important species such as snook, tarpon, jacks, mullet, mojarra, native river shrimp, American eel, and other fishery resources. These species are important components of the marine food web and many serve as food items for Federally-managed species present in the area such as silk snapper, coney, red hind, and white grunt.

The project documents do not address indirect and cumulative impacts of twin levee construction. Concerns with indirect impacts include increased sedimentation, especially during project construction and initial operation when excess excavated material will be placed on the levees. Measures to control sediment transport and erosion both during construction and operation of the project are not addressed in the project documents, but are of concern to NMFS because mangrove

root communities and estuarine wetlands in the area may be adversely impacted by increases in sedimentation. Hydrologic alterations due to the replacement of natural overland flow with one one-way drainage through the Espinar levee and three one-way drainages through the Aguadilla levee are also of concern due to the potential for indirect effects of these alterations on remaining estuarine wetlands, including mangroves.

Project documents state that development in the floodway will not be encouraged and that, should development occur, projects will be expected to follow flood zone regulations. However, without a guarantee that lands within the floodway will be protected in perpetuity, the project's main purpose could be compromised. The development of lands within the floodway would eliminate flood storage areas, provide more property areas that will flood, and negate the utility of the levees. For example, the NMFS is aware of a large project named Discovery Bay Resort and Marina that contemplates the development of villas, condominiums, a hotel complex, and a large marina which would require modification of the preferred twin levee design and modification of nearly the entire flood zone and channel of Caño Madre Vieja. Such modifications are contrary to the goals of the flood protection project. They will further exacerbate problems in the coastal zone of this area and cause severe impacts to estuarine wetlands and nearshore habitats. Another proposal that would contribute to hydrologic alterations in the area and subsequent impacts to EFH is the development of 28 acres of beachfront within the coastal barrier north of the Espinar community. This development may affect the northern leg of the Espinar levee, as well as the mangrove wetlands. The COE should evaluate these and similar projects to ensure that the project purpose is not compromised.

The project documents state that mitigation will be performed on an as-needed basis. Given that the project will directly impact estuarine wetlands, including mangrove forest, and eliminate 3,200 feet of tidally-influenced channel and associated wetlands from the Caño Madre Vieja, the NMFS believes that mitigation is a necessary component of the project. A wetland delineation also should be performed to determine the exact acreage of wetland impacts and establish the mitigation acreage to be required. The creation of drainage canals and ponding areas within the protected side of the levees, including areas that are currently estuarine wetland and tidally-influenced streams, should not be considered as mitigation. Further, the use of the Wetland Rapid Assessment Procedure has not been approved for the U.S. Caribbean and, therefore, is not appropriate for this project.

In view of the above, and to ensure conservation of EFH and dependent fishery resources, the NMFS recommends the following:

EFH Conservation Recommendations

1. The single and twin levee alternatives should be reevaluated to accurately depict, compare, and contrast the adverse impacts and benefits of each. This analysis should address direct and indirect construction and operation impacts to EFH and other wetland resources, comparative measures to fully compensate for destroyed or degraded wetland functions, hydrologic impacts, and the effects of future residential/commercial development within adjacent floodways on the viability of each alternative;

2. A wetland delineation should be performed to accurately determine the acreage of wetland impacts, including EFH areas of mangroves and estuarine wetlands;

3. For the twin levee alternative, plans should be modified to minimize impacts to the channel of Caño Madre Vieja, and the cut-off channel should be designed to mimic natural stream pattern and channel size;

4. Mitigation plans for unavoidable impacts to EFH should be developed in cooperation with NMFS and the U.S. Fish and Wildlife Service; and

5. The designated floodways associated with this project should be protected from future development by placing them under conservation easements. If this cannot be done, the COE should evaluate whether this project continues to be justified for flood protection.

Section 305(b)(4)(B) of the MSFCMA and the NMFS's implementing regulation at 50 CFR Section 600.920(k) require your office to provide a written response to this letter within 30 days of its receipt. If it is not possible to provide a substantive response within 30 days, in accordance with our "findings" with your Planning Division, an interim response should be provided to the NMFS. A detailed response then must be provided at least 10 days prior to final approval of the action. Your detailed response must include a description of measures proposed by your agency to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendations, you must provide a substantive discussion justifying the reasons for not following these recommendations.

Thank you for the opportunity to provide comments on the draft documents prepared for this flood control project. Questions related to the proposed project and marine fishery resource issues should be directed to Dr. Lisamarie Carrubba at 787-851-3700.

Sincerely,

Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

COMMONWEALTH OF PUERTO RICO
OFFICE OF THE GOVERNOR
PLANNING BOARD

MINILLAS GOVERNMENT CENTER
DE DIEGO AVE., STOP 22, SANTURCE
PO BOX 41119, SAN JUAN, PUERTO RICO 000940-1119

May 29, 2002

James C. Duck
Chief, Planning Division
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Attn. Planning Division
Special Projects Section

Dear Sirs:

We have reviewed and evaluated the "Draft Detailed Project Report" and the "Draft Environmental Report" for the flood protection work along the Río Culebrinas and the Caño Madre Vieja, south of the municipality of Aguadilla.

At a cost of $4.5 million, the proposed project aims to provide 100 years of flood protection to the municipalities of Aguada, the Espinar community, and Aguadilla, the southwest portion of the municipality. The project consists of twin levees, a total length of 3.3 kilometers, located on both *overbanks* of the Caño Madre Vieja. This project is expected to; protect 247 acres of urban area from floods, minimize the impacts in the floodplain on both historic and culture resources, and enhance the redevelopment of the existing flood prone areas, now protected by coastal barriers.

Based on the materials considered, we find that the project does not promote new land development within the floodplains; and therefore, *we concur with the proposed project.* However, **we require** a brief explanation regarding the estimated impacts on the flood levels and the regulatory floodway of the Flood Insurance Study, currently enforced, as the materials submitted did not include either evaluation.

Should you require any additional clarification or aid, please contact our offices.

Cordially yours,

Hermenegildo Ortiz Quiñones
Chairman

RM/mla

B. FISH AND WILDLIFE COORDINATION ACT REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Boqueron Field Office
P.O. Box 491
Boqueron, Puerto Rico 00622

November 19, 1999

Mr. James C. Duck, Chief
Jacksonville District Planning Division
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Attn. Mr. Esteban Jiménez

Re: Coordination Act Report
Culebrinas River Flood Control Project

Dear Mr. Duck :

Enclosed please find an original and 1 copy of the Fish and Wildlife Service Coordination Act Report for the proposed Culebrinas River flood control project. Another copy has been provided to the Antilles Area Office, Planning Division, and a copy has been sent to the Department of Natural and Environmental Resources.

The Coordination Act Report discusses the fish and wildlife resources of the area and points out that a portion of the proposed project, the north end of the west levee, would fall within a designated Coastal Barrier Unit. The Service would like the opportunity to provide further Coordination Act comments if modifications are planned for this project.

Thank you for the opportunity to comment on this action.

Sincerely yours,

James P. Oland
Field Supervisor

bby
cc:
DNER, San Juan
COE, San Juan

Culebrinas River Flood Control Project

Prepared by Beverly Yoshioka
U.S. Fish and Wildlife Service
Boqueron Field Office

November 1999

Culebrinas River Flood Control Project

Executive Summary

The U.S. Army Corps of Engineers, Jacksonville District, is planning a flood control project for an associated river mouth drainage of the Culebrinas River, Caño Madre Vieja. During high flood events, the Culebrinas River overflows its channel upstream of highway PR-2 and at the first meander curve just downstream of PR-2. The flood waters enter Caño Madre Vieja flooding out the southwestern sectors of Aguadilla and the northeastern portion of the community of Espinar.

The preferred alternative would place two dikes east and west of the Caño to maintain the flood waters within this floodway. To accommodate the eastern levee, a double meander of flowing stream in the Caño would be eliminated via a cut-off channel. The western levee would cross a mangrove forest and channel near the mouth of the Caño, directly impacting some mangroves and indirectly affecting the existing hydrology that supplies tidal flow to the mangrove forest that would be left outside the flood dikes.

The Service's major concern centers around the potential indirect and secondary impacts for the mangrove forest and other wetlands that would remain outside the flood levee. The section of the mangrove forest where the west levee would pass through lies within Coastal Barrier unit PR-75. Our understanding is that this precludes the use of Federal funds for projects, including flood control projects authorized after the date of the inclusion of the Coastal Barrier unit. Another concern is for the section of river to be eliminated. The Service believes that ample opportunities exist in the area for appropriate mitigation, however, there has been no specific mitigation plan discussed to this point.

Introduction

The Río Culebrinas is the fifth largest watershed in Puerto Rico with a total drainage area of approximately 103 square miles. The river flows at a relatively low gradient out of the central mountain region in a northwesterly direction, emptying into Aguadilla Bay southwest of the town of Aguadilla. Historically the river has meandered throughout the valley (C type meandering stream, Rosgen hydrogeomorphic classification), and the mouth of the river has periodically migrated. Caño Madre Vieja, to the north of the Culebrinas River, is considered to be an abandoned river mouth that now carries only localized drainage except during flood stages on the Culebrinas. The beach in this area receives moderate to high energy sea conditions, and the coastline is subject to erosion. The beach between the Culebrinas River and Caño Madre Vieja has a low berm, and is backed by herbaceous and mangrove forest wetlands with a direct hydrological connection to the Caño.

One of the major island highways, PR-2, crosses the Culebrinas River in a north/south direction. The highway is elevated above the surrounding floodplain, although the river is capable of going over the highway during flood stage (Figure 1). The highway bridges the Culebrinas River and culverts maintain flow in the upper part of Caño Madre Vieja. When the Culebrinas exceeds bank-full flows, it floods over the first large meander below PR-2, and into the drainage for Caño Madre Vieja, flooding both the Espinar Community and the southwestern low-lying portions of Aguadilla. In higher flood stages, it overflows above PR-2, also draining towards the Caño.

The river has no major impoundments, but does have a small low head dam (Photos 1 and 2) built in the early part of the century to provide a water diversion for the Coloso Sugar Mill. This diversion is still used to provide process water for the mill. In 1998, the Puerto Rico Aqueducts and Sewers Authority (PRASA) along with the Commonwealth Infrastructure Agency (AFI) developed a surface water intake for potable water using the impoundment from this dam. The dam is located several hundred meters upstream of PR-2, and the pump house is located on an elevated stand next to the diversion dam (presumably above the 100 year flood stage). The raw water is currently pumped up to the Aguadilla treatment plant, but AFI is considering the creation of an off-river reservoir/ sedimentation lake near the damsite to supply additional firm yield and reduce the very high sediment load in the raw water extracted from the river. Because of its narrow design, it is likely that the existing dam serves as a constriction creating overflow into the floodplain above PR-2 during flood stage.

The dam acts as a partial barrier for fish and shrimp migration upstream, and juvenile shrimp can generally be seen migrating upstream on the cement bulkhead of the weir in the wetted zone above the water flow (Photo 3). Native fish (approximately 6 species) and shrimp (as many as 14 species) are compulsory migrators, requiring a portion of their life cycles in estuarine or marine waters. At least six species of shrimps are large enough to be fished for human consumption, one species reaching very large sizes (Photo 4). Most of these species are also likely to occur in Caño Madre Vieja along with estuarine fish such as snook, tarpon, mullet, mojarra, and jacks; and crustaceans such as blue crabs and land crabs. Fishermen of the area

Figure 1. USGS Topographic quadrangle enlargement showing the lower Culebrinas River and Caño Madre Vieja. Coloso diversion dam location shown.

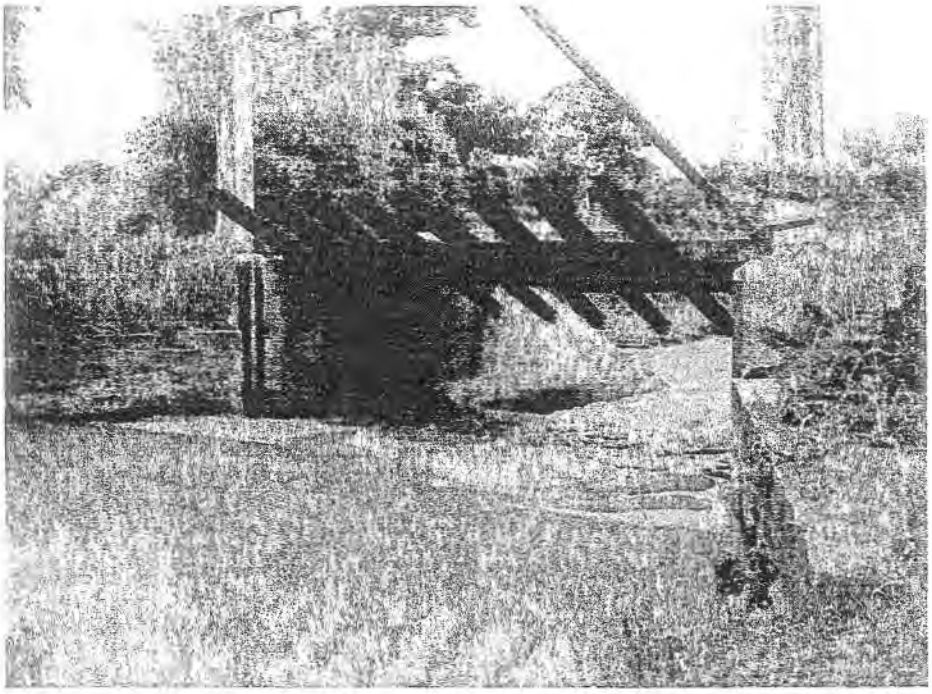


Photo 1. Coloso diversion dam from the upstream side. Note that the opening is very narrow and topped by a road.

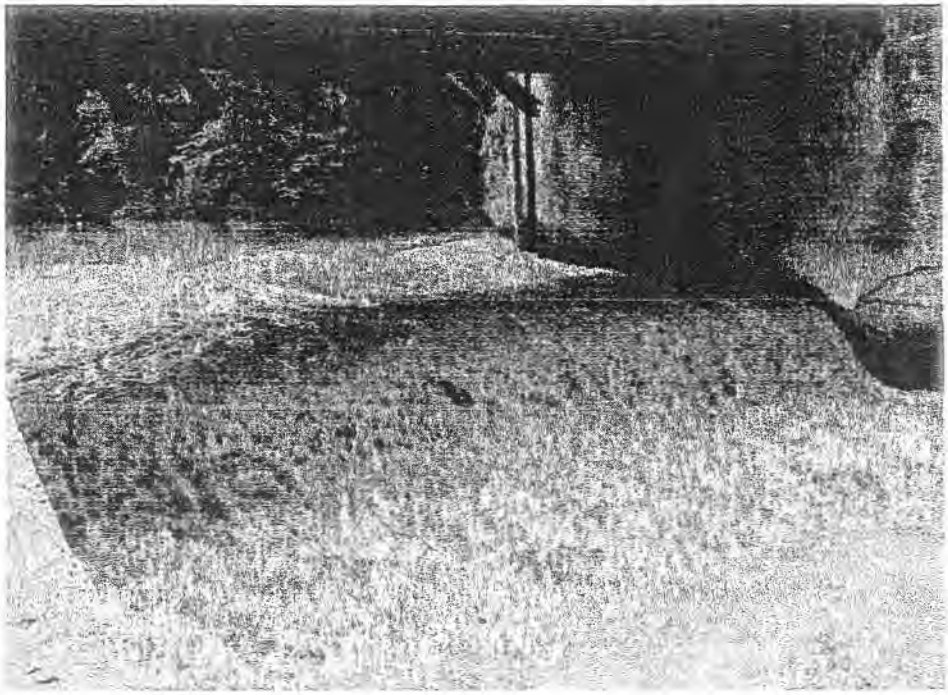


Photo 2. Downstream side of the Coloso dam. Drop during lower flows (photo condition) approximately 2 meters including a lower step not shown in the photo. Note that the vertical sidewalls have a wetted zone.

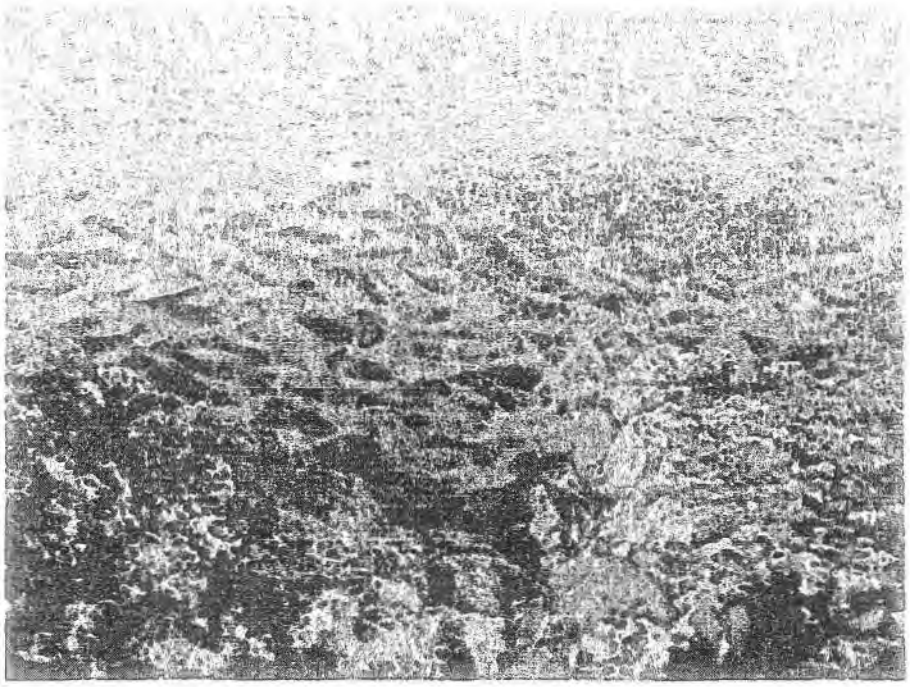


Photo 3. Juvenile shrimps, approximately 1 cm long, migrating upstream in the wetted (splash zone of the dam side walls.

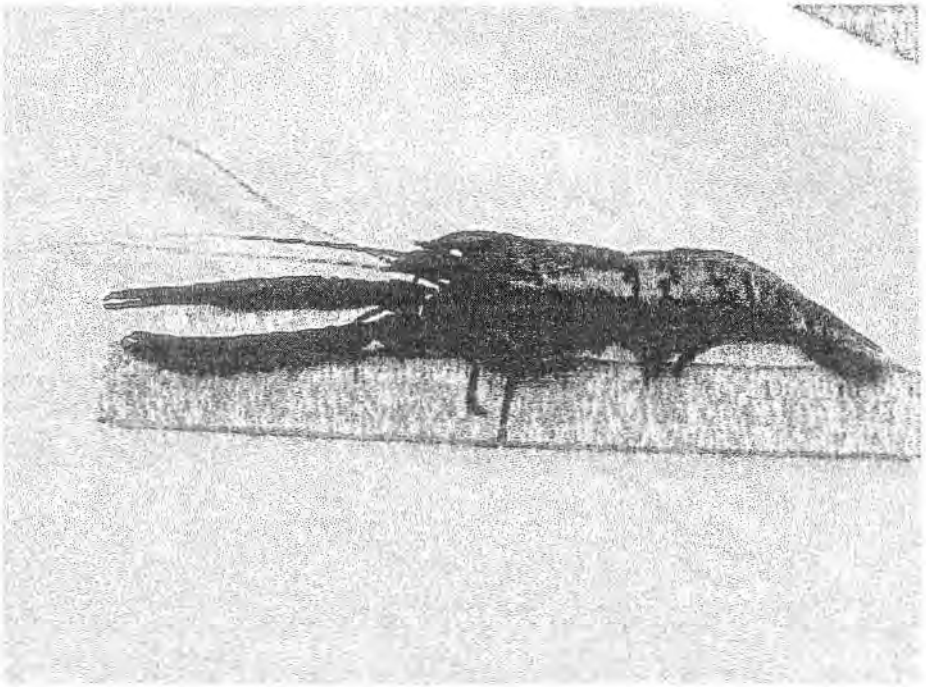


Photo 4. A specimen of *Macrobrachium carcinus*, the largest species of freshwater shrimp. This species can reach overall lengths of 18 inches and a pound in weight. This, and four other species of shrimp are actively fished.

have commented that they catch fish and the larger species of shrimp from both the Culebrinas and the Caño and its canals for consumption. The Service is participating in a fishway project for the Coloso Mill dam with AFI and PRASA.

A large wetland area, the Cayures marsh, lies south of the Culebrinas River near the Coloso sugar mill. This wetland area is a DNER designated Critical Coastal Wildlife Area providing habitat for a number of waterfowl species. The marsh consists of some interconnected ponding areas associated with overflow from the river. This wetland area will not be discussed further as the preferred alternative would not impact this marsh. In addition to the Cayures marsh, herbaceous wetlands occur on the south side of the Culebrinas River and are directly associated with the river.

From documents provided by the Corps, we understand that a number of alternatives have been considered to provide some Flood Hazard Mitigation for already developed portions of the community of Espinar and the southwestern communities of Aguadilla. The first alternative proposed was to construct a single flood levee from PR-2, just southwest of Caño Madre Vieja extending along the south side of Espinar, tying into a hill to the west to isolate the Caño from the floodwaters of the Culebrinas River (Figure 2). This would have provided flood protection for the western communities of Aguadilla, greatly reduced the floodplain of Caño Madre Vieja, and protected portions of the Espinar community. It would have raised flood levels in the Culebrinas River, however, thus affecting other portions of the Espinar community along the Culebrinas River. It also would have reduced the frequency of high flows that help maintain the channel and mouth of Caño Madre Vieja and encouraged development in much of the currently uninhabited floodplain along the Caño, violating E.O. 11988 for the protection of floodplains. To be effective, this plan would have to include channelization of the lower Culebrinas River to minimize the flood levels on its course, eliminating the river meanders and associated wetlands, and increasing maintenance costs for the floodway channel. Channelization of the lower Culebrinas River would have been likely to affect hydrology in the neighboring associated Cayures marsh. Our understanding is that this alternative has been discarded due to high costs and environmental considerations.

Alternative 2 from the original Reconnaissance Report (Figure 3) would provide two flood levees: one along the eastern side of Caño Madre Vieja north of PR-2 to protect southern Aguadilla, and a flood ring levee on the west side of the Caño. The original design would also have included a continuation of this levee on the north side of Espinar. Various permutations of Alternative 2 have been considered by the Corps as additional alternatives, mostly as variations to the western levee. In addition to the levees, the various permutations of this alternative also require the elimination of a double meander of Caño Madre Vieja via a short cut-off channel to accommodate the eastern levee. A modified version of Alternative 2 is the currently preferred alternative described as "Plan 1" in the Detailed Project Report (Figure 4). The western levee of this plan was altered to include the Iglesia de Espinar, a historic church for that community, in the protected area. The portion of the levee behind the beach berm and just north of Espinar community was eliminated, and the end of the levee was tied into the beach berm on the west side of the mouth of the Caño. One-way drainage structures are to be incorporated into the levee at strategic points. This last alternative has been further modified to include a two-way culvert

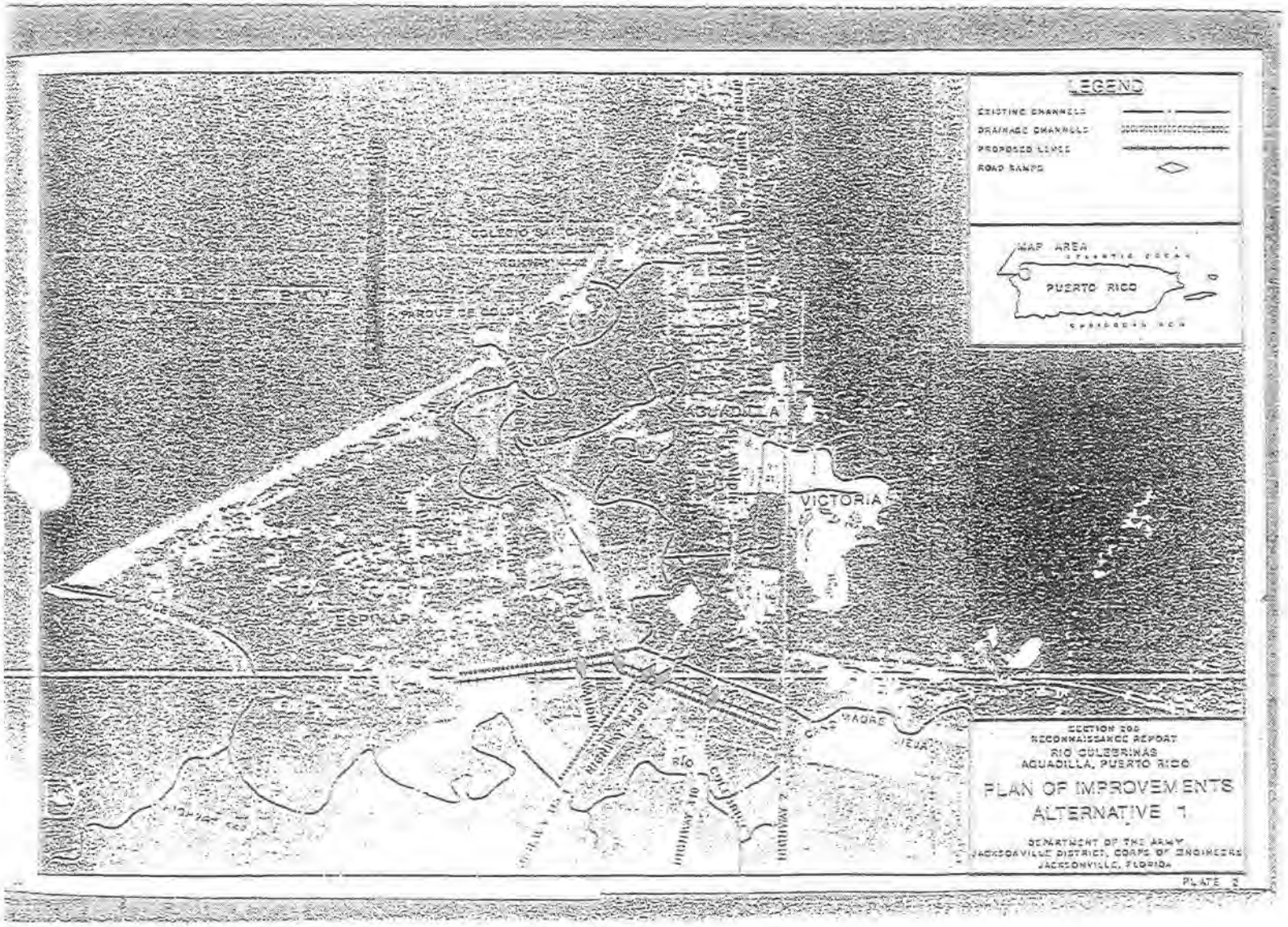


Figure 2. Original alternative 1 from Section 205 Reconnaissance Report, 1992.

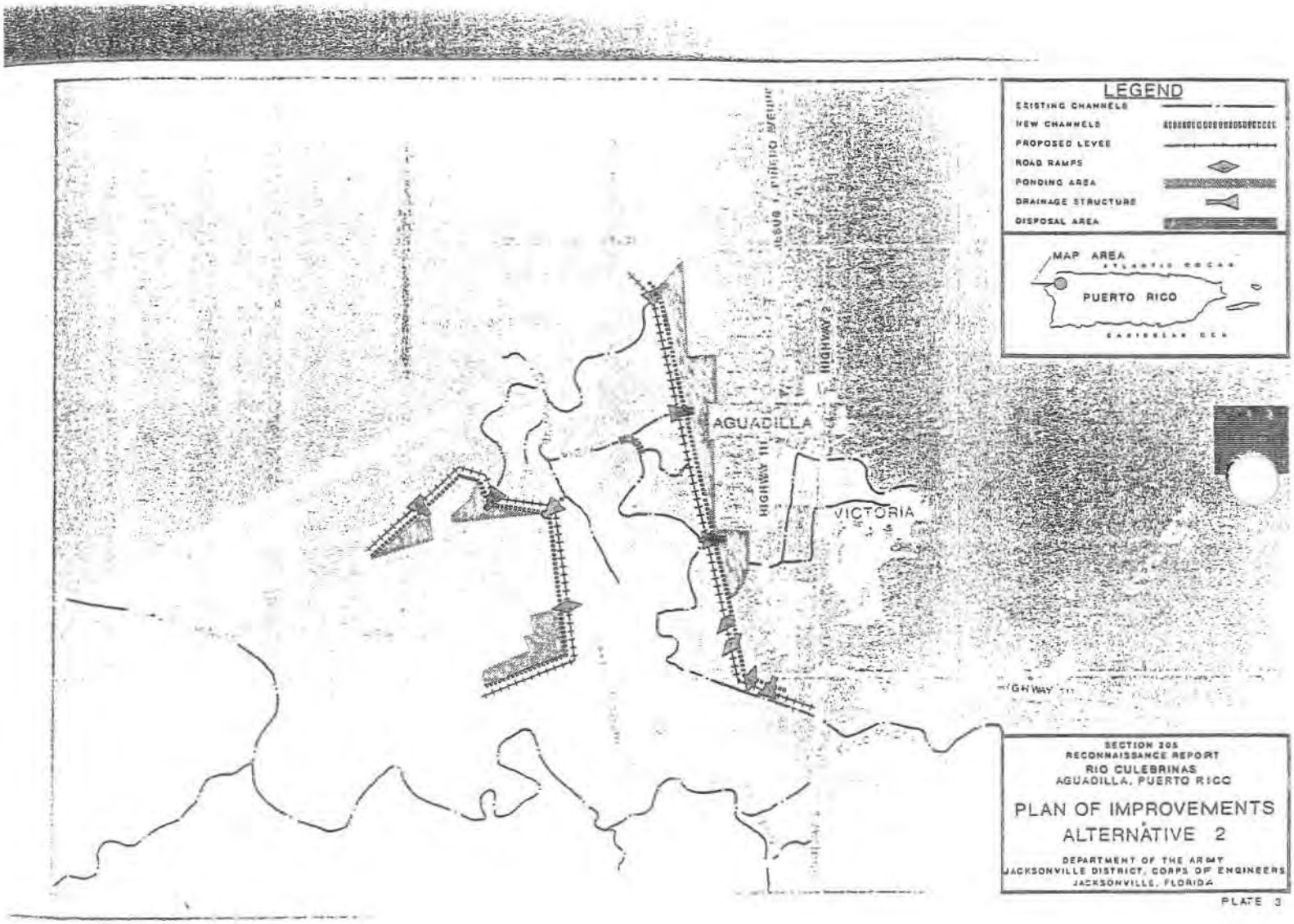


Figure 3. Original Alternative 2 from Section 205 Reconnaissance Report, 1992.

Figure 4. Currently favored alternative with the modified west levee.

to provide hydrology to the mangrove forest channel that runs on the north and east sides of the Espinar community.

Fish and Wildlife Trust Resources

Evaluation of the fish and wildlife trust resources for this CAR focus strictly on the Caño Madre Vieja area that would be affected by the currently favored alternative. Both the Cayures marsh and the low-head dam discussed above are outside of the immediate project area, but should be evaluated if further alternatives outside the lower Caño Madre Vieja area are considered. The lower Culebrinas River valley includes areas of herbaceous and forested (mostly mangrove) wetlands. Most of the forested wetlands in the immediate project area are located near the mouth of Caño Madre Vieja.

On the east side of the Caño, Aguadilla developed a public park with recreational facilities, a boat ramp, and an athletic field and track. The beach front road on the west side from the town to the park is protected in most areas by rip-rap. The mouth of the Caño is protected by breakwater/groins, the larger one lying on the east side of the mouth (Photos 5 and 6). These help maintain the mouth open and provide some protection for small boats entering and leaving the mouth. Our understanding is that the municipality of Aguadilla may also periodically provide maintenance to keep the mouth open, and that no new alterations are planned for the mouth the the Caño. The eastern side of the Caño mouth lies within Coastal Barrier unit PR-75P, while the western side of the mouth lies within Coastal Barrier PR-75 (Figure 5). On the west side of the Caño mouth is a small groin, but the beach berm is otherwise in a relatively natural condition. The western levee would tie into the beach berm within PR-75. According to the information available in our office on CBRA, the use of Federal funds is prohibited, and exempt activities do not include flood control work authorized after the date the relevant unit was included in the CBRA (in this case 1990).

While the Service has no ongoing beach monitoring projects in the area, a previous site inspection revealed the beach between Caño Madre Vieja and the Espinar community is likely to be suitable nesting habitat for the endangered hawksbill sea turtle (*Eretmochelys imbricata*) and the leatherback sea turtle (*Dermochelys coriacea*). While the project does not contemplate any alterations to the beach area, project changes that would require alterations to this beach should require consultation under Section 7 of the Endangered Species Act. This section of the beach also lies within Coastal Barrier Unit PR-75.

Soils

Caño Madre Vieja and the lower Culebrinas River lie within two major soil associations: the Coloso-Toa Association described as nearly level porous loamy soils, and the Bejucos-Jobos Association consisting of strongly leached soils with a very tight, clayey subsoil. Caño Madre Vieja lies mostly within the intersection of these two major associations. Soils in the project area are all either considered to be hydric soils or non-hydric soils with hydric inclusions (Figure 6). Those considered to be hydric soils include Bajura clay (Ba), Iguadad clay (Ig), and Tidal swamp (Td). The non hydric soils with hydric inclusions include Toa silty clay-loam (ToA),

Photo 5. A view of southwestern Aguadilla from PR-2 above the town. The jetty visible in the middle of the coastline is the eastern jetty of Caño Madre Vieja.

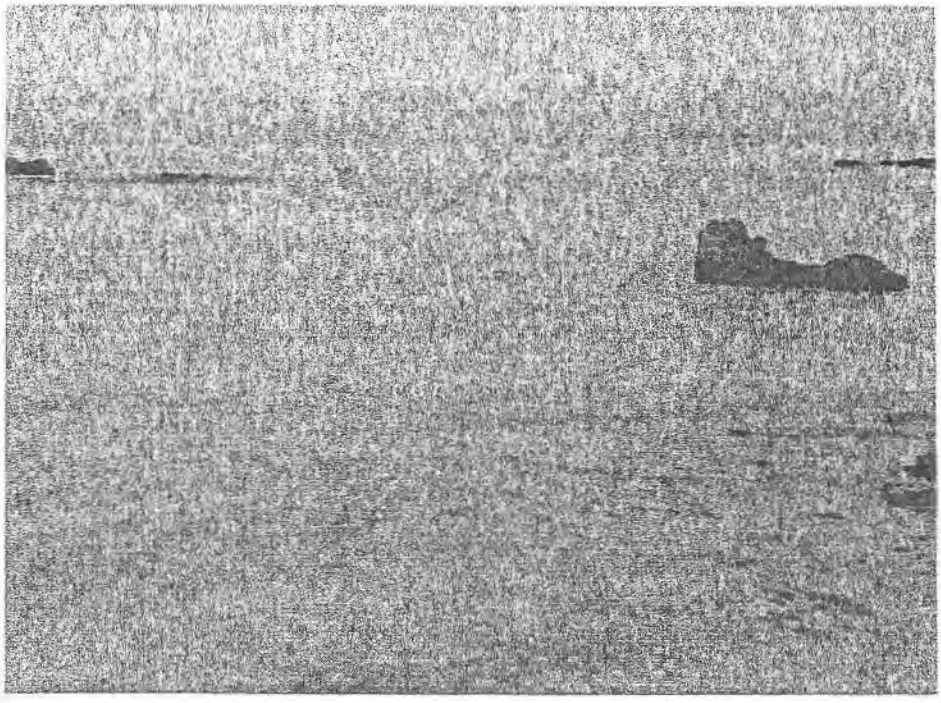


Photo 6. Open mouth of Caño Madre Vieja from Parque Colón on the east side. The tip of the small western jetty is visible on the left side of the picture.

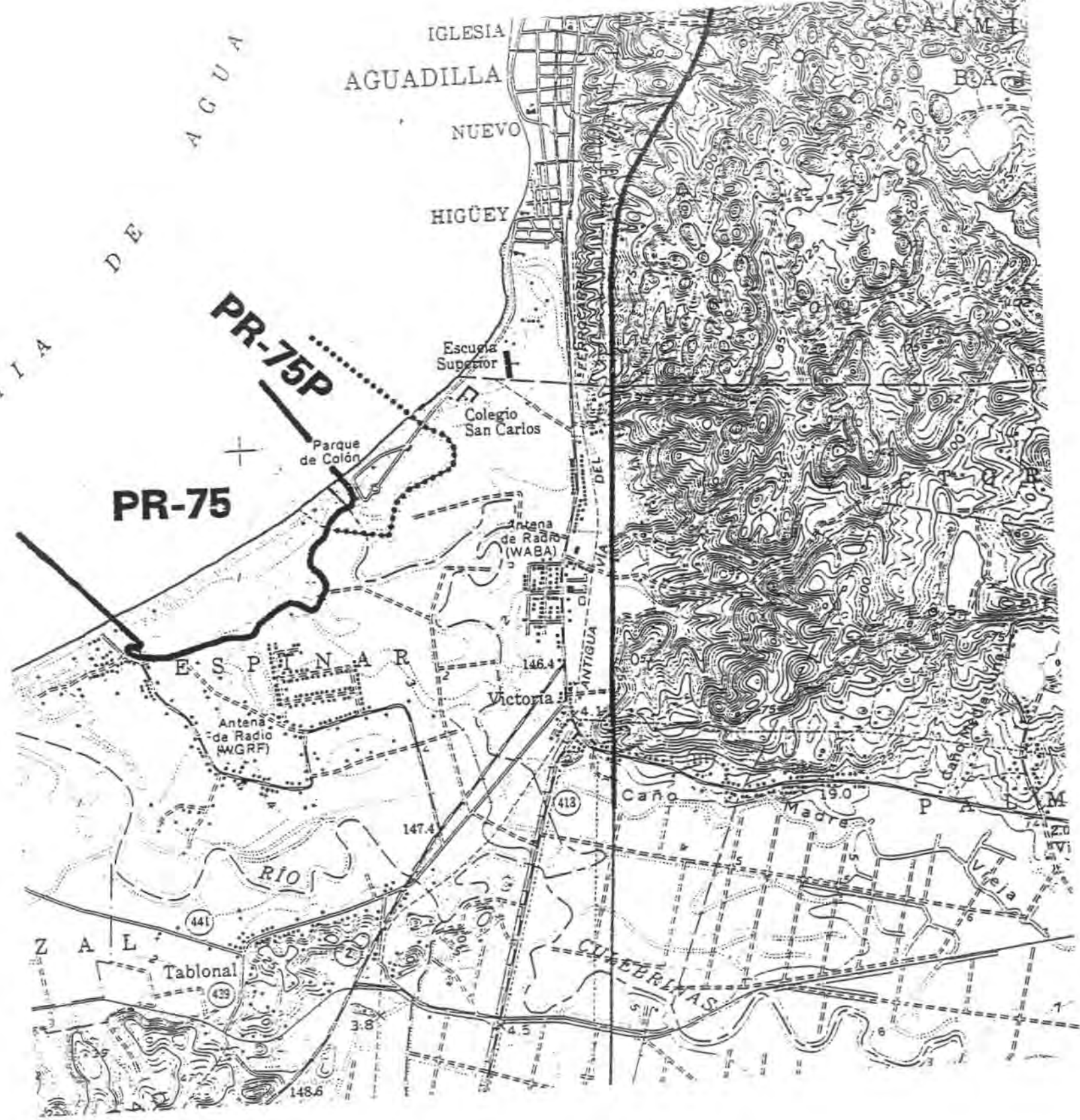


Figure 5. Showing Coastal Barrier Resource Units PR-75 and PR-75P.

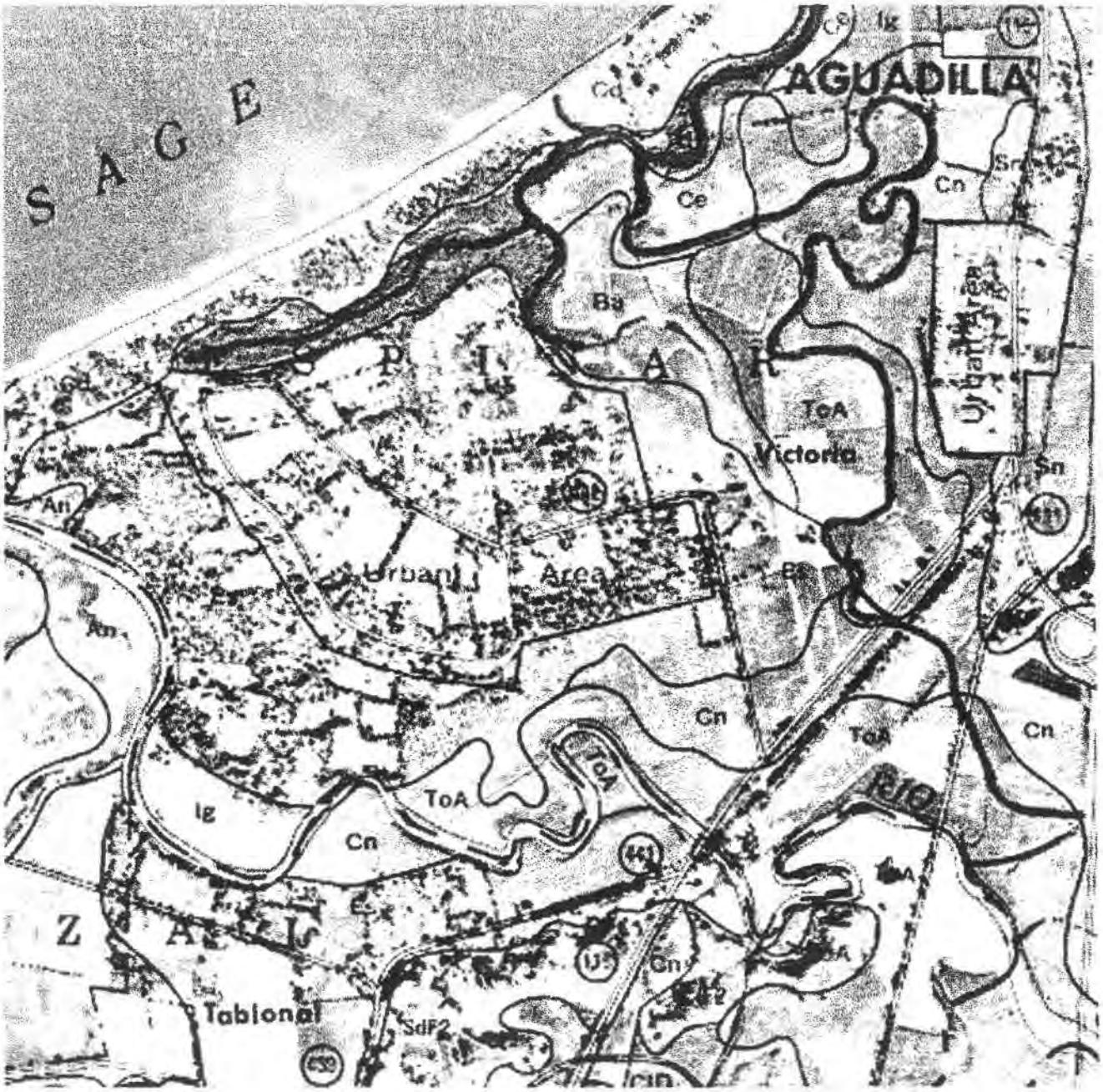


Figure 6. Enlarged soil map showing Caño Madre Vieja.

Coloso silty clay-loam (Cn), Cataño sandy clay-loam (Ce), and Cataño sand (Cd). In general, the unmapped inclusions may be small units of the above listed known hydric soils, or would be described as "unnamed inclusions". These unnamed inclusions generally have a lot of the characteristics of the surrounding soils and may lack obvious hydric indicators, but are often ponded. In the case of soils with heavy clay content, hydric indicators may not be obvious, and inclusions are usually within depressional wetland areas where the hydrology is maintained by ponding rather than flooding. NRCS has noted that the hydric soil indicators in such soils are good for saturation only and may not be present in ponding situations. Drainage channels have been dug on both sides of the Caño in various places, and while some have been maintained others have not, making the hydrology of the area complex.

Existing Conditions

The National Wetland Inventory Map (Figure 7) of the area indicates relatively extensive wetlands in the Caño Madre Vieja area. While wetlands east of Caño Madre Vieja may be over-estimated in the maps, some areas marked as uplands within the proposed levees may be in the process of reverting to wetlands. The mouth of Caño Madre Vieja is mapped as Cd on the soil map, and is a classic small stream opening on a dynamic beach. The beach berms, while considered to be uplands are relatively narrow. On the eastern side of the Caño, as mentioned above, the beach berm has been elevated for the coastal road and further altered with groins and rip-rap to protect the park development, the public road, and the school. The beach berm on the western side of the Caño mouth has retained more natural characteristics with some forest of coconut palms and portia tree (*Thespesia populnea*), and West-Indian almond (*Terminalia catappa*).

Typically small rivers form sand bar sills in the river mouths during low flows and may even close during very low flows. As mentioned above, this channel is generally maintained open by the groins and occasional maintenance. Both east and west of the mouth, the beach berm is backed by the two side drainages that enter into the Caño near the mouth. These drainages are mapped as Tidal swamp (Td) and contain the riverine mangrove associations commonly found in small drainages where water accumulates behind the river mouth bar. Red mangroves (*Rhizophora mangle*) generally occur as fringes immediately adjacent to the channels, while black mangroves (*Avicennia germinans*) dominate in the saturated areas away from the open channel. On the beach side of this channel, red mangrove on the channel is backed by white mangrove (*Laguncularia racemosa*), and indication that soils are not hypersaline in this area. Leather ferns (*Achrosticum* spp.) are also commonly found in this association.

The eastern forested wetlands have been reduced since the NWI maps were made by the park development, particularly the athletic track and by the western edge of the school (Colegio San Carlos). The remaining wetlands still retain mangroves and other wet tolerant trees such as west-indian almond (*Terminalia catappa*), and palms (Photos 7 and 8). The seaward edge of the east dike would pass through the edge of the school yard, possibly cutting off a small segment of this drainage and wetland forest.

The western drainage divides with one arm passing just behind the beach berm directly west,

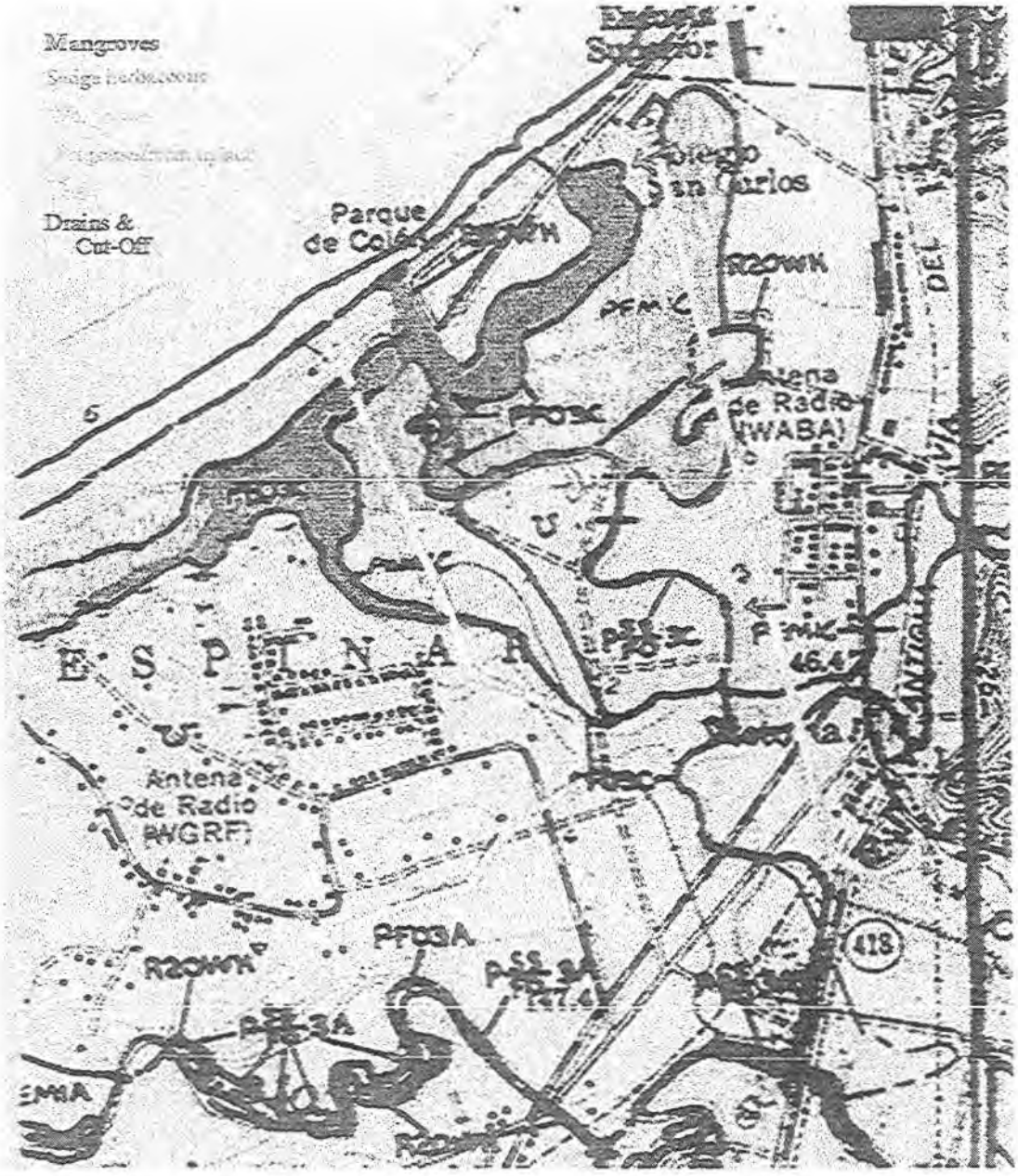


Figure 7. NWI map of the project with the dike layout and rough approximation of wetland types

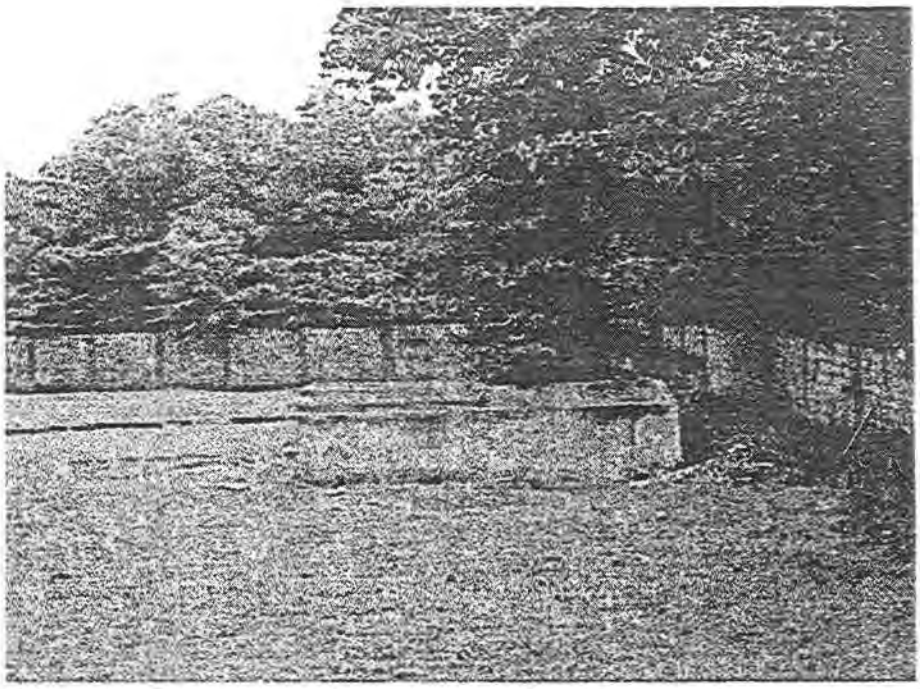


Photo 7. Colegio San Carlos school yard with the forested drainage behind it. The eastern levee would pass through part of the school yard and forest.

Photo 8. The forested drainage from the road just west of the school. Upland trees are in the foreground on the road levee and mangroves are in the background.

and the other arm meandering south on the edge of Espinar community. The mangrove forest along the southern portion of this drainage next to the Espinar community is well developed with some trees exceeding 30 feet in height. The channel is also connected to an intermittent drainage lying on the north side of Espinar, just behind the beach berm. The wetlands behind the beach berm are dominated by cattail (*Typha domingensis*) and other herbaceous vegetation to the west, probably a result of past (and current) land clearing and sand extraction. A previous wetland violation was noted in that area, and these wetlands were recently disturbed by land clearing activities (Photos 9 and 10). It appears that most of the cleared wetlands consisted of cattail (Typha domingensis) mixed with sedges and salt grass. The western dike would cut across the mangrove channel to tie into the existing beach berm just to the west of the mouth of Caño Madre Vieja. While the current plan calls for a two-way culvert to maintain tidal flow into this channel, the size of the culvert is critical in maintaining the hydraulic capacity of this channel. At the narrowest point in the vicinity of the proposed dike, the channel is approximately five feet in width and at least a foot in depth (Photos 11 and 12). Our understanding is that the Corps is currently considering a 2' diameter two-way culvert which appears to be considerably below the existing hydraulic capacity of the channel.

The east side of the Caño, south of the mangrove channel and park, lies between the side channel and a large curve in the main channel. It is mapped as Cataño sandy clay-loam (Ce) just south of the channel, shifting to Coloso silty clay-loam (Cn) and Igualdad clay (Ig) to the east. Probably reflecting these mixed soil associations, the plant community is patchy, varying between FACU and FACW herbaceous plant species. Most of the area is in grasses classified as FACU (*Panicum maximum*) with patches including sedges and FACW grasses such as *Brachiaria purpurascens*. The plant association shifts to cyperids and leather fern as the wetland forest is approached to the north, and the soils shift to Cataño sandy clay-loam. Much of the area on the eastern side of the Caño near the existing community could be considered as uplands, however, small changes in topography promote the wetland plant species in shallow depressions. The area is complex, and should be considered to be a mixture of wetlands and uplands that perform a number of wetland functions including filtration and sedimentation.

On the west side of Caño Madre Vieja, south of the mangrove channel, the soils are mapped as Cataño sandy clay-loam (Ce), grading into Bajuras clay. The plant community in this area strongly reflects the hydric soils, being dominated by wetland grasses and sedges (Photos 13 and 14). The ground in this area was completely saturated, with ponded water in places during the October 12 site visit. This area is bordered on the west by the mangrove lined channel adjacent to Espinar community. The dike would pass through this area.

Further south, in the vicinity of the double meander that would be impacted by the project (see below), the soils shift from Coloso silty clay-loam (Cn) on the east bank and within the meander area to Toa silty clay-loam (ToA) further west. Some small forest stands of geno-geno (Lonchocarpus domingensis) lie on or near the Caño meanders to be cut off by the levee (Photo 15 and 16). This tree is often found associated with drainages in drier areas and is considered to be a FACW tree. Some of the trees lie within a meander channel below bankfull levels, and fiddler crabs were abundant in the area indicating the liklihood of occasional estuarine conditions. Otherwise, the east bank area is dominated by guinea grass (*Panicum maximum*,

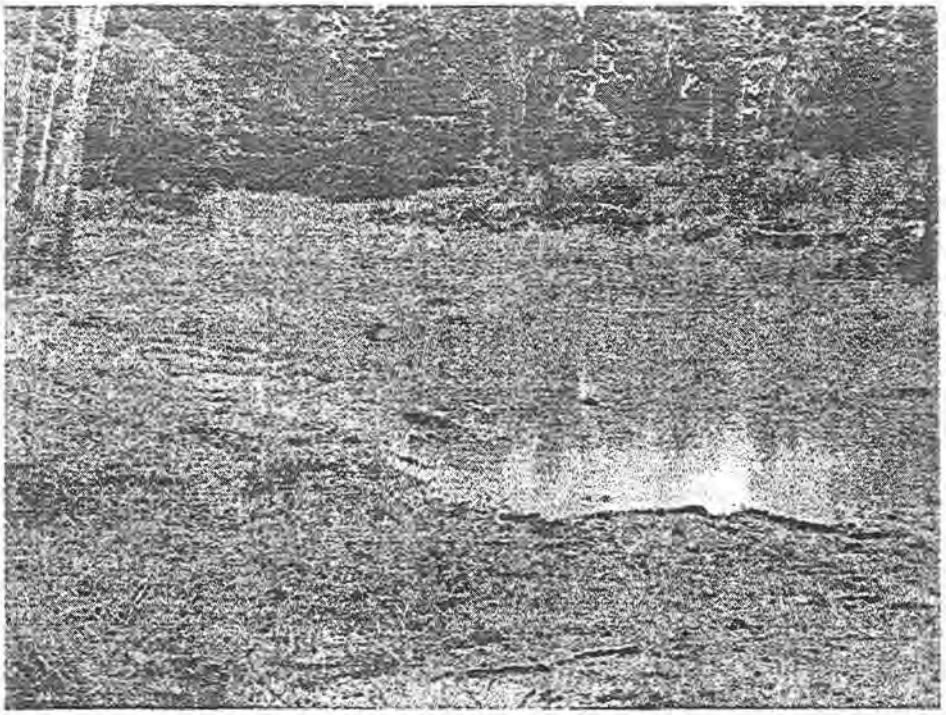


Photo 9. Recently disturbed wetland area behind the beach berm to the west of Caño Madre Vieja. Note the piles of cleared vegetation and soil deposited in wetlands towards the mangrove forest.

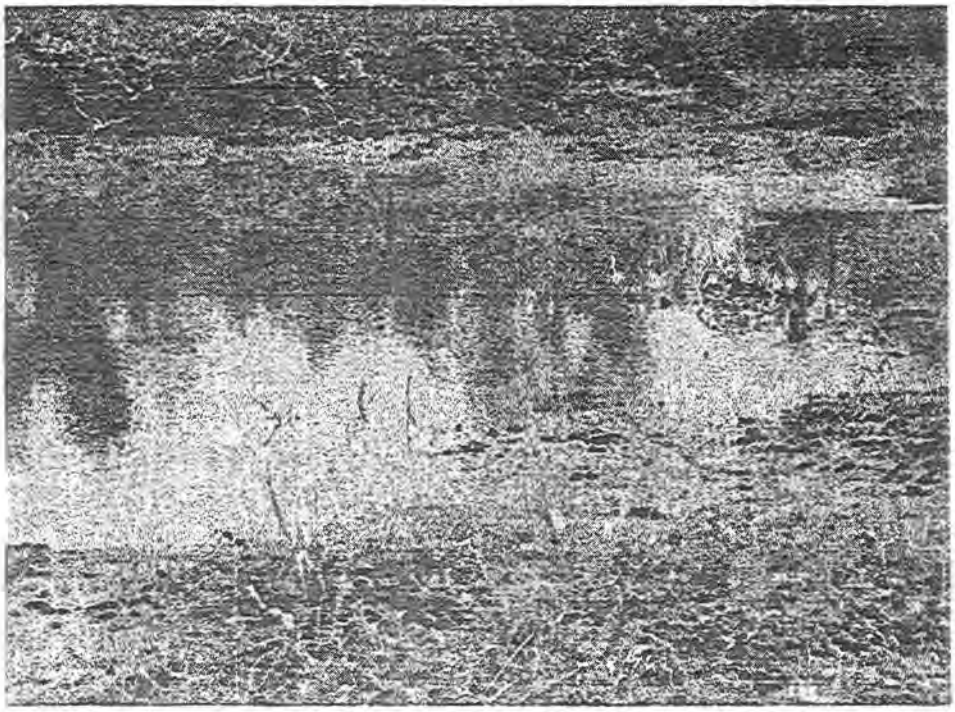


Photo 10. Cleared wetland area behind beach berm west of the Caño showing piled debris that includes some trees.

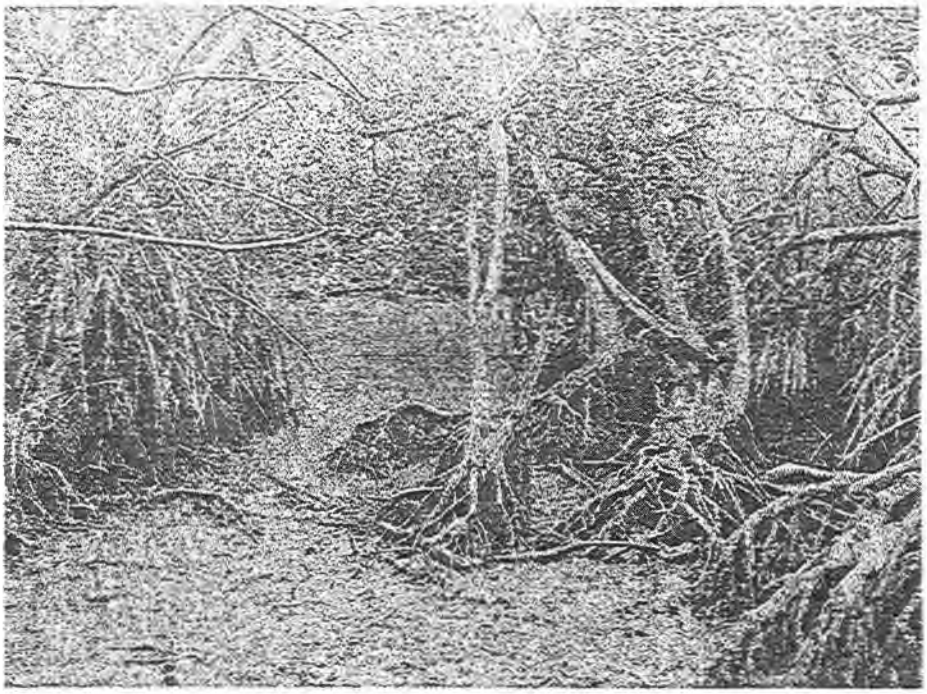


Photo 11. Predominantly red mangrove forest in the area where the western dike would cross and near the narrow point of the channel. The tide was moving out and at low stage.

Photo 12. Mixed red and white mangroves along the mangrove channel area behind the beach berm west of the Caño.

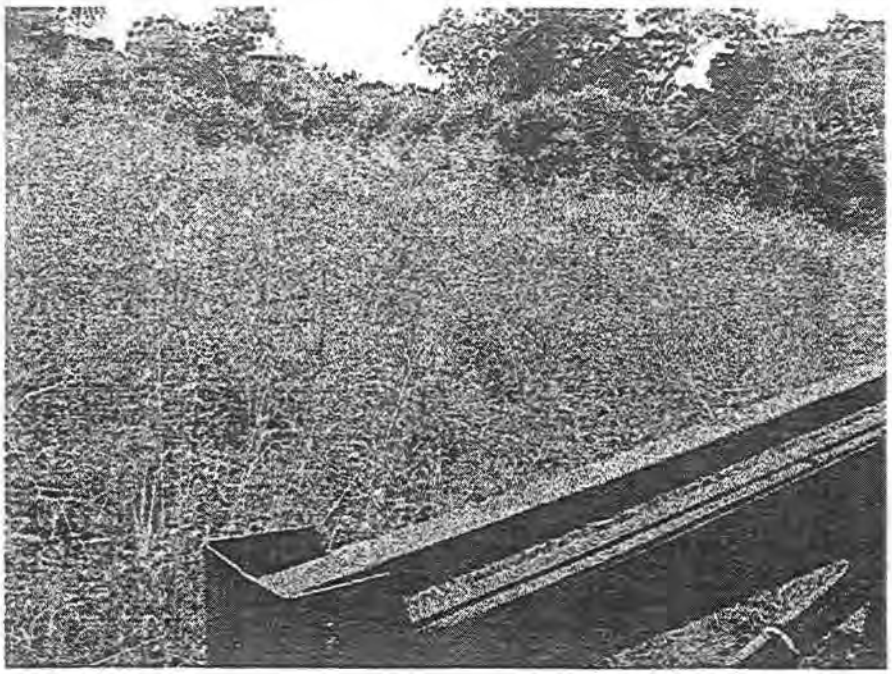


Photo 13. Sedge dominated wetlands on the west side of the Caño, south of the mangrove channel (visible in background). The ground was ponded with several inches of water during this visit.

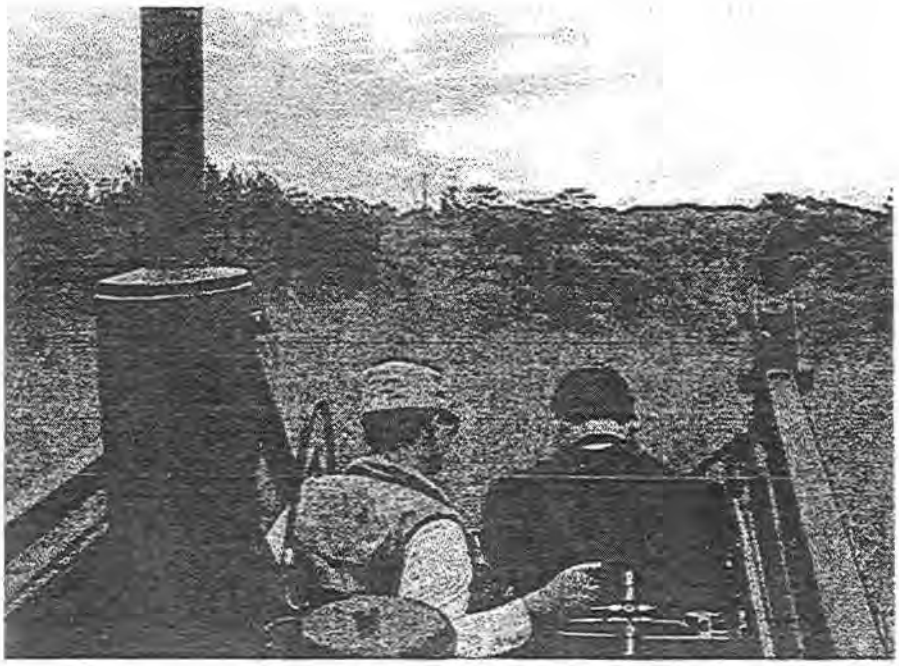


Photo 14. Another view of sedge/wetland grass dominated area. The entire area on the west side of the channel was too wet to enter with conventional 4 wheel drive vehicles and could only be accessed on foot or by tractor.

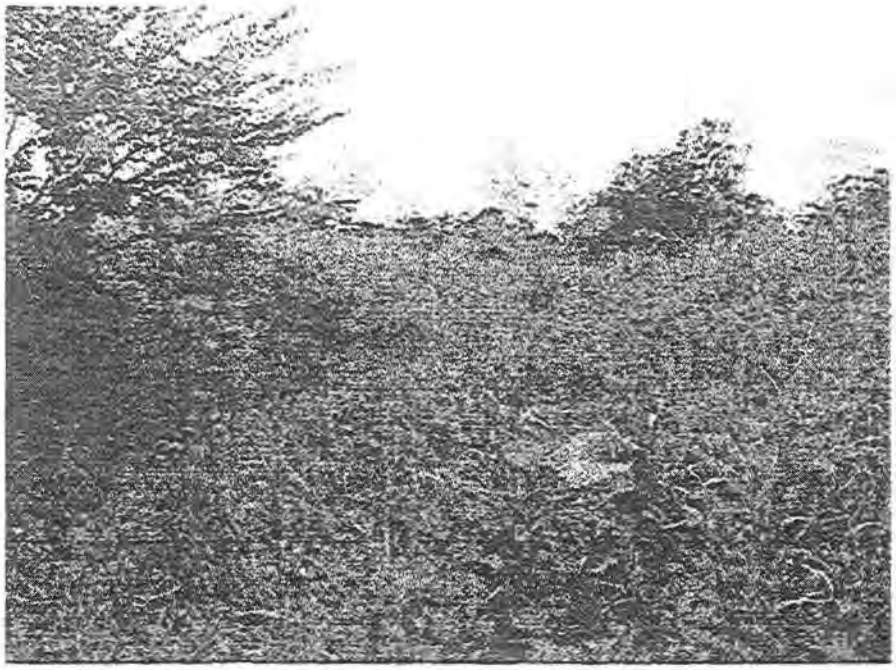


Photo 15. Mixed uplands and wet prairie area on the eastern side of the Caño, near the meanders that would be impacted. The larger trees are geno-geno (*Lonchocarpus domingensis*), and the herbaceous plants are mostly guinea grass (*Panicum maximum*) mixed with cyperids and *Brachiaria purpurascens.*

Photo 16. Geno-geno trees next to the river. Fiddler crabs were in abundance around the roots of the trees in this area.

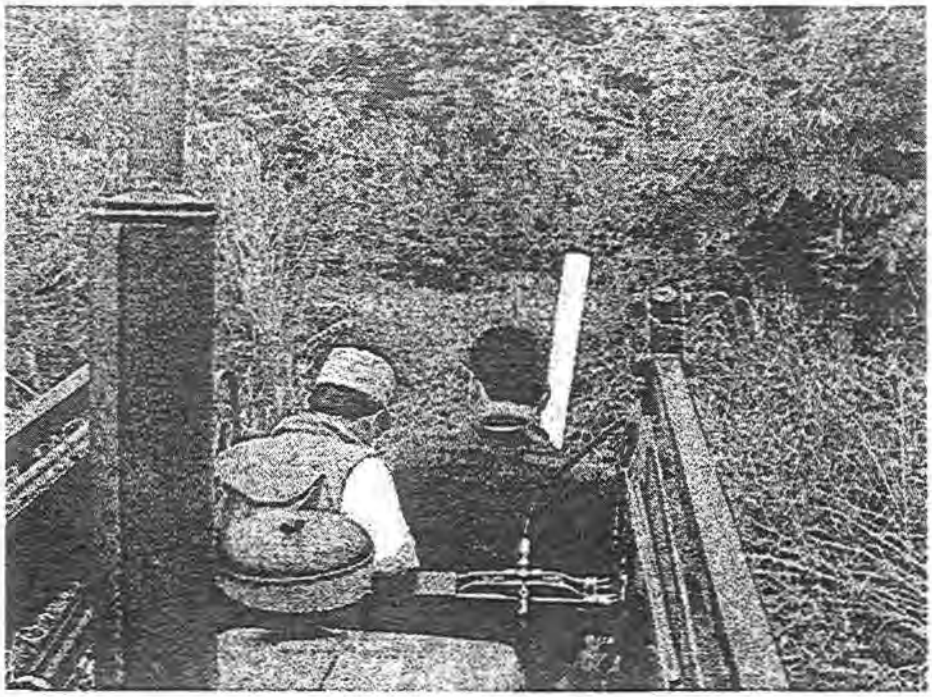


Photo 17. Western side of the Caño, approaching the edge. Note upland trees on the top of the river bank. Many of the grasses are FACW such as *Brachiaria purpurascens* and *Paspalum millegrana*.

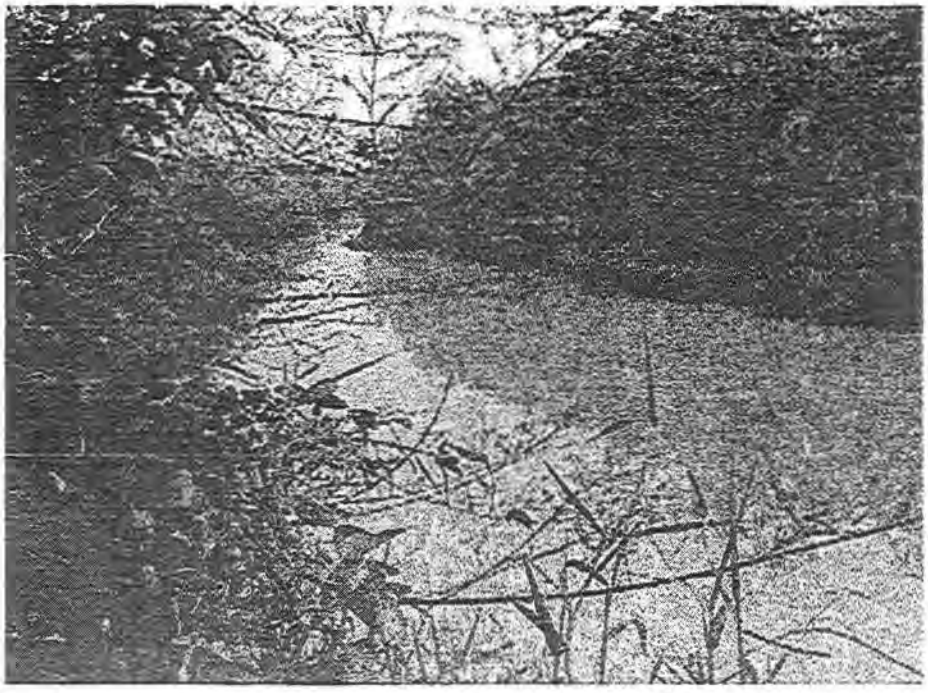


Photo 18. View downstream of the Caño from the west bank just downstream of the meanders. Trees near the water-line are mangroves (red and some white). Most are under 10 feet in height.

FACU), and the southern Aguadilla communities have developed up to the edges of the meanders at some points. The west bank is still largely in sugarcane production, with very deep furrows made to help drain the soils. Depressional areas have sedges and FACW grasses moving in. A drainage channel coming from the edge of Espinar community divides this area from the sedge dominated areas further north.

Small mangroves still occur on the Caño banks just downstream of the double meander (Photos 17 and 18). The size of the mangroves probably reflect the last time this Caño was mechanically cleaned out. While the Corps does not intend further alteration to the cut-off meander, the hydrology would be highly altered from an estuarine to a fresh-water ponding condition. Some of the trees would be eliminated, though it appears that most would be outside the immediate footprint of the levee.

Further upstream, to the southeast, the eastern dike would pass through a forested area and over two roads (Figure 4). The forest in this area has some mature mango trees, but is heavily dominated by *Albizia procera*, an introduced legume that colonizes old cane fields and disturbed areas. *Albizia* tends to form monocultures and provides little wildlife habitat value. While this species is often found in relatively wet soils on the edges of wetlands, it is considered to be an upland species.

Wildlife seen in the Caño Madre Vieja included a number of herons and egrets, smooth-billed anis (*Crotophaga ani*), and the red bishop (*Euplectes orix*). The presence of fiddler crabs in the vicinity of the double meander indicates that estuarine conditions occur at least that far upstream. Other likely fauna would include mongoose, rats, the cane toad (*Bufo marinus*), and other common amphibians, reptiles, and birds in the less disturbed areas with trees. The aquatic freshwater species of fishes and shrimps should occur in the Caño as well as the Culebrinas River.

Potential Project Impacts and Recommendations

The draft Environmental Assessment for the project estimates a wetland loss of approximately 0.5 acres of mangroves (under worst case scenario), and approximately 1.5 acres of wet prairie. It would also eliminate approximately 980 meters of active stream (meander to be cut off). The EA emphasizes that these are strictly estimates of direct impacts from the footprint of the levee, and do not include indirect or secondary impacts likely to occur in wetlands outside of the flood levees. The EA does not consider the fragmentation of wetlands by the dike and associated construction (including the small pilot channel and land to be disturbed during the construction phase). Estimated impact width for the levee footprint includes: a side access on the inside of the levee (5m), the levee footprint (approximately 21m with side slopes), access between the levee and small pilot channel (9m), pilot channel on the outside of levee (7m), and 4m of disturbed area outside of the pilot channel. The total width of the disturbed area would be approximately 46m or 150 feet. Permanent impacts would likely be less, but should include at least the levee footprint to the pilot channel (approximately 21 m).

Indirect and secondary impacts should receive careful consideration as they are likely to be

greater and have longer term impacts on the Caño's wetlands than the direct impacts. Indirect effects would be likely to include hydrology modifications to wetlands lying outside the flood levee and meander wetlands to be cut off by the diversion channel within the flood levees. Secondary impacts would include the liklihood that wetlands remaining outside of the levees would be filled for urban expansion.

Much of the alignment of the eastern levee would lie within uplands, except where it passes in the vicinity of the mangrove wetlands near the school and where it cuts off the Caño meanders. The eastern levee would impinge on the edge of the mangrove fringed channel between the track and Colegio San Carlos, and the impact area is likely to be small as this is a much more restricted forested wetland area than the mangrove channel next to Espinar. The major impact to the meander to be cut off would be due to the cut-off channel within the levee. The tendency over time should be for this meander to fill with sediment since the only hydrology would be provided by the one-way drainage structure through the dike. At the least, the character of the channel and any associated wetlands would change.

The western dike, as currently contemplated cuts across a small portion of the mangrove forest and channel near Espinar and bisects the relatively large herbaceous (sedge dominated) wetland south of the mangroves. The hydrology currently supporting the mangroves is likely to be altered. As mentioned above, the seaward end of the dike, including the mangrove channel crossing, lies within Coastal Barrier PR-75. The two-way culvert being proposed for maintaining hydrology to the Espinar mangrove channel is only 2 feet in diameter. Heavy flood waters moving down this channel would be drained through additional one way drainage structures. Our understanding is that the sizing of the two-way culvert was based on a need to prevent back-flow flooding into the side channel as the flood stage rises on the main channel within the dikes. Apparently this is also based on the assumption of continued partial closing of the Caño, forcing flood levels to as high as 2 meter near the mouth of the Caño. Heavy flooding has traditionally opened this mouth, and the mouth rarely closes now due to the groin/breakwater modifications and periodic maintenance by the municipality.

The original version of the two-levee alternative (Figure 3) included a flood ring levee immediately adjacent to the south, east and north sides of Espinar community. The variation to include the church could still be used within this alternative. That alternative would have impinged on the mangrove channel immediately adjacent to the northeast part of Espinar community, but would have remained south of the back-berm herbaceous and forested wetlands and Coastal Barrier Unit PR-75 and it would have avoided impacts to the sedge dominated wetlands south of the mangroves. The mangroves that would be impacted could be mitigated by relocating the portion of the channel to be impacted slightly eastward and replanting mangroves.

If the currently favored alternative can still be developed under the Coastal Barriers Resources Act, we strongly recommend that the Corps consider installing a larger two-way culvert to maintain tidal flows in the mangrove channel. Reducing the hydraulic capacity of this channel would be likely to encourage sedimentation upstream of the culvert. While the general tendency of flows in the existing mangrove channel is seaward, the persistence of mangroves far upstream along this channel indicates that seawater moves in as a tidal salinity wedge, at least during

spring tides (or normal tides in low rainfall periods). Maintaining adequate two-way flow may be critical to maintaining this system. The additional one-way flood-plain culverts should be slightly elevated above the two-way culvert to encourage the normal flows to continue passing through the principal two-way culvert, and to maintain the existing hydrology in the wetlands upstream.

Wetlands outside of the dike are supposed to be maintained as ponding areas to reduce community flooding, and allow these areas to drain out as flood levels recede within the flood dikes. The Corps should stipulate how these ponding areas would be maintained. Considerations for maintaining these areas as wetlands should include careful evaluation of the elevations of the one-way drainage structures through the dikes. If these ponding areas are not protected through acquisition and posting, they area likely to be developed in a piece-meal fashion through incidental filling and should be considered as part of the secondary impacts of the project.

For wetland impacts that cannot be avoided, we believe that significant opportunities exist within the flood levee dikes for wetland restoration, and possibly some creation. The presence of young mangroves far up the channel of Caño Madre Vieja indicates that the area has probably been periodically altered through channel clearing. Mangroves could be planted, and to some degree, allowed to naturally colonize the Caño margins. Post-project conditions within the dike floodway area may preclude the little agricultural use currently occurring there. Without maintenance of existing drainage channels, more of the area would be likely to revert to wetlands. This obviously depends on the future plans for agricultural use and sand/earth extraction in the area.

The sedge dominated area on the west side of the Caño near the mangrove forest would be particularly suitable for estuarine and freshwater forested wetland restoration. Since this area would lie mostly outside the flood levee, protection of this area from future development would be critical. If no use restrictions are put on these wetlands, they should be considered to be part of secondary project impacts. The upstream portions of this area may be capable of supporting fresh-water wetland trees such as swamp apple (*Annona glabra*), (*Maechaerium lunatum*), and swamp bloodwood *(Pterocarpus officinalis*). Freshwater forested wetlands in similar positions on the landscape used to be quite abundant in Puerto Rico, but were largely eliminated by clearing for agriculture early in this century. A *Pterocarpus officinalis* forest (Caño Boquilla) occurs on a similar small drainage associated with the Añasco River to the south and is in the process of becoming a Natural Reserve.

In summary, we recommend that the preferred alternative be re-evaluated to avoid impacts within Coastal Barrier PR-75. If the Corps determines that the project can still proceed as proposed under CBRA, careful consideration should be given to the capacity of the two-way culvert to maintain hydrology to the mangrove channel. The wetland areas outside of the flood dikes would also have to be protected in some manner and the drainage culvert elevations would be critical to maintaining these wetlands. Mitigation needs could be met through development of additional estuarine and freshwater forested wetlands within the flood levees.

C. CLEAN WATER ACT SECTION 404 (b)(1) EVALUATION AND MITIGATION PLAN

The proposed levees will impact through fill deposition a 0.2-acre red mangrove area, a 1.5-acre emergent prairie area, and 35.55 acres of wet prairie within the projected footprint. These are currently used as pastureland. Hydrologic flow through the area comprised between both planned levees will be unaltered.

The work should not result in violations of water quality standards. Water quality will not be adversely impacted by this project, and Commonwealth water quality standards will be met. Contaminants will not be introduced by clean fill material that may become suspended or dissolved in the river water during the construction operations. Short-term increases in the turbidity are expected during the construction phase of the project; however, the system will re-establish itself as a productive part of the overall ecosystem. No long-term surface water quality problems will result.

Full compliance will be achieved with issuance of a water quality certificate (WQC) from the Environmental Quality Board of Puerto Rico. WQC issuance is expected, but Commonwealth procedures require application to begin after NEPA coordination is completed, not before.

CESAJ-PD-EE (200) 13 July 1995

MEMORANDUM FOR Chief, Environmental Studies Section

SUBJECT: Rio Culebrinas Water Quality (404), Air Quality, and HTRW Input

1. Enclosed is a copy of the water quality, air quality, and HTRW Civil Works Report for subject project for your use. The report is summarized below.

2. Water Quality. Water Quality will not be adversely impacted by this project, and Commonwealth water quality standards will be met. Contaminants will not be introduced by clean fill material that may become suspended or dissolved in the river water during the construction operations. Short term increases in turbidity are expected during the construction phase of the project; however, the system will re-establish itself as a productive part of the overall ecosystem. No long-term surface water quality problems will result.

3. Air Quality. No adverse effects on air quality will result from the implementation of the proposed project. Fugitive dust may be generated by excavation and deposition of fill material, as in the construction of levees. All dust and pollution suppression measures and equipment required under Federal and Commonwealth laws and regulations will be utilized during project construction.

4. Hazardous Toxic and Radiological Wastes (HTRW). Preliminary research (background information, literature search, etc.) revealed that no known sources of HTRW materials exist in the directly impacted portions of the project corridors. A civil works audit as defined in ER-1165-2-132 for HTRW materials was conducted in May of 1995. The following signs of potential HTRW problems were not identified: landfills, dumps, and disposal areas; burning or burned areas; tanks; vats, lagoons, ponds, and basins sludge pits; pits, quarries, and borrow areas; wells; containers of unidentified substances; spills, seepage, and slicks; odors; dead or stressed vegetation; water treatment plants; ditches, trenches, or depressions; mounds and dirt piles; transport areas, such as boat or rail yards, harbors, airports, and truck terminals; and abandoned buildings. No sites with potential for contamination with HTRW were found. Additional trip reports, photos, and other documentation are on file in the CESAJ District office.

5. POC for this work is Mr. Ivan Acosta at X1693.

Encl

JAMES J. MC ADAMS
Chief, Environmental
Quality Section

WATER QUALITY, AIR QUALITY AND HTRW CIVIL WORKS REPORT FOR RIO CULEBRINAS AT AGUADILLA, PUERTO RICO.

1. HAZARDOUS TOXIC RADIOLOGICAL WASTE (HTRW) INITIAL ASSESSMENT (Reconnaissance Phase). An initial HTRW assessment was conducted for a Section 205 Flood Control project to be located along Rio Culebrinas at Aguadilla, Puerto Rico. (see attachments 1 and 2 for location and vicinity maps). This assessment also included an investigation of the water quality and air quality potential impact in the project area. The assessment addresses the existence of, or potential for, HTRW contamination on lands, structures and submerged lands in the study area, or external HTRW contamination which could impact or be impacted by the proposed project. Contamination problems will be considered in determining whether to proceed to the feasibility phase. The assessment will help identify and develop the level of effort to be undertaken in the feasibility phase.

a. Level of effort. Consideration of HTRW in the initial assessment phase involves the same level of detail given to other engineering, economic, real estate, and environmental aspects of the project. This initial HTRW assessment of the project area relied primarily on existing documents, interviews, and observations gathered during the conduct of a site visit.

b. Procedures. The following was documented.

i. Land Uses: The predominant land usage in the project area consists of agriculture and poses little or no HTRW threat. The proposed work will be carried out from Highway 2 to high ground at Espinar community.

ii. Adjacent Problems: In an interview with Felix Lopez, US Fish and Wildlife Services representative, it was indicated that the area presented no adverse impacts or HTRW threat.

iii. Soils: The principal soil types found in the Rio Culebrinas basin area are the Valdora-Moca, Colinas-Soler, Caguabo-Mucara, and the Consumo-Humatas in the uplands and the Coloso-Toa and Bejucos-Jobos in the lower flood plain. These soils are predominantly of the "D" type, indicating high runoff potential. Type "B" soils, indicating moderate drainage potential, are also found within the basin. The principal soil type surrounding the proposed work site Coloso-Toa.

According to the U.S. Weather Bureau climatological zone designations, the upper part of the basin lies within the western interior zone; the northern part and flood plain are in the northern slopes zone.

iv. Photos: Current and historical photographs have been studied and compared to assist in identifying potentially contaminated sites/structures (see attachment 3). No evidence of contaminated sites was found.

v. History: The Rio Culebrinas flood control project is located on the northwestern coast of Puerto Rico at Aguadilla, approximately 130 kilometers (81 miles) from the city of San Juan. The river flows in a westerly direction through the municipalities of Lares, San Sebastian, Moca, Aguada, and Aguadilla to discharge into the Aguadilla Bay. The basin is bordered on the north, south, and east by other river basins, and on the west by the bay.

Since the turn of the century, there have been at least 38 damaging floods on the Rio Culebrinas Basin. The largest flood of record occurred on September 16, 1975. This flood had an estimated recurrence interval of approximately 25 years. The discharge associated with this flood was estimated at 1,954 cms (69,000 cfs), and stages just downstream of Highway 2, where ground elevation averages about 4.0 meters, reached about 7.2 meters (23.6 feet) above mean sea level. Other large floods in the Rio Culebrinas for which records are available occurred in October 1972, May 1980, October 1981, May 1985, May 1986 and August 1988. The dates of these events, elevations above mean sea level (msl), and their respective peak discharges in cubic meters per second (cms) as determined by the United States Geologic Survey (USGS) at the Moca gaging stations are shown on Table 1 of the Reconnaissance Report dated March 1992.

vi. Records Search: Appropriate available records, such as community right-to-know records have been reviewed. Also contacted was the U.S. Fish and Wildlife Service and the Puerto Rico Environmental Quality Board (EQB), with the same results as mentioned above. No problems were identified.

vii. Anecdotal Evidence: To obtain additional information, long-time local residents or workers were interviewed about past land uses, potential contamination, and any history of HTRW problems. No HTRW problems were identified.

viii. Agency Coordination: Federal, State, and local regulatory or response agencies were consulted for license/permit actions, for any violations, enforcement actions, and/or litigation against property owners, and for general information about local HTRW problems such as illegal dumping and past contamination, etc. No other problems were found.

ix. Site Visitation Sheet: A visual survey of the proposed project site was made to determine the potential for HTRW. No evidence of surface contamination or partially buried containers, discolored soil, seeping liquids, films on water, abnormal or dead vegetation or animals, suspect odors, dead-end pipes, abnormal grading, fills, or depressions were observed.

a. An experienced Environmental Engineer was part of the team doing field visits and made record searches, interviews, and on-site visual evaluation for possible HTRW contamination.

b. Results. A preliminary assessment was conducted in May 1995 to address the existence or potential for occurrence of HTRW contamination on lands, including structures and submerged lands, in the Rio Culebrinas project/study area in Aguadilla, Puerto Rico. The preliminary assessment for the project/study area included a project review, site literature/document review, and site reconnaissance. During each assessment, the following signs of potential HTRW problems were looked for:

Landfills, dumps, disposal areas
Burning or burned areas
Tanks (underground surface)
Vats, lagoon, ponds or basins sludge pits
Excavations (pits, quarries borrow areas)
Wells
Containers of unidentified substances
Spills, seepage, slicks

Odors
Dead or stressed vegetation (brown, spotted curled or withered leaves)
Water treatment plants
Ditches, trenches, depressions
Mounds and dirt piles
Transport areas (i.e. boat yards, harbors, rail yards, airports, truck terminals)
Abandoned buildings

c. There is refuse floating on the canal, (see attachment 3 for photographs of the area). The components of the refuse are garbage, food wastes, and rubbish which includes glass, tin cans and paper. This could present a direct threat to human health in the future. The relationship between solid wastes and human diseases should be apparent. Improper disposal of solid wastes is a definite health hazard, which can serve as the catalyst for the spread of at least 22 human diseases. The most important vectors (vectors are means by which disease organisms are transmitted) of human diseases in regard to solid wastes are rats and flies (water, air and food can be factors). The fly is a prolific breeder (70,000 flies can be produced in 1 cubic foot of garbage) and a carrier of many diseases, e.g., bacillary dysentery. Rats destroy property and can cause infection by direct bite; they are also dangerous as carriers of insects which can also act as vectors. Refuse is unsightly, unhealthy, and damaging to the wildlife.

The refuse appears to be primarily municipal solid waste and debris rather than excavatable dirt. We recommend that the refuse be removed from the Rio Culebrinas and properly disposed of in a sanitary landfill. Also is recommended that a public awareness campaign (newsletter, signs, etc.) be developed in the project area and vicinity to avoid further contamination and to address the impact to human, wildlife, and aquatic environments.

d. Resolution of HTRW issues. No issues were found.

e. Sponsor's commitment. The Feasibility Cost Sharing Agreement (FCSA) will state that the development of a response plan for dealing with any HTRW discovered is a 100 percent non-Federal cost as stated in Engineering Regulation 1165 -2- 132 "Water Resources Policies and Authorities - HTRW Guidance for Civil Works Projects", dated June 1992.

2. WATER QUALITY. The EQB has designated the waters of Rio Culebrinas as class SD. According to USGS, the water from Rio Culebrinas is of good quality and suitable for most purposes. Short term local increases in water turbidity are expected due to construction activities. All appropriates measures required by EQB regulations would be adopted. It is believed that conditions will return to normal soon after construction activities have terminated. A data base analysis of the historical data available was performed on the EPA STORET system and the USGS Water Resources Data-Puerto Rico and U.S. Virgin Islands, with the following results; one station was reported to collect data from the vicinity of the proposed area between 1968 to 1989. This station collected samples to test for inorganic and bacterial constituents in water. Two stations upstream from the proposed work site were also studied. These stations collected samples to test for organic, inorganic, and bacterial constituents in water. The values reported from these stations comply within the EQB Parameters for waters with the SD classification, with certain exceptions. Fecal contamination may be the most serious water quality problem. In addition, the data reflected concentrations of lead greater than EQB specifications.

Hydrologist, Senen Guzman, USGS Puerto Rico, suggested that these elevated levels were most likely due to urban runoff from the city of San Sebastian and were fairly typical of the area.

3. AIR QUALITY. The air quality in the Rio Culebrinas area is good due to the presence of either on-, or off-shore coastal breezes. The EQB, Air Quality Division has classified the Rio Culebrinas project area as an attainment area. No appreciable decrease in air quality is expected in the future because of the presence of either on-, or off-shore coastal breezes. Fugitive dust can be generated by excavation and deposit of fill material, as in the construction of levees. All appropriate measures required by EQB regulations will be adopted during construction.

STATEMENT OF WORK

Prepared By:

Signed: Brenda W. Stamps — 5 July 1995
Brenda W. Stamps, Biologist — Date
Environmental Quality Section
USACOE - Jacksonville District

Signed: — 7/5/95
Ivan Acosta, Environmental Engineer — Date
Environmental Quality Section
USACOE - Jacksonville District

Reviewed By:

Signed: — 7/6/95
James McAdams, Chief Environmental — Date
Quality Section
USACOE - Jacksonville District

Approved By:

Signed: Kenneth R. Dragg for — 7/6/95
Hanley K. Smith, Chief Environmental — Date
Resources Branch
USACOE - Jacksonville District

SECTION 404(b) EVALUATION

Flood Control Project
Río Culebrinas
Aguada and Aguadilla, Puerto Rico

I. Project Description

a. Location. The proposed work will be performed Caño Madre Vieja and Río Culebrinas, between the municipalities of Aguada and Aguadilla, Puerto Rico.

b. General Description. The proposed plan calls for the construction of two flood control levees to separate the last downstream segment of Caño Madre Vieja from adjoining residential communities. Other project features are: a short cutoff channel, to connect two meanders of the stream where the Aguadilla Levee will interrupt it, four drainage structures, interior drainage channels, and a commercial borrow area located in Aguada.

c. Authority and Purpose. This study and proposed project were developed under the authority of Section 205 of the 1948 Flood Control Act, as amended.

d. General Description of Dredged or Fill Material.

(1) General Characteristics of Material. Clean, toxic contaminant-free fill will be used.

(2) Quantity of Material. Approximately 110,000 cubic yards of fill. And 1,000 cubic yards of spoil fill.

(3) Source of Material. Approximately 30,000 cubic yards would come from the cutoff and drainage channels and the rest from the commercial borrow site at nearby Tablonal Quarry.

e. Description of the proposed Discharge Site.

(1) Location. Most spoil fill will be disposed of within the right-of-way of the levees, on top or on the sides slopes as topsoil. Any spoil fill or debris that cannot be disposed of in that manner will be disposed of in the municipal landfill in use by the Municipalities of Agüadilla and Aguada at the time the work takes place.

(2) Size. The approximately 19.6 acres. Area of the levee footprints. And the minimal debris and spoil found to be unsuitable will go in the existing landfills.

(3) Type of Site. Mostly uplands pastureland.

(4) Type of Habitat. Footprint of the levees

(5) Timing and Duration of Discharge. Duration of the actual levee construction.

f. Description of Disposal Method. Transportation over existing roads, using commercial trucks. Deposition at existing municipal sanitary landfills.

II. Factual Determinations

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. Both levees would have an average structural height of 2.5 meters, 1 on 2.5 side slopes, an average levee base of 16 meters, and a levee crest width of 3 meters.

(2) Sediment Type. Sandy silt.

(2) Dredge/Fill Material Movement. Material to be excavated by backhoe and carried to final destination using dump trucks.

(4) Physical Effects on Benthos. No effect is expected on the Benthic habitat.

b. Water Circulation, Fluctuation and Salinity Determination.

(1) Water Column Effects. These are Class SD waters. No changes are expected.

(2) Current Patterns and Circulation. Existing fast water flow patterns for the Culebrinas River will remain unchanged.

(3) Normal Water Level Fluctuations and Salinity Gradients. No changes are expected.

c. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. None expected. The disposal site is the footprint of the levee and the municipal landfill, no permanent turbidity level changes are

expected during deposition. The acceptable turbidity levels in the Culebrinas River (50 NTUs) will not be exceeded.

(2) Effects on the Chemical and Physical Properties of the Water Column.

(a) Light Penetration. Since no significant changes in turbidity are expected, no significant changes in light penetration are expected, either.

(b) Dissolved Oxygen. The amount of dissolved oxygen 5.0 mg/L (PPM) is not expected to vary.

(c) Toxic Metals, Organics, and Pathogens. No increase expected in these parameters.

(d) Aesthetics. The earthen levees will be re colonized by the existing vegetation, blending with the surroundings

(3) Effects on Biota.

(a) Primary Productivity and Photosynthesis. No effect.

(b) Suspension/Filter Feeders. No effect.

(c) Sight Feeders. No effect.

d. Contaminant Determinations.

e. Aquatic Ecosystem and Organism Determinations.

(1) Effects on Plankton. None.

(2) Effects on Benthos. None.

(3) Effects on Nekton. None.

(3) Effects on the Aquatic Food Web. None.

(5) Effects on Special Aquatic Sites.

(a) Hardground and Coral Reef Communities. Doesn't apply.

(b) Sanctuaries and Refuges. Not applicable.

(c) Wetlands. The project will impact approximately 1.5 acres of emergent wet prairie currently used as pasturelands, and having a total biological value of 1 unit in accordance with the Wetlands Rapid Assessment Procedure Methodology (WRAP). Mitigation for unavoidable project impacts, if needed, would include enhancement of 1 acre of emergent wet prairie.

(d) Mud Flats. Not applicable.

(e) Vegetated Shallows. Not applicable.

(f) Riffle and Pool Complexes. Not applicable.

(6) Endangered and Threatened Species. No endangered species was identified in the work area.

(7) Other Wildlife. Not applicable.

(8) Actions to Minimize Impacts. The design and footprint of the project were modified to avoid work inside the wetlands of Coastal barrier PR-75.

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination. Not applicable.

(2) Determination of Compliance with Applicable Water Quality Standards. Fill deposition will occur within the footprints of the levees on existing pasturelands. Other deposition will be in contained, approved municipal landfills. The Corps has thus determined that the proposed work complies with Applicable Water Quality Standards.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supplies. Not applicable.

(b) Recreational and Commercial Fisheries. Not applicable.

(c) Water Related Recreation. Not applicable.

(d) Aesthetics. No aesthetic changes are foreseen, the levees will be re-colonized by the local vegetation.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. Not applicable.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. None expected.

h. Determination of Secondary Effects on the Aquatic Ecosystem. None expected.

III. Findings of Compliance or Non-compliance with the Restrictions on Discharge.

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

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

c. After consideration of disposal site dilution and dispersion, the discharge of fill materials will not cause or contribute to, violations of any applicable State 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 construction of the levees and associated canal cut 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 material 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, aesthetic, and economic values will not occur.

f. On the basis of the guidelines, the proposed disposal site for the discharge of dredged material is specified as complying with the requirements of these guidelines.

SECTION 404(b) EVALUATION

Flood Control Project
Río Culebrinas
Aguada and Aguadilla, Puerto Rico

I. Project Description

a. Location. The proposed work will be performed Caño Madre Vieja and Río Culebrinas, between the municipalities of Aguada and Aguadilla, Puerto Rico.

b. General Description. The proposed plan calls for the construction of two flood control levees to separate the last downstream segment of Caño Madre Vieja from adjoining residential communities. Other project features are: a short cutoff channel, to connect two meanders of the stream where the Aguadilla Levee will interrupt it, four drainage structures, interior drainage channels, and a commercial borrow area located in Aguada.

c. Authority and Purpose. This study and proposed project were developed under the authority of Section 205 of the 1948 Flood Control Act, as amended.

d. General Description of Dredged or Fill Material.

(1) General Characteristics of Material. Clean, toxic contaminant-free fill will be used.

(2) Quantity of Material. Approximately 110,000 cubic yards of fill. And 1,000 cubic yards of spoil fill.

(3) Source of Material. Approximately 30,000 cubic yards would come from the cutoff and drainage channels and the rest from the commercial borrow site at nearby Tablonal Quarry.

e. Description of the proposed Discharge Site.

(1) Location. Most spoil fill will be disposed of within the right-of-way of the levees, on top or on the sides slopes as topsoil. Any spoil fill or debris that cannot be disposed of in that manner will be disposed of in the municipal landfill in use by the Municipalities of Agüadilla and Aguada at the time the work takes place.

(2) Size. The approximately 19.6 acres. Area of the levee footprints. And the minimal debris and spoil found to be unsuitable will go in the existing landfills.

(3) Type of Site. Mostly uplands pastureland.

(4) Type of Habitat. Footprint of the levees

(5) Timing and Duration of Discharge. Duration of the actual levee construction.

f. Description of Disposal Method. Transportation over existing roads, using commercial trucks. Deposition at existing municipal sanitary landfills.

II. Factual Determinations

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. Both levees would have an average structural height of 2.5 meters, 1 on 2.5 side slopes, an average levee base of 16 meters, and a levee crest width of 3 meters.

(2) Sediment Type. Sandy silt.

(2) Dredge/Fill Material Movement. Material to be excavated by backhoe and carried to final destination using dump trucks.

(4) Physical Effects on Benthos. No effect is expected on the Benthic habitat.

b. Water Circulation, Fluctuation and Salinity Determination.

(1) Water Column Effects. These are Class SD waters. No changes are expected.

(2) Current Patterns and Circulation. Existing fast water flow patterns for the Culebrinas River will remain unchanged.

(3) Normal Water Level Fluctuations and Salinity Gradients. No changes are expected.

c. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. None expected. The disposal site is the footprint of the levee and the municipal landfill, no permanent turbidity level changes are expected during deposition. The acceptable turbidity levels in the Culebrinas River (50 NTUs) will not be exceeded.

(2) Effects on the Chemical and Physical Properties of the Water Column.

(a) Light Penetration. Since no significant changes in turbidity are expected, no significant changes in light penetration are expected, either.

(b) Dissolved Oxygen. The amount of dissolved oxygen 5.0 mg/L (PPM) is not expected to vary.

(c) Toxic Metals, Organics, and Pathogens. No increase expected in these parameters.

(d) Aesthetics. The earthen levees will be re colonized by the existing vegetation, blending with the surroundings

(3) Effects on Biota.

(a) Primary Productivity and Photosynthesis. No effect.

(b) Suspension/Filter Feeders. No effect.

(c) Sight Feeders. No effect.

d. Contaminant Determinations.

e. Aquatic Ecosystem and Organism Determinations.

(1) Effects on Plankton. None.

(2) Effects on Benthos. None.

(3) Effects on Nekton. None.

(3) Effects on the Aquatic Food Web. None.

(5) Effects on Special Aquatic Sites.

(a) Hardground and Coral Reef Communities. Doesn't apply.

(b) Sanctuaries and Refuges. Not applicable.

(c) Wetlands. The project will impact approximately 1.5 acres of emergent wet prairie currently used as pasturelands, and having a total biological value of 1 unit in accordance with the Wetlands Rapid Assessment Procedure Methodology (WRAP). Mitigation for unavoidable project impacts, if needed, would include enhancement of 1 acre of emergent wet prairie.

(d) Mud Flats. Not applicable.

(e) Vegetated Shallows. Not applicable.

(f) Riffle and Pool Complexes. Not applicable.

(6) Endangered and Threatened Species. No endangered species was identified in the work area.

(7) Other Wildlife. Not applicable.

(8) Actions to Minimize Impacts. The design and footprint of the project were modified to avoid work inside the wetlands of Coastal barrier PR-75.

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination. Not applicable.

(2) Determination of Compliance with Applicable Water Quality Standards. Fill deposition will occur within the footprints of the levees on existing pasturelands. Other deposition will be in contained, approved municipal landfills. The Corps has thus determined that the proposed work complies with Applicable Water Quality Standards.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supplies. Not applicable.

(b) Recreational and Commercial Fisheries. Not applicable.

(c) Water Related Recreation. Not applicable.

(d) Aesthetics. No aesthetic changes are foreseen, the levees will be re-colonized by the local vegetation.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. Not applicable.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. None expected.

h. Determination of Secondary Effects on the Aquatic Ecosystem. None expected.

III. Findings of Compliance or Non-compliance with the Restrictions on Discharge.

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

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

c. After consideration of disposal site dilution and dispersion, the discharge of fill materials will not cause or contribute to, violations of any applicable State 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 construction of the levees and associated canal cut 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 material 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, aesthetic, and economic values will not occur.

f. On the basis of the guidelines, the proposed disposal site for the discharge of dredged material is specified as complying with the requirements of these guidelines.

D. COASTAL ZONE MANAGEMENT ACT COORDINATION – Certification of Compliance with PR Coastal Management Plan and Application for Concurrence from PR Planning Board.

At this time the study and recommended plan have been determined to be in compliance with the major programs and objectives of the Puerto Rico Coastal Management Program. Concurrence from the Puerto Rico Planning Board (PRPB) will be sought when the public comment period on this EA has closed.

E. SITE VISIT MEMORANDUM AND WRAP SCORE SHEETS

Project completion will directly impact approximately 1.5 acres of emergent wet prairie currently used as pasturelands and 0.2-acre of Red mangrove swamp. These were assessed to have a total biological value of 1 unit, using the Wetlands Rapid Assessment Procedure Methodology (WRAP). The score was 0.48 for the pasture and 0.56 for the Red mangrove. Mitigation for unavoidable project impacts, if needed, would include enhancement of 1 acre of emergent wet prairie. The USACE estimates that project completion will also result in the construction of drainage channels parallel to the levees. These will have an average width of approximately 7 meters (21feet) and will run for the entire length of the levees. This will create approximately
21 x 9,723 = 204,183 square feet or 4.69 acres of habitat for fish and amphibian species.

Assuming creation of at least 13 meters (40 feet) of shallow littoral area on both banks of each channel, an additional 8.93 acres of wetlands would be created. The USACE believes that the wetlands and waters of the United States created by the project would avoid a net loss of wetlands.

Present during the October 12, 1999 site visit: Beverly Yoshioka USFWS; Ana Román, USFWS; Jorge M. Tous, USACE; Esteban Jimenez, USACE.

CESAJ-PD-ES 12 October 1999

MEMORANDUM FOR RECORD

SUBJECT: Culebrinas River Flood Control (Aguadilla & Espinar Levees) Project Site Visit

1. Going west to east along the Aguadilla levee footprint (24.2 acres or 98,095 square meters including levee, drainage channel, ramps, and right of way), the start is an approximately 35% urban developed area. It continues along fields use for horses grazing. Sawgrass predominates with few depressional wetlands. Functional wetlands are 10% or less of the total footprint area of the proposed Aguadilla levee. These are found mostly halfway along the footprint.

2. A similar situation is seen along the Espinar levee proposed footprint. (17.5 acres or 70,861 square meters including levee, drainage channel, ramps, and right of way). Upland herbaceous species and sawgrass predominate. Mangroves and cattail (*Typha spp.*) are found in 10% or less of the footprint area. The most impressive wetland vegetation is seen in an approximately 100-foot by 70-foot section of coastal barrier vegetated over 90% by climax red mangroves with a height over 50 feet . This exists in the margins of the drainage channel, which exist parallel to the coastline in a south-north attitude, no more than 500 feet inland and connecting to the estuary at the mouth of the Culebrinas River. Considerable sediment extrusion into the bay is seen at the Culebrinas River estuary.

3. For the projected cut at the central area approximately halfway between the two projected levees: The area currently includes drainage channels with flowing water, supporting mature white mangrove populations with approximately 90% coverage for some 25 feet from the existing channel margins. An mangrove juvenile and *Typha* understory dominates.

////////////////////////nothing follows//

ESTEBAN JIMENEZ
Biologist

EVALUATION SUMMARY

ESTUARINE WETLAND RAPID ASSESSMENT PROCEDURE

Date of Site Visit: 12 Oct 99

E-WRAP SCORE 0.78

Evaluator(s): E. Jimenez

Project/Site: R. Culebrines (Espinor Levee at Coastal Barrier)
Permit Number:
Wetland ID:
Wetland Type: Saltwater Swamp
Land Use: Coastal Barrier and Run off channel

SCORE	NOTES
2 Fish and Wildlife Utilization:	Slight human impact due to adjacent beach and area habitation. Debris seen. No fish seen. Crustacean burrows.
2.5 Overstory/Shrub Canopy:	Mature Red Mangrove > 90%
1.5 Ground Cover:	Juvenile Mangrove and Typha 40%
2.5 Upland/Wetland Buffer:	> 30', < 300'
2.5 Field Indicators of Wetland Hydrology:	Flowing water in channel. Adequate hydroperiod.
3 Water Quality Inputs and Treatment:	Land Use 3 unimprov natural Pre-treatment 3 unimprov natural

$\frac{14}{18}$

EVALUATION SUMMARY

ESTUARINE WETLAND RAPID ASSESSMENT PROCEDURE

Date of Site Visit: 12 Oct 99

E-WRAP SCORE 0.33

Evaluator(s): E. Jimenez

Project/Site: R. Culebrinas (Espinor Levee)
Permit Number:
Wetland ID:
Wetland Type: Emergent (Freshwater Flat) prairie
Land Use: Agricultural Use

SCORE **NOTES**

0.5 Fish and Wildlife Utilization:

Cattle and associated bird species
No fish seen.

0.5 Overstory/Shrub Canopy:

Upland Spp. ~ 80%

0.5 Ground Cover:

~ 10% Cattail (Typha). Predominant upland Spp.

1.5 Upland/Wetland Buffer:

>30'. Connection to wildlife corridors

0.5 Field Indicators of Wetland Hydrology:

Altered wetland hydrology would require scrapedown.

2.5 Water Quality Inputs and Treatment:

Land Use 2.5 Ran

$\frac{6}{18}$

Pre-treatment 2.5 Berms

EVALUATION SUMMARY

Without Proje

ESTUARINE WETLAND RAPID ASSESSMENT PROCEDURE

Date of Site Visit: 12 Oct 99

E-WRAP SCORE 0.33

Evaluator(s): E. Jimenez

Project/Site: Rio Culebrinas (Aguadilla Levee following Cano Madre Vieja)
Permit Number:
Wetland ID:
Wetland Type: Freshwater Flat (emergent prairie
Land Use: Horse/Cattle pasture

SCORE **NOTES**

1 Fish and Wildlife Utilization:

Birds associated with cattle (i.e. egrets). No fish seen. Various crab burrows.

0 Overstory/Shrub Canopy:

No nesting. <10% in some depressional areas.

0.5 Ground Cover:

Typha and Buttonwood 10%

1.5 Upland/Wetland Buffer:

30'> x <300'. Wildlife corridor connections.

1 Field Indicators of Wetland Hydrology:

Transitional vegetation indicating interference with hydrology.

2 Water Quality Inputs and Treatment:

$LU = 2.5(.5) + 2(.5)$
$= 1.25 + 1.0$
$= 2.25$

Land Use 50% high de
vegitation; 50% past
Pre-treatment 1 dry rete
2.5 Berms

6 $2.25 + 1.75 = \frac{4}{2} = 2$

EVALUATION SUMMARY

Without Project

ESTUARINE WETLAND RAPID ASSESSMENT PROCEDURE

Date of Site Visit: 12 Oct 99

E-WRAP SCORE 0.76

Evaluator(s): E. Jimenez

Project/Site: R. Culebrinas (Planned cutoff between Espinar and Aguadilla)
Permit Number:
Wetland ID:
Wetland Type: Mangrove forest and existing channel.
Land Use: Undeveloped.

SCORE **NOTES**

2 Fish and Wildlife Utilization:

No fish seen. Birds (crane) seen. Rodents crabs and burrows.

3 Overstory/Shrub Canopy:

Over 90% mature mangrove (white)

2 Ground Cover:

Wetland spp., Mangrove juveniles.

2 Upland/Wetland Buffer:

30' > x < 300', undeveloped. Connected to possible wildlife corridors.

2 Field Indicators of Wetland Hydrology:

Standing water with high hydroperiod. Supports wetland vegetation.

2.75 Water Quality Inputs and Treatment:

Land Use 3 Open = 3

Pre-treatment 2.5 wet de swales.

$\frac{13.75}{18} = 0.76$ $\frac{3+2.5=5.5}{2 \quad 2} = 2.75$