

May 2020

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# **FINAL ENVIRONMENTAL ASSESSMENT**

## **RÍO CULEBRINAS, PUERTO RICO STUDY**



**US Army Corps of Engineers  
JACKSONVILLE DISTRICT**

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**FINAL**



## **FINDING OF NO SIGNIFICANT IMPACT**

### **ENVIRONMENTAL ASSESSMENT**

### **RÍO CULEBRINAS, PUERTO RICO STUDY**

The U.S. Army Corps of Engineers, Jacksonville District (Corps) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Environmental Assessment (EA) dated May 2020, for the Río Culebrinas, Puerto Rico Study addresses reduction of flood damages opportunities and feasibility in the southwest portion of Aguadilla and the community of Espinar in Aguada and Aguadilla, Puerto Rico. The final recommendation is contained in the report of the Chief of Engineers, dated May 2020.

The final EA, incorporated herein by reference, evaluated various alternatives that would reduce flood risk in the study area. The Recommended Plan is the National Economic Development (NED) Plan and includes:

- a) Two levees (Aguadilla and Espinar) with a total length of approximately 3.03 km (2.05 miles);
- b) Interior drainage features consisting of a 1 meter (3.28 feet) deep and 7 meter (22.97 feet) wide drainage channel along the protected side of each levee;
- c) A two-way drainage structure near the north end of the Espinar Levee; three one-way drainage structures along the Aguadilla Levee;
- d) A 60-meter (196.85 feet) long cutoff channel for the Caño Madre Vieja to connect two meanders of the stream where the Aguadilla Levee will interrupt it (4 meters [13.12 feet] deep by 43.2 meters [141.73 feet] wide);
- e) Three paved roadway ramps across the levees;
- f) A borrow area located in Aguada;
- g) Net creation of approximately 11 to 12 acres of wetlands for mitigation based on unavoidable impacts to approximately 10 acres of wetlands in the levee right of way.

In addition to a “no action” plan, two alternatives were evaluated in this EA. One alternative was the originally selected 2004 Recommended Plan. During the 2015 project update, new Corps’ standards and guidelines were applied to the 2004 Recommended Plan. The necessary changes resulted in a new alternative, the 2015 Recommended Plan, which is being carried forward as this EA’s Recommended Plan. Section 2 of the EA describes the alternatives, issues, and basis of choice in more detail.

For all alternatives, the potential effects were evaluated, as appropriate. A summary of the potential effects of the Recommended Plan are listed in Table 1:



**Table 1: Summary of Potential Effects of the Recommended Plan**

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Aesthetic resources	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal barrier resource systems	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cultural resources	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish and wildlife resources	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous, toxic & radioactive waste	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Noise	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental justice	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Essential Fish Habitat (EFH)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Prime and unique farmland soils	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recreation resources	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Socioeconomic resources	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Threatened and endangered species	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vegetation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wetlands	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the Recommended Plan. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts. The Recommended Plan is expected to result in unavoidable impacts to approximately 10 acres of wetlands within the levee right of way. The 2015 Detailed Project Report (DPR) Draft Addendum and EA proposed a conceptual mitigation plan which would create approximately 13 acres of wetlands. (A portion of the plan included excavation in existing wetlands to ensure hydrologic connection; therefore, the total net creation would be approximately 11 – 12 acres of wetlands.) The Corps prepared a 2020 proposed mitigation plan (included as Appendix D), which builds upon the 2015 DPR Draft Addendum’s conceptual mitigation plan. The Corps will conduct a wetland habitat functional analysis during the project’s Preconstruction Engineering Design (PED) phase to verify that the functional equivalent is still valid and ensure the appropriate performance measures are in place. Detailed calculations and exact acreages are not expected to change by more than 50% from the project’s conceptual mitigation plan proposed in the 2015 DPR Draft Addendum. The final mitigation plan will be coordinated with the U.S. Fish and Wildlife Service (USFWS) as well as the Puerto Rico Department of Natural and Environmental Resources (DNER). The plan will be developed by the Corps and provided to partner agencies for



review and comment. The mitigation plan will be finalized during the design phase when the project is reviewed on Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) characteristics.

Public review of the proposed FONSI and draft EA was completed on April 20, 2019. All comments submitted during the public review period were responded to in the final EA and FONSI. **A state and agency review of the final EA was also completed on XXXX, 2020.** Comments from state and federal agency review did not result in any significant changes to the final EA.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers determined that the Recommended Plan may affect but is not likely to adversely affect the following federally listed species or their designated critical habitat: Puerto Rican boa (*Epicrates inornatus*). The U.S. Fish and Wildlife Service (FWS) concurred with the Corps' determination on March 7, 2019.

Pursuant to section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers initiated consultation for the Recommended Plan with the Puerto Rico Historic Preservation Officer (SHPO). The Corps and the Puerto Rico SHPO signed a Programmatic Agreement (PA) on May 24, 2019. All terms and conditions resulting from the agreement shall be implemented in order to minimize adverse impacts to historic properties.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the Recommended Plan has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in Appendix C of the EA.

A water quality certification pursuant to section 401 of the Clean Water Act will be obtained from the Commonwealth of Puerto Rico prior to construction. All conditions of the water quality certification will be implemented in order to minimize adverse impacts to water quality.

A determination of consistency with the Puerto Rico Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972 will be obtained from the Puerto Rico Planning Board (PRPB) prior to construction. The Corps determined that the Recommended Plan is consistent with the Puerto Rico's Coastal Zone Management program. PRPB concurred with the Corps' determination on December 4, 2019.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed. Pursuant to the Farmland Protection Policy Act of 1981, the Corps coordinated with the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) in 2002 for effects to prime and/or unique farmland affected by implementation of this project. Due to project design modifications, the Corps re-coordinated with NRCS and concluded that



additional acreage may be affected; however, the route of the levees and cutoff channel is constrained by nearby development and has been optimized for hydraulic and engineering considerations. NRCS concurred with the Corps' determination in an email dated May 10, 2019.

Technical, environmental, and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the Recommended Plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

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Date

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Andrew D. Kelly, Jr.  
Colonel, Corps of Engineers  
District Commander

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# FINAL ENVIRONMENTAL ASSESSMENT RÍO CULEBRINAS, PUERTO RICO STUDY

## 1 PROJECT PURPOSE AND NEED

### 1.1 PROJECT DESCRIPTION

The U.S. Army Corps of Engineers, Jacksonville District (Corps), proposes to construct two segments of earthen levees, a short cutoff channel, drainage structures, interior drainage channels, and three paved road ramps across the levees to reduce flood damage to the southwest portion of Aguadilla and the community of Espinar in Aguada, Puerto Rico. The non-Federal sponsor (NFS) is the Municipality of Aguadilla.

The Río Culebrinas is approximately 43.94 kilometers (km) (27.3 miles) long and originates in the western part of the central mountain range of Puerto Rico, approximately 130 km (80.8 miles) west of the city of San Juan (see **Figure 1**). The Río Culebrinas flows in a westerly direction through the areas of San Sebastian, Moca, Aguadilla, and Aguada where the river discharges into the Aguadilla Bay in the Mona Passage on the northwestern coast of Puerto Rico. Tributaries of the Río Culebrinas include the Caño Madre Vieja, Río Guatemala, Río Caño, Río Sonador, and Quebrada Grande. The Caño Madre Vieja, a 2.09 km (1.3 miles) long tributary of Río Culebrinas, is an old river outlet that flows across the project area and discharges into the Aguadilla Bay. This small intermittent stream is the political boundary dividing the municipalities of Aguadilla and Aguada.



**Figure 1. Río Culebrinas, Puerto Rico Study project location map.**  
 (SOURCE: Corps 2018)

More detailed information on the project can be found in the documents listed in section 1.4 of this report.

## **1.2 PROJECT AUTHORITY**

The Río Culebrinas project was initially authorized under the Continuing Authorities Program (CAP), Section 205 of the Flood Control Act of 1948, Public Law 80-858, as amended (33 U.S.C. § 701s). A Detailed Project Report (DPR) and Environmental Assessment (EA) were approved in 2004. A 2015 Draft Addendum was prepared to supplement the 2004 DPR and EA. However, the project was suspended due to project costs exceeding the CAP funding limits for the federal share, and the 2015 Draft Addendum was never approved. Completion of all components of the approved plan are necessary to achieve full project benefits. No portion of the project has been constructed since the project's initial approval. The project cost exceeded the capacity of the statutory CAP budget limits. The project is now being planned under the authority of Section 204 of the Flood Control Act of 1970, Public Law 91-611, authorizing the Secretary of the Army, acting through the Chief of Engineers, to prepare plans for the development, utilization and conservation of water and related land resources of drainage basins and coastal areas in the Commonwealth of Puerto Rico.

Title IV, Division B of the Bipartisan Budget Act (BBA) of 2018 (Public Law 115-123), authorizes the Corps to conduct the study at full federal expense to the extent that appropriations provided under the Investigations heading of the 2018 BBA are available and used for such purpose. Due to the impact of Hurricane Maria in 2017 and the NFS request, the project was included in the list of projects to receive funding in the BBA 2018, with plans for it to be converted to a specifically authorized project. A more detailed discussion on the project authority can be found in Appendix F, specifically the 2020 CAP Conversion Feasibility Report for Río Culebrinas, Puerto Rico Study.

## **1.3 PROJECT NEED OR OPPORTUNITY**

The purpose of the project is to reduce flood damages to the southwest portion of Aguadilla and the community of Espinar in Aguada, Puerto Rico. Although flooding in the Río Culebrinas basin can occur at any time during the year, it is most frequent during the period of May through December. The large rainfall-driven peak discharges in the basin are generally associated with hurricanes, tropical depressions and tropical waves passing over or near Puerto Rico. Due to the steep slopes in the upper basin, flash floods from intense thunderstorms are a common event affecting this area and can occur anytime during the year. During the flood season, floodwaters overtopping the Río Culebrinas and Caño Madre Vieja pose potential dangers to surrounding residents, inundate all major highways and roads in the Río Culebrinas floodplain, and are a source of frequent flood damage to properties. Effects from Hurricane Maria, which hit the island in September 2017, prompted the Corps to include the project for consideration for funding under the BBA. (Effects from the storm are discussed more in this EA's section 3.5 Hurricane Maria Storm Effects.)

This Environmental Assessment (EA) evaluates the Recommended Plan, which is described in detail in Section 2.2. This EA also completes the required analysis under National Environmental Policy Act (NEPA) and adopts the 2004 EA by reference where the information is valid and applicable to this evaluation.

#### **1.4 RELATED ENVIRONMENTAL DOCUMENTS**

The Recommended Plan is detailed in the 2004 Río Culebrinas Aguadilla-Aguada, Puerto Rico Final Detailed Project Report (DPR) and EA, 2015 DPR Draft Addendum, and the 2020 CAP Conversion Feasibility Report for Río Culebrinas, Puerto Rico Study. These documents are available on the Corps' environmental website, under Puerto Rico, at the following link:

<http://www.saj.usace.army.mil/About/Divisions-Offices/Planning/Environmental-Branch/Environmental-Documents/>

(On that page, click on the “+” next to “Puerto Rico” and scroll down to the project name.)

#### **1.5 DECISIONS TO BE MADE**

This NEPA document analyzes whether the implementation of the project will result in significant effects on the human environment. The Recommended Plan is expected to result in unavoidable impacts to approximately 10 acres of wetlands within the levee right of way; therefore, mitigation is needed and a proposed mitigation plan has been prepared (see Appendix D), which builds upon the 2015 DPR Draft Addendum's conceptual mitigation plan. In order to meet current Federal, state, and local laws, regulations, and policy, as well as Corps standards and guidelines, the Recommended Plan will be refined during the PED phase. The project, as it is currently described and designed, is environmentally acceptable; however, if during PED changes to the project result in effects that have not been previously evaluated, then pursuant to NEPA, the Corps will prepare a separate NEPA document to address the changes and evaluate the associated effects. The Corps and its contractors commit to avoiding, minimizing, and mitigating for adverse effects during construction activities.

In addition to this NEPA document, a 2020 CAP Conversion Feasibility Report for Río Culebrinas, Puerto Rico Study has also been prepared and is included in this EA's Appendix F. The purpose of the 2020 report is twofold: (1) to reaffirm the economic justification, environmental acceptability, and engineering feasibility of the plan previously identified in the DPR and EA that was approved by the South Atlantic Division Commander in June 2004; and (2) to convert this project from CAP to a specifically authorized project. This is an expedited review of the previously approved plan without additional plan formulation and is a supplement to the 2004 DPR and EA.

#### **1.6 SCOPING AND ISSUES**

Environmental scoping started in February 1991 during the reconnaissance level studies. A scoping letter, dated July 14, 1995, was issued for the project and circulated to applicable federal and Commonwealth agencies. Pursuant to NEPA, the draft DPR and EA were circulated for comments from April 29, 2002 through June 4, 2002. Comments received during the public and agency review period were incorporated into the EA prior to the signature of the 2004 FONSI. A public outreach meeting was held by the Corps on November 6, 2018 in Aguadilla for the project. The proposed FONSI, draft EA, and associated appendices were released for a 60-day public and agency review and

comment period, which ended on April 20, 2019.

#### 1.6.1 RELEVANT ISSUES

The Corps identified the following issues as relevant to the Recommended Plan and appropriate for further evaluation: vegetation, wetlands, threatened and endangered and species, fish and wildlife resources, essential fish habitat (EFH), coastal barrier resource system (CBRS) units, water quality, hazardous, toxic, and radioactive waste (HTRW), prime and unique farmland soils, air quality, noise, aesthetic resources, recreation resources, socioeconomic resources, cultural resources, unavoidable adverse environmental effects, and cumulative effects. The Corps analyzed many of these issues in the 2004 EA. The 2020 EA updates that analysis and adopts the 2004 EA by reference where the information is valid and applicable to this evaluation. Please see **Table 1** for additional information.

#### 1.6.2 ISSUES ELIMINATED FROM FURTHER ANALYSIS

No issues were identified for elimination.

### **1.7 WATER QUALITY CERTIFICATION (WQC) AND COASTAL ZONE MANAGEMENT ACT**

The project will meet the Commonwealth of Puerto Rico water quality standards. Pursuant to Section 401 of the Clean Water Act of 1972, as amended, water quality certification (WQC) will be obtained from the Commonwealth of Puerto Rico prior to construction. The project will implement and meet all applicable conditions imposed by the WQC in order to minimize adverse impacts to water quality. Pursuant to the Coastal Zone Management Act (CZMA), a Federal Consistency Determination (FCD) was submitted to the Puerto Rico Planning Board (PRPB) for the Commonwealth of Puerto Rico's review and concurrence. The Corps determined that the Recommended Plan is consistent with Puerto Rico's Coastal Zone Management Program. On October 29, 2019, the Corps attended an interagency meeting and a public meeting, which were hosted by PRPB as part of their review of the project's FCD. PRPB concurred with the Corps' determination on December 4, 2019. Pertinent correspondence is found in Appendix A.

## 2 ALTERNATIVES

This EA evaluates changes between the 2004 and 2015 Recommended Plans as well as changes in the existing environment to ensure that any new potential environmental consequences on the human environment are fully analyzed and disclosed to the public. Section 4 (Environmental Effects) compares the alternatives in more detail, providing a clear basis for choice to the decision maker and the public. The project's Recommended Plan best meets the project objectives and constraints and is environmentally acceptable and economically justified.

### 2.1 NO ACTION ALTERNATIVE

NEPA regulations refer to the No Action Alternative as the continuation of existing conditions of the affected environment without implementation of, or in the absence of, the Recommended Plan and 40 C.F.R. §6.205 requires an agency to assess the No Action Alternative in an EA. Under this alternative, existing and prospective flooding conditions would continue. Damages to communities experiencing the flooding could increase if development continues in these areas. Flooding, and its associated damages, may result in potential human health and safety issues.

### 2.2 2004 RECOMMENDED PLAN EARTHEN LEVEES, CUTOFF CHANNEL, AND DRAINAGE FEATURES FOR 100-YEAR FLOOD

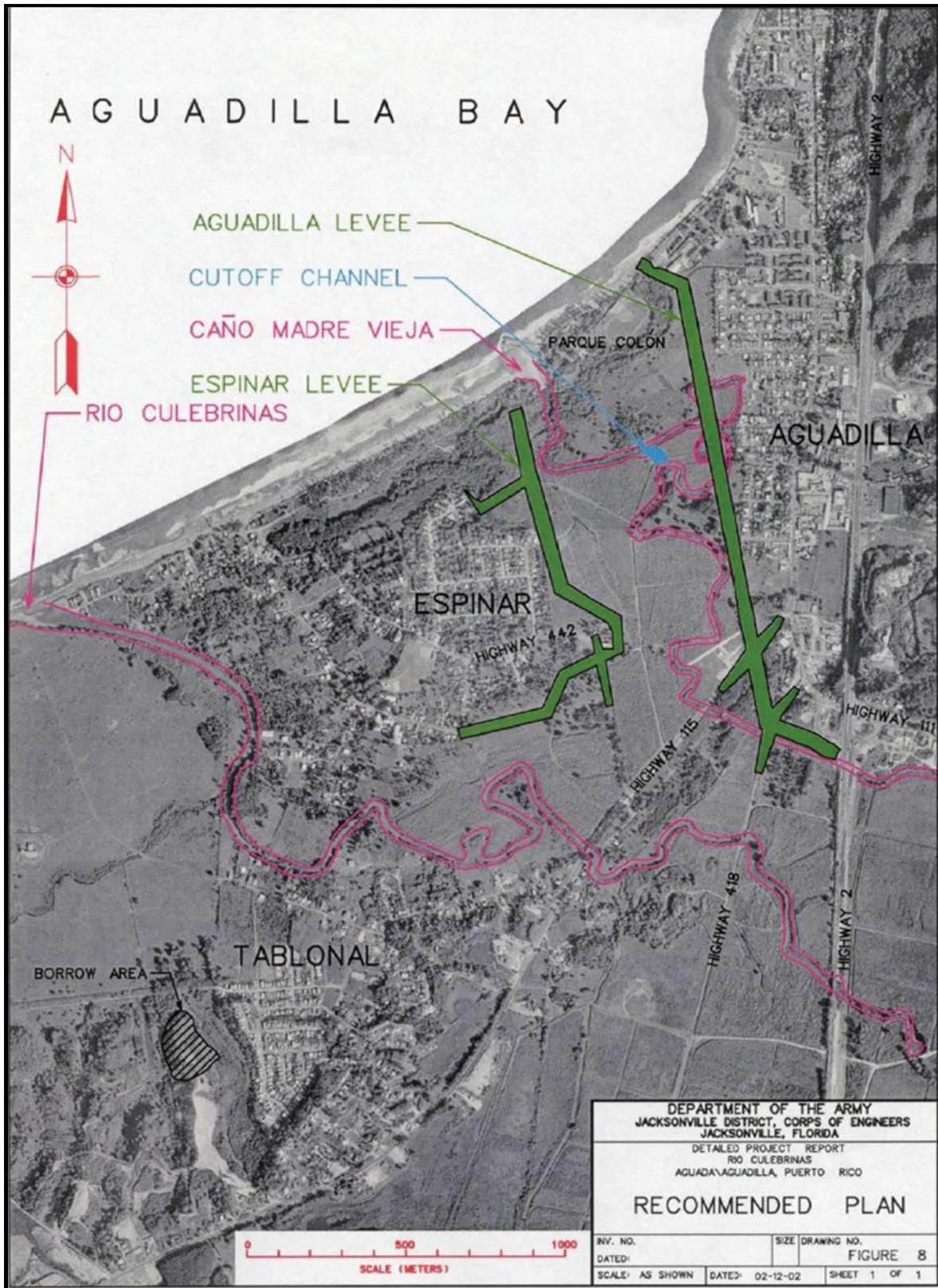
The 2004 Recommended Plan (see **Figure 2** and **Figure 3**), maximizes the National Economic Development (NED) benefits and consists of the construction of two drainage levees with a combined total length of approximately 3.3 kilometers (km) (2.05 miles) and average height of 2.5 meters (8.2 feet) with 3:1 side slopes and levee crest of 3 meters (9.84 feet). The Espinar Levee begins at the southern end of the Espinar community and extends east then north for approximately 1.5 km (0.93 miles) and ends south of the Caño Madre Vieja mouth. The Aguadilla Levee begins near Highway 2 and extends north for approximately 1.8 km (1.12 miles) and ends near Yumet Avenue. The Aguadilla Levee will transect the Caño Madre Vieja. A cutoff channel, measuring approximately 60 meters long by 4 meters deep by 43.2 meters wide (196.85 feet long by 3.12 feet deep by 141.73 feet wide), will be constructed to reconnect the two sections of the Caño Madre Vieja interrupted by the levee. Three paved roadway ramps will also be constructed across the levees.

In addition to the levees and cutoff channel, other drainage components of the project include:

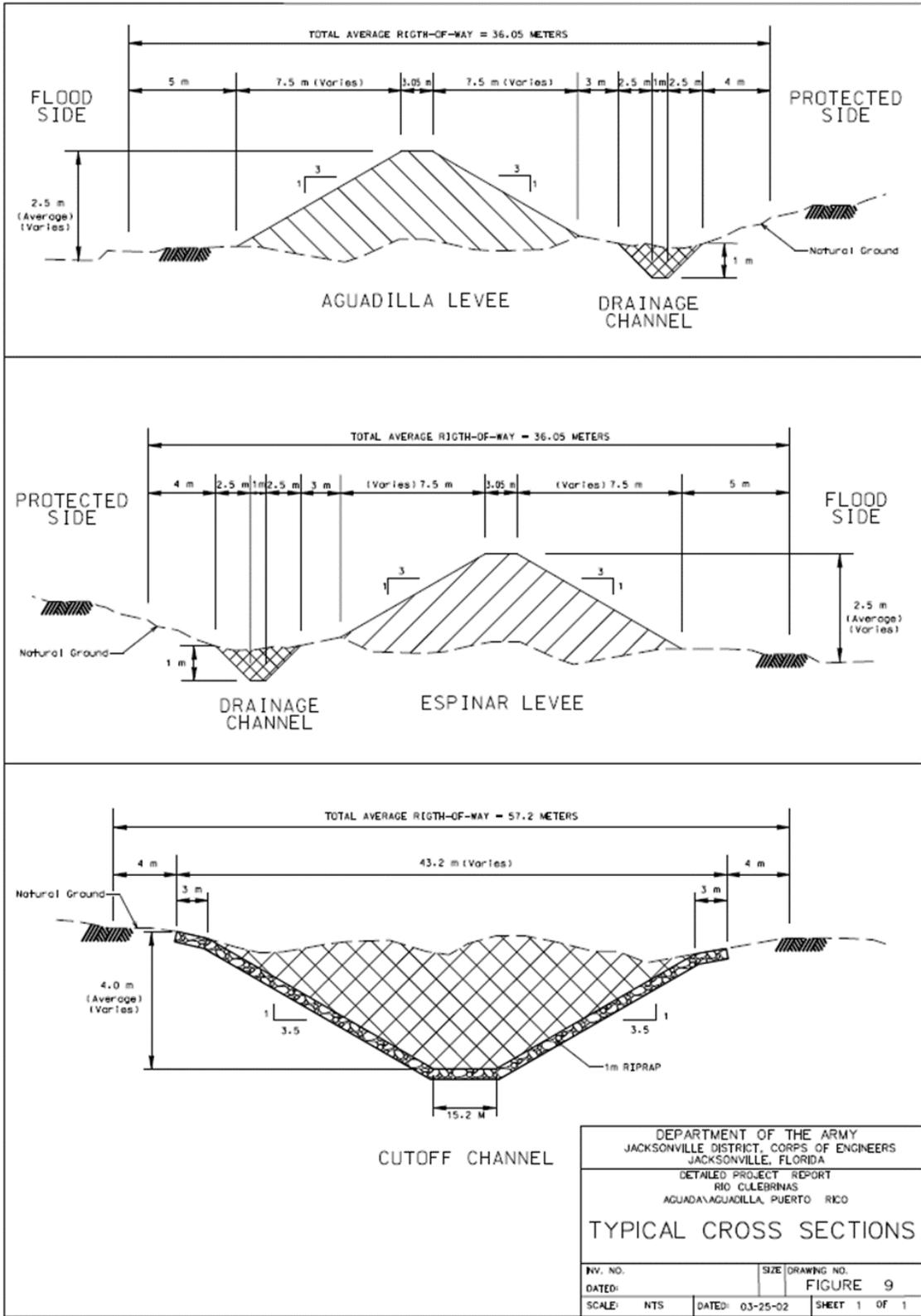
- Interior drainage channels measuring approximately 1 meter deep by 7 meters wide (3.28 feet deep by 22.97 feet wide) constructed adjacent to the protected side of the levees;
- One, two-way drainage structure near the north end of the Espinar levee;
- Three, one-way drainage structures along the Aguadilla levee.

The construction of the 100-year levees, interior drainage facilities, and cutoff channel

would require approximately 84,101 cubic meters (110,000 cubic yards) of fill. Approximately 24,466 cubic meters (32,000 cubic yards) would come from the excavation of the cut-off and interior drainage channels, while the rest of the fill would come from a permitted and approved commercial borrow site.



**Figure 2. Recommended Plan features.**  
 (SOURCE: Corps 2018)



**Figure 3. Recommended Plan cross sections.**  
 (SOURCE: Corps 2018)

## **2.3 2015 RECOMMENDED PLAN**

### **THE 2004 RECOMMENDED PLAN, INCLUDING 2015 DESIGN MODIFICATIONS**

Due to updated Corps' models and levee safety standards, the 2004 Recommended Plan required several design modifications. Design changes include the use of concrete (instead of metal) culverts, armoring for the cutoff channel, and revisions to the levee side slopes to meet current Corps levee design guidance criteria. The dimensions of the levees increased from 2.5:1 in the 2004 plan to 3:1 in the 2015 plan. The 2004 project was self-mitigating; however, due to the increases in the width of the levee cross sections and the need for additional lands, the current project was reviewed for its potential environmental impacts with respect to adjacent wetlands. The Corps determined that the revised levee design would affect additional wetlands more than anticipated in 2004 and thus a mitigation plan would be implemented. The Recommended Plan is expected to result in unavoidable impacts to approximately 10 acres of wetlands within the levee right of way. The Corps' 2015 DPR Draft Addendum proposed a conceptual mitigation plan which would create approximately 13 acres of wetlands. (A portion of the plan included excavation in existing wetlands to ensure hydrologic connection; therefore, the total net creation would be approximately 11 – 12 acres of wetlands.) The Corps prepared a 2020 proposed mitigation plan (see Appendix D), which builds upon the 2015 DPR Draft Addendum's conceptual mitigation plan. The Corps will conduct a wetland habitat functional analysis during the project's PED phase to verify that the functional equivalent is still valid and ensure the appropriate performance measures are in place. Detailed calculations and exact acreages are not expected to change by more than 50% from the project's conceptual mitigation plan proposed in the 2015 DPR Draft Addendum. The final mitigation plan will be coordinated with the U.S. Fish and Wildlife Service (USFWS) as well as the Puerto Rico Department of Natural and Environmental Resources (DNER). The plan will be developed by the Corps and provided to partner agencies for review and comment. The mitigation plan will be reassessed during the design phase when the project is reviewed on the Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) characteristics. A more detailed description of the 2015 updates to the project, including discussion on the conceptual mitigation plan, can be found in Appendix F, specifically the 2015 DPR Draft Addendum.

## **2.4 ALTERNATIVES ELIMINATED FROM FURTHER EVALUATION**

Two alternatives (in addition to the 2004 Recommended Plan) were considered in the 2004 DPR and EA:

- Same components as described in the Recommended Plan but for the 50-year flood;
- Same components as described in the Recommended Plan but the levees would be higher and wider to provide protection for the Standard Project Flood.

These alternatives did not maximize the NED benefits and were eliminated from further evaluation, however, more detailed information can be found in the 2004 DPR and EA.

## **2.5 RECOMMENDED PLAN AND BASIS FOR CHOICE**

**Table 1** in Section 4 lists the factors considered in the alternatives comparison process and provides the analysis of the major features and consequences of each alternative in comparison to one another. The No Action Alternative is not carried forward as it does

not meet the mission. During the 2015 project update, new Corps standards and guidelines were applied to the 2004 Recommended Plan. The necessary changes resulted in a new alternative, the 2015 Recommended Plan, which is also being carried forward as this EA's recommended plan. In consideration of applicable factors listed in 33 CFR section 320.4, the Corps has determined the 2015 Recommended Plan is not contrary to public interest and is therefore, carried forward as the preferred alternative.

### **3 EXISTING ENVIRONMENT**

The Existing Environment Section describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that will affect or that will be affected by the alternatives if they were implemented. This section, in conjunction with the description of the No Action Alternative, forms the baseline conditions for determining the environmental effects of the reasonable alternatives.

No significant changes to the existing conditions have been documented between site visits conducted in 2004, 2015, and 2019. A brief summary of existing conditions is included in this section; however, a full detailed analysis is provided within the 2004 DPR and EA and is hereby incorporated by reference within this EA. The 2004 DPR and EA is available on the Corps' environmental website, under Puerto Rico.

#### **3.1 NATURAL SETTING**

##### **(VEGETATION, WETLANDS, THREATENED AND ENDANGERED SPECIES, FISH AND WILDLIFE RESOURCES, AND EFH)**

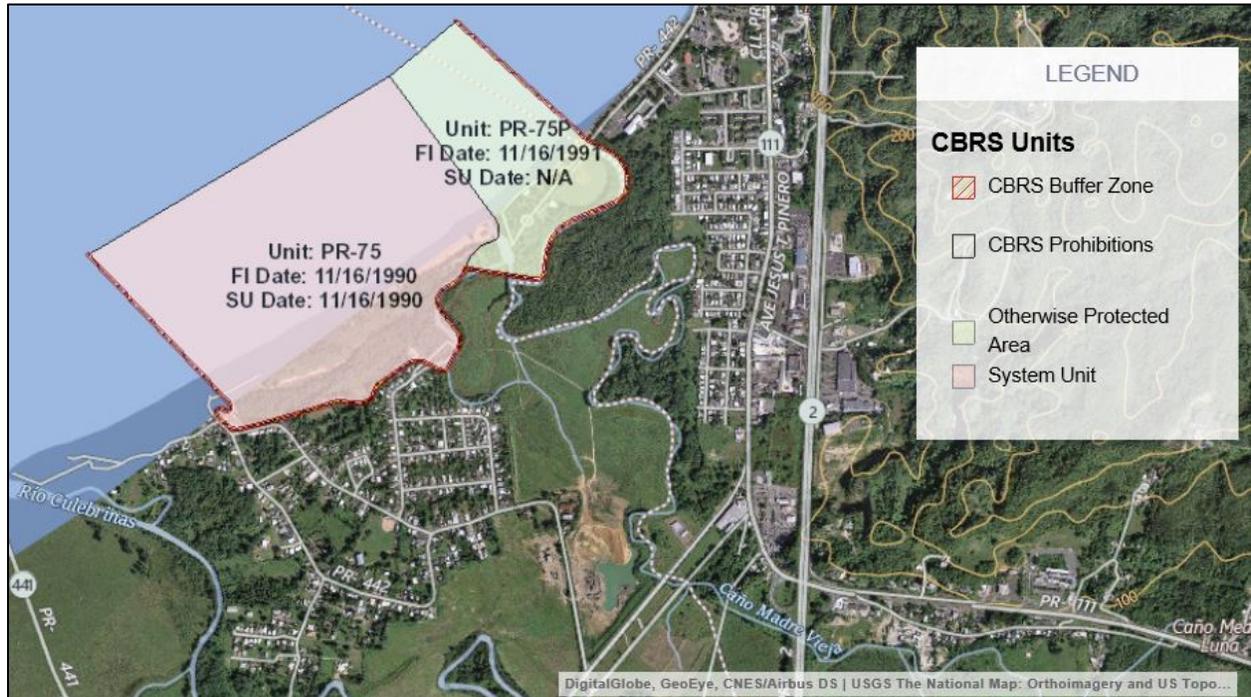
Most of the lands in the project area are unimproved pasture or formerly planted in sugar cane and have since reverted to mixed upland and/or wet grassland vegetation such as grasses, herbs, and salt-tolerant shrubs. PRBP, DNER, the Sea Grant Program, and the non-governmental organization "Ciudadanos Aguadefios Pro Conservacion del Ambiente" have proposed a portion of the project area's wetlands for designation as a Natural Reserve. According to a letter from PRPB dated April 16, 2019, the Espinar Swamp Reserve area would be approximately 56 acres and is one of the first of 26 natural areas to be recommended by the Puerto Rico Coastal Zone Management Program for official designation as a Natural Reserve. DNER describes this area as the only swamp and estuary with a healthy mangrove population in the northeast coast of Puerto Rico. The mixed pasture and emergent wetlands of the area do not appear to be significant habitat; therefore, wildlife in this area is not very diverse or unusual. Wildlife species, such as lizards, frogs, birds, rats, and crustaceans, are commonly seen in the area. The USFWS 1999 Coordination Act Report (CAR) identified freshwater river shrimp (*Macrobrachium carcinus*) as an aquatic species of concern in this area. Additionally, the federally listed endangered Puerto Rican boa (*Epicrates inornatus*) may occur in the project area. No effect to EFH is anticipated as the project occurs inland. In a letter dated August 4, 1999, National Marine Fisheries Service (NMFS) stated it had no comments or recommendations to offer on the project with regard to EFH.

#### **3.2 PHYSICAL SETTING**

##### **(CBRS, WATER QUALITY, HTRW, PRIME AND UNIQUE FARMLAND SOILS, CLIMATE CHANGE, AIR QUALITY, NOISE)**

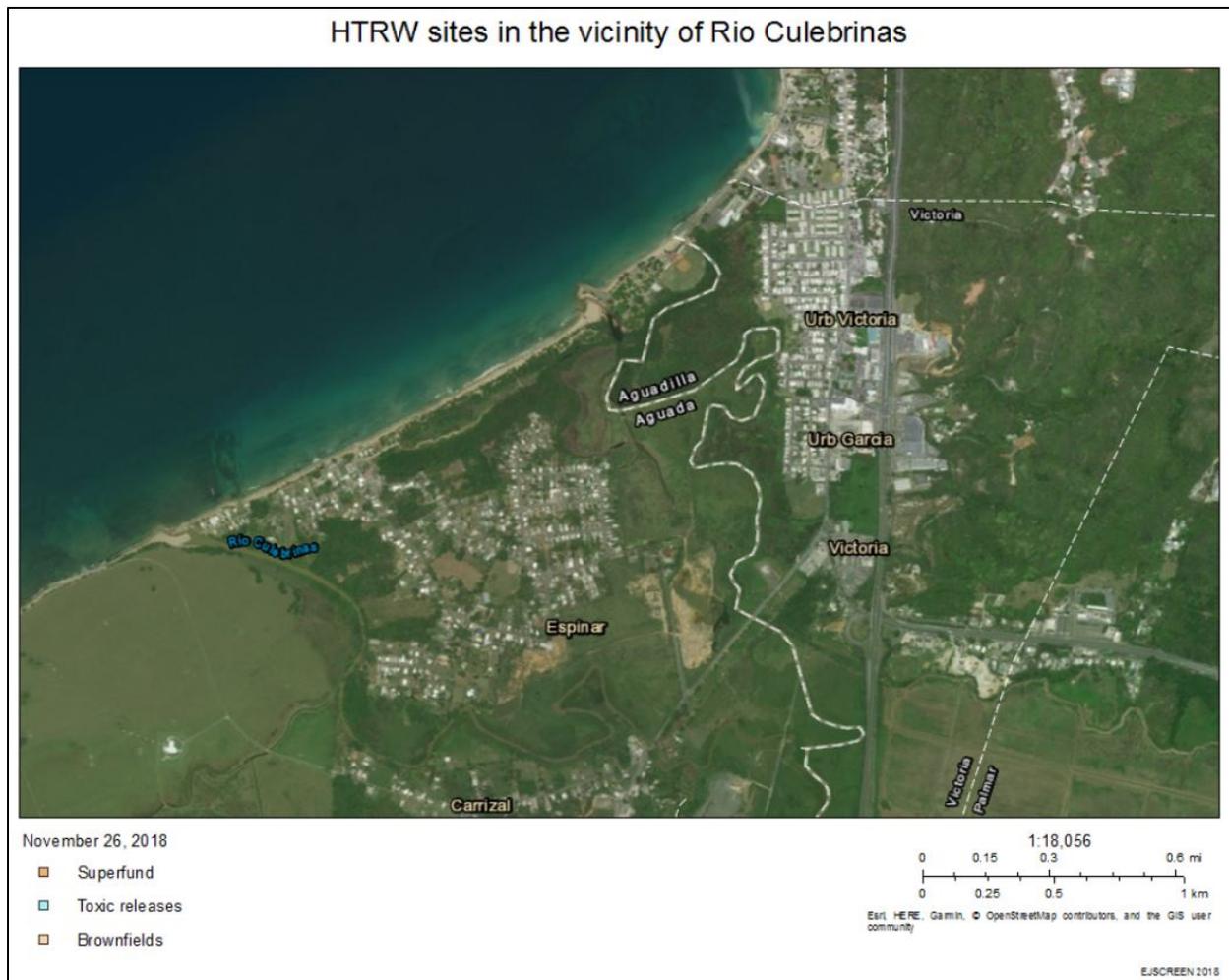
Río Culebrinas and Caño Madre Vieja are Class SD Surface Waters. Class SD waters are intended for use as a raw source of public water supply, propagation and preservation

of desirable species as well as primary and secondary contact recreation. Primary contact recreation is precluded in any water body or segment that does not comply with Rule 1303.2 (D) (2) (m) until such water body or segment meets the goal of the referred section. CBRS Units PR-75 and PR-75P are located adjacent to, but not within, the project area (see **Figure 4**).



**Figure 4. USFWS CBRS units in the project area.**  
(SOURCE: USFWS CBRS mapper)

A civil works audit in May 1995 (updated in May 1999) and the HTRW review conducted in the 2004 EA determined HTRW contamination is negligible in the study area due to the predominant land use being agricultural and no known spills, problems, or sites were known to be in the study area. A review of the U.S. Environmental Protection Agency’s (USEPA) EnviroMapper in November 2018 confirmed there are no superfund, toxic release, or brownfield sites in the project vicinity (see **Figure 5**).



**Figure 5. USEPA resource mapper HTRW sites.**  
(SOURCE: USEPA EnviroMapper)

Prime and unique farmland soils exist in the project area. Coordination with the Natural Resources Conservation Service (NRCS) for effects in the project footprint was completed in the 2004 EA. The climate in this region is characteristically tropical, with annual rainfall varying from a mean low of 45 inches to a mean high of 81 inches. Climate change requirements for Corps' projects changed in 2018. Reanalysis of the effects of climate change will occur during the PED phase. In addition, section 2.2 of the 2020 CAP Conversion Feasibility Report for Río Culebrinas, Puerto Rico Study (see Appendix F) includes more discussion on climate and climate change. The municipalities of Aguada and Agudilla are located in Air Quality Control Region "Puerto Rico", which is considered as being in attainment with the National Ambient Air Quality Standards. The project area is located in rural municipalities, where noise levels are low, except in the immediate vicinity of roads and neighborhoods.

### 3.3 SOCIOECONOMIC RESOURCES (ECONOMICS, AESTHETIC RESOURCES, RECREATION RESOURCES)

The population centers within the study area are: Aguadilla, Aguada, and Espinar (which

is unincorporated and part of the Aguada municipality). According to the 2010 Census, the populations of Aguadilla and Aguada are 60,898 and 41,912\*, respectively (\*including approximately 1,400 people in Espinar). Development within the study area is primary residential in nature, with nearly 800 residential properties (both single family homes and multi-family residences) subject to flooding. There are also approximately 100 commercial properties (including retail stores, restaurants, pharmacies, business/service offices, and gas stations) as well as 24 public properties. Notable properties in the study area include a police department, a US Army reserve station, a senior center, and a historic church (the Emerita de Espinar).

The primary economic activity in Aguadilla is manufacturing, including rubber, textiles, plastics, and other products. Most manufacturing facilities in Aguadilla are located in one of two major industrial parks, the San Antonio Technological Park or the Camaseyes Industrial Park. Other important economic activities in Aguadilla include tourism and service industries, healthcare, retail, and commercial fishing. One of Puerto Rico's most important airports, the Rafael Hernandez international airport, is located near the city. The primary economic activities in Aguada are tourism, agriculture and agricultural processing, light manufacturing, commercial fishing, services, and retail. Both cities have a mixed income socioeconomic profile, with some affluent households but also relatively high unemployment (greater than 10% in both cities).

The 2004 DPR/EA noted key infrastructure in the study area, including:

- The Aguadilla Wastewater Treatment Facility;
- An Electric Power Transmission facility and eight substations;
- Several major roads and highways, including highway PR-2, 110, and 115;
- Second largest airport in Puerto Rico, the Rafael Hernandez Airport.

All of the noted infrastructure is still located in the study area. No major infrastructure improvements have occurred since 2004.

Census data indicate that the population in the study area actually decreased slightly between 2004 and 2017 (the last date for which data are available). This was partly due to an economic crisis that has affected Puerto Rico since 2008. Over the past decade, the island has seen a net migration trend away from the island and decreasing population overall. In the short term this effect may continue due to the lingering effects of Hurricane Maria, which had a devastating effect both within the study area and throughout the island.

Two baseball fields and a public park, Parque de Colon, are located adjacent to the project footprint. Parque de Colon is located at the north end of the proposed Aguadilla levee and includes one of the baseball fields and a beach. The other baseball field is located east of the Aguadilla levee.

### **3.4 CULTURAL RESOURCES**

The Río Culebrinas valley is a very important area in both the prehistoric and recent history of Puerto Rico. The area was inhabited throughout the Ceramic Age/Pre

Columbian period, 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*, is located adjacent to the Espinar levee and is one of Puerto Rico's earliest churches. The church was originally constructed in 1526 and is eligible for listing in the National Register of Historic Places (NRHP). The Culebrinas River floodplain was heavily utilized for agriculture in the nineteenth and twentieth centuries, and as a result, numerous sugar producing haciendas and sugar processing molinos (sugar mills) were established near the study area.

Based on the high probability for historic properties to be located within the study area, a cultural resources survey of the proposed levee alignment was conducted in 1999. As a result of this survey, two archaeological sites eligible for the NRHP (Culebrinas Site 1 and the Iglesia de Espinar archaeological site) were identified within the proposed Espinar Levee footprint. One archaeological site was also identified within the proposed Aguadilla Levee footprint (Culebrinas Site 2); however, more information is necessary to determine if the site is eligible for inclusion in the NRHP.

Culebrinas Site 1 is a multicomponent site that was occupied through the late prehistoric period to the early-nineteenth century. The site predominately consists of historic ceramic artifacts with a small number of prehistoric lithic artifacts. The Iglesia de Espinar archaeological site was identified east of the existing historic church. The Church is known locally as *Iglesia de Espinar* or the *Hermitage of Immaculada Concepcion of Barrio Espinar* and located adjacent to the Espinar levee. The Iglesia de Espinar archaeological site represents historic ceramics and architectural materials likely associated with the early church community. During the initial study, both Culebrinas Site 1 and the Iglesia de Espinar archaeological site were determined eligible for inclusion in the NRHP and avoidance, minimization, or mitigation of adverse effects caused by the 2004 Recommended Plan was determined necessary.

Culebrinas Site 2 consists of a scatter of historic period artifacts, likely dating from the late-nineteenth century. As a result of the initial study, Phase II NRHP eligibility testing was deemed necessary to determine if the site is eligible for inclusion in the NRHP as defined by the National Register criteria (36 CFR Part 63).

Since the 1999 archaeological investigation, the study area has been heavily disturbed. Aerial photography of the study area indicates that Culebrinas Site 1, Culebrinas Site 2, and the Iglesia de Espinar archaeological site have been severely impacted by ground disturbing activities conducted by local entities. Additional Phase I cultural resources surveys are necessary at these locations to verify the presence of intact archaeological deposits and determine National Register eligibility. The Corps executed a Programmatic Agreement (PA) with the Puerto Rico Historic Preservation Officer (SHPO) on May 24, 2019. The PA outlines the process in which the Corps will consult with the agency to avoid, minimize, and mitigate adverse effects to historic properties.

### 3.5 HURRICANE MARIA STORM EFFECTS

Hurricane Maria, the worst storm to hit Puerto Rico in 80 years, first made landfall near the southeastern town of Yabucoa and traveled northwest across the island. The powerful Category 4 storm arrived only two weeks after Hurricane Irma passed just north of the island. The storm crossed the island with sustained winds of 155 miles per hour, which resulted in uprooted trees, downed weather stations and cell towers, and ripped wooden and tin roofs off homes. Electricity was cut off to 100 percent of the island leaving approximately 1 million people without power. Access to clean water and food became limited for most of the population.

Heavy rains and flash floods brought on by the storm exacerbated widespread devastation, turning streets into rivers full of debris. In some areas, floodwaters were waist-high, more than 30 inches deep, and often sewage-ridden. The main damages sustained in the project area are from flooding. Large portions of Aguadilla and Aguada were inundated by the overburdened Río Culebrinas and Caño Madre Vieja flood plains (see **Figures 6** and **7**). However, the areas impacted by post Hurricane Maria flooding appear to be at 90% reoccupancy. The project area's vegetation, mainly grasses and shrubs, appears to have rapidly recovered and is not substantially different than the pre-storm conditions.



**Figure 6. Caño Madre Vieja flooding post-hurricane Maria in 2017.**



Figure 7. Caño Madre Vieja flooding post-hurricane Maria in 2017.

## 4 ENVIRONMENTAL EFFECTS

The anticipated changes to the existing environment (including direct and indirect effects) for the No Action Alternative, the 2004 Recommended Plan, and the 2015 Recommended Plan are included in **Table 1**. Cumulative effects are also discussed in **Tables 2** and **3** of this section.

In order to meet current Federal, state, and local laws, regulations, and policy, as well as Corps standards and guidelines, the Recommended Plan will be refined during the PED phase. The project, as it is currently described and designed, is environmentally acceptable; however, if during PED changes to the project result in effects that have not been previously evaluated, then pursuant to NEPA, the Corps will prepare a separate NEPA document to address the changes and evaluate the associated effects. The Corps and its contractors commit to avoiding, minimizing, and mitigating for adverse effects during construction activities.

**Table 1. Summary and comparison of the potential environmental consequences associated with the implementation of the No Action Alternative and Recommended Plan.**

Environmental Factor / Resource	No Action Alternative	2004 Recommended Plan	2015 Recommended Plan
Vegetation	No effect	Construction of the levees, cutoff channel, and drainage features would lethally affect vegetation through excavation or burial; however, effects to wetland vegetation were determined to be self-mitigating.	Same as 2004 Recommended Plan; however, additional wetland impacts are anticipated due to need for levee redesign.
Wetlands	No effect	Project completion will directly affect approximately 1.5 acres of emergent wet prairie currently used as pasturelands. No mitigation plan was proposed for these effects.	Project completion is expected to result in unavoidable impacts to approximately 10 acres of wetlands within the levee right of way. The Corps' 2015 DPR Draft Addendum proposed a conceptual mitigation plan which would create approximately 13 acres of wetlands. (A portion of the plan included excavation in existing wetlands to ensure hydrologic connection; therefore, the total net creation would be approximately 11 – 12 acres of wetlands.) The goal is (1) to achieve wetland hydrologic conditions (flooding or saturation of the soil for sufficient duration and frequency) (2) to excavate material suitable for levee construction to the extent practicable, (3) to minimize the amount of unusable excavated material needing disposal, and (4) to minimize impacts (to residential, commercial, recreational, and cultural interests).

**Table 1. Summary and comparison of the potential environmental consequences associated with the implementation of the No Action Alternative and Recommended Plan.**

Environmental Factor / Resource	No Action Alternative	2004 Recommended Plan	2015 Recommended Plan
			<p>The Corps prepared a 2020 proposed mitigation plan (see Appendix D), which builds upon the 2015 DPR Draft Addendum’s conceptual mitigation plan. The Corps will conduct a wetland habitat functional analysis during the project’s PED phase to verify that the functional equivalent is still valid and ensure the appropriate performance measures are in place. Detailed calculations and exact acreages are not expected to change by more than 50% from the project’s conceptual mitigation plan proposed in the 2015 DPR Draft Addendum. The final mitigation plan will be coordinated with USFWS as well as DNER. The plan will be developed by the Corps and provided to partner agencies for review and comment. The mitigation plan will be finalized as part of the completion of the BCOES reviews. On May 21, 2019, the Corps, DNER, PRPB, and the mayors of Aguadilla and Aguada discussed the possible impacts of the project to the proposed Espinar Swamp Reserve. It is the Corps’ understanding that the proposed designation of the</p>

**Table 1. Summary and comparison of the potential environmental consequences associated with the implementation of the No Action Alternative and Recommended Plan.**

Environmental Factor / Resource	No Action Alternative	2004 Recommended Plan	2015 Recommended Plan
			Espinar Swamp Reserve has not yet been finalized. Should the proposed designation of the Espinar Swamp Reserve area become final, the Corps will work with the pertinent agencies to address any additional efforts that may be required.
Threatened and Endangered Species	No effect	No effect on any federally listed threatened and endangered species. NMFS concurred in a letter dated August 8, 1995. The 1999 USFWS CAR did not identify any threatened and endangered species or effects to critical habitat.	Construction activities may affect, but are not likely to adversely affect, (MANLAA) the Puerto Rican boa. Standard protection measures will also be implemented to protect any boas that may occur in the area. In a letter dated March 7, 2019, USFWS concurred with the Corps' MANLAA determination. Pertinent correspondence is included in Appendix A.

**Table 1. Summary and comparison of the potential environmental consequences associated with the implementation of the No Action Alternative and Recommended Plan.**

Environmental Factor / Resource	No Action Alternative	2004 Recommended Plan	2015 Recommended Plan
Fish and Wildlife Resources	No effect	Construction of the cutoff channel and the Aguadilla levee where it intersects Caño Madre Vieja may result in lethal effects to non-motile species in these areas due to removal and/or burial. These impacts, although lethal, are expected to be minor and temporary as recolonization from adjacent communities will occur almost immediately. Temporary displacement of wildlife during construction due to noise and/or construction activities may occur; however, these effects are expected to be minor and will cease with the completion of construction. If fish are located in the abandoned portion of the channel, these fish may be stranded.	Same as 2004 Recommended Plan
EFH	No effect	No effect, EFH is not present in the project area.	Same as 2004 Recommended Plan. In an email dated April 10, 2019, NMFS stated “The NMFS anticipates any adverse effects from implementing the Recommended Plan to NOAA-trust resources would be minimal.” NMFS did not provide any conservation recommendations. See Appendix A for pertinent correspondence.

**Table 1. Summary and comparison of the potential environmental consequences associated with the implementation of the No Action Alternative and Recommended Plan.**

Environmental Factor / Resource	No Action Alternative	2004 Recommended Plan	2015 Recommended Plan
CBRS	No effect	The project will have no effect on the CBRS units in the area. The project will not result in an increase in the development of CBRS Unit PR-75P, which has already been developed by the Municipality of Aguadilla. The project was modified to avoid working within CBRS Unit PR-75.	Same as 2004 Recommended Plan
Water Quality	No effect	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. Short-term increases in the turbidity are expected during the construction phase of the project; however, water quality is expected to quickly return to pre-construction conditions following completion of construction.	Same as 2004 Recommended Plan
HTRW	No effect	No effect	No effect

**Table 1. Summary and comparison of the potential environmental consequences associated with the implementation of the No Action Alternative and Recommended Plan.**

Environmental Factor / Resource	No Action Alternative	2004 Recommended Plan	2015 Recommended Plan
Prime and Unique Farmland Soils	No effect	The Recommended Plan would eliminate 11.7 acres of farmland. Existing development confines the work area and acts as a containment berm for water flow. In a letter dated May 17, 2002, NRCS stated the draft EA clearly addressed the Farmland Protection Policy Act of 1981 and the agency has no further environmental concerns.	Same as 2004 Recommended Plan.
Air Quality	No effect	Minor, temporary degradation of air quality will occur due to emissions during construction operations as well as heavy equipment and truck haul emissions, however, air quality is expected to quickly return to pre-construction conditions following completion of construction.	Same as 2004 Recommended Plan
Noise	No effect	A temporary increase in the noise level in the project area would occur during construction operations; however noise levels are expected to quickly return to pre-construction conditions following completion of construction.	Same as 2004 Recommended Plan

**Table 1. Summary and comparison of the potential environmental consequences associated with the implementation of the No Action Alternative and Recommended Plan.**

Environmental Factor / Resource	No Action Alternative	2004 Recommended Plan	2015 Recommended Plan
Aesthetic Resources	No effect	The structures will be incorporated into the aesthetic appearance of the area. The quality of aesthetically pleasing green areas will not be compromised by project results.	Same as 2004 Recommended Plan; equipment used for construction of the project will be visible and may be considered unsightly by members of the public, resulting in a temporary reduction in the aesthetic value in the construction area.
Recreation Resources	No effect	Recreation features were not included in the Recommended Plan, and so there are no recreation benefits associated with the project. There are also no expected adverse effects to existing recreation resources.	Same as 2004 Recommended Plan

**Table 1. Summary and comparison of the potential environmental consequences associated with the implementation of the No Action Alternative and Recommended Plan.**

Environmental Factor / Resource	No Action Alternative	2004 Recommended Plan	2015 Recommended Plan
Socioeconomic Resources	In the future without project condition, flooding will continue to inflict damages in Aguada, Aguadilla, and Espinar. These include flood damages to residential, commercial, and public properties (as well as utilities) totaling more than \$1.15 million a year in average annual damages.	In the future with project condition (as estimated by the 2004 report) the majority of annual flood damage (about 86%) will be prevented by the project. Some residual flood damage will still occur (about \$146,000 in annual damages). Also, construction of the project will create NED employment benefits (estimated to be about \$20,000 a year). The NED benefits of the project will have secondary beneficial economic effects, including improved business and tax revenue that will contribute to regional economic development.	In the future with project condition, the majority of annual flood damage will be prevented by the project. The proportion of damages prevented by the project (and the magnitude of residual flood risk) will need to be updated during the PED phase based on updated rainfall data. Also, construction of the project will create additional NED employment benefits. The NED benefits of the project will have secondary beneficial economic effects, including improved business and tax revenue that will contribute to regional economic development. These benefits are particularly important in the current context, given that the communities in the study area are still suffering from the lingering effects of a catastrophic hurricane and economic crisis.
Cultural Resources	No effect on cultural resources listed or eligible for listing in the NRHP.	Additional surveys are necessary to identify and evaluate cultural resources and determine effects of the Recommended Plan on historic properties.	Same as 2004 Recommended Plan. The Corps executed a PA with Puerto Rico SHPO on May 24, 2019. The PA outlines the process in which the Corps will consult with the agency to avoid, minimize, and mitigate adverse effects to historic properties.

**Table 1. Summary and comparison of the potential environmental consequences associated with the implementation of the No Action Alternative and Recommended Plan.**

Environmental Factor / Resource	No Action Alternative	2004 Recommended Plan	2015 Recommended Plan
Unavoidable Adverse Environmental Effects	No effect	Project completion will directly affect approximately 1.5 acres of emergent wet prairie currently used as pasturelands. Construction of the cutoff channel and the Aguadilla levee where it intersects Caño Madre Vieja may result in lethal effects to non-motile species in these areas due to removal and/or burial. These impacts, although lethal, are expected to be minor and temporary as recolonization from adjacent communities will occur almost immediately. Temporary displacement of wildlife during construction due to noise and/or construction activities may occur; however, these effects are expected to be minor and will cease with the completion of construction. The Recommended Plan would eliminate 11.7 acres of farmland.	Same as Recommended Plan, however, an additional 8.75 acres of wetlands would be impacted. Effects from the construction activities to fish and wildlife, including threatened and endangered species, are expected to be insignificant and temporary as the motile organisms are able to relocate and avoid direct effects. However, if fish are located in the abandoned portion of the channel, these fish may be stranded. While construction will lethally affect existing vegetation in the footprint, native vegetation will be planted following completion of construction. These effects are expected to be short-term and minor.

#### 4.1 CUMULATIVE EFFECTS

Cumulative effects are defined in 40 C.F.R. §1508.7 as those effects that result from “...the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.”

Past, present and reasonably foreseeable actions and plans are summarized below in **Table 2**. Section 1.4 of this EA contains more details on environmental reports completed in/around the project’s vicinity. No other Federal projects exist in the project vicinity; however, the Puerto Rico Coastal Storm Risk Management and San Juan Metro Coastal Storm Risk Management studies were initiated in October 2018 and are ongoing. The purpose of these studies is to look at management measures to assist to reduce coastal storm risk along the Puerto Rican coastline. It is expected that the public, Commonwealth of Puerto Rico, and local governments could have permitted activities in or around the project area. Activities completed by the Federal government are evaluated under NEPA directly for each project. Other projects that could result in a cumulative effect, occur in-water, or would affect wetlands are evaluated under a permit issued by the Corps’ Regulatory Division and are incorporated by reference.

The implementation of the Río Culebrinas, Puerto Rico Study project, when considered with past projects in the area and potential future projects, has no significant cumulative impact on the environmental conditions of the project area. A summary of cumulative effects on environmental factors from past, present, and reasonably foreseeable actions and plans is provided in **Table 3**.

**Table 2. Past, present, and reasonably foreseeable actions and plans affecting the project area.**

Past Actions/Authorized Plans	Current Actions and Operating Plans	Reasonably Foreseeable Future Actions and Plans
- General development - Agricultural activities	- No known current projects.	- No known future actions or plans.

**Table 3. Summary of cumulative effects.**

Natural Setting (Vegetation, Wetlands, Threatened and Endangered Species, Fish and Wildlife Resources, and EFH)	
<b>Past Actions</b>	Construction of residential and commercial/public infrastructure has decreased the amount of habitat available for use by wildlife and threatened and endangered species potentially in the area.
<b>Present Actions</b>	No known present actions are occurring in the project vicinity.

<p><b>2015 Recommended Plan</b></p>	<p>Implementation of the 2015 Recommended Plan could result in temporary effects to fish, wildlife, and threatened and endangered species during construction due to noise and/or construction activities; however, these impacts are expected to be minor and will cease with the completion of construction. Non-motile species located in the levee, drainage channels, or cutoff channel footprints would be lethally effected due to excavating or fill operations. These effects, although lethal, are expected to be minor and temporary as recolonization from adjacent communities will occur almost immediately. The Recommended Plan is expected to result in unavoidable impacts to approximately 10 acres of wetlands within the levee right of way. The Corps' 2015 DPR Draft Addendum proposed a conceptual mitigation plan which would create approximately 13 acres of wetlands. (A portion of the plan included excavation in existing wetlands to ensure hydrologic connection; therefore, the total net creation would be approximately 11 – 12 acres of wetlands.) The Corps prepared a proposed mitigation plan (included as Appendix D), which builds upon the 2015 DPR Draft Addendum's conceptual mitigation plan. The Corps will conduct a wetland habitat functional analysis during the project's Preconstruction Engineering Design (PED) phase to verify that the functional equivalent is still valid and ensure the appropriate performance measures are in place. Detailed calculations and exact acreages are not expected to change by more than 50% from the project's conceptual mitigation plan proposed in the 2015 DPR Draft Addendum. The final mitigation plan will be coordinated with USFWS as well as DNER. The plan will be developed by the Corps and provided to partner agencies for review and comment. The mitigation plan will be finalized during the design phase when the project is reviewed on the BCOES characteristics.</p>
<p><b>Future Actions</b></p>	<p>Any Federal and/or state/local projects will be required to follow regulations to maintain and protect threatened and endangered species and their habitats within the area.</p>
<p><b>Cumulative Effect</b></p>	<p>Cumulative effects to the natural setting of this area are not anticipated.</p>
<p><b>Physical Setting (CBRS, Water Quality, HTRW, Prime and Unique Farmland Soils, Air Quality, Noise)</b></p>	
<p><b>Past Actions</b></p>	<p>The project area has mostly been dedicated to agriculture therefore sources of pollution, contamination, etc. are negligible.</p>
<p><b>Present Actions</b></p>	<p>No known present actions are occurring in the project vicinity.</p>

<b>2015 Recommended Plan</b>	Implementation of the 2015 Recommended Plan could result in temporary minor turbidity impacts. Construction, including excavating or fill operations, of the levees, drainage structures, ramps, and/or new channel footprints could temporarily increase turbidity in surrounding waters. Construction equipment may release negligible amounts of pollutants, including oils and grease. Best management practices will be used to limit the possibility of adverse effects, and detailed pollution control plans will be developed during the design phase. Construction of the Recommended Plan would eliminate approximately 11.7 acres of farmland, of which 5.43 acres are in pasture production and approximately 1.5 acres are wet pasturelands.
<b>Future Actions</b>	Projects implemented would maintain and meet regulated water quality standards within the area.
<b>Cumulative Effect</b>	Ongoing seasonal weather and storm event effects on water quality are unlikely to be eliminated; however, implementation of the Recommended Plan will reduce risk of flooding. The Corps is committed to ensuring that projects will not result in violations of water quality standards. Loss of farmland is coordinated with NRCS and the public. Cumulative effects to the physical setting of this area are not anticipated.
<b>Socioeconomic Resources (Aesthetic Resources, Recreation Resources, Economic Resources)</b>	
<b>Past Actions</b>	Economic growth and development in the study area has been stable with the exception of adverse storm effects.
<b>Present Actions</b>	No known present actions are occurring in the project vicinity.
<b>2015 Recommended Plan</b>	By implementing the Recommended Plan, flood damage in the project area will be reduced which will positively affect socioeconomic resources in this area.
<b>Future Actions</b>	As the economy continues to recover from storm effects of Hurricane Maria, additional economic growth and development will likely occur.
<b>Cumulative Effect</b>	Continuation of benefits to socioeconomic resources may be anticipated when considering the cumulative effects of projects in this area.
<b>Cultural Resources</b>	
<b>Past Actions</b>	Construction of residential and commercial/public infrastructure has likely severely impacted known cultural resources within the area.
<b>Present Actions</b>	No known present actions are occurring in the project vicinity.

<b>2015 Recommended Plan</b>	The Corps executed a PA with Puerto Rico SHPO on May 24, 2019. The PA outlines the process in which the Corps will consult with the agency to avoid, minimize, and mitigate adverse effects to historic properties. The project is in compliance with Section 106 NHPA by implementation of any applicable conditions as described in the PA.
<b>Future Actions</b>	Any Federal and/or state/local projects will be required to follow regulations to avoid, minimize, or mitigate impacts to cultural resources within the area.
<b>Cumulative Effect</b>	With the implementation of the PA, no cumulative effects to the cultural resources are expected.

## **5 PUBLIC AND AGENCY COORDINATION**

A Notice of Availability for the proposed FONSI, draft EA, and associated appendices was coordinated with pertinent agencies and interested stakeholders for a 60-day review and comment period, which ended on April 20, 2019. The project is in compliance with the NEPA of 1969, as amended, 42 U.S.C. 4321, *et seq.* Public Law 91-190.

### **5.1 COMMENTS RECEIVED AND CORPS' RESPONSES**

A copy of the comments received during the 60-day agency review and public comment period, as well as a summary matrix of the comments and Corps' responses, have been included in Appendix E.

## 6 ENVIRONMENTAL COMMITMENTS AND COMPLIANCE

The Corps will comply with all terms and conditions of agency consultations and/or permits. The Corps and its contractors also commit to avoiding and minimizing for adverse effects during construction activities by including the commitments in **Table 4** in the contract specifications:

**Table 4. Corps' environmental commitments.**

Environmental Commitment	Corps' Commitment
Protection of Fish and Wildlife Resources	Construction activities will be kept under surveillance, management, and control to minimize interference with, disturbance of, and damage to fish and wildlife. Prior to the start of construction, the Contractor will submit their Environmental Protection Plan (EPP) that will include protective measures for species that require specific attention.
Threatened and Endangered Species Protection	Adverse effects to threatened and endangered species will be avoided and/or minimized. The Corps will include the USFWS standard protection measures for the Puerto Rican boa ( <i>Epicrates inornatus</i> ) in the project plans and specifications to protect any boas that may be in the area. Threatened and endangered species protection criteria will be included in the Contractor's EPP.
Water Quality	Implementation of design and procedural controls will prevent oil, fuel, or other hazardous substances from entering the air or water and reduce turbidity impacts. All wastes and refuse generated by project construction will be removed and properly disposed. Excavation will produce fill for levee construction; however, best management practices for containment will be implemented. Contractors will implement a spill contingency plan for hazardous, toxic, or petroleum material. Conditions imposed by the WQC will be implemented in order to minimize adverse impacts to water quality.
Cultural Resources	Pursuant to 54 U.S.C. 306108 § 800.14, the Corps is conducting a phased identification and evaluation of historic properties. The Corps executed a PA with Puerto Rico SHPO on May 24, 2019. The PA outlines the process in which the Corps will consult with the agency to avoid, minimize, and mitigate adverse effects to historic properties. The Corps will implement any applicable conditions as described in the PA. In addition, an unexpected cultural resources finds clause will be included in the project specifications. In the event of an archaeological resource discovery, work in the area will be suspended at the site until compliance with all federal and state regulations is successfully completed and Corps staff members provide further directive.

Environmental Commitment	Corps' Commitment
Protection of Migratory Birds	Standard migratory bird protection protocols will be incorporated into the project plans and specifications. The contractor will be required to abide by those protocols and all monitoring timeframes as specified by all applicable licenses and permits.
Wetland Mitigation	<p>Project completion is expected to result in unavoidable impacts to approximately 10 acres of wetlands within the levee right of way. The Corps' 2015 DPR Draft Addendum proposed a conceptual mitigation plan which would create approximately 13 acres of wetlands. (A portion of the plan included excavation in existing wetlands to ensure hydrologic connection; therefore, the total net creation would be approximately 11 – 12 acres of wetlands.) The goal is (1) to achieve wetland hydrologic conditions (flooding or saturation of the soil for sufficient duration and frequency) (2) to excavate material suitable for levee construction to the extent practicable, (3) to minimize the amount of unusable excavated material needing disposal, and (4) to minimize impacts (to residential, commercial, recreational, and cultural interests). The Corps prepared a 2020 proposed mitigation plan (see Appendix D), which builds upon the 2015 DPR Draft Addendum's conceptual mitigation plan. The Corps will conduct a wetland habitat functional analysis during the project's PED phase to verify that the functional equivalent is still valid and ensure the appropriate performance measures are in place. Detailed calculations and exact acreages are not expected to change by more than 50% from the project's conceptual mitigation plan proposed in the 2015 DPR Draft Addendum. The final mitigation plan will be coordinated with USFWS as well as the DNER. The plan will be developed by the Corps and provided to partner agencies for review and comment. The mitigation plan will be reassessed during the design phase when the project is reviewed on the BCOES characteristics. Additionally, on May 21, 2019, the Corps, DNER, PRPB, and the mayors of Aguadilla and Aguada discussed the possible impacts of the project to the proposed Espinar Swamp Reserve. It is the Corps' understanding that the proposed designation of the Espinar Swamp Reserve has not yet been finalized. Should the proposed designation of the Espinar Swamp Reserve area become final, the Corps will work with the pertinent agencies to address any additional efforts that may be required.</p>

This EA has been prepared pursuant to NEPA and its implementing regulations. The status of the proposed project's compliance with environmental acts and E.O. are provided in **Table 5**:

**Table 5. Proposed project's environmental act and E.O. compliance status.**

Environmental Act or E.O.	Project Compliance Status
<p>National Environmental Policy Act of 1969 (42 U.S.C. §4321 <i>et seq.</i>)</p>	<p>This EA has been prepared pursuant to NEPA and its implementing regulations. A Notice of Availability for the proposed FONSI, draft EA, and associated appendices was coordinated with pertinent agencies and interested stakeholders for a 60-day review and comment period, which ended on April 20, 2019. In order to meet current Federal, state, and local laws, regulations, and policy, as well as Corps standards and guidelines, the Recommended Plan will be refined during the PED phase. The project, as it is currently described and designed, is environmentally acceptable; however, if during PED changes to the project result in effects that have not been previously evaluated, then pursuant to NEPA, the Corps will prepare a separate NEPA document to address the changes and evaluate the associated effects. The Corps and its contractors commit to avoiding, minimizing, and mitigating for adverse effects during construction activities. The project complies with this Act.</p>
<p>Endangered Species Act of 1973 (16 U.S.C. §1531 <i>et seq.</i>)</p>	<p>The project was coordinated with NMFS and USFWS through the 2004 EA and was coordinated again during the public review of this NEPA document. The Corps has determined that implementation of the 2015 Recommended Plan may affect, but will not adversely affect the Puerto Rican boa (<i>Epicrates inornatus</i>). In addition, the Corps has determined that the project would have no effect on listed species under NMFS' purview. USFWS concurred with the Corps' MANLAA determination in a letter dated March 7, 2019. Pertinent correspondence is found in Appendix A. The project complies with this Act.</p>
<p>Fish and Wildlife Coordination Act of 1958 (16 U.S.C. §661 <i>et seq.</i>)</p>	<p>A Coordination Act Report was prepared for the Río Culebrinas Section 205 project in 1999. A Memorandum for the Record, dated February 19, 2019 and found in Appendix A, was signed by USFWS and the Corps to document an agreement between the agencies to use the NEPA review and endangered species act consultation processes to complete coordination responsibilities under the Fish and Wildlife Coordination Act. Funds may be sent to the USFWS during the PED phase to provide support during design refinements. The project complies with this Act.</p>

Environmental Act or E.O.	Project Compliance Status
National Historic Preservation Act of 1966 ( <i>Inter Alia</i> )	The Corps has initiated consultation for the Recommended Plan with the Puerto Rico SHPO pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and consideration given under NEPA. The Corps executed a PA with Puerto Rico SHPO on May 24, 2019. The PA outlines the process in which the Corps will consult with the agency to avoid, minimize, and mitigate adverse effects to historic properties. The project is in compliance with Section 106 NHPA by implementation of any applicable conditions as described in the PA.
Clean Water Act of 1972, Section 401 and Section 404(B) (33 U.S.C. §1341 <i>et seq.</i> and 33 U.S.C. §1344(b) <i>et seq.</i> )	The Corps determined that the discharge or fill material associated with the Recommended Plan is compliant with Section 404(b)(1) Guidelines as required by the Clean Water Act. A section 404(b)(1) Guidelines Evaluation is found in Appendix C. The Corps will seek WQC from the Commonwealth of Puerto Rico to be in compliance with the Clean Water Act and Commonwealth standards in effect for the Clean Water Act. The project complies with this Act.
Clean Air Act of 1972 (42 U.S.C. §7401 <i>et seq.</i> )	No air quality permits are required for this project. Because the project is located within an attainment area, USEPA General Conformity Rule to implement Section 176(c) of the Clean Air Act does not apply and a conformity determination is not required. The project complies with this Act.
Coastal Zone Management Act of 1972 (16 U.S.C. §1451 <i>et seq.</i> )	A FCD was submitted to the PRBP for the Commonwealth of Puerto Rico's review and concurrence. The Corps determined that the Recommended Plan is consistent with Puerto Rico's Coastal Zone Management Program. PRPB concurred with the Corps' determination on December 4, 2019. The project complies with this Act.
Farmland Protection Policy Act of 1981 (7 U.S.C. §4201 <i>et seq.</i> )	Coordination with the NRCS was completed in 2002 for effects to prime and/or unique farmland affected by implementation of this project. Due to project design modifications, the Corps re-coordinated with NRCS and concluded that additional acreage may be affected; however, the route of the levees and cutoff channel is constrained by nearby development and has been optimized for hydraulic and engineering considerations. NRCS concurred with the Corps' determination in an email dated May 10, 2019. Pertinent correspondence is included in Appendix A. The project will complies with this Act.
Wild and Scenic River Act of 1968 (16 U.S.C. §1271 <i>et seq.</i> )	This project will not affect any designated wild and scenic river reaches. This Act is not applicable.
Marine Mammal Protection Act of 1972 (16 U.S.C. §1361 <i>et seq.</i> )	No marine mammals will be affected by this project. This Act is not applicable.

<b>Environmental Act or E.O.</b>	<b>Project Compliance Status</b>
Estuary Protection Act of 1968 (16 U.S.C. §§1221-26)	No estuaries will be affected by this project. This Act is not applicable.
Federal Water Project Recreation Act (16 U.S.C. §460(L)(12)-460(L)(21) <i>et seq.</i> )	Recreational resources and opportunities are discussed in Section 4 of this report. The project complies with this Act.
Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended (16 U.S.C. §1801 <i>et seq.</i> )	The project was coordinated with NMFS through the 2004 EA and was coordinated again during the public review of this NEPA document. The Corps determined the proposed work occurs inland and would not affect EFH under the jurisdiction of NMFS. In a letter dated August 4, 1999 NMFS stated it had no comments or recommendations to offer on the project. In an email dated April 10, 2019, NMFS stated “The NMFS anticipates any adverse effects from implementing the Recommended Plan to NOAA-trust resources would be minimal.” NMFS did not provide any conservation recommendations. See Appendix A for pertinent correspondence. The project complies with this Act.
Submerged Lands Act of 1953 (43 U.S.C. § 1301 <i>et seq.</i> )	No submerged navigable lands will be affected by implementation of the project. This Act is not applicable.
Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990 (16 U.S.C. §3501 <i>et seq.</i> )	The project will have no effect on the CBRS units in the area. The project will not result in an increase in the development of CBRS Unit PR-75P, which has already been developed by the Municipality of Aguadilla. The project was modified in 2004 to avoid working within CBRS Unit PR-75. The project complies with this Act.
Rivers and Harbors Act of 1899, Section 10 (33 U.S.C. §403 <i>et seq.</i> )	The proposed work will not obstruct navigable waters of the U.S. The project complies with this Act.
Anadromous Fish Conservation Act (16 U.S.C. §§757A-757G)	The project will have no effect on anadromous fish species. The project complies with this Act.
Migratory Bird Treaty Act (16 U.S.C. §§703-712) and Migratory Bird Conservation Act (16 U.S.C. §§715-715D, 715E, 715F-715R)	The project plans and specifications will include migratory bird protection measures for construction activities. If nesting activities occur within the construction area, appropriate buffers will be placed around nests to ensure their protection. The project was coordinated with USFWS and complies with these Acts.
Marine Protection, Research, and Sanctuaries Act (16 U.S.C. §1431 <i>et seq.</i> AND 33 U.S.C. §1401 <i>et seq.</i> )	Ocean disposal is not a component of this project. This Act is not applicable.

Environmental Act or E.O.	Project Compliance Status
Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. §4601 <i>et seq.</i> )	The NFS will be responsible for acquiring any real estate interests for the project. The Corps will work with the NFS to ensure compliance with this Act. The project will comply with this Act.

<p>E.O. 11988, Flood Plain Management</p>	<p>Per guidance provided in E.O. 11988, the following factors were evaluated:</p> <p><i>1. Determine if a proposed action is in the base floodplain (area with a one percent or greater chance of flooding in any given year).</i></p> <p>Yes, the proposed action would occur within the base floodplain.</p> <p><i>2. Conduct early public review, including public notice.</i></p> <p>Public review of the proposed action was conducted during the 2004 DPR and EA as well as during this EA's review process.</p> <p><i>3. Identify and evaluate practicable alternatives to locating in the base floodplain, including alternative sites outside of the floodplain.</i></p> <p>There is no practicable alternative to locating the project outside of the base floodplain due to the nature of the project's objectives, which are discussed in more detail in this EA's section 1.3 and in the 2020 CAP Conversion Feasibility Report for Río Culebrinas, Puerto Rico Study (provided in Appendix F).</p> <p><i>4. Identify impacts of the proposed action.</i></p> <p>Impacts of the proposed action are discussed in Section 4 of this EA.</p> <p><i>5. Minimize threats to life and property and to natural and beneficial floodplain values. Restore and preserve natural and beneficial floodplain values.</i></p> <p>The purpose of the project includes minimizing threats to life and property while restoring and preserving natural and beneficial floodplain values. More details on the project's purpose are included in this EA's section 1.3, and details on the environmental commitments are included in section 6.</p> <p><i>6. Reevaluate alternatives.</i></p> <p>Alternatives were evaluated in the 2004 DPR and EA and are discussed again in this EA's section 2. The Recommended Plan that is selected best meets the study objectives.</p> <p><i>7. Issue findings and a public explanation.</i></p> <p>This EA provides the Recommended Plan and explanation in section 2.</p> <p><i>8. Implement the action.</i></p> <p>The action will be implemented once authorized, appropriations are received, and all appropriate documentation (e.g. agreements, permitting, etc.) is completed.</p>
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Environmental Act or E.O.	Project Compliance Status
<i>(E.O. 11988, Flood Plain Management continued)</i>	The Corps concludes that the proposed project will not result in harm to people, property, and floodplain values, will not induce development in the floodplain, and the project is in the public interest. The project will result in a reduction of flood damages. The project complies with this Order.
E.O. 11990, Protection of Wetlands	Project completion is expected to result in unavoidable impacts to approximately 10 acres of wetlands within the levee right of way. The Corps' 2015 DPR Draft Addendum proposed a conceptual mitigation plan which would create approximately 13 acres of wetlands. (A portion of the plan included excavation in existing wetlands to ensure hydrologic connection; therefore, the total net creation would be approximately 11 – 12 acres of wetlands.) The goal is (1) to achieve wetland hydrologic conditions (flooding or saturation of the soil for sufficient duration and frequency) (2) to excavate material suitable for levee construction to the extent practicable, (3) to minimize the amount of unusable excavated material needing disposal, and (4) to minimize impacts (to residential, commercial, recreational, and cultural interests). The Corps prepared a 2020 proposed mitigation plan (see Appendix D), which builds upon the 2015 DPR Draft Addendum's conceptual mitigation plan. The Corps will conduct a wetland habitat functional analysis during the project's PED phase to verify that the functional equivalent is still valid and ensure the appropriate performance measures are in place. Detailed calculations and exact acreages are not expected to change by more than 50% from the project's conceptual mitigation plan proposed in the 2015 DPR Draft Addendum. The final mitigation plan will be coordinated with USFWS as well as the DNER. The plan will be developed by the Corps and provided to partner agencies for review and comment. The mitigation plan will be finalized during the design phase when the project is reviewed on the BCOES characteristics. Additionally, on May 21, 2019, the Corps, DNER, PRPB, and the mayors of Aguadilla and Aguada discussed the possible impacts of the project to the proposed Espinar Swamp Reserve. It is the Corps' understanding that the proposed designation of the Espinar Swamp Reserve has not yet been finalized. Should the proposed designation of the Espinar Swamp Reserve area become final, the Corps will work with the pertinent agencies to address any additional efforts that may be required. The project complies with this Order.

Environmental Act or E.O.	Project Compliance Status
E.O. 12898, Environmental Justice	Detailed analysis of the project's environmental justice status is found in Appendix B. The project will result in temporary impacts related to noise, air quality, water quality, and use of the project staging area during construction of the project. These temporary effects would cease with construction completion and are not considered to be long-term adverse effects. The project will result in long-term positive effects to the project area. Benefits of the project include the reduction of existing and future flood damages to the nearby neighborhoods. This project will not cause disproportionate and adverse effects to minority or low income populations. The project complies with this Order.
E.O. 13045, Protection of Children from Environmental Health Risks and Safety Risks	The proposed action does not affect children disproportionately from other members of the population and would not increase any environmental health or safety risks to children. The project complies with this Order.
E.O. 13089, Coral Reef Protection	No corals or hardbottom habitat exists within the project area. The project complies with this Order.
E.O. 13112, Invasive Species	The Recommended Plan will not introduce or promote the introduction of non-species to the region. Planting of native species will result in a decrease of habitat availability for invasive/exotic species. The project complies with this Order.
E.O. 13186, Responsibilities of Federal Agencies to Protect Migratory Birds	This E.O. requires, among other things, a Memorandum of Understanding (MOU) between the Corps and USFWS concerning migratory birds. Neither the Department of Defense MOU nor the Corps' Draft MOU clearly address migratory birds on lands not owned or controlled by the Corps. For many Corps' civil works projects, the real estate interests are provided by the non-Federal Sponsor. Control and ownership of the Project lands remain with a non-Federal interest. Measures to avoid the destruction of migratory birds and their eggs or hatchlings are described in Section 4 of this EA and are incorporated by reference. The Corps will include standard migratory bird protection requirements in the project plans and specifications and will require the contractor to abide by those requirements. The project complies with this Order.

## 7 LIST OF PREPARERS

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## 8 ACRONYM LIST

BBA	Bipartisan Budget Act of 2018
BCOES	Biddability, Constructability, Operability, Environmental and Sustainability
C.F.R.	Code of Federal Regulations
CAP	Continuing Authorities Program
CBRS	Coastal Barrier Resource System
CEQ	Council on Environmental Quality
Corps	U.S. Army Corps of Engineers
DPR	Detailed Project Report
E.O.	Executive Order
EA	Environmental Assessment
EFH	Essential Fish Habitat
EJ	Environmental Justice
EPP	Environmental Protection Plan
FONSI	Finding of No Significant Impact
HTRW	Hazardous, Toxic, and Radioactive Waste
MOU	Memorandum of Understanding
NED	National Economic Development
NEPA	National Environmental Policy Act
NFS	Non-Federal Sponsor
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
PED	Preconstruction Engineering and Design
PRBP	Puerto Rico Planning Board
SHPO	Puerto Rico State Historic Preservation Officer
U.S.	United States
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WQC	Water Quality Certification

## 9 REFERENCES

U.S. Army Corps of Engineers (Corps). 2004. Río Culebrinas at Aguada and Aguadilla, Puerto Rico, Section 205 Detailed Project Report and Environmental Assessment. Jacksonville, Florida.

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Corps. 2020. Draft Río Culebrinas, Puerto Rico Study. Jacksonville, Florida.

U.S. Fish and Wildlife Services (USFWS). 1999. Culebrinas River Flood Control Project. Coordination Act Report. Boqueron, Puerto Rico.