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October 26, 2011

VIA E-MAIL AND CERTIFIED MAIL, RETURN-RECEIPT REQUESTED

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Re: Notice of Intent to Sue U.S. Army Corps of Engineers for Violations of Sections 7 and 9 of the Endangered Species Act, as well as 50 C.F.R. § 402.16, in Connection with the Issuance of a Permit under Section 404 of the Clean Water Act for the Via Verde Natural Gas Pipeline Project, Permit Application No. SAJ 2010-02881 (IP-EWG)

Dear Colonel Pantano and Mr. Kinard:

Pursuant to the citizen suit provision of the Endangered Species Act (ESA), 16 U.S.C. § 1540(g), and on behalf of our clients listed in Appendix A, we hereby notify the U.S. Army Corps of Engineers (Corps) that we intend to file a citizen suit in federal district court challenging the Corps' issuance of a permit authorizing the construction of the Via Verde Natural Gas Pipeline in Puerto Rico because this decision will violate the agency's procedural and substantive obligations under the ESA, 16 U.S.C. §§ 1536, 1538, and related regulations. In light of the threat of irreparable harm to numerous endangered species, we plan to commence a citizen suit immediately after the expiration of the requisite 60-day period unless the Corps undertakes sufficient corrective actions before then. The following is an outline of the violations and the required corrective actions:

I. STATUTORY FRAMEWORK

The Endangered Species Act (ESA) is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[1] The ESA's "language, history and structure" convinced the U.S. Supreme Court "beyond doubt" that "Congress intended endangered species to be afforded the highest of priorities."[2] Indeed, the "plain intent of Congress in enacting [the ESA] was to halt and reverse the trend toward species extinction . . ."[3] In light of these lofty objectives, the Supreme Court declared that "endangered species [have] priority over the 'primary missions' of federal agencies."[4] Furthermore, federal Circuit Courts have held that the ESA imposes an "affirmative duty on each federal agency to conserve each listed species."[5]

As the permitting agency for a dredge-and-fill permit under Section 404 of the Clean Water Act (404 Permit),[6] the Corps is required to insure that its permitting decisions comply with all of the substantive and procedural requirements of the ESA.[7] Substantively, the ESA requires that any action "authorized, funded, or carried out" by the Corps, including issuance of a 404 Permit, is "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species . . . determined . . . to be critical . . ."[8]

In addition, the ESA strictly prohibits any person from "taking" any endangered or threatened fish or wildlife species.[9] This substantive prohibition applies to all federal agencies that "cause to be committed" the take of a listed species through regulatory or permitting action.[10] "Take" of a species is defined broadly to include actions such as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[11] The term "harass" is similarly defined broadly to include any "intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering."[12] The definition of prohibited "harm" includes "significant habitat modification or degradation where it actually kills or injures wildlife."[13]

Procedurally, the ESA requires the Corps to consult with the U.S. Fish and Wildlife Service (FWS), the National Marine Fisheries Service (NMFS), or both, concerning the potential effects

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[1] Tennessee Valley Auth. v. Hill, 437 U.S. 153, 180 (1978).
[2] Id. at 174.
[3] Id. at 184.
[4] Id. at 185.
[5] Sierra Club v. Glickman, 156 F.3d 606, 616 (5th Cir. 1998); Florida Key Deer v. Paulison, 522 F.3d 1133, 1138 (11th Cir. 2008).
[6] 33 U.S.C. § 1344(a) (2006).
[7] 16 U.S.C. § 1536(a)(2) (2006).
[8] 16 U.S.C. § 1536(a)(2) (2006).
[9] 16 U.S.C. § 1538(a)(1) (2006); 50 C.F.R. § 17.31 (2010).
[10] 16 U.S.C. § 1538(g) (2006); Strahan v. Coxe, 127 F.3d 155 (1st Cir. 1997), cert. denied, 525 U.S. 830 (1998).
[11] 16 U.S.C. § 1532(19) (2006).
[12] 16 U.S.C. § 1532(19) (2006).
[13] 16 U.S.C. § 1538(a)(1) (2006); 50 C.F.R § 17.3 (2010); See also Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, 515 U.S. 687 (1995) (cited for the interpretation of "harm").

of proposed federal actions on endangered and threatened species and their habitat.[14] The fundamental purpose of this mandatory consultation procedure is to facilitate informed agency decision-making in order to insure no jeopardy to endangered species and no adverse modification of critical habitat.[15] The consultation process takes place through the following four general phases:

Phase 1 – Initial Request for Information. Whenever a federal agency is considering undertaking or approving an action with the potential to harm listed species, the agency must take the initiative to "request ... information" from FWS and/or NMFS—the agencies with expertise concerning endangered and threatened species—to determine "whether any species which is listed or proposed to be listed may be present in the area of such proposed action."[16]

Phase 2 – Biological Assessment. If FWS and/or NMFS advise the action agency during Phase 1 that "such species may be present," then the action agency is required to "conduct a biological assessment for the purpose of identifying any endangered species or threatened species which is likely to be affected by such action."[17] When preparing a Biological Assessment, the agency must consider the effects of the action "directly and indirectly . . . and not merely the immediate area involved in the action."[18] In other words, the agency is required to consider "the effects of the action as a whole," including all direct, indirect, and cumulative effects.[19] In preparing the Biological Assessment, the agency is also required to utilize the "best scientific and commercial data available."[20] Furthermore, in order to ensure that the highest quality biological and ecological information is used, FWS and NMFS "require biologists to evaluate *all scientific and other information* that will be used to . . . prepare biological assessments."[21] FWS and NMFS are thus required to conduct evaluations to ensure that the information used by the action agency in developing a Biological Assessment is "reliable, credible, and represents the best scientific and commercial data available."[22] The overall philosophy guiding ESA consultation is that "biology comes first . . . [k]now the facts; state the case; and provide supporting documentation."[23] Furthermore, when gaps exist in the information base used to prepare a Biological Assessment, "the Services are expected to provide the benefit of the doubt to the species."[24] Biological Assessments are inadequate when the agency "entirely failed to consider an important aspect of the problem" or to "consider the relevant factors and articulate a rational

[14] 16 U.S.C. § 1536(a)(2) (2006); 50 C.F.R. § 402.01(b) (2010).
[15] 16 U.S.C. § 1536(a)(2) (2006); Sierra Club v. Marsh, 816 F.2d 1376, 1389 (9th Cir. 1987) ("Congress intended that the consultation process would operate so as to prevent substantive violations of the act").
[16] 16 U.S.C. § 1536(c)(1) (2006).
[17] 16 U.S.C. § 1536(c)(1) (2006).
[18] 50 C.F.R. §§ 402.02; 402.12; 402.14 (2010).
[19] 50 C.F.R. § 402.14(c) (2010).
[20] 16 U.S.C. § 1536(a)(2) (2006).
[21] Endangered and Threatened Wildlife and Plants: Notice of Interagency Cooperative Policy on Information Standards Under the Endangered Species Act, 59 Fed. Reg. 34271 (notice of policy statement, July 1, 1994). See also, U.S. Fish & Wildlife Serv. & Nat'l Marine Fisheries Serv., Endangered Species Consultation Handbook [hereinafter Consultation Handbook] (emphasis added).
[22] Consultation Handbook at 31.
[23] Id. at 27.
[24] Id. at 32.

connection between the facts found and the choice made."[25] If the contents of a Biological Assessment or administrative record do not adequately support the "not likely to adversely affect" or "no effect" finding, that finding must be overturned.[26]

Phase 3 – Formal Consultation. If the Biological Assessment shows that the proposed action "may affect" threatened or endangered species, the action agency *must* undergo formal consultation with FWS and/or NMFS.[27] The threshold for determining whether a proposed project may affect listed species is low and includes "any possible effect, whether beneficial, benign, adverse, or of an undetermined character."[28] The action agency may avoid formal consultation only if FWS concurs with its determination in the Biological Assessment that the proposed project is unlikely to adversely affect protected species or habitat.[29] As noted above, the purpose of the formal consultation process is to ensure compliance with the ESA's substantive requirement that the agency's action is "not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species . . . determined . . . to be critical . . ."[30] During the formal consultation process, and until FWS and/or NMFS issues a Biological Opinion, the action agency and the permit applicant are prohibited from making "any irreversible or irretrievable commitment of resources . . . which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures."[31]

Phase 4 – Biological Opinion. The formal consultation process concludes when the appropriate expert agency, FWS and/or NMFS, issues a Biological Opinion "detailing how the agency action affects the species or its critical habitat."[32] As with the Biological Assessment, the Biological Opinion must utilize the "best scientific and commercial data available."[33] If the expert agency makes a "jeopardy" or "adverse modification" finding, the project is prohibited from going forward, as this would violate the action agency's substantive obligation to insure "no jeopardy" to endangered or threatened species.[34] If after further consultation, however, the action agency agrees to implement "reasonable and prudent alternatives" that the expert agency deems sufficient to eliminate the risk of jeopardy or adverse modification, then the project may go forward.[35] Similarly, after completing formal consultation, if FWS and/or NMFS conclude that

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[25] See Native Ecosystems Council v. Dombeck, 304 F.3d 886, 901 (9th Cir. 2002) (citing Pacific Coast Fed'n of Fishermen's Ass'ns v. Nat'l Marine Fisheries Serv., 265 F.3d 1028 (9th Cir. 2001) (where the court found that the BA contained "no discussion of scientific methodology, relevant facts, or rational connections linking the project's potential impacts" with the action area and issuing an injunction pending compliance with the ESA and its regulations).

[26] See, e.g., House v. U.S. Forest Serv., 974 F. Supp. 1022, 1028-29 (E.D. Ky. 1997).

[27] 50 C.F.R. § 402.14(a) (2010); Dow AgroSciences LLC v. NMFS, 638 F. Supp. 2d 508, 509 (D. Md. 2009). "Effects of the action refers to the direct and indirect effects of an action on the species or critical habitat…[i]ndirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur." 50 C.F.R. § 402.02.

[28] Interagency Cooperation—Endangered Species Act of 1973, as Amended, 51 Fed. Reg. 19926, 19949 (final rule June 3, 1986) (to be codified at 50 C.F.R. pt. 50).

[29] 50 C.F.R. § 402.14(b) (2010).

[30] 42 U.S.C. § 1536(a)(2) (2006); 50 C.F.R. §402.14(a) (2010).

[31] 42 U.S.C. § 1536(d) (2006).

[32] See 16 U.S.C. § 1536(b)(3)(A) (2006); Thomas v. Peterson, 753 F.2d 754, 763 (9th Cir. 1985).

[33] 16 U.S.C. § 1536(a)(2) (2006).

[34] See 16 U.S.C. § 1536(b)(3)(A) (2006).

[35] Id. § 1536(b)(3)–(4) (2006).

the taking of an endangered or threatened species is "incidental to the agency action" and would not violate the "no jeopardy" provision of the ESA, then FWS and/or NMFS shall provide the applicant and the action agency with a written incidental take statement (ITS) specifying "the impact of such incidental taking on the species."[36]

The ESA includes a citizen suit provision that authorizes citizens to enforce compliance with the substantive and procedural obligations described above.[37] Before initiating a citizen suit, the plaintiffs must submit a notice of intent to sue at least 60 days prior to filing the complaint (60-Day Notice).[38] The purpose of the 60-Day Notice is to give the agencies an opportunity to take all the corrective steps necessary to bring their action into compliance with the ESA.[39] A number of courts have ruled that notice is appropriate in advance of actual permit issuance where the agency has indicated its intent to move forward with permitting an action likely to violate the ESA.[40] Subsequent ESA violations flowing from an agency's inadequate consultation may be included within a single notice of intent.[41] Notice of intent letters are adequate when they provide "sufficient information of a violation so that the Secretary . . . could identify and attempt to abate the violation."[42]

II. FACTUAL BACKGROUND AND PROCEDURAL HISTORY

The island of Puerto Rico is one of the world's premier biodiversity hotspots, supporting a multitude of endemic tropical and subtropical flora and fauna species.[43] The relatively small island, 110 miles in length from east to west and 40 miles wide from north to south, supports an extremely varied topography consisting of at least ten diverse ecological and geoclimatic zones.[44] These unique ecological zones include coastal semi-deciduous forests, coastal mangrove forests, moist submontane and lower montane rain forests, cloud forest formations, dry and wet karst limestone forests, moist broadleaf evergreen forests, and mixed lowland dry

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[36] 16 U.S.C. § 1536 (b)(4) (2006).
[37] 16 U.S.C. § 1540(g) (2006).
[38] 16 U.S.C. § 1540(g)(2) (2006).
[39] Water Keeper Alliance v. U.S. Dept. of Defense, 152 F. Supp. 2d 163, 172–73 (D. P.R.) (citing Southwest Center for Biological Diversity v. U.S. Bureau of Reclamation, 143 F.3d 515, 520 (9th Cir. 1998)).
[40] See, e.g., Turtle Island Restoration Network v. Nat'l Marine Fisheries Serv., 340 F.3d 969 (9th Cir. 2003) (wherein the Circuit Court held that issuance of permits, when a result of a discretionary agency action, requires ESA section 7 consultation. Furthermore, a 60-day notice of intent to sue under ESA sections 7 and 9 was proper prior to issuance of permits when it was apparent that "take" of species was likely as a result of permit issuance). See also, Home Builders Ass'n of North California v. U.S. Fish and Wildlife Serv., 2006 WL 3190518 (E.D.Cal. 2006) ("For the purposes of the notice requirement, it is sufficient that Home Builders gave Federal Defendants notice of the issues they would pursue in litigation and subsequently filed suit on those exact issues.").
[41] Id.
[42] Marbled Murrelet v. Babbitt, 83 F.3d 1068 (9th Cir. 1996) ("Although section 7 was referenced in only one part of the letter, the letter as a whole provided notice sufficient to afford the opportunity to rectify the asserted ESA violations.").
[43] Conservation International, Biodiversity Hotspots, Caribbean Islands, http://www.biodiversityhotspots.org/xp/hotspots/caribbean/Pages/default.aspx (last visited Oct. 21, 2011).
[44] Helmer, Ramos, López, Quiñones, and Diaz, Mapping the Forest Type and Land Cover of Puerto Rico, a Component of the Caribbean Biodiversity Hotspot (2002), available at http://edcintl.cr.usgs.gov/ip/macga/docs/cjs_map_pr.pdf

and moist forests.[45] Puerto Rico's diverse and distinct ecological habitats are home to many endangered and threatened species, with new species being discovered all the time.

The Puerto Rico Electric Power Authority (PREPA) is planning to construct a 92-mile natural gas pipeline, known as the Via Verde Project, across the entire island of Puerto Rico, traversing many of the island's most important ecological zones. The pipeline would convey liquefied natural gas (LNG) from the EcoEléctrica LNG Terminal in Peñuelas on the southern coast, northward across the interior of the island to the Cambalache Termoeléctricas Authority Central power plant in Arecibo on the northern coast, and then eastward along the northern coast to the Palo Seco power plant in Toa Baja and the San Juan power plant in San Juan.[46] According to PREPA, the Project's footprint would cover approximately 1,114 acres of land, require a 150 to 300-foot wide right-of-way during construction, require a permanent 50-foot maintenance right-of-way,[47] cross approximately 158 jurisdictional waters of the United States, and impact approximately 369 acres of wetlands.[48] The 92-mile pipeline would traverse Commonwealth Forests, Natural Reserves, forested volcanic and karst areas, and portions of privately-owned lands participating in conservation programs due to their high ecological value.[49] Moreover, as proposed, the Project will affect more than forty endangered and threatened species.[50]

PREPA has submitted an application to the Corps for a 404 Permit, and the Corps is in the final stages of processing this application. It is our understanding that the Corps submitted to FWS an initial request for information regarding endangered and threatened species that may be present within the Project's action area.[51] FWS determined that at least thirty-two listed species may be present.[52] This number was later adjusted upward to include additional species under FWS and NMFS jurisdiction; thereby, technical assistance on the Project's effects between the Services and the Corps included over forty listed species.[53]

Despite this large number of endangered and threatened species, the Corps and FWS conducted formal consultation for only three species – the Puerto Rican Boa (*Epicrates inornatus*), the Puerto Rican Sharp-shinned Hawk (*Accipiter striatus venator*), and the Puerto Rican Broad-

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[45] Helmer, Ramos, López, Quiñones, and Diaz, Mapping the Forest Type and Land Cover of Puerto Rico, a Component of the Caribbean Biodiversity Hotspot (2002), available at http://edcintl.cr.usgs.gov/ip/macga/docs/cjs_map_pr.pdf

[46] Gov't of P.R., Office of the Governor, Planning Board, Federal and Commonwealth Joint Permit Application for Water Resource Alterations in Waters, Including Wetlands, of Puerto Rico (Aug. 2010, modified Nov. 2010) [hereinafter Joint Permit Application].

[47] Id. at 2.

[48] Id. at 42.

[49] Letter from Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Sindulfo Castillo, Chief, Regulatory Section U.S. Army Corps of Eng's-Antilles Office 5 (Oct. 18, 2010) [hereinafter Letter from Edwin Muniz to Sindulfo Castillo (Oct. 18, 2010)].

[50] Letter from Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (May 20, 2011) [hereinafter Letter from Edwin Muniz to Robert Barron (May 20, 2011)].

[51] Letter from Edwin Muniz to Sindulfo Castillo (Oct. 18, 2010), supra note 49.

[52] Id.

[53] See U.S. Fish & Wildlife Serv., RE: Biological Opinion Via Verde Project, Puerto Rico SAJ 2010-02881 (IP-EWG) (Aug. 23, 2011), available at http://www.fws.gov/Caribbean/PDF/BiologicalOpinion_ViaVerde.pdf [hereinafter Via Verde Biological Opinion] (Table 1 of listed species contains more than the initial 32 species).

winged Hawk (*Buteo platypterus brunnescens*).[54] For the remaining species, the Corps determined that the Project is "not likely to adversely affect" the species or would have "no effect,"[55] and FWS concurred with these determinations.[56] Within six weeks after the commencement of formal consultation, FWS issued its Biological Opinion, which concluded that the proposed Via Verde Project is "not likely to jeopardize the continued existence" of the Puerto Rican Boa, the Puerto Rican Sharp-shinned Hawk, and the Puerto Rican Broad-winged Hawk.[57] The Biological Opinion has been finalized, and the Corps has concluded its ESA consultation with FWS. Moreover, the Corps has not initiated consultation with NMFS, despite repeated requests from that agency.

Parties issuing notice to the Corps consist of various conservation and community organizations and individuals concerned with the effects of the proposed Via Verde Project on endangered and threatened species of Puerto Rico. These conservation and community organizations include Ciudadanos del Karso, Federación Espeleológica de Puerto Rico, Sociedad Ornitológica Puertorriqueña, Inc., Vegabajeños Impulsando un Desarrollo Ambiental Sustentable, Comite Utuadeño Contra el Gasoducto, the Center for Biological Diversity, and the Sierra Club. See Appendix A for a more detailed discussion of these clients and their interests.

III. VIOLATIONS RELATING TO PUERTO RICAN NIGHTJAR; PUERTO RICAN PARROT; CARIBBEAN ROSEATE TERN; PUERTO RICAN CRESTED TOAD; COQUÍ LLANERO; ANTILLEAN MANATEE; LEATHERBACK, HAWKSBILL, GREEN, AND LOGGERHEAD SEA TURTLES; AND TWENTY-NINE PLANTS

The Corps is in violation of Section 7(a)(2) of the ESA based on its failure to consult with FWS concerning the impacts of the Via Verde Project on ten wildlife species (Puerto Rican Nightjar, Puerto Rican Parrot, Caribbean Roseate Tern, Puerto Rican Crested Toad, Coquí Llanero, Antillean Manatee, Leatherback Sea Turtle, Hawksbill Sea Turtle, Green Sea Turtle, Loggerhead Sea Turtle) and twenty-nine plant species (Palo de Ramón, Diablito de Tres Cuernos, Turtlefat, Mata Buey, Erubia, Rosewood, Chupacallos, Bariaco, St. Thomas Prickly Ash, Nogal Walnut Tree, Cana Gorda Girdlepod, Maxwell's Girdlepod, Tropical Lilythorn, Elfin Tree Fern, Monte Guilarte Hollyfern, Puerto Rico Halberd Fern, Cordillera Maiden Fern, Barrio Charcas Maiden Fern, Puerto Rico Maiden Fern, Palo de Nigua, Woodbury's Stopper, Ausu, Heller's Cieneguillo, Jamaican Broom, Serpentine Manjack, Palma de Manaca, Cobana Negra, Arana, Puerto Rico Manjack).[58] The Corps cannot lawfully rely upon a demonstrably inadequate Biological

[54] Letter from Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist., to Edwin Muniz Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office (July 11, 2011) [hereinafter Letter from Robert Barron to Edwin Muniz (July 11, 2011)].
[55] Id.
[56] Letter from Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (July 15, 2011) [hereinafter Letter from Edwin Muniz to Robert Barron (July 15, 2011)].
[57] Via Verde Biological Opinion, supra note 53, at 52–53.
[58] Background information about these species is set forth in Appendix B and is incorporated by reference as though fully set forth herein. This group of species includes the Coquí Llanero, which was recently proposed for listing as "endangered," as well as the Puerto Rico Manjack, which is a "candidate" for listing as "endangered" under the ESA. 76 Fed. Reg. 63420 (Oct. 12, 2011); 75 Fed. Reg. 69269 (Nov. 10, 2010). Both of these species were discussed in the Biological Assessment, albeit in an inadequate manner similar to the other species. See BA, at 39–40 and 80–83. In light of the potential for these two species to become listed under the ESA, we are hereby

Assessment prepared by the applicant's consultant. The mitigation measures are wholly inadequate to prevent the risk of jeopardy and harm to the protected species.
Unless and until the Corps initiates formal consultation and completes an adequate consultation for these species, the Corps is in violation of Section 7(a)(2) of the ESA. The Corps is also in violation of Section 7(a)(4) of the ESA based on its failure to confer with FWS concerning impacts of the project on the Coquí Llanero and its critical habitat, which were recently proposed for listing under the ESA. Furthermore, several substantive violations flow from the Corps's failure to consult, including violation of its duty under Section 7(a)(2) to insure that the Project will not jeopardize listed species or adversely modify their critical habitat, and violation of the Section 9 prohibition against "take" of listed species.

A. VIOLATIONS OF 16 U.S.C. § 1536(A)(2) BASED ON INADEQUATE BIOLOGICAL ASSESSMENT, FAILURE TO CONSULT WITH FWS, AND IMPROPER MITIGATION MEASURES FOR THIRTY-NINE SPECIES

The Corps has approved a Biological Assessment, prepared by PREPA's consultant, for the Via Verde Project that is severely inadequate in many respects, several examples of which are discussed below. As a result of these inadequacies, the Corps has violated its duties under Section 7(a)(2) of the ESA to use "the best scientific and commercial data available," consider the Project as a whole, analyze all direct, indirect, and cumulative impacts of the Via Verde Project on listed species, and give the benefit of the doubt to the listed species, including the Puerto Rican Nightjar, Puerto Rican Parrot, Caribbean Roseate Tern, Puerto Rican Crested Toad, Coquí Llanero, Antillean Manatee, Leatherback Sea Turtle, Hawksbill Sea Turtle, Green Sea Turtle, Loggerhead Sea Turtle, and the Twenty-Nine Plants listed above. Moreover, because the Biological Assessment was inadequate, the Corps' "no effect" and "not likely to adversely effect" determinations for these thirty-nine species and its resulting failure to conduct formal consultation with FWS regarding these thirty-nine species constitute violations of Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2).

1. Inadequate Survey Methods

The Corps must insure that its ESA consultation fully evaluates the potential effects of the Via Verde Project on endangered and threatened species listed under the ESA. In order to do so, the Corps must conduct adequate surveys along the entire action area of the Project to determine whether the Project is likely to affect listed species. During its development of the Biological Assessment, the Corps failed to conduct adequate scientific surveys along the entire Project route. Instead, surveys were generally conducted by means of subjective survey transects over a limited percentage of the route, and within an extremely expedited timeframe. The following are a few examples of the inadequacies in the survey methods used in the preparation of the Biological Assessment:

- According to Dr. Hector Quintero, a well-recognized expert on the endangered Puerto Rican Nightjar, "[i]t is impossible that in more than 6.0 km there are only 1.9 acres" of prime

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notifying the Corps' of our intent to sue based on its failure to comply with the substantive and procedural obligations of the ESA with respect to these two species.

Nightjar habitat,[59] and this inaccuracy demonstrates that "the habitat assessment of this species is deficient."[60] In particular, the Nightjar study "does not provide the scientific rigor necessary to properly describe the impact that the pipeline will have" on Nightjar populations with the Colinas de Peñuelas area, the second-most important habitat for the Nightjar in the world.[61] The study in this region only analyzed a mere 11.1% of the route over an insufficient time period of nine days.[62] A comprehensive Nightjar study should "be made during the breeding season and should extend for at least three months."[63]

- With respect to endangered and threatened trees, shrubs, and other plant species, Dr. Quintero has stated that the "surveys in the BA are incomplete and deficient."[64] Surveys for endangered and threatened flora species are "based on two limited field surveys . . . cover[ing] only 3.21 miles of the total 92.0."[65]

- On at least ten separate occasions, FWS directed the Corps and PREPA to conduct thorough and probing surveys of the Project route without the use of transects.[66] However, this direction was not heeded, resulting in surveys only to "[s]pecific sites selected by the investigator as 'hotspots' where he thought it was most appropriate to find endangered species."[67] This type of survey methodology lacks scientific value, particularly when utilized in Puerto Rico's biologically diverse ecosystems where endangered species "can appear anywhere, and sometimes endangered plant species are found where you least imagine."[68]

- The Corps failed to comply with directives from FWS to (1) survey the entire 92-mile long project route instead of merely subjectively selected transects; (2) create georeferenced shape-file maps of all potential threatened and endangered species located in the overall action area, and (3) survey all potential access roads, staging areas, and construction zone sites.[69]

- Throughout the consultation process, the Corps has conducted an inadequate review of scientific literature regarding all species within the Via Verde Project action area. Potential species habitat exists in many locations that remain unsurveyed by PREPA.

- The Corps has relied heavily on the failure of the consultants to observe species during the limited times and in the limited locations they looked for them using survey methods of

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[59] Letter from Dr. Héctor E. Quintero, Interamerican University of Puerto Rico, to Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office (Sept. 15, 2011) [hereinafter Letter from Dr. Héctor E. Quintero to Edwin Muniz (Sept. 15, 2011)].
[60] Id.
[61] Id.
[62] Id.
[63] Id.
[64] Id.
[65] Id.
[66] See Id. at 3 (for a summary of all FWS letters containing requests that the Corps not allow the transect methodology for determining presence of endangered plant species).
[67] Id.
[68] Id.
[69] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.

doubtful effectiveness. Contrary to the Corps' conclusions, these flawed surveys do not provide clear evidence of the absence of listed species from suitable habitat.[70]

- For the Crested Toad, FWS directed the Corps and PREPA to conduct thorough surveys during the species' most active months during the rainy season from November to January;[71] however, the Corps failed to require surveys for the Crested Toad during these months. In fact, PREPA's own consultant admits "the presence of the toad in those areas cannot be categorically discarded because the search coincided with the period of low activity for the species and therefore, the probability of detection was significantly reduced."[72] Subsequent studies during the rainy season were never conducted to determine the presence of the Crested Toad along the Project route.

- For the Puerto Rican Parrot, FWS has continually noted the inadequacy of surveys conducted by PREPA consultants. When evaluating PREPA's initial Biological Assessment studies, FWS noted that the field studies were "not designed for Puerto Rican parrot detection . . . [and were] missing a period of high activity for the Puerto Rican parrot (i.e., the afternoon) and observation points at key strategic areas."[73] FWS noted at least twice that the information provided by PREPA and the Corps relating to the Puerto Rican Parrot was "not sufficient" and "too general" for FWS to make a species determination.[74] The final Biological Assessment contains no updated surveys for the Puerto Rican Parrot; instead it continues to rely on these problematic studies, dated March 2011.

- For the Caribbean Roseate Tern, the Corps conducted neither the required field studies nor a review of the scientific literature to determine whether the Via Verde Project "may affect" the species or its habitat. In all draft versions of the Biological Assessment, PREPA included the Roseate Tern as a species "likely to occur" in the following municipalities affected by the Project – Peñuelas, Barceloneta, and Manatí.[75] However, despite inclusion of the species as one likely to occur in the Project's action area, the Corps completely failed to conduct any formal or informal consultation regarding the effects of the Project on the Roseate Tern. In fact, the final Biological Assessment merely makes the determination that the Project would have "no affect" [*sic*] on the species without devoting any part of the assessment to a

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[70] Letter from Dr. Jesus Danilo Chinea, University of Puerto Rico, Department of Biology, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (Sept. 7, 2011) [hereinafter Letter from Dr. Jesus Danilo Chinea to Robert Barron (Sept. 7, 2011)].

[71] E-mail from Rafael Gonzales, U.S. Fish & Wildlife Serv. Caribbean Field Office, to Daniel Pagan Rosa, Asesores Ambientales y Educativos Inc. (April 13, 2011, 12:30 PM).

[72] Puerto Rico Electric Power Authority, Via Verde Natural Gas Pipeline Project Biological Assessment (April 2011, modified July 2011) [hereinafter Final Biological Assessment] Appendix 3, Search of the Puerto Rican crested toad and coquí llanero in areas proposed for the construction of Via Verde at page 9.

[73] E-mail Rafael Gonzales to Daniel Pagan (April 13, 2011, 12:30 PM), supra note 71.

[74] E-mail from Rafael Gonzales to Daniel Pagan (April 13, 2011, 12:30 PM), supra note 71; Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.

[75] See Final Biological Assessment, supra note 72, at 16–22. Additionally, information from FWS shows that the Roseate Tern is likely to occur in the municipality of Arecibo. See U.S. Fish & Wildlife Serv., Caribbean Endangered Species Map (June 15, 2011), available at http://www fws.gov/caribbean/es/PDF/Map.pdf. It is unclear why the Biological Assessment includes a direct copy of all other species from this FWS source except for the occurrence of the Roseate Tern in Arecibo.

discussion of the species, let alone basing such a determination on the required species studies.[76]

- The Project route and design have been modified and realigned multiple times along the beach at Levittown, to the detriment of sea turtle nesting habitat. Originally, the proposed Project route was aligned away from the beach in Levittown; however, due to safety concerns relating to nearby communities, the route was realigned toward the beach.[77] This realignment presents a particular concern as the beach at Levittown supports known Leatherback and Hawksbill Sea Turtle nesting sites. However, neither FWS nor the Corps provided any data on the amount of nesting habitat to be affected by the project or any analysis of the impacts on the protected turtles.

The Corps' "no effect" and "not likely to adversely affect" determinations in the Biological Assessment for the thirty-nine species listed above are based on severely flawed and inadequate species surveys. As a result, the Corps has violated its duties under the ESA to (1) use the best scientific and commercial data available, (2) consider the Project as a whole, (3) analyze all direct, indirect, and cumulative impacts on listed species, (4) give the benefit of the doubt to the listed species, and (5) engage in formal consultation whenever a proposed Project "may affect" listed species.

2. Ever-Changing Project Design and Route Alignment

The proposed route for the Via Verde Project has been realigned on at least six separate occasions.[78] Furthermore, the Corps has acknowledged the "potential for *other changes* to occur as a result of *on-going consultation* with other agencies" even after the Corps made its final "no effect" and "not likely to adversely affect" determinations for the thirty-nine species listed above.[79] To our knowledge, this on-going consultation with other agencies continues today, and the final Project design and route alignment have not yet been determined.[80] The following are a few examples of past and ongoing changes that are being made to the Project design and route alignment without sufficient additional surveys and analysis regarding the species-related impact of these changes:

- It is our understanding that the Corps is still in consultation with the State Historic Preservation Office and is considering realignments in order to avoid effects on archeological sites, specifically within the ecologically sensitive Northern Karst region.

- The Project route and design have been modified and realigned multiple times along the beach at Levittown. Due to this, FWS urged that "additional information is required to assess potential impacts to sea turtles from the proposed alignment along beaches on the

[76] See Final Biological Assessment, supra note 72, at 131.
[77] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.
[78] See generally, Via Verde Biological Opinion, supra note 53, at 2–9 (timeline describes realignment instances).
[79] Letter from Edwin Muniz to Robert Barron (July 15, 2011), supra note 56 (emphasis added).
[80] See, e.g., Letter from Donald W. Kinard, Chief, Regulatory Div., U.S. Army Corps of Engineers-Jacksonville, to Charlene Vaughn, Assistant Dir., Office of Federal Agency Program, Advisory Council on Historic Preservation (Sept. 1, 2011) (describing the on-going consultation between the Corps and State Historic Preservation Office and resulting need for project realignments).

north coast of Puerto Rico."[81] Visits to this area indicated that "nesting habitat for leatherback sea turtle and hawksbill sea turtle is present" and that because of this finding, "specific plans (construction area, monitoring plan during construction, restoration of habitat and sediment control) [are] still needed."[82] However, the final Biological Assessment does not fully address these concerns; rather, it merely relies on an inadequate "turtle monitoring program" allowing for relocation of affected nests.[83]

- On multiple occasions, the Project design has been altered through the heart of Puerto Rico's steep and fragile karst terrain. Project designs have, at various times, suggested use of all sorts of construction methods, such as Horizontal Directional Drilling, trenching, terracing, and boring. The construction right-of-way has been modified in ways that seem unpractical, given the difficult topography of the island. FWS has expressed concerns about the feasibility of reducing the construction right-of-way, stating that Project construction along the side of a hill will "probably involve more than the 150 foot construction zone, since you cannot build on the side of a hill with trucks and heavy equipment, it simply is not possible from an engineering stand point."[84]

- The Corps realigned the Project route in the sensitive Nightjar habitat of Colinas de Peñuelas in order to avoid "direct effects to prime nightjar habitat"[85] yet failed to conduct further Nightjar surveys for the newly realigned route. Subsequent to this realignment, Dr. Quintero independently surveyed this newly aligned route and discovered an individual Nightjar located precisely in the center of the new route alignment right-of-way.[86] Based on this discovery, Dr. Quintero concluded that "more field sampling is needed to determine the distribution of this species along the ROW of the pipeline."[87]

- The Via Verde Project route has been realigned through the Rio Abajo Forest along PR-10, and the Corps has failed to conduct surveys along the new route despite potential threats to the Puerto Rican Parrot. Such threats include fragmentation of foraging habitat and increased likelihood of predation of the Puerto Rican Parrot due to creation of canopy gaps.

- FWS noted that potential Crested Toad breeding pond habitat would be impacted through a newly proposed Project alignment, yet "this pond was not surveyed appropriately to determine presence of the species."[88]

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[81] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.
[82] Deputy Field Supervisor, Caribbean Ecological Services Field Office, Boqueron, PR, MEMO: Issues discussed during meeting on June 2, 2011 for the Via Verde project (June 3, 2011).
[83] Final Biological Assessment, supra note 72, at 115–16 .
[84] Email from Felix Lopez, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Rafael Gonzales, U.S. Fish & Wildlife Serv. Caribbean Field Office (April 13, 2011, 11:13 AM).
[85] Letter from Edwin Muniz to Robert Barron (July 15, 2011), supra note 56.
[86] Letter from Hector Quintero to Edwin Muniz (Sept. 15, 2011), supra note 59.
[87] Id.
[88] E-mail from Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Jeff Weller, Ecological Services Division, U.S. Fish & Wildlife Serv., Atlanta GA (July 1, 2011, 03:00 PM) [hereinafter E-mail from Edwin Muniz to Jeff Weller (July 1, 2011, 03:00 PM)].

- The Via Verde Project route has also been realigned in areas such as Manatí and Colinas de Peñuelas without additional surveys regarding the presence of listed trees, shrubs, and other plants within the newly proposed route.[89]

- These repeated and ongoing changes in project design and route alignment implicate the need for changes to the construction process as well, including the nature, extent, and location of staging areas, construction platforms, excavation, land-use conversion, and additional access road construction. These changes have not been adequately analyzed in the Biological Assessment.

Despite these repeated and ongoing project alterations, the Corps issued its final Biological Assessment on July 11, 2011. Four days later, in a letter dated July 15, 2011, FWS concurred with the Corps' determinations in the Biological Assessment that the Via Verde Project is "not likely to adversely affect" the Puerto Rican Parrot, Puerto Rican Nightjar, Puerto Rican Crested Toad, Coquí Llanero, and twenty-seven listed plant species.[90] Although the FWS concurrence letter did not explicitly mention the remaining two listed plant species discussed in the Biological Assessment (Cana Gorda Girdlepod, *Mitracarpus polycladus*, and Maxwell's Girdlepod, *Mitracarpus maxweliiae*), we infer that FWS concurred with the Corps' "no effect" determinations for these two species because the Corps and FWS did not engage in formal consultation concerning either species. Similarly, although the FWS concurrence letter did not explicitly address the Caribbean Roseate Tern, Antillean Manatee, or the Leatherback, Hawksbill, Green, and Loggerhead Sea Turtles, we infer that FWS concurred with the Corps' "no effect" determinations for these species because the Corps and FWS did not engage in formal consultation concerning any of these species.[91]

In its July 15, 2011 letter, FWS emphasized that its concurrence with the Corps' determinations was "based on the information submitted to us on July 11, 2011 and the project alignment submitted on July 12, 2011 . . . [and] should project plans change . . . *this determination may require reconsideration*."[92] Similarly, the Biological Assessment itself notes that the Corps may be required to initiate formal consultation for any project realignments to avoid species impacts during construction of the project.[93]

On July 27, 2011, nearly two weeks *after* FWS's concurrence on the Biological Assessment determinations, the Corps submitted "revised GIS shape-files of the project route."[94] These revisions to the project route and associated GIS shape-files thus were not utilized during the

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[89] Letter from Hector Quintero to Edwin Muniz (Sept. 15, 2011), supra note 59.
[90] Letter from Edwin Muniz to Robert Barron (July 15, 2011), supra note 56.
[91] The Biological Assessment also included a discussion of the Kemp's Ridley Sea Turtle and made a "no effect" determination for this species, although the conclusion of the discussion appears to include a typographical error referring to the Leatherback by mistake. See Final Biological Assessment at 124–27. In a subsequent e-mail, NMFS informed the Corps that there was no need to consider the Kemp's Ridley Sea Turtle because it does not occur within the action area for the Via Verde Project. E-mail from Lisamarie Carrubba, National Marine Fisheries Service, Protected Resources Div., Caribbean Field Office, to Edgar W. Garcia, Regulatory Project Manager, U.S. Army Corps of Engineers-Antilles Office (May 2, 2011, 14:26:42).
[92] Letter from Edwin Muniz to Robert Barron (July 15, 2011), supra note 56 (emphasis added); see also, Via Verde Biological Opinion, supra note 53, at 9.
[93] See, e.g., Final Biological Assessment, supra note 72, at 74.
[94] Via Verde Biological Opinion, supra note 53, at 9 (emphasis added).

development of the Biological Assessment. To our knowledge, however, the Corps has not revised its Biological Assessment to reflect these changes in the project and the accompanying changes in impacts on listed species. Moreover, the Corps has indicated, through correspondence with concerned scientists, that the July 27, 2011 route alignment is not final.[95]

Therefore, the Corps has relied on inaccurate and incomplete information concerning the project design and route alignment when making its "no affect" and "not likely to adversely affect" determinations in the Biological Assessment with respect to the thirty-nine species listed above. As a result, the Corps has violated its duties under the ESA to (1) use the best scientific and commercial data available, (2) consider the project as a whole, (3) analyze all direct, indirect, and cumulative impacts on listed species, (4) give the benefit of the doubt to the listed species, and (5) engage in formal consultation whenever a proposed project "may affect" listed species.

3. Reliance on Outdated Biological Opinion for the Antillean Manatee

Due to the prevalence of Antillean Manatees off the coast of the southern municipality of Peñuelas in the area near the EcoEléctrica facility, authorization of construction for the original LNG Terminal in 1996 triggered formal consultation under the ESA and the issuance of a Biological Opinion.[96] This Biological Opinion addressed the effects of an increase in boat and barge traffic in the area, the probability of manatee/boat collisions, and the adverse impacts to the Manatee's coastal habitat.[97] The 1996 Biological Opinion authorized an increase in marine traffic in the Guayanilla Bay area by "10 to 25 movements per year [with] a 125,000 cubic meter LNG ship."[98] The Corps has relied on the fifteen-year old findings and authorization in the 1996 Biological Opinion in support of its "no effect" determination for the Manatee in the Biological Assessment.[99]

FWS has continually noted, however, that the Environmental Baseline[100] has changed since 1996 and that this requires the Corps to analyze "any necessary changes to current facilities and/or operation of the EcoEléctrica LNG Terminal needed for the Via Verde project."[101] For instance, FWS has called attention to PREPA's intention to receive additional movements of LNG barges at a rate beyond the current shipping authorized by the 1996 Biological Opinion to the EcoEléctrica LNG Terminal.[102] Additionally, information regarding the increased scope of the project resulting from additional valves to the pipeline suggests increased capacity beyond a

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[95] Letter from Hector Quintero to Edwin Muniz (Sept. 15, 2011), supra note 59.
[96] Letter from Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (Dec. 15, 2011) [hereinafter Letter from Edwin Muniz to Robert Barron (Dec. 15, 2011)].
[97] Letter from Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (May 27, 2011) [hereinafter Letter from Edwin Muniz to Robert Barron (May 27, 2011)].
[98] Id.
[99] Final Biological Assessment, supra note 72, at 79.
[100] "The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process." 50 C.F.R. § 402.02 (2010).
[101] Letter from Edwin Muniz to Robert Barron (Dec. 15, 2011), supra note 96.
[102] Letter from Edwin Muniz to Robert Barron (May 27, 2011), supra note 97.

level that the 1996 Biological Opinion anticipates. FWS articulates the concern that an "increase in traffic [will] increase the probability of manatee/boat collisions and adverse impacts to the species' habitat."[103] On at least three separate occasions, FWS has informed the Corps and PREPA that the existing 1996 Biological Opinion for the EcoEléctrica LNG Terminal "would not cover the additional movements of LNG barges that would be needed to supply the natural gas to allow the full development of the Via Verde project's scope."[104] FWS thus requested that the Corps fully evaluate the impacts associated with increased ship traffic beyond the 1996 Biological Opinion authorization.[105]

These concerns have never been addressed by the Corps. Indeed, the Corps has failed to analyze the inevitable changes to the facilities and operation of the EcoEléctrica LNG Terminal that will be necessitated by the Via Verde Project or the resulting impacts of this activity on the Antillean Manatee, such as increased ship traffic, increased risk of manatee/boat collisions, increased underwater noise, habitat degradation, and other impacts. Instead, the Biological Assessment merely mentions that "PREPA may in the future purchase additional gas for transmission through the pipeline but that would require a modification of the import terminal which would require authorization from FERC, who would, based on past practice, assess and consult with FWS on the effect on the Antillean Manatee."[106] The Corps has its own duty to consult with FWS regarding these foreseeable impacts on Manatees before authorizing the Via Verde Project. As a result of its failure to do so, the Corps has violated its duties under the ESA to (1) use the best scientific and commercial data available, (2) consider the project as a whole, (3) analyze all direct, indirect, and cumulative impacts[107] on listed species, (4) give the benefit of the doubt to the listed species, and (5) engage in formal consultation whenever a proposed project "may affect" listed species.

4. Failure to Adequately Consider All Direct, Indirect, and Cumulative Impacts of the Project

The Corps' analysis in the Biological Assessment is based on an unduly narrow scope in that it is limited to the right-of-way for the pipeline, does not include many other components of the project (e.g., staging areas, construction platforms, construction of valve stations, excavation, use of hill terracing, land-use conversion, and access roads), does not consider impacts beyond the Project footprint, and does not include inevitable additional projects (e.g., necessary modifications to EcoEléctrica facility to provide natural gas for the pipeline) associated with the pipeline. Moreover, the Corps' analysis fails to consider all the direct, indirect, and cumulative impacts on listed species that may result from the proposed Via Verde Project as a whole. The

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[103] E-mail from Edwin Muniz to Jeff Weller (July 1, 2011), supra note 88.

[104] Letter from Edwin Muniz, to Robert Barron, (May 27, 2011), supra note 97. See also, E-mail from Edwin Muniz to Jeff Weller (July 1, 2011, 03:00 PM), supra note 88; Daniel Pagan, Workplan Meeting 05 Draft (June 10, 2011), available at http://www.saj.usace.army.mil/Divisions/Regulatory/DOCS/interest/ViaVerde/06_FOIA-ReadingRoom/20110610_WorkplanMeeting_PaganCOEandEvans_redacted.pdf.

[105] Letter from Edwin Muniz to Robert Barron (May 27, 2011), supra note 97.

[106] Final Biological Assessment, supra note 72, at 80.

[107] "Cumulative effects" are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." 50 C.F.R. § 402.02 (2010).

following are a few examples of these types of gaps and inadequacies in the Biological Assessment:

- FWS has expressed concern about the need for surveys and analysis of species impacts in areas beyond the scope of the Project's narrowly defined footprint.[108]

- The Corps' Biological Assessment describes, as part of the proposed Project action area, permanent impacts on wetlands due to "construction of *several* mainline valve stations" and access to these valve stations.[109] However, the Corps failed to determine the exact number of valve stations required for the Project. Failure to include and analyze a definitive number of potential valve stations results in an unduly narrow project scope. Additional valves necessary for the Project may increase the scope of the Project's action area. In its final Biological Opinion, FWS expresses particular concern with this narrow project scope, claiming that it anticipates "additional new valve connections to the gas pipeline" along the Project's route.[110] The Corps failed to evaluate or assess the direct, indirect, and cumulative impacts on listed species and habitat due to possible future pipeline expansion resulting from an increase in an unknown number of mainline valves.

- The Corps has failed to adequately consider the impacts associated with creating a "corridor for exotic organisms to move across the island" and intrude upon sensitive and previously secluded habitats.[111] The Project will "create a ***long linear gap*** that can serve as a conduit for predators, exotic species, weeds, and pathogens . . . [causing] deleterious effects on the biota and ecosystem functions."[112] This impact would be especially devastating to Nightjars, which require remote habitat far removed from human activity, and which are ground nesting birds especially vulnerable to predators. Destruction of forest canopy and opening up of vegetation will "put young dispersing nightjars at higher risk to aerial and ground predators."[113] In particular, the proposed pipeline route and necessary access roads "will provide a corridor to exotic species like the mongoose and to domestic and feral cats and dogs, the first two are the major predators of the Puerto Rican Nightjar."[114]

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[108] Letter from Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Yousev García, Director, Asesores Ambientales y Educativos, Inc. (June 30, 2010) (FWS is especially concerned with the scope of the Via Verde Project due to its prior experience with construction of the Gasoducto del Sur and the need for construction of access roads, platforms, etc. outside of the action area initially considered by the agencies).
[109] Final Biological Assessment, supra note 72, at 13 (emphasis added).
[110] Via Verde Biological Opinion, supra note 53, at 48–52.
[111] Comments on Via Verde NG Pipeline Project Biological Assessment, Ariel E. Lugo, Director, Int'l Institute of Tropical Forestry, U.S.D.A. Forest Service, Rio Piedras (comments written on personal time and represent personal views and not those of the U.S. Forest Service) (June 7, 2011) [hereinafter Ariel E. Lugo Comments on Via Verde (June 7, 2011)].
[112] Letter from Carla Restrepo, Associate Professor, Universidad de Puerto Rico, Departamento de Biologia, to Col. Alfred A. Pantano, Jr., Dist. Commander, U.S. Army Corps Eng's-Jacksonville Dist. (June 2, 2011) (emphasis original).
[113] Letter from Carlos A. Delannoy, Ph.D. Avian Ecology and Conservation Specialist, Departamento de Biologíca, Universidad de Puerto Rico, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (Sept. 6, 2011) [hereinafter Letter from Carlos A. Delannoy, Ph.D. to Robert Barron (Sept. 6, 2011)].
[114] Letter from Dr. Héctor E. Quintero, Interamerican University of Puerto Rico, to Col. Alfred A. Pantano, Jr., Dist. Commander, U.S. Army Corps Eng's-Jacksonville Dist. (Aug. 25, 2011).

- The Corps has also failed to adequately consider fragmentation of habitat. For instance, with respect to Nightjars, construction of the project would "increase the acreage (area) of edge [habitat], promoting and increasing predation pressure."[115] This fragmentation would also result in isolated Nightjar populations which could promote Nightjar inbreeding and "genetic degradation that could lead to extinction" of the species.[116] This is also a concern for the Crested Toad, as breeding tends to be located around a smaller area containing small vernal ponds.

- The Biological Assessment does not describe what methods would be used to maintain a right-of-way for the pipeline clear of vegetative growth. The potential options include tearing vegetation, cutting vegetation, or use of chemical herbicides. Any of these methods could result in direct, indirect, and cumulative impacts to listed species. For example, maintenance and removal of vegetation through herbicide application would adversely impact amphibians, such as the Crested Toad and Coquí Llanero, directly, indirectly, and cumulatively through bioaccumulation throughout the food chain.[117] For further example, because Nightjars require remote habitat far removed from human activity, the use of noisy and disruptive mechanical vegetation clearing would likely cause the Nightjar to abandon its nesting areas.[118]

- Due to maintenance requirements, conversion to grasslands is inevitable through permanent removal of deep-rooted trees, shrubs, and other plants along the project route. The Corps' analysis has not considered the edge effects and invasion of exotic grasses, which are more susceptible to wildfire burning, on listed species. The permanent removal of "at least 277,000 trees" and the subsequent permanent conversion of forested land cover to a grassy ecosystem[119] would have a particularly detrimental effect on the Nightjar as this species requires dense canopy to shield it from predation.

- For the Puerto Rican Crested Toad and the Coquí Llanero, the Corps has generally failed to consider the potential for the project to exacerbate present threats to amphibians in Puerto Rico, such as those associated with climate change, disease (such as the chytrid fungus), and weather disruption.[120]

- For the Caribbean Roseate Tern, because the Corps failed to include *any studies whatsoever* in making its determination that the project will "not affect" the Roseate Tern, it has also failed to conduct any analysis of the direct, cumulative, and indirect effects of the Project on the Roseate Tern and its habitat.

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[115] Letter from Carlos A. Delannoy, Ph.D. to Robert Barron (Sept. 6, 2011), supra note 113.
[116] Id.
[117] Letter from Rafael L. Joglar, Ph.D. Profesor, Universidad de Puerto Rico, Departamento de Biología, to Col. Alfred A. Pantano, Jr., Dist. Commander, U.S. Army Corps Eng's-Jacksonville Dist. (June 7, 2011) [hereinafter Letter from Rafael L. Joglar, Ph.D. to Alfred A. Panatano, Jr. (June 7, 2011)].
[118] Letter from Dr. Héctor E. Quintero to Edwin Muniz (Sept. 15, 2011), supra note 59.
[119] Ariel E. Lugo Comments on Via Verde (June 7, 2011), supra note 111.
[120] Letter from Rafael L. Joglar, Ph.D. to Alfred A. Panatano, Jr. (June 7, 2011), supra note 117.

- The Corps has failed to consider the hydrological interconnectedness of the only wetland the Coquí Llanero is known to inhabit with other surrounding surface water and groundwater, and how that water system may be affected by the Via Verde Project. The Corps has also failed to consider the hydrological effects on the unique plant composition upon which the Coquí Llanero depends.

- As discussed above, the Corps has also failed to analyze the species-related impacts of other projects associated with the development of the Via Verde Project, such as the necessary modifications to the EcoEléctrica facility, the additional vessel traffic associated with the delivery of a natural gas supply for the pipeline, and other related projects, operations, and activities.

- The Corps has also failed to consider the cumulative impacts of the Via Verde Project on listed species in combination with other past, present, and reasonably foreseeable future projects (e.g., highway construction, residential and commercial development, and other projects) affecting the thirty-nine species listed above and/or their habitat. Additionally, the Corps has failed to consider the cumulative impacts to species, such as the Nightjar, Roseate Tern, Hawksbill Sea Turtle, and Green Sea Turtle, already affected by development of the WindMar Renewable Energy Project in Guayanilla.[121]

Therefore, in making its "no effect" and "not likely to adversely affect" determinations in the Biological Assessment with respect to the thirty-nine species listed above, the Corps has violated its duties under the ESA to (1) use the best scientific and commercial data available, (2) consider the project as a whole, (3) analyze all direct, indirect, and cumulative impacts on listed species, (4) give the benefit of the doubt to the listed species, and (5) engage in formal consultation whenever a proposed project "may affect" listed species.

5. Improper Approach to Mitigation and Inadequate Analysis of Effectiveness of Proposed Mitigation Measures

Under the ESA, mitigation measures must be "reasonably specific, certain to occur, and capable of implementation; they must be subject to deadlines or otherwise-enforceable obligations; and most important, they must address the threats to the species in a way that satisfies the jeopardy and adverse modification standards."[122]

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[121] U.S. Fish & Wildlife Serv., Biological Opinion for Issuance of an Incidental Take Permit Pursuant to Section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended, for the WindMar RE Project, Guayanilla, Puerto Rico 9 (2006) available at http://coalicionventanasverraco.org/files/Signed_BO_Windmar_9_7_2006.pdf.

[122] Ctr. for Biological Diversity v. Rumsfeld, 198 F. Supp. 2d 1139, 1152 (D. Ariz. 2002) (citing Sierra Club v. Marsh, 816 F.2d 1376 (9th Cir. 1987)); see also NWF v. NMFS, 481 F.3d 1224 at *12 & n. 16 ("Although the record does reflect a general desire to install structural improvements [to benefit fish] where feasible, it does not show a clear, definite commitment of resources for future improvements."); Natural Res. Defense Council v. Kempthorne 506 F. Supp. 2d 322 (E.D. Cal. 2007) (adaptive management protocol described in a Biological Opinion failed to provide reasonable certainty to assure that necessary mitigation measures would be implemented, as required by ESA); Ctr. For Biological Diversity v. Bureau of Land Mgmt., 422 F. Supp. 2d 1115, 1133 (N.D. Ca. 2006) (citing Ctr. For Biological Diversity v. Rumsfeld, 198 F. Supp. 2d at 1152) (Finding a "no jeopardy" determination contrary to law where the agency instituted a plant transplanting program that failed to require mitigation measures to be undertaken prior to population decline of a plant species).

The Corps has relied heavily on mitigation measures of dubious effectiveness in order to avoid the serious scrutiny of these impacts that would occur during formal consultation. As FWS has pointed out, under the ESA, "[a]voiding impacts to species and their habitat should be the first approach instead of mitigation."[123] The following are some of the reasons why the Corps' approach to mitigation and its analysis of proposed mitigation measures are inadequate:

- As the U.S. Supreme Court has ruled, the ESA establishes "the institutionalization of caution" requirement for federal agency decision-making.[124] Through its proposed mitigation measures, the Corps is attempting to postpone the bulk of site-specific surveys, impact assessment, analysis of mitigation measures, and other interagency consultation activities until the construction process is already underway. This violates the most fundamental tenets of the ESA.[125]

- The plant conservation recommendations in the Biological Assessment are based on generic scientific literature and would involve applying similar techniques for all endangered and threatened plants. It is not appropriate to apply this "one size fits all protocol" for twenty-nine distinct species of trees, shrubs, and plants without analyzing its effectiveness in light of each species' individual characteristics and specific habitat requirements.[126]

- The Corps is relying primarily on a speculative "transplanting program" involving transplantation of individual plant species to the botanical Garden at Río Piedras, and it contends that this mitigation measure will be sufficient to avoid adverse effects to all listed plant species.[127] The Corps has failed to consider the feasibility or effectiveness of such a measure, and it has failed to determine whether the Rio Pedras Botanical Garden is even capable of handling the transplantation plan. Prior experiences with plant relocation attempts in Puerto Rico have proven that transplantation is prone to failure and eventual death of the endangered plant species.[128]

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[123] Letter from Edwin Muniz to Sindulfo Castillo (Oct. 18, 2010), supra note 49; Ctr. for Biological Diversity v. Bureau of Land Mgmt., 422 F.Supp.2d 1115 (N.D. Cal. 2006) ("the Court further concludes that deferring any mitigation measures until after significant degradation has occurred to a threatened species does not "address the threats to the species in a way that satisfies the jeopardy and adverse modification standards.").

[124] Tennessee Valley Auth. v. Hill, 437 U.S. 153, 178 (1978). "Congress has spoken in the plainest of words, making it abundantly clear that the balance has been struck in favor of affording endangered species the highest of priorities." Id. at 194.

[125] Any mitigation measures imposed by permit terms and conditions or by the Biological Opinion cannot defer "any mitigation measures until after significant degradation has occurred to a threatened species [as this] does not 'address the threats to the species in a way that satisfies the jeopardy and adverse modification standards.'" Ctr. For Biological Diversity v. Bureau of Land Mgmt., 422 F. Supp. 2d 1115, 1133 (N.D. Ca. 2006) (citing Ctr. For Biological Diversity v. Rumsfeld, 198 F. Supp. 2d at 1152) (Finding a "no jeopardy" determination contrary to law where the agency instituted a plant transplanting program that failed to require mitigation measures to be undertaken prior to population decline of a plant species).

[126] Letter from Edgardo Gonzalez, Comisión Técnica y Cientifico, Casa Pueblo, to Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office (Sept. 12, 2011) [hereinafter Letter from Edgardo Gonzalez to Edwin Muniz (Sept. 12, 2011)].

[127] Via Verde Biological Opinion, supra note 53, at 23.

[128] Letter from Edgardo Gonzalez to Edwin Muniz (Sept. 12, 2011), supra note 126.

- The Corps is relying on a similar transplantation program for the Crested Toad even though it is likely to fail for several reasons. First, it is unlikely that the Toad would survive transplantation. The Crested Toad is territorial and inhabits a small territory. Past experience shows that relocated toads will attempt to return to their territory. Second, the Crested Toad is nearly impossible to find via sight and sound even when it is active. The proposed mitigation calls for pre-construction surveys during morning time periods when the Crested Toad is not active, making it unlikely that any Toads in the area would be discovered and relocated prior to construction. Third, the Toad is not able to move very quickly to avoid the adverse impact from tractors and construction.

- The Corps is again relying on a relocation approach for the Coquí Llanero, an approach that has never been studied for this species and likely to result in failure.[129] Dr. Rafael Joglar—a well-renowned Puerto Rican amphibian and reptile expert—maintains that the dominant reasons behind amphibian and reptile relocation failures are homing and migration issues and poor habitat.[130] Moreover, relocation of a limited number of individuals is more likely to result in failure than large numbers of individuals because a limited number of individuals will not be able to establish a viable breeding population.[131] Successful relocation efforts are observed with releases of 1000 individuals or more.[132] Also, this approach depends on the performance of a daily survey prior to construction activities. It would be very difficult for a field biologist to discover a tree frog the size of a dime, identified primarily by its barely audible high frequency call, during the time of day it is inactive, rather than during the period of greatest activity between 4:30 and 11:00 p.m.[133]

- FWS has concurred with the Corps' "not likely to adversely affect" determination for the Nightjar based on the Corps' proposal to "foster nightjar conservation and recovery" through acquisition of approximately 290 acres of Nightjar habitat.[134] However, this vague proposal is flawed for a number of reasons: it fails to identify what 290 acres of habitat would be used for mitigation; whether this acreage provides high quality breeding or foraging habitat; whether the proposed mitigation habitat would expose the Nightjar to natural or invasive predators; how the proposed habitat compares to the excellent habitat that would be lost through the construction of the Via Verde Project; whether the relocation of Nightjars to the new habitat is likely to be successful or not; and whether the relocation of Nightjars might result in a "take" and/or might put the species at risk of "jeopardy."

- The Corps has proposed to avoid pipeline construction during the breeding season for numerous species, including the Nightjar.[135] However, the Biological Assessment lacks concrete information regarding the construction timetable or project implementation schedule,[136] and the Corps has not analyzed the effectiveness or feasibility of this proposed mitigation measure in preventing a "take" and/or "jeopardy" to each of the various species.

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[129] Letter from Rafael L. Joglar, Ph.D. to Alfred A. Panatano, Jr. (June 7, 2011), supra note 117.
[130] Id.
[131] Id.
[132] Id.
[133] Id.
[134] Letter from Edwin Muniz to Robert Barron (July 15, 2011), supra note 56.
[135] Final Biological Assessment, supra note 72, at 111.
[136] Letter from Dr. Héctor E. Quintero to Edwin Muniz (Sept. 15, 2011), supra note 59.

Moreover, the Biological Assessment allows for construction activities and clearing of vegetation to occur during the breeding season in "emergency situations" so long as a biologist is present.[137] The nature and extent of this exemption and its impact on the species have not been analyzed.

- The Corps requires that "at the time of construction," PREPA avoid the base of the mogotes and include a buffer setback of 25 to 30 feet from highway PR-10 in order to avoid impacting Puerto Rican Parrot habitat and home range.[138] However, this method of mitigation was never evaluated in the Biological Assessment for its effectiveness in avoiding impacts on the Parrot and its habitat, and the Biological Assessment contained no analysis regarding means or techniques for avoiding contact with this critically endangered species. In fact, the final Biological Assessment contains no mention of a buffer setback whatsoever, reaching a determination of "no effect to the Parrot" based on the Project alignment alone.

- With regard to recognized sea turtle nesting along the beach at Levittown, PREPA and the Corps rely on an inadequate "turtle relocation program" to address the inevitable Project effects on nesting habitat. The program requires monitoring, flagging, fencing, and mapping of turtle nests during project construction, resulting in relocation of nests coordinated by DNER and FWS.[139] However, the Biological Assessment fails to analyze the effectiveness of such a program and does not define the area where relocation will occur. Furthermore, this plan does not adequately address numerous other effects of construction along the beach, such as the use of lights at nighttime, drilling vibrations, risk of explosion, modification of adult female nesting behavior and the resulting increase of false crawls.

6. Failure to Consult and Consequences of Failure to Enter into Formal Consultation with FWS

The obligation to engage in formal consultation is triggered by "[a]ny possible effect, whether beneficial, benign, adverse, or of an undetermined character . . . ."[140] The threshold for a "may affect" determination is low. A federal agency must consider "the effects of the action as a whole," including all direct and indirect effects.[141] If the Corps, through informal consultation with FWS, finds that the proposed Project "may adversely affect" listed species or their critical habitat, then formal consultation between the Corps and FWS is required.[142]

For the reasons discussed above, the proposed Via Verde Project "may affect" the ten wildlife species and twenty-nine plant species discussed above, and the Corps' "no effect" and "not likely to adversely affect" determinations for these species are based on flawed and inadequate analyses in the Biological Assessment as well as an unlawful approach to mitigation. As a consequence of these violations, the Corps has also violated Section 7(a)(2) of the ESA, 16

[137] Final Biological Assessment, supra note 72, at 111.
[138] Email from Corps "SAJ" to Larry Evans, BCPeabody Consulting, RE: Via Verde: checklist from review of Biological Assessment (June 15, 2011, 3:39:00 PM) (on file with author).
[139] Final Biological Assessment, supra note 72, at 115–16.
[140] Fed. Reg. 19,926, 19,949 (June 3, 1986) (codified at 50 C.F.R. pt. 402); See Natural Res. Def. Council v. EPA, 2005 WL 1241904 5 (D. Md. 2005) (citing 50 C.F.R. § 402).
[141] 50 C.F.R. § 402.14(c) (2010).
[142] 50 C.F.R. § 402.14(a) (2010).

U.S.C. § 1536(a)(2), by failing to engage in formal consultation with FWS concerning the thirty-nine species listed above.

The formal consultation process includes procedural requirements that are designed to insure "no jeopardy" and to minimize "take" of listed species. By failing to enter into formal consultation, the Corps has deprived the thirty-nine species listed above of these robust procedural protections, including: (1) careful analysis of species impacts in a Biological Opinion utilizing the expertise of FWS and its biologists; (2) analysis and selection of Reasonable and Prudent Alternatives (RPAs) for the project; (3) monitoring of the project and its impacts to insure the success of RPAs; (4) preparation and issuance of an Incidental Take Statement (ITS) to minimize "take" of listed species; and (5) any additional permit conditions deemed necessary by FWS to avoid "jeopardy" to listed species or "adverse modification" of critical habitat.[143] Moreover, formal consultation prohibits the Corps from undertaking any agency action "that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and *recovery* of a listed species in the wild."[144] During the formal consultation process with FWS, the Corps and PREPA would also be prohibited from making any irretrievable commitments of resources toward Project development.[145] All of these procedural requirements help to insure that the project is designed to protect listed species and reduce all direct and indirect impacts on such species. Because the Corps did not initiate consultation with FWS, it has deprived the thirty-nine species listed above of these procedural protections.

B. VIOLATION OF 16 U.S.C. § 1536(A)(4) BASED ON FAILURE TO CONFER WITH FWS IN LIGHT OF THE NEW PROPOSED COQUÍ LLANERO LISTING

On October 12, 2011, three months subsequent to the issuance of the Biological Assessment for the Via Verde Project, FWS announced its intention to list the Coquí Llanero as "endangered" under the Endangered Species Act.[146] FWS also proposed to designate approximately 440 acres within the municipality of Toa Baja as "critical habitat" for the Coquí Llanero. The ESA requires the Corps to confer with FWS and/or NMFS "on any action which is likely to jeopardize the continued existence of any species proposed to be listed . . . or result in the destruction or adverse modification of critical habitat proposed to be designated for such species."[147] While the Corps conferred with FWS regarding the Coquí Llanero, this conference and the Corps' effects determination contained in the Biological Assessment failed to fully consider the effects of the project on the Coquí Llanero and its newly designated critical habitat. Because the Coquí Llanero was proposed to be listed subsequent to issuance of the Biological Assessment, the Corps must additionally "review the action to determine whether formal consultation is required."[148] Failure of the Corps to fully review the Via Verde Project's effects on the Coquí Llanero and its critical habitat designation through formal consultation is a violation of the ESA.

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[143] 50 C.F.R. § 402.14(h) (2010).
[144] 50 C.F.R. § 402.02 (2010) (emphasis added). See also, Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 524 F. 3d 917, 931–33 (9th Cir. 2008) (holding a Biological Opinion legally deficient because it failed to consider both the impact on survival and recovery).
[145] 16 U.S.C. § 1536(d) (2006).
[146] 12-Month Petition Finding, Proposed Listing of Coquí Llanero as Endangered, Designation of Critical Habitat for Coquí Llanero, 76 Fed. Reg. 63420 (proposed Oct. 12, 2011) (to be codified at 50 C.F.R. pt. 17).
[147] 16 U.S.C. § 1536(a)(4) (2006).
[148] 50 C.F.R. § 402.10(c) (2010).

The Coquí Llanero has been found within the Project right-of-way on six separate occasions.[149] Given its very small population size, limited distribution, and unique habitat requirements, there is a reasonable likelihood that the Via Verde Project could jeopardize the species and adversely modify its designated critical habitat.[150] The Project could result in the destruction or adverse modification of the Coquí Llanero's critical habitat either directly or indirectly through alterations of the hydrology of the area, impacts on the vegetation, or other effects. The Coquí Llanero is a habitat specialist, existing only within the seasonally flooded herbaceous wetland Sabana Seca located in Toa Baja, and reproducing only on the plant *Sagittaria lancifolia*.

For the reasons discussed above, the Biological Assessment for the Via Verde Project is inadequate and the proposed conservation measures and avoidance protocol for the Coquí Llanero are wholly deficient. As a result, the Corps' determination that the Project is "not likely to adversely affect" the species is unfounded and does not eliminate this reasonable likelihood of jeopardy to the species and/or habitat effects. Therefore, the failure of the Corps to confer with FWS in accordance with procedures set forth at 50 C.F.R. § 402.10 and failure to produce a Biological Opinion for the Coquí Llanero constitute violations of Section 7(a)(4) of the ESA, 16 U.S.C. § 1536(a)(4), and its implementing regulations.[151]

C. VIOLATIONS OF 16 U.S.C. § 1536(A)(2) BASED ON FAILURE TO INSURE "NO JEOPARDY" FOR THIRTY-NINE SPECIES

As discussed above, the fundamental purpose of the ESA is to "halt and reverse the trend toward species extinction,"[152] and this objective takes precedence over the primary missions of federal agencies.[153] The Corps has an affirmative duty to insure that its permitting decisions are "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species . . . determined . . . to be critical . . ."[154]

The Via Verde Project will traverse the entire island of Puerto Rico from its southern coast, across the mountainous interior, and along the northern coast, requiring major construction and operational activities in a wide variety of habitats and ecosystems. The Project will also necessitate additional projects and activities both on-shore and off-shore, including those designed to provide the necessary gas supply and ongoing maintenance of the pipeline and related facilities. The species descriptions in Appendix B provide background information showing the general locations and habitats where the thirty-nine species listed above are known to occur or have the potential to occur within the vicinity of the proposed Project. The following are a few examples of the ways in which the Via Verde Project threatens jeopardy and adverse modification for the ten wildlife species listed above (Puerto Rican Nightjar, Puerto Rican

[149] Final Biological Assessment, supra note 72, at 81.
[150] Letter from Rafael L. Joglar, Ph.D. to Alfred A. Panatano, Jr. (June 7, 2011), supra note 117.
[151] 16 U.S.C. § 1536(a)(4) (2006); 50 C.F.R. 402.10(d) (2010).
[152] Tennessee Valley Auth. v. Hill, 437 U.S. 153, 184 (1978).
[153] Id. at 185.
[154] 16 U.S.C. § 1536(a)(2) (2006).

Parrot, Caribbean Roseate Tern, Crested Toad, Coquí Llanero, Antillean Manatee, Leatherback, Hawksbill, Green, and Loggerhead Sea Turtles):

- Death or injury during construction and operation of project (including potential poisoning from drilling chemicals, fire or explosion of pipeline or related facilities, collisions with heavy equipment, vehicles, or vessels, etc.)
- Disturbance or destruction of nests
- Interference with foraging, breeding, rearing of young, sheltering, and other behaviors
- Increased exposure to predators, parasites, and/or disease
- Destruction, degradation, or interference with available food resources
- Harassment or displacement due to noise, vibration, lights, and other impacts associated with human activities
- Destruction, degradation, or fragmentation of suitable habitat (including hydrological systems, composition of vegetation, sedimentation, etc.)
- Isolation of individuals
- Exacerbation of difficulty maintaining genetic diversity
- Exacerbation of climate change-related impacts

The following are a few examples of the ways in which the Via Verde Project threatens jeopardy and adverse modification for the twenty-nine plant species listed above (Palo de Ramón, Diablito de Tres Cuernos, Turtlefat, Mata Buey, Erubia, Rosewood, Chupacallos, Bariaco, St. Thomas Prickly Ash, Nogal Walnut Tree, Cana Gorda Girdlepod, Maxwell's Girdlepod, Tropical Lilythorn, Elfin Tree Fern, Monte Guilarte Hollyfern, Puerto Rico Halberd Fern, Cordillera Maiden Fern, Barrio Charcas Maiden Fern, Puerto Rico Maiden Fern, Palo de Nigua, Woodbury's Stopper, Ausu, Heller's Cieneguillo, Jamaican Broom, Serpentine Manjack, Palma de Manaca, Cobana Negra, Arana, Puerto Rico Manjack):

- Death or injury during construction and operation of project (including potential poisoning from drilling chemicals, indiscriminate herbicide application, individual species relocation, fire or explosion of pipeline or related facilities, damage from heavy equipment or vehicles or vessels, etc.)
- Interference with sexual or asexual reproduction
- Increased exposure to predators, parasites, and/or disease
- Destruction, degradation, or fragmentation of suitable habitat (including composition of surrounding vegetation, composition of soil, available nutrients, alterations in hydrology, alterations in level of exposure to sun, wind, storms, erosion, etc.)
- Isolation of individuals
- Exacerbation of difficulty maintaining genetic diversity
- Exacerbation of climate change-related impacts

For the reasons discussed above, the Corps has violated the key procedures designed to help it insure no jeopardy and no adverse modification for these thirty-nine species by implementing a cursory and unduly rushed review process. The Corps is basing its permitting decision on a wholly inadequate Biological Assessment, inappropriate and inadequately studied mitigation measures, no formal consultation with FWS, and no conference with FWS concerning the Coquí

Llanero following the proposed listing and designation of critical habitat for the species. The Corps has thus failed to gather or analyze enough information to even *determine* whether or to what extent the proposed Via Verde Project would put some or all of the thirty-nine species listed above at risk of jeopardy or adverse modification, much less taken adequate steps to insure that these consequences do not occur. As a result, the Corps is in violation of its duty to insure no jeopardy and no adverse modification under Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2).

D. VIOLATIONS OF 16 U.S.C. § 1538 BASED ON A REASONABLE LIKELIHOOD OF "TAKE" FOR TEN WILDLIFE SPECIES

As discussed above, the ESA strictly prohibits any person from "taking" any endangered or threatened fish or wildlife species,[155] including federal agencies that "cause to be committed" the take of a listed species through regulatory or permitting action.[156] "Take" of a species is defined broadly to include actions such as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[157] The term "harass" is similarly defined broadly to include any "intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering."[158] The definition of prohibited "harm" includes "significant habitat modification or degradation where it actually kills or injures wildlife."[159]

The Via Verde Project will traverse the entire island of Puerto Rico from its southern coast, across the mountainous interior, and along the northern coast, requiring major construction and operational activities in a wide variety of habitats and ecosystems. The Project will also necessitate additional projects and activities both on-shore and off-shore, including those designed to provide the necessary gas supply and ongoing maintenance of the pipeline and related facilities. The species descriptions in Appendix B provide background information showing the general locations and habitats where the ten wildlife species listed above are known to occur or have the potential to occur within the vicinity of the proposed Project.

For the reasons discussed above, the Corps has violated the key procedures required under the ESA. The Corps is basing its permitting decision on a wholly inadequate Biological Assessment, inappropriate and inadequately studied mitigation measures, no formal consultation with FWS, and no conference with FWS concerning the Coquí Llanero. Because the Corps has not initiated formal consultation, it has not received a Biological Opinion containing Incidental Take Statements (ITSs) for the Puerto Rican Nightjar, Puerto Rican Parrot, Caribbean Roseate Tern, Puerto Rican Crested Toad, Coquí Llanero, Antillean Manatee, and Leatherback, Hawksbill, Green, and Loggerhead Sea Turtles. As a result, the take of these ten wildlife species during the construction and operation of the Via Verde Project is not authorized, yet there is a reasonable

[155] 16 U.S.C. § 1538(a)(1) (2006); 50 C.F.R. § 17.31 (2010).
[156] 16 U.S.C. § 1538(g) (2006); Strahan v. Coxe, 127 F.3d 155 (1st Cir. 1997), cert. denied, 525 U.S. 830 (1998).
[157] 16 U.S.C. § 1532(19) (2006).
[158] 16 U.S.C. § 1532(19) (2006).
[159] 16 U.S.C. § 1538(a)(1) (2006); 50 C.F.R §17.3 (2010); See also, Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, 515 U.S. 687 (1995) (cited for the interpretation of "harm").

likelihood that the Corps' issuance of a 404 permit for the Via Verde Project will lead to a take of these species. The following are a few examples of the ways in which the Via Verde Project is likely to result in a take of these ten wildlife species:

- Death or injury during construction and operation of project (including potential poisoning from drilling chemicals, fire or explosion of pipeline or related facilities, collisions with heavy equipment, vehicles, or vessels, etc.)
- Interference with foraging, breeding, rearing of young, sheltering, and other behaviors
- Increased exposure to predators, parasites, and/or disease
- Destruction, degradation, or interference with available food resources
- Disturbance or destruction of nests
- Harassment or displacement due to noise, vibration, lights, and other impacts associated with human activities
- Destruction, degradation, or fragmentation of suitable habitat (including hydrological systems, composition of vegetation, sedimentation, etc.)
- Isolation of individuals
- Exacerbation of difficulty maintaining genetic diversity
- Exacerbation of climate change-related impacts

Since there is a reasonable likelihood of take and no ITS authorizing such take, the Corps is in violation of the take prohibition set forth in Section 9 of the ESA, 16 U.S.C. § 1538.

IV. VIOLATIONS RELATING TO PUERTO RICAN BOA, PUERTO RICAN SHARP-SHINNED HAWK, AND PUERTO RICAN BROAD-WINGED HAWK

The Corps is in violation of Section 7(a)(2) of the ESA based on its reliance on an inadequate Biological Opinion to support its permitting decision for the Via Verde Project, including inadequate surveys, inadequate analysis of direct, indirect, and cumulative impacts, failure to utilize best available scientific and commercial data, and inappropriate and inadequately studied mitigation measures in connection with the Puerto Rican Boa, Sharp-Shinned Hawk, and Broad-Winged Hawk. The Corps is also in violation of 50 C.F.R. § 402.16(c) based on its failure to reinitiate formal consultation despite modification of the Project after the issuance of the Biological Opinion. Unless and until the Corps reinitiates formal consultation and completes an adequate consultation, the Corps is in violation of Section 7(a)(2) of the ESA and its implementing regulations. Furthermore, several substantive violations flow from the Corps' failure to consult, including violation of its duty under Section 7(a)(2) to insure that the Project will not jeopardize listed species or adversely modify their critical habitat, and violation of the Section 9 prohibition against "take" of listed species.

A. VIOLATIONS OF 16 U.S.C. § 1536(A)(2) BASED ON CORPS' RELIANCE ON INADEQUATE BIOLOGICAL OPINION

A Biological Opinion must be based on the "best scientific and commercial data available,"[160] and it must establish an accurate environmental baseline to allow for assessment of the impacts

[160] 16 U.S.C. §1536(a)(2) (2006).

of a proposed project.[161] This analysis must include consideration of direct effects as well as indirect effects "that are caused by the proposed action and are later in time, but still are reasonably certain to occur."[162] It must also consider "private actions and other human activities in the action area."[163] Once the baseline has been established, the Biological Opinion must consider direct and indirect effects of an action on the species "together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline."[164] The Biological Opinion for the Via Verde Project fails to utilize the best available scientific data, fails to establish an accurate baseline, fails to adequately analyze the direct, indirect, and cumulative impacts of the Project on listed species and their habitat, and it is laden with errors in reasoning and gaps in science. Therefore, the Corps' reliance on its conclusion that the Project will not jeopardize listed species or adversely modify their critical habitat violates Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(A)(2). The following sections provide examples of the many errors and inadequacies throughout the Biological Opinion concerning the impacts of the Via Verde Project on the Puerto Rican Boa, Puerto Rican Sharp-Shinned Hawk, and Puerto Rican Broad-Winged Hawk.

1. Inadequate Surveys for Puerto Rican Boa

Only one brief study was conducted to consider the impact of the Via Verde Project on the Puerto Rican Boa. This study, purporting to encompass the impacts of a 92-mile pipeline, generated a report of only 1.5 pages of double-spaced text, including one page of background on the Boa and only half a page of actual analysis.[165] The Project's impact area was not sufficiently studied in order to understand its effect on the Puerto Rican Boa, the survey methods used were woefully inadequate, and no special attention was given to the karst region, which provides the best habitat for the Boa.

With respect to the impact area, the consultant conducted a GIS analysis to estimate the area of Boa habitat affected by the Project.[166] The consultant equated "forested areas" with "potential PR boa habitat" and assumed that whenever the pipeline crossed such forested areas, the boa would be affected.[167] However, blind reliance on GIS maps and old studies is insufficient. For example, the consultant never determined what percentage of the pipeline route constituted a "forested area." An actual field review or walk-through of the proposed Project route by a person with sufficient expertise in identifying Boa habitat is necessary in order to identify suitable habitat and analyze the potential impacts of the Project on such habitat.

The survey methods were similarly generic and inadequate. While field reviews were conducted for other species, no field review was conducted specifically for the Boa.[168] Interestingly, surveyors still incidentally encountered two Boas.[169] The consultant's report admits that the Boa

[161] 50 C.F.R. § 402.02 (2010).
[162] 50 C.F.R. § 402.02 (2010).
[163] 50 C.F.R. § 402.02 (2010).
[164] 50 C.F.R. § 402.02 (2010).
[165] Final Biological Assessment, supra note 72, at Appendix 3.
[166] Id. at 88.
[167] Id.
[168] Id.
[169] Id.

has "a high potential of occurrence in the proposed pipeline corridor."[170] However, this did not spur further on-site investigation of where exactly the species is likely to be found or how the Project will affect it. Instead, the analysis is based entirely on reviewing GIS maps and extrapolating from outdated studies done by other biologists for other purposes.

2. Inadequate Surveys for Puerto Rican Sharp-Shinned Hawk and Broad-Winged Hawk

The Biological Opinion based its analysis of both Sharp-Shinned Hawk and Broad-Winged Hawk species on an inadequate raptor survey within the Biological Assessment.[171] The survey was "limited to 12 observation points surveyed twice each[,] from January 12 to 28, 2011."[172] Raptor expert Carlos Delannoy has indicated that this two-week survey was inadequate to eliminate the possibility of pair formation and nest construction along the Project route because these activities can occur at any time from December through March each year.[173] A scientifically sound raptor survey should span the entire breeding season to determine the presence or absence of Sharp-Shinned and Broad-Winged Hawks. Indeed, FWS has admonished the Corps that raptor surveys designed to "identify breeding behavior and display . . . should be extended for the *complete* [breeding] season."[174]

Moreover, these surveys were conducted by aerial overflights, even though the Hawks engage in less flying activity during the nesting season. According to the FWS Recovery Plan, "most Puerto Rican Sharp-Shinned Hawks started the construction of their nests shortly after remaining *permanently on their nesting areas* in January of each year,"[175] and "[m]ated Puerto Rican Sharp-Shinned Hawk pairs in January can and do spend a lot of time in nest sites motionless and quiet for hours until males arrive carrying food for the sedentary females. It is then that the position of nest sites becomes evident."[176] The same is true for Broad-Winged Hawks, which the FWS Recovery Plan explains "were more active in territorial and epigamic displays from December through March. Nest building occurred in February until early March."[177] In light of this sedentary period, the Corps should have conducted field surveys for nests from the ground. Instead, after a brief period of aerial surveys, the consultants decided not to search for nests and merely assumed the site was not occupied by nests.[178] In fact, FWS complained that the current surveys "were limited to detect presence / absence [of raptors;] the surveys were not designed nor implemented to determine nesting territories or search for nests."[179]

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[170] Final Biological Assessment, supra note 72, at 88.
[171] Letter from Carlos A. Delannoy, Ph.D. to Robert Barron (Sept. 6, 2011), supra note 113.
[172] Id.
[173] Id.
[174] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50 (emphasis added).
[175] U.S. Fish & Wildlife Serv., Recovery Plan for the Puerto Rican Broad-Winged Hawk and Puerto Rican Sharp-Shinned Hawk 9-10 (1997) [hereinafter Puerto Rican Hawk Recovery Plan], *available at* http://www fws.gov/caribbean/PDF/Recovery_Plans/Buteo_platypterus_and_Accipiter_striatus.pdf (emphasis added).
[176] Letter from Carlos A. Delannoy, Ph.D. Avian Ecology and Conservation Specialist, Departamento de Biologíca, Universidad de Puerto Rico, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (May 18, 2011); Puerto Rican Hawk Recovery Plan at 10.
[177] Puerto Rican Hawk Recovery Plan, supra note 175, at 9.
[178] Letter from Carlos A. Delannoy, Ph.D. to Robert Barron (Sept. 6, 2011), supra note 114 (emphasis added).
[179] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.

The scope of the raptor surveys was also too narrowly focused on the Project right-of-way and breeding season. The Corps failed to accurately survey the raptors' foraging habitat. Sharp-Shinned and Broad-Winged Hawks have extended home range needs for hunting. They require large amounts of land "to sustain viable populations and are very sensitive to human disturbance."[180] Destruction or modification of hunting areas "could impair future growth of local populations, rendering their recovery efforts more difficult."[181]

3. Inadequate Analysis of Impacts on Puerto Rican Boa and Its Habitat

Since the karst region provides the best habitat for the Boa, any meaningful review of the impacts of the proposed Project would include an in-depth analysis of the impacts of the construction and operation of the Project on Boa populations in this region. There was, however, never any field review or study conducted specific to this area. Instead, the Biological Opinion treated the karst region as equivalent to all other potential Boa habitat. For instance, the Biological Opinion stated that "the amount of Puerto Rican boa habitat to be affected by the proposed project is significantly low taking into consideration the range of the species throughout the island, and the plasticity of the species for utilizing different habitat types."[182] Therefore, the Opinion concludes "that the Via Verde gas pipeline project, as proposed, is not likely to jeopardize the continued existence of [the boa, partly because] the amount of habitat to be affected is small relative to the overall distribution of the species."[183] This analysis confuses distribution and abundance; and it fails to distinguish between suitable habitat and prime habitat.

While the Biological Opinion acknowledges that the karst region, and particularly the limestone cracks, crevices and caves that characterize the region, constitute prime Boa habitat, [184] it never distinguishes this acreage from other available habitat for purposes of its analysis of Project impacts. Instead, the Opinion lumps together the acreage of all potential Boa habitat as if it was all of the same quality and importance. This mischaracterizes and greatly underestimates the Project's effect on the Boa habitat most important for its foraging, reproduction, and survival.

The Via Verde Project will likely damage this prime Boa habitat. For instance, construction directly over a caves, cracks, and crevices creates a risk of collapse or other damage. Construction over or even near these features may also disturb the Boa population and interfere with nesting, foraging, and other behaviors. The Biological Opinion also failed to consider the impact of roads and paths necessary to constructing the Project which will provide access to invasive species and allow increased human activity, including ATV traffic, accumulation of

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[180] Letter from Carlos A. Delannoy, Ph.D. to Robert Barron (Sept. 6, 2011), supra note 113.
[181] Id.
[182] Via Verde Biological Opinion, supra note 53, at 39–40; see also Via Verde Biological Opinion at 32 ("[I]t is clear that the Puerto Rican boa is distributed throughout the island (it has been reported in more than 50 percent of the municipalities of Puerto Rico) and it is likely that the Puerto Rican boa is more abundant than generally perceived").
[183] Id. at 53.
[184] Id. at 24–25, 31, 34, 46, 48, 53 (noting an abundance of boas in the northern karst). Most boa sightings happen amongst the limestone caves of the karst, which represent a highly productive habitat for the boa. Id. at 25. Two independent studies of a particular cave document an abundance of boas (over 20 different snakes sighted in a single night. Id. at 31.

trash, fires, illegal cutting of vegetation, illegal hunting, increased use of area by visitors, and nesting disturbances.[185]

The Project route is currently set to pass directly over "Cueva Matos" and is likely to pass over many other similar karst caves occupied by Boas.[186] Indeed, caves occur with great frequency in the karst region, and the Project is certain to disturb some. Despite this, the Biological Opinion states that "in terms of the Puerto Rican boa, direct impacts from the proposed construction will not affect the most highly productive habitat for this species (i.e., karst caves)."[187] This conclusion is unfounded and inaccurate. First, the Via Verde Project will affect karst caves, and the nature and extent of these effects have not been adequately analyzed in the Biological Opinion. Second, while boas do inhabit karst caves under the right conditions, more often, they inhabit smaller cracks and crevices dispersed amongst the region. No in depth analysis was performed on this habitat.

The Biological Opinion also fails to consider a whole host of other direct, indirect, and cumulative impacts on the Boa, including the impacts of vegetation removal as part of maintaining the pipeline right-of-way corridor (discussed further below), the combined impacts of the Via Verde Project along with many other proposed projects, including the proposed trash incinerator in Caño Tiburones and the proposed WindMar facility, and other potential impacts.

4. Inadequate Analysis of Impacts on Puerto Rican Sharp-Shinned and Broad-Winged Hawks and Their Habitat

The basis for the Biological Opinion—the Biological Assessment—was criticized by FWS for failing to consider important issues. FWS sent these criticisms to the Corps on May 20, 2011.[188] The letter requested a "[d]escription of all project components (i.e., access roads, staging areas, construction zones, among others)" along the 92-mile proposed project area and the indirect effects including interdependent and interrelated effects on species habitats and individuals.[189] In fact, the Biological Assessment only generally discussed direct effects, and utterly fails to consider indirect effects in plain violation of the consultation regulations.[190] As such, FWS requested further analysis regarding the indirect "effects of habitat fragmentation, edge effects on home ranges and breeding habitat, disturbance during construction and operation, invasive species, future maintenance requirements, among other effects of habitat removal and project construction and operation."[191] Unfortunately, after this request, FWS did an about-face in its subsequent Biological Opinion and skimmed over the very issues it had so passionately requested further analysis about.

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[185] Via Verde Biological Opinion, supra note 53, at 47.
[186] See generally, Puerto Rican Power Authority, Via Verde Phase 1A Archeological Investigation (June 2010) (for a list of multiple caves affected by the Project).
[187] Via Verde Biological Opinion, supra note 53, at 53.
[188] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.
[189] Id.
[190] Biological opinions must contain "A detailed discussion of the effects of the action on listed species or critical habitat." 50 C.F.R. § 402.14(h)(2) (2010). The term "effects of the action" refers to "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." 50 C.F.R. § 402.02 (2010).
[191] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.

FWS initially recommended that PREPA assess "access roads" and "staging areas" throughout the "mogotes" regions.[192] However, access roads were not reviewed for anticipated direct or indirect effects on the Puerto Rican Sharp-Shinned or Broad-Winged Hawks, *except* for references to examples of locations where FWS is aware that access roads have caused damage to both Hawk habitats. Similarly, FWS first acknowledges prior access road impacts but then inexplicably fails to acknowledge the impacts associated with the pending 92-mile Project that will necessarily require a plethora of access roads to accomplish the job. Further, the word "staging area" is mentioned only within the Consultation History section, and nowhere else in the entire Biological Opinion are the words "construction zone."[193]

FWS also initially criticized the Biological Assessment's failure to consider interdependent, interrelated, and cumulative effects, only to later ignore its own admonishments. After four pages describing direct and indirect effects on the Puerto Rican Sharp-Shinned and Broad-Winged Hawks, FWS concludes, without no supporting explanation or rationale, that "After reviewing the current status of the [boa and hawks] . . . it is the Service's biological opinion that the Via Verde gas pipeline project, as proposed, is not likely to jeopardize the continued existence of these species . . ."[194]

Some examples of the indirect effects include: opening up the Hawks' closed-canopy habitat, which would allow for increased predation by the red-tailed hawk; creating a permanent corridor of access for people to horseback ride, mountain bike, and all-terrain-vehicle ride; illegal activities such as cutting of vegetation and hunting; and lastly, creating an avenue for invasive species such as rats, mongooses, and feral dogs and cats.[195] Also important are the indirect effects of displacing the Puerto Rican Hawks from the Project route into overlapping hawk home ranges and subprime habitat. This may result in competition for resources such as food, mates, and breeding habitat.[196] The end result is likely to be an increase in their mortality rate and reduced fitness.[197]

Absent from the indirect, interdependent, and interrelated effects section is any discussion of the previously mentioned botfly that impacts Sharp-Shinned Hawk nestlings. Delannoy notes that the rate of infestation varies but once nestlings are parasitized, very few survive.[198] The construction of a 92-mile pipeline right-of-way corridor will provide access to parts of the forest otherwise inaccessible to parasites, such as the botfly, and their vectors.

Also missing from the analysis is any consideration of the need for and means of right-of-way maintenance. The right-of-way corridor is mentioned as a tool to provide maintenance to the pipeline, but the maintenance of the right-of-way itself, i.e. prevention of deep rooted trees and other vegetation, is never reviewed. There are only five methods of practical application:

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[192] Via Verde Biological Opinion, supra note 53, at 5.
[193] See generally, Via Verde Biological Opinion, supra note 53 (for evidence of failure to use of the term "construction zone" throughout).
[194] Via Verde Biological Opinion, supra note 53, at 52.
[195] Id. at 49–52.
[196] Id. at 49.
[197] Id. at 49.
[198] Id. at 31.

mechanical trimming by person, mechanical trimming by vehicle, chemical spraying by person, chemical spraying by vehicle, some hybrid of mechanical and chemical application with people and vehicles, or aerial chemical application. Considering much of the terrain is so dynamic and rugged, a FWS scientist observed:

> As you move into the mountains and look at the pipeline profile you will see that in some areas the pipeline will be built along the side of a hill, this will probably involve more than the 150 foot construction zone, since you cannot build on the side of a hill with trucks and heavy equipment, it simply is not possible from an engineering stand point. I believe that much more natural resource impacts will occur due to having to build a stable road bed over which to transport equipment. Also many of these areas are prone to landslides and have highly erodible soils. How is PREPA going to maintain these areas free of deep tree roots and perform any needed repairs? The slopes would have to be cut to allow for some kind of permanent transit along the entire route.[199]

In light of this information, it would appear that chemical application may be preferred by PREPA as compared to other alternatives. Furthermore, aerial application may be cheaper and faster for 92-miles. What is the impact on the Sharp-Shinned and Broad Winged Hawk of a helicopter or small plane spraying herbicide along the permanent right-of-way? What are the biological impacts of spraying herbicide? What specifically will be sprayed? Does it bioaccumulate in the food chain? What types of aircraft will be used, with what frequency, and with what impacts on these sensitive species? What restrictions on aerial and manual pesticide spraying will be put in place, such as wind speed, wind direction, spray height, geographic scope, buffer zones, prior notice to nearby communities, etc.? None of these questions are examined in the Biological Opinion.

Assuming PREPA chooses an alternate method, what are the effects of the ongoing human presence involved in maintaining the right-of-way? If mechanical maintenance is used, where will the slash be left? How will the initial slash from creating the right-of-way be treated? Will it be burned? Dr. Ariel Lugo notes that Puerto Rico is experiencing an increase of invasive grass species.[200] These newly converted grasslands have a higher average temperature and lower humidity level than other climates of Puerto Rico.[201] The introduction of non-native African grasses increased the risk of fires. The Biological Opinion contemplates the potential for fires in the newly created right-of-way.[202] Fires would cause a variety of direct impacts on listed Hawks and other species. They would also present many indirect and cumulative threats. For instance, fires near a natural gas pipeline pose a risk of explosion that could produce catastrophic consequences for Hawks and other listed species.

These are just a few examples of the direct, indirect, and cumulative impacts on Hawks that were not addressed at all or were not addressed adequately in the Biological Opinion. Based on these

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[199] Email from Felix Lopez, U.S. Fish & Wildlife Serv., Boqueron Field Office, to Rafael Gonzalez, U.S. Fish & Wildlife Serv., Ecological Services Caribbean Field Office, Boqueron, (April 13, 2011, 11:13 AM).
[200] Ariel E. Lugo Comments on Via Verde (June 7, 2011), supra note 111.
[201] Id.
[202] Via Verde Biological Opinion, supra note 53, at 47.

undeniable record gaps and inadequacies, it is clear that Biological Opinion was not based on the best available science. Therefore, the Corps' reliance on this flawed document violates Section 7(a)(2) of the ESA.

5. Improper Approach to Mitigation and Inadequate Analysis of Effectiveness of Proposed Mitigation Measures

Proposed mitigation measures must be derived from a sound "environmental baseline." Due to the inadequate surveys and inadequate analysis of direct, indirect, and cumulative impacts described above, as well as the changes to the Project route following the issuance of the final Biological Opinion described in Section IV(B) below, there was never established any accurate environmental baseline. As a result, the mitigation measures developed by FWS in reliance on an inadequate environmental baseline are defective. The mitigation measures are also inadequate for several other reasons as well, including inadequate analysis of the effectiveness of the measures and the feasibility of enforcement.

a. Mitigation for Puerto Rican Boa

The mitigation measures for the Puerto Rican Boa are fundamentally flawed because of the lack of adequate surveys and the failure to establish an environmental baseline. Instead of sufficiently delineating and characterizing Boa habitat during the development of the Biological Opinion, the Opinion provides that, as part of the "mitigation" for the Project, two field biologists will search the construction area for Boas "*[d]uring* the clearing and construction of the right-of-way."[203] These searches will occur only between 5:00am and 7:00am, either on days that heavy machinery is operated or whenever heavy machinery is restarted after more than 24 hours of nonuse.[204] In addition to the difficult task of searching for Boas, the two biologists will simultaneously be searching for the Puerto Rican Crested Toad and (when in its habitat) Coquí Llanero—both also extremely difficult to find.[205]

The surveys will not uncover Boas located within the construction right-of-way. It is extremely difficult to visually detect the species.[206] To demonstrate: one research team failed to visually detect even telemetry-tracked Boas 85 percent of the time.[207] The Biological Opinion describes the Puerto Rican Boa as a "cryptic and secretive species"[208] Also, the Boa is inactive when the surveys are supposed to take place. While the surveys will take place between 5:00am and 7:00am, Boas are significantly more active at night.[209] It is considerably more difficult to spot a Boa when not active. In an email, the Corps acknowledges that daytime searches for the nocturnal Crested Toad are inappropriate.[210] The same is true for Boas. Even the Biological

[203] Via Verde Biological Opinion, supra note 53, at 12–13, 57, 66.
[204] Id. at 13.
[205] Id. at 17; 18.
[206] Id. at 31.
[207] Id. at 32.
[208] Id. at 31.
[209] Id. at 28.
[210] Email from Corps "SAJ" to Larry Evans, BCPeabody Consulting, RE: Via Verde: checklist from review of Biological Assessment (June 15, 2011, 3:39:00 PM) (on file with author).

Opinion admits that, while "one may still find boas outside of [night] hours and [peak-activity] months, the likelihood of finding the species is greatly reduced."[211]

Any Boas located along the construction route will likely be killed. In fact, the Biological Opinion admits that construction "may result in the death of adult and juvenile boas that are not detected and relocated."[212] Due to the Boa's secretive nature, the number not detected will likely be high. Also, the number likely to move on their own is low—Puerto Rican Boas are extremely inert. According to one study, the Puerto Rican Boa spends, on average, over 40 days at the same location.[213] Another study found that Boas move, on average, only about 12.9 meters daily.[214] Boas spend, on average, over ten consecutive days without significant movement.[215] Because of this inactivity, Boas will not likely move away from construction in time. Instead, when threatened by construction, they will hide in their current location until harmed or killed.

The Biological Opinion also relies on mitigation measures for Boas that are unlikely to be effective. For instance, the Opinion provides that the project developer will relocate any Boas found during construction and, if a Boa is detected, the developer will "capture the specimen for relocation" to the Guajataca or Rio Abajo Commonwealth Forests, "or other public lands in an area with habitat similar to the capture area."[216] To capture the snake, a biologist will seize it with a "snake rod" and place it in a "bag or box," where it will remain until it is measured, tagged and shipped to its relocation site.[217]

Expert biologists have expressed concern about the effectiveness of Boa relocation.[218] There are many reasons relocation would likely be ineffective at least and detrimental at worst. For example, Boas could be harmed, or at the very least, harassed by remaining inside a "bag or box" for potentially the entire workday.[219] There is no restriction on how long a Boa may remain inside a box. Also, the Biological Opinion requires that the Boa be injected with a pit-tag or transponder.[220] The Biological Opinion recognizes the danger, acknowledging that "[i]f not done correctly it may cause injury, infection and/or death to the boa."[221] The Corps has expressed concerns about relocation of Boas, such as that Boas relocated outside of the construction area will return.[222] Boas are territorial animals, yet the mitigation measure provides that Boas will be relocated within only 1 to 1.5 km from the capture site.[223] During a previous construction project, (Highway 10), relocation efforts failed to eliminate boa deaths throughout the same area (Rio Abajo forest). For the first few months after the highway opened, dead boas were spotted along the pavement.

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[211] Via Verde Biological Opinion, supra note 53, at 56.
[212] Id. at 46.
[213] Id. at 28.
[214] Id. at 28.
[215] Id. at 28.
[216] Id. at 13.
[217] Id.
[218] Letter from Rafael L. Joglar, Ph.D. to Alfred A. Panatano, Jr. (June 7, 2011), supra note 117.
[219] Via Verde Biological Opinion, supra note 53, at 66.
[220] Id. at 67.
[221] Id.
[222] Email from Corps "SAJ" to Larry Evans, BCPeabody Consulting, RE: Via Verde: checklist from review of Biological Assessment (June 15, 2011, 3:39:00 PM) (on file with author).
[223] Via Verde Biological Opinion, supra note 53, at 67.

The Biological Opinion's response to this concern is simply to hope that "this relocation distance shall allow enough time for the boa to return after the project has been completed at the capture site."[224] Then, paradoxically, the Biological Opinion attempts to validate Boa return to the Project right-of-way as a good thing, suggesting that the Boa "will still be within same habitat and area that [it] normally uses, thus minimizing disorientation and negative relocation effects."[225] This reasoning contradicts the rest of the Biological Opinion, which concludes that a "permanent disturbance area will remain along the pipeline route."[226] Maintenance will permanently disrupt the right-of-way and make it unsuitable as Boa habitat.[227] Invasive species colonization, new predators, ATVs, bikes, horses, and humans—which bring trash, the possibility of fire, further illegal habitat destruction and prejudicial killing—all will remain along the Project right-of-way.[228]

In another attempt to shore up the dubious relocation approach, PREPA is required to perform surveys at least 30 days in advance of construction to allow for relocation of any Boas that are discovered.[229] These pre-construction surveys are a poor substitute for the comprehensive field surveys that should have been performed during the preparation of the Biological Opinion. Even if a survey discovers an abundance of Boas along a section of the route, it will be too late to realign the Project to avoid this important habitat. Instead, the construction workers will attempt to relocate any Boas they find, and construction will still proceed through the area regardless of whether this mitigation measure is actually effective.

In addition to the difficulties associated with detecting the presence of Boas and the questionable feasibility and effectiveness of the relocation approach to mitigation, it is unlikely this mitigation measure will be properly implemented or enforced. The Project involves millions of dollars and serious time-constraints, and there will be no immediate oversight of construction from a government agency, such as FWS or DNER, to ensure compliance with the protocol. With no oversight, there would be serious pressure and incentives to not follow the relocation protocol. For example, the protocol demands that, upon discovery of a Boa, all construction activities within 50 feet of a Boa must cease.[230] It is easy to imagine that, when faced with serious time and budget constraints, a construction employee might ignore a Boa, or a supervisor might order a construction worker to remove a Boa without notifying the biologist.

The mitigation measures proposed in the Biological Opinion also remain incomplete. For example, no specific measures are outlined to prevent or minimize Boa impacts during long-term maintenance of the pipeline following the initial construction. Instead, the Incidental Take Statement (ITS) merely requires the contractors to eventually develop a "management and

[224] Via Verde Biological Opinion, supra note 53, at 67.
[225] Id. at 67.
[226] Id. at 47.
[227] Id. at 47.
[228] Id. at 47.
[229] Id. at 56.
[230] Id. at 47.

protection plan" to address this problem.[231] This is precisely the type of mitigation measure that should have been analyzed in the Biological Opinion prior to construction of the Project.

The ITS does impose other long-term requirements on PREPA with the burden of ensuring compliance falling on the Corps,[232] which is unlikely to adequately monitor and ensure their implementation. For example, after construction is completed, "[a]ll temporarily impacted areas within boa habitat shall be enhanced via reforestation with native vegetation."[233] Supposedly, required "[r]eforestation efforts and maintenance shall continue for at least 5 years after project completion."[234] Also, surveys along the Project's permanent right-of-way within Boa habitat will supposedly be conducted "for at least 3-5 years."[235] While these reforestation, survey, and monitoring efforts sound good, there is no indication that the Corps has the on-the-ground personnel or resources to ensure these terms and conditions are enforced. Indeed, some of these conditions may not even be enforceable under the Corps' Regulatory Guidance Letter 92-40.[236]

Finally, the mitigation measures for the Boa are inadequate because they do not take into account the importance of the karst region as habitat for the Boa. FWS has recognized the need to adopt distinctive protective procedures to protect the Boa in the karst-region's unique geography: "[b]oa protocol will be revised to minimize possible effects to boa individuals in the [karst region of Utuado], particularly in sinkholes that have been filled with rocks."[237] Moreover, the Biological Opinion acknowledges that "[t]he karst and surrounding forests are under heavy pressure from development that could further destroy essential Puerto Rican boa" habitat. Similarly, the developer has acknowledged that "[c]aution must be taken with the boa in [Utuado karst region], especially in the sink holes . . .[238] and that "[t]he boa protocol must be revised to include these special precautions."[239] Moreover, in its Biological Assessment, the Corps required the developer "to reduce the construction ROW to 60-feet in the more valuable boa habitat in the Karst areas (Manati)."[240]

Despite this consensus, however, no special Boa protocols have been adopted for the karst region. While requiring the right-of-way to be reduced to 60 feet in "sensitive upland habitats," "wetland areas,"[241] "steep slopes and narrow ridges," and where listed plants grow,[242] the ITS does not require a similar reduction for "valuable boa habitat in the Karst areas." This exemplifies the lack of care with which the Project's effect on the Boas was analyzed and addressed.

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[231] Via Verde Biological Opinion, supra note 53 at 56.
[232] Id. at 57.
[233] Id. at 58.
[234] Id.
[235] Id.
[236] U.S. Army Corps of Engineers, Regulatory Guidance Letter 92-04 (Sept. 1992), available at http://www nap.usace.army.mil/cenap-op/regulatory/rgls/rgl92-04.pdf.
[237] Deputy Field Supervisor, Caribbean Ecological Services Field Office, Boqueron, PR, MEMO: Issues discussed during meeting on June 2, 2011 for the Via Verde project (June 3, 2011).
[238] Letter from Daniel Pagan PE, Via Verde Project Environmental Consultant, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (June 6, 2011).
[239] Id.
[240] Final Biological Assessment, supra note 72, at 88.
[241] Via Verde Biological Opinion, supra note 53, at 11.
[242] Id. at 19.

b. Mitigation for Puerto Rican Sharp-Shinned Hawk and Broad-Winged Hawk

Much like the flaws in the Boa mitigation measures resulting from inadequate surveys, the mitigation measures for the Puerto Rican Sharp-Shinned and Broad-Winged Hawks are flawed due to inaccurate survey assumptions and the failure to establish an environmental baseline. The Biological Opinion provides that, "[i]n order to avoid mortality of the [two hawks] *within occupied habitat*, all land clearing activities and construction activities *within occupied habitat* shall be conducted outside of the breeding seasons for the two species (December to July)."[243] Yet, because the Biological Opinion is based on flawed raptor surveys, as discussed above, the developer will not know when it is entering raptor-occupied habitat.

The proposed mitigation measures for the Hawks are also inadequate because they are impossible to implement and useless to preserve the species. Take, for example, the Hawk mitigation measure which involves the planting of three trees for every one removed along the Project route. In a letter preceding the Biological Opinion, the FWS refuted this measure as inappropriate "to minimize possible effects on hawks."[244] The Project will impact well-developed montane forest. This region has a special forest structure, species composition, and microclimate characteristics that cannot be recreated by simply planting three trees for every one removed.[245] Considering that the right-of-way is 100 feet wide with a permanent 50 foot right-of-way after construction, tree removal will be so extensive that it will not be feasible to plant three trees due to space constraints. Additionally, this is not consistent with the species' preferred habitat.[246]

The same FWS letter acknowledges the flawed mitigation measure proposed by the applicant to avoid nesting trees by altering the Project route as needed. FWS has placed the Corps on notice that it is not feasible to find Hawk nests without surveying the birds during the breeding season.[247] Moreover, the raptors will be indirectly harassed by the mere presence of construction, not just the destruction of trees in which they nest.[248]

Another mitigation measure involves the purchase of privately owned lands to be held in perpetuity for the benefit of the Hawks, but it is not clear what lands would be purchased and whether those lands would provide high quality habitat for the Hawks.[249] This mitigation measures is likely to fail because the Sharp-Shinned and Broad-Winged Hawks have specialized habitat needs. They require vast amounts of habitat to sustain viable populations.[250] These raptors select prime habitat as their home ranges. Purchasing anything less than prime habitat is a failure of mitigation. Surveys (throughout the entire breeding season) for prime breeding habitat on privately owned lands should have been conducted and where located, purchased.

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[243] Via Verde Biological Opinion, supra note 53, at 58 (emphasis added).
[244] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.
[245] Id.
[246] Id.
[247] Id.
[248] Id.
[249] Via Verde Biological Opinion, supra note 53, at 60.
[250] Letter from Carlos A. Delannoy, Ph.D. to Robert Barron (Sept. 6, 2011), supra note 113.

Without these surveys, a mitigation measure involving a promise to purchase unspecified privately owned land is pointless.

Another example of an infeasible and ineffective mitigation measure is that, after construction is complete, "actions shall be taken to increase surveillance and law enforcement in the area" adjacent to the Project route "[t]o reduce the possibility of shooting and nesting habitat vandalism."[251] These actions include "patrolling by rangers, the creation of educational materials to increase public awareness on protection of endangered wildlife species in the area, and placement of signs."[252] It is unclear what the frequency and duration of these measures will be and who will verify that these actions are being taken. Moreover, there is no evidence that posting rangers, making signs, or passing out pamphlets will actually reduce illegal hawk shooting or habitat vandalism.

As with the Boa mitigation measures, the ITS for Hawks imposes several long-term requirements on the developer. The burden of ensuring compliance falls to the Corps,[253] which is unlikely to adequately monitor and ensure their implementation. For example, "hawk nesting sites located adjacent to the ROW area shall be monitored for at least two breeding seasons" after construction is completed.[254] While these efforts are laudable, there is no indication that the Corps has the technical capability or resources to ensure these terms and conditions are enforced. The Corps is an extremely busy agency with many important responsibilities. Unfortunately, ensuring that a Puerto Rican utility company actually plants the proper trees or correctly transects a corridor through jungle looking for snakes is not likely to be high on its list of priorities.

B. VIOLATIONS OF 50 C.F.R. § 402.16 (A) AND (C) BASED ON FAILURE TO REINITIATE CONSULTATION FOR THREE SPECIES AFTER PROJECT MODIFICATION

The Corps is required to reinitiate formal consultation if the project is "subsequently modified in a manner that causes effect to the listed species . . . that was not considered in the biological opinion."[255] The Corps is in violation of 50 C.F.R. § 402.16(c) because it has failed to reinitiate formal consultation with FWS in order to address modifications to the Via Verde Project following the issuance of the Biological Opinion and the effects of these modifications on the Puerto Rican Boa, Sharp-Shinned Hawk, and Broad-Winged Hawk. In addition, failure to reinitiate based on subsequent modifications will likely to result in a take of these species at levels exceeding the Incidental Take Statement, thereby requiring that consultation be reinitiated.[256]

The Biological Opinion acknowledges that, in order to insure no jeopardy, the Corps "must ensure that the proposed project is constructed and operated as designed, planned, and

[251] Via Verde Biological Opinion, supra note 53, at 58.
[252] Id.
[253] Id. at 57 (stating that the Corps "must ensure that PREPA implements measures to minimize or eliminate impacts from construction and operation").
[254] Via Verde Biological Opinion, supra note 53, at 58.
[255] 50 C.F.R. § 402.16(c) (2010).
[256] 50 C.F.R. § 402.16(a) (2010).

documented in [among other things, the] GIS shape-files submitted on July 27, 2011."[257] However, this will be impossible as the Project will almost certainly not follow the route outlined in these GIS shape-files. Already, the route has been realigned on at least six separate occasions.[258] We have reason to believe that the proposed Via Verde Project alignment has been and/or will be modified in a manner that was not considered during the exceptionally short formal consultation period between July 27, 2011 and August 23, 2011. For instance, during meetings between FWS and the Corps, the Corps admitted the "potential for *other changes* [to ROW alignment] to occur as a result of *on-going consultation* with other agencies."[259] Also, to our knowledge, the Corps is still in consultation with the State Historic Preservation Office as required by the National Historic Preservation Act and is considering realignments in order to avoid effects on archeological sites, including those within the ecologically sensitive Northern Karst region.[260] Furthermore, on September 6, 2011, the Corps acknowledged in correspondence with concerned scientists that the July 27, 2011 alignment is not final.[261]

In addition to concerns relating to Project realignment, FWS has expressed concerns regarding "anticipate[d] new actions near the proposed project" subsequent to issuance of its final Biological Opinion, such as construction of new mainline valve stations.[262] Such a subsequent modification was not considered in the final Biological Opinion. FWS is concerned with imminent "[p]ossible future pipeline expansion," presenting a Project modification unassessed by FWS for the potential direct, indirect, and cumulative effect on listed species and habitat and the potential for additional incidental take of the Puerto Rican Boa, the Puerto Rican Broad-Winged Hawk, and the Puerto Rican Sharp-Shinned Hawk.[263]

Since the Project has been modified and may be further modified subsequent to the issuance of the final Biological Opinion, and because the amount of incidental take will be exceeded as a result of such modifications, the Corps has a duty to reinitiate formal consultation. Unless and until it reinitiates consultation, it is in violation of 50 C.F.R. § 402.16 (a) and (c). Moreover, since the failure to analyze impacts associated with the Project modification renders the Biological Opinion inadequate, this is a further reason that the Corps is in violation of section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2).

C. VIOLATIONS OF 16 U.S.C. § 1536(A)(2) BASED ON FAILURE TO INSURE "NO JEOPARDY" FOR THREE WILDLIFE SPECIES

As discussed above, the fundamental purpose of the ESA is to "halt and reverse the trend toward species extinction,"[264] and this objective takes precedence over the primary missions of federal

[257] Via Verde Biological Opinion, supra note 53, at 55.
[258] See generally, Via Verde Biological Opinion (for timeline describing realignment conferences between project consultants and FWS).
[259] Letter from Edwin Muniz to Robert Barron (July 15, 2011), supra note 56 (emphasis added).
[260] Letter from Donald W. Kinard, Chief, Regulatory Div., U.S. Army Corps of Engineers-Jacksonville, to Charlene Vaughn, Assistant Dir., Office of Federal Agency Program, Advisory Council on Historic Preservation (Sept. 1, 2011).
[261] Letter from Dr. Héctor E. Quintero to Edwin Muniz (Sept. 15, 2011), supra note 59.
[262] Via Verde Biological Opinion, supra note 53, at 52.
[263] Id.
[264] Tennessee Valley Auth. v. Hill, 437 U.S. 153, 184 (1978).

agencies.[265] The Corps has an affirmative duty to insure that its permitting decisions are "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species . . . determined . . . to be critical . . ."[266]

The Via Verde Project will traverse the entire island of Puerto Rico from its southern coast, across the mountainous interior, and along the northern coast, requiring major construction and operational activities in a wide variety of habitats and ecosystems. The Project will also necessitate additional projects and activities, such as the construction of access roads and long-term maintenance activities. The species descriptions in Appendix B provide background information showing the general locations and habitats where the Puerto Rican Boa, Sharp-Shinned Hawk, and Broad-Winged Hawk are known to occur or have the potential to occur within the vicinity of the proposed Project. The following are a few examples of the ways in which the Via Verde Project threatens jeopardy for these three species:

- Death or injury during construction and operation of project (including potential poisoning from drilling chemicals, fire or explosion of pipeline or related facilities, collisions with heavy equipment or vehicles, etc.)
- Disturbance or destruction of nests and/or the trees in which nests are found
- Interference with foraging, breeding, rearing of young, sheltering, and other behaviors
- Increased exposure to predators, parasites, and/or disease
- Destruction, degradation, or interference with available food resources
- Harassment or displacement due to noise, vibration, lights, and other impacts associated with human activities
- Destruction, degradation, or fragmentation of suitable habitat (including hydrological systems, composition of vegetation, sedimentation, etc.)
- Isolation of individuals
- Exacerbation of difficulty maintaining genetic diversity
- Exacerbation of climate change-related impacts

For the reasons discussed above, the Corps has violated the key procedures designed to help it insure no jeopardy and no adverse modification for these three species by implementing a cursory and unduly rushed review process. The Corps is basing its permitting decision on a wholly inadequate Biological Opinion, inappropriate and inadequately studied mitigation measures, and no new formal consultation with FWS following project modification. The Corps thus does not have enough information to even *determine* whether or to what extent the proposed Via Verde Project would put these three species at risk of jeopardy, much less taken adequate steps to insure that these consequences do not occur. As a result, the Corps is in violation of its duty to insure no jeopardy under Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a).

[265] Tennessee Valley Auth. v. Hill at 185.
[266] 16 U.S.C. § 1536(a)(2) (2006).

D. VIOLATION OF 16 U.S.C. § 1538 BASED ON REASONABLE LIKELIHOOD OF "TAKE" FOR THREE WILDLIFE SPECIES

As discussed above, Section 9 of the ESA strictly prohibits any person from "taking" any endangered or threatened fish or wildlife species,[267] including federal agencies that "cause to be committed" the take of a listed species through regulatory or permitting action,[268] unless the taking is incidental to agency action and falls within the terms and conditions of a valid Incidental Take Statement (ITS).[269] Although the Corps did receive an ITS from FWS,[270] its permitting decision nevertheless violates Section 9 of the ESA, 16 U.S.C. § 1538, for at least two reasons. First, because the ITS is invalid, it does not shield the Corps from liability for taking listed species. Second, there is a reasonable likelihood that issuing the permit will lead to "take" beyond that authorized under the ITS.

1. The Incidental Take Statement is Invalid and Does Not Shield the Corps from Liability for Violating the Take Prohibition of the ESA

The terms and conditions of the Incidental Take Statement are based on the conclusions of the Biological Opinion. However, the Biological Opinion is invalid because it is not based on the best available scientific and commercial data and for many other reasons discussed above. An ITS based on a deficient Biological Opinion is invalid and does not shield a federal agency or any other party from liability under the "take" prohibition of the ESA.

In addition, the ITS is invalid on its face because it authorizes the harming, harassment, and killing of an unspecified number of Boas, Sharp-Shinned Hawks, and Broad-Winged Hawks.[271] For instance, instead of attempting to quantify the number of Boas that will be harmed or killed as a result of the Project,[272] FWS merely states that it is "unable to identify the numbers of Puerto Rican Boas that may be taken . . . because of the biology of the species and its widespread distribution"[273] and that "an unknown number of boas that are not detected and relocated during surveys may be taken as a result of the proposed project."[274] The lack of any estimate of, or limitation on, the extent of take is another reason that the ITS is wholly invalid.

The Biological Opinion also fails to include any meaningful analysis concerning whether the authorized level of take would be "incidental" and would not lead to jeopardy. For instance, the ITS is based on the unsupported assumption that "incidental take is expected to be in form of harm and harassment. Direct mortality is not anticipated . . ."[275] Yet the Project *is* likely to result in Hawk death, in addition to harm and harassment. For example, young nesting hawks will likely be killed during construction. Since the Hawk surveys were deeply flawed and failed to identify the full scope of Hawk breeding habitats and nests, there is a reasonable likelihood

[267] 16 U.S.C. § 1538(a)(1) (2006); 50 C.F.R. § 17.31 (2010).
[268] 16 U.S.C. § 1538(g) (2006); Strahan v. Coxe, 127 F.3d 155 (1st Cir. 1997), cert. denied, 525 U.S. 830 (1998).
[269] 16 U.S.C. §§ 1536(b)(4); 1536(o)(2) (2006).
[270] Via Verde Biological Opinion, supra note 53, at 53.
[271] Id. at 54.
[272] Id. at 54.
[273] Id. at 55.
[274] Id. at 54.
[275] Id. at 54.

that construction will destroy Hawk nests and the young Hawks inhabiting them. Thus, the ITS underestimates the severity of the take that will occur.

Indirect disturbances to nesting Hawks can be just as severe as destruction of the nests. Both species of Hawks are very sensitive to disturbance, and they are particularly sensitive to disturbance near their nesting territories.[276] If construction encroached near enough to a Hawk nest to cause a disturbance, the Hawk may abandon its young and leave them to die in order to escape the disturbance. For further example, the Project will create a corridor for Red-Tailed Hawks (*Buteo jamaicensis*), a predator of the Sharp-Shinned and Broad-Winged Hawks, to encroach on their territory. While the endangered Sharp-Shinned and Broad-Winged Hawks hunt in closed-canopy forests, the Red-Tailed Hawk hunts in open areas.[277] Red-Tailed Hawks have been reported preying on juvenile Puerto Rican Broad-Winged Hawks in the Rio Abajo area.[278] Broad-Winged Hawks fiercely antagonize Red-Tailed Hawks intruding into their territories.[279] There is a reasonable likelihood that these threats – disturbance, predation, competition, and others – will cause mortality or other forms of take to Sharp-Shinned and Broad-Winged Hawks.

2. Issuing the Permit Will Lead to "Take" Beyond That Authorized Under the Incidental Take Statement

The ITS authorizes damage to or destruction of up to 330 acres of Puerto Rican Boa habitat, 189 acres of Puerto Rican Sharp Shinned Hawk habitat, and 104 acres of Puerto Rican Broad-Winged Hawk habitat.[280] This qualifies as "take" within the meaning of Section 9 of the ESA.[281] Since the ITS greatly underestimates the amount of habitat damage and destruction the Project will cause, there is a reasonable likelihood Via Verde Project will lead to more take than contemplated by the Biological Opinion and authorized by the ITS. As a result, the Corps' permitting decision violates Section 9 of the ESA.

With respect to the Puerto Rican Boa, the actual amount of habitat will likely be much larger than 330 acres and will likely include prime Boa habitat in the karst region, including caves that are very important for Boas. For the reasons discussed above, the analysis in the Biological Opinion grossly underestimates the impacts of the Project on Boas and their habitat. Also, the acreage estimate for "take" only accounts for the direct effects to Boas and their habitat. It does not take into account Project effects beyond the 100-foot permanent corridor, nor does it account

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[276] Via Verde Biological Opinion, supra note 53, at 36.
[277] Id. at 33.
[278] Id. at 30.
[279] Id. at 30.
[280] Id. at 54.
[281] "Take" of a species is defined broadly to include actions such as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. § 1532(19). The definition of prohibited "harm" to species includes "significant habitat modification or degradation where it actually kills or injures wildlife." 16 U.S.C. § 1538(a)(1) (2006); 50 C.F.R §17.3 (2010); See also, Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, 515 U.S. 687 (1995) (for interpretation of 'harm'). Moreover, the definition of "harass" is read broadly to include any "intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." Id.

for predation, invasive species, [282] fragmentation, [283] the effects of construction access-roads, or other indirect or cumulative impacts.[284] While to Biological Opinion acknowledges these dangers elsewhere, it fails to account for them in the ITS.[285]

Similarly, with respect to the two Hawk species, the Project will likely cause more take than the 189 and 104 acres authorized. For instance, as discussed above, the scope of the Hawks' nesting and breeding habitat was not adequately delineated. Moreover, the Hawks have extended home range needs for hunting purposes, yet this factor was not adequately analyzed in the Biological Opinion, leading to a gross underestimation of impacts on Hawks associated with the Project.

E. VIOLATION OF 16 U.S.C. § 1536(D) BASED ON "IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES" DURING THE FORMAL CONSULTATION PROCESS

Section 7(d) of the ESA prohibits the agency and applicant from making any "irreversible or irretrievable commitment of resources" during the formal consultation period.[286] Courts are mindful of their "responsibility under [the ESA] . . . to preserve the status quo where endangered species are threatened, thereby guaranteeing the legislative or executive branches sufficient opportunity to grapple with the alternatives."[287] Based on multiple media reports, it is our understanding that the developer has entered into final, binding contracts committing large sums of money to the construction of the Project. We are informed and believe that the Corps has acquiesced in these contracts, authorized them, and/or provided sufficient assurances of permit issuance that the developer was induced to enter into and/or finalize such contracts. These contracts constitute irreversible and irretrievable commitments of resources in violation of Section 7(d) of the ESA, 16 U.S.C. § 1536(d).

V. VIOLATIONS RELATING TO LEATHERBACK SEA TURTLE, LOGGERHEAD SEA TURTLE, HAWKSBILL SEA TURTLE, GREEN SEA TURTLE, STAGHORN CORAL, AND ELKHORN CORAL

The Corps is in violation of Section 7(a)(2) of the ESA based on its inadequate Biological Assessment and failure to initiate formal consultation with NMFS for the Via Verde Project concerning Leatherback, Hawksbill, Green, and Loggerhead Sea Turtles, Staghorn and Elkhorn Corals, and designated critical habitat. Unless and until the Corps initiates formal consultation for these species, resulting in the issuance of a Biological Opinion, the Corps is in violation of Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2). Furthermore, several substantive violations of the ESA flow from these procedural violations, including violations of the duty to ensure "no jeopardy" to listed species and no "adverse modification" of critical habitat under Section

[282] Via Verde Biological Opinion, supra note 53, at 47.
[283] Id. at 34, 47.
[284] Id. at 47.
[285] Id. at 39. Authorizing the degradation of even the grossly underestimated figure of 330 acres is a larger authorization than any past ITS has allowed. FWS has issued eight prior ITS for Boa habitat, none authorizing degradation of so much habitat.
[286] 50 C.F.R. § 402.09 (2010).
[287] Tennessee Valley Authority v. Hill, 437 U.S. 153, 169 (1978).

7(a)(2), 16 U.S.C. § 1536(a)(2), as well as violations of the prohibition against "take" of endangered and threatened species under Section 9 of the ESA, 16 U.S.C. § 1538.

A. VIOLATIONS OF 16 U.S.C. § 1536(A) BASED ON INADEQUACY OF BIOLOGICAL ASSESSMENT AND FAILURE TO CONSULT WITH NMFS FOR SIX SPECIES

The Corps is in violation of Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2), based on the inadequacy of its Biological Assessment and failure to initiate formal consultation with NMFS for six endangered and threatened species under the jurisdiction of NMFS – namely the Leatherback, Hawksbill, Green, and Loggerhead Sea Turtles, as well as the Staghorn and Elkhorn Corals.

1. No Analysis of Impacts on Corals and Their Critical Habitat in the Biological Assessment

The final Biological Assessment for the Via Verde Project contains absolutely no mention of Elkhorn or Staghorn Corals nor any discussion of designated critical habitat for these species.[288] The absence of this information is especially notable in light of NMFS's repeated requests for the Corps to initiate consultation regarding the impacts of the Via Verde Project on Corals and their critical habitat. Moreover, the initial Biological Assessment, dated April 2011, had mentioned the Project's impact on Staghorn and Elkhorn Corals.[289] Upon review of this initial Biological Assessment, NMFS urged the Corps to include a more thorough analysis of the Project's impacts on listed Corals.[290] The Corps ignored these requests and failed to include any analysis of Corals or their critical habitat in the final Biological Assessment.

Because the listed Coral species were not included in the final Biological Assessment, the Corps and NMFS have not analyzed the direct, indirect, and cumulative effects of the proposed project on the listed Coral species. For example, NMFS directed the Corps to consider whether and to what extent construction by means of Horizontal Direction Drilling (HDD) has the potential to generate sediment and bentonite discharges that could lead to an adverse effect on and/or modification of Coral colonies.[291] This analysis was not conducted, and the Corps has not evaluated the effects of HDD during construction on Coral species. NMFS reiterated its concerns over sedimentation and bentonite contamination resulting from HDD technology in its most recent request to the Corps for initiation of ESA consultation.[292] Moreover, the initial

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[288] See generally, Final Biological Assessment, supra note 72 (wherein the final biological assessment neglects to mention any coral species).

[289] Puerto Rico Electric Power Authority, Via Verde Natural Gas Pipeline Project Biological Assessment (April 2011 draft).

[290] E-mail from Lisamarie Carrubba, National Marine Fisheries Service, Protected Resources Div., Caribbean Field Office, to Edgar W. Garcia, Regulatory Project Manager, U.S. Army Corps of Engineers-Antilles Office (May 2, 2011, 14:26:42) [hereinafter E-mail from Lisamarie Carrubba to Edgar W. Garcia (May 2, 2011, 14:26:42)].

[291] Letter from David M. Bernhart, Assistant Regional Admin. for Protected Resources, Nat'l Marine Fisheries Serv., to Sindulfo Castillo, Chief, Regulatory Section, U.S. Army Corps Eng's-Antilles Office (March 24, 2011) [hereinafter Letter from David M. Bernhart to Sindulfo Castillo (March 24, 2011)]; E-mail from Lisamarie Carrubba to Edgar W. Garcia (May 2, 2011, 14:26:42).

[292] Letter from David M. Bernhart, Assistant Regional Admin. for Protected Resources, Nat'l Marine Fisheries Serv., to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (June 16, 2011) [hereinafter Letter from David M. Bernhart to Robert Barron (June 16, 2011)].

Biological Assessment from April mentions use of a "sediment control plan" to "prevent any sediments from impacting offshore marine environments."[293] However, because the Corps did not initiate consultation, NMFS lacked the opportunity to evaluate this sediment control plan in order to determine the effect of the Via Verde Project on Coral colonies and designated habitat.

Other examples of direct, indirect, and cumulative effects on listed Corals and their critical habitat that the Corps failed to consider in final the Biological Assessment include the following:

- Project realignment closer to the waterline along the beach in Levittown
- Methods of maintenance over the life of the pipeline
- Potential impacts to mangroves and resulting sedimentation issues from use of HDD
- Use of excavation during construction
- Use of backfill during construction
- Grading of hills subsequent to construction
- HDD Spill response
- Use of open trenching for construction through restored wetlands areas and other areas
- Effects of alternatives for both project alignment and methods of construction
- Death or injury during construction and operation of project (including potential poisoning from drilling chemicals, indiscriminate herbicide application, individual species relocation, fire or explosion of pipeline or related facilities, damage from heavy equipment or vehicles or vessels, etc.)
- Interference with sexual or asexual reproduction
- Interference with feeding and other behaviors
- Increased exposure to predators, parasites, and/or disease
- Destruction, degradation, or interference with available nutrients or food resources
- Harm due to noise, vibration, lights, and other impacts associated with human activities
- Destruction, degradation, or fragmentation of suitable habitat (including hydrological systems, composition of vegetation, sedimentation, etc.)
- Isolation of individuals
- Exacerbation of difficulty maintaining genetic diversity
- Exacerbation of climate change-related impacts

By completely failing to analyze the impact of the Via Verde Project on Staghorn Coral and Elkhorn Coral and their critical habitat in its Biological Assessment, the Corps is in violation of Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2).

[293] Puerto Rico Electric Power Authority, Via Verde Natural Gas Pipeline Project Biological Assessment (April 2011 draft) at 128–30.

2. Inadequate Analysis of Impacts on Sea Turtles in the Biological Assessment

NMFS and FWS share joint jurisdiction under the ESA for the Leatherback Sea Turtle, the Hawksbill Sea Turtle, the Loggerhead Sea Turtle, and the Green Sea Turtle.[294] As discussed above, in the Biological Assessment, the Corps failed to analyze all potential direct, indirect, and cumulative effects of the Via Verde Project on these species despite knowledge of nesting activities along the Project route.

The Biological Assessment states that, for all species of Sea Turtle, the Project route along the Levittown Beach is "not considered to be suitable habitat for sea turtle nesting."[295] However, throughout the consultation process with FWS, the Corps was aware that "[t]he beach of Levittown harbors suitable habitat for nesting sea turtles."[296] Moreover, actual Sea Turtle nesting was found to be occurring along the beach within the vicinity of the Project.[297] While NMFS informed the Corps of the need to address the effects of the Project on Sea Turtle "refuge and foraging habitat," the Corps continued to avoid engaging in consultation with NMFS regarding the direct, indirect, and cumulative impacts of the project on listed Sea Turtles.[298]

Other examples of direct, indirect, and cumulative effects of the Project on Sea Turtles that remain unaddressed by the Corps in the Biological Assessment include the following:

- Increased water pollution as a result of HDD construction methods
- Increased shipping traffic for LNG
- Noise disruption
- Increased nighttime lighting for construction
- Explosion risks
- Death or injury during construction and operation of project (including potential poisoning from drilling chemicals, fire or explosion of pipeline or related facilities, collisions with heavy equipment, vehicles, or vessels, etc.)
- Disturbance or destruction of nests, eggs, or young
- Interference with foraging, breeding, rearing of young, sheltering, and other behaviors
- Increased exposure to predators, parasites, and/or disease
- Destruction, degradation, or interference with available food resources
- Harassment or displacement due to noise, vibration, lights, and other impacts associated with human activities
- Destruction, degradation, or fragmentation of suitable habitat (including hydrological systems, composition of vegetation, sedimentation, etc.)

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[294] Memorandum of Understanding Defining the Roles of the U.S. Fish and Wildlife Service and the National Marine Fisheries Service in Joint Administration of the Endangered Species Act of 1973 as to Marine Turtles (July 18, 1977).

[295] See generally, Final Biological Assessment, supra note 72 (for all turtle species, the Biological Assessment claims that the beach along the Project route is unsuitable for nesting habitat, without conducting any sort of qualitative analysis of the beach habitat nor with a serious review of the scientific literature over time).

[296] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.

[297] See Memorandum from Deputy Field Supervisor (June 3, 2011) (explaining that during a site visit conducted on May 25, 2011, nesting habitat for the leatherback sea turtle and hawksbill sea turtle was present).

[298] E-mail from Lisamarie Carrubba to Edgar W. Garcia (May 2, 2011, 14:26:42), supra note 290.

- Isolation of individuals
- Exacerbation of difficulty maintaining genetic diversity
- Exacerbation of climate change-related impacts

By failing to adequately analyze the impact of the Via Verde Project on the Leatherback Sea Turtle, Hawksbill Sea Turtle, Loggerhead Sea Turtle, and Green Sea Turtle and their critical habitat in its Biological Assessment, the Corps is in violation of Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2).

3. Failure to Engage in Formal Consultation with NMFS

The obligation to engage in formal consultation is triggered by "[a]ny possible effect, whether beneficial, benign, adverse, or of an undetermined character . . . ."[299] The threshold for a "may affect" determination is low. A federal agency must consider "the effects of the action as a whole," including all direct and indirect effects.[300] If the Corps, through informal consultation with NMFS, finds that the proposed Project "may adversely affect" listed species or their critical habitat, then formal consultation between the Corps and NMFS is required.[301] For the reasons discussed above, the proposed Via Verde Project "may affect" the Leatherback Sea Turtle, Hawksbill Sea Turtle, Loggerhead Sea Turtle, Green Sea Turtle, Staghorn Coral, Elkhorn Coral, and their designated critical habitat.

For the reasons discussed above, the Corps' explicit and implicit "no effect" determinations for the six species listed above are based on flawed and inadequate analyses in the Biological Assessment as well as an unlawful approach to mitigation. As a consequence of these violations, the Corps has not engaged in formal consultation with NMFS concerning the six Sea Turtle and Coral species and their critical habitat, in violation of Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2).

This failure to consult occurred despite FWS recommendations to the Corps that it must coordinate consultation with NMFS regarding the Project's direct and indirect effects on Sea Turtles,[302] and despite NMFS's repeated requests for the Corps to initiate formal consultation.[303] Initially, the Corps acknowledged its duty to initiate formal consultation with NMFS in its public notice for the Via Verde Project.[304] Based on the Corps' public notice, on November 19, 2010, NMFS Protected Resources Division requested formal consultation due to the location of the Project in relation to the coastline.[305] In particular, NMFS was concerned with the Project's

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[299] Fed. Reg. 19,926, 19,949 (June 3, 1986) (codified at 50 C.F.R. pt. 402); See Natural Res. Def. Council v. EPA, 2005 WL 1241904 5 (D. Md. 2005) (citing 50 C.F.R. § 402).
[300] 50 C.F.R. § 402.14(c) (2010).
[301] 50 C.F.R. § 402.14(a) (2010).
[302] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.
[303] See, e.g., Letter from David M. Bernhart to Sindulfo Castillo (March 24, 2011), supra note 291; E-mail from Lisamarie Carrubba to Edgar W. Garcia (May 2, 2011, 14:26:42), supra note 290; Letter from David M. Bernhart to Robert Barron (June 16, 2011), supra note 292.
[304] Joint Permit Application, supra note 46, at 3.
[305] E-mail from Lisamarie Carrubba, Protected Resources Div., Nat'l Marine Fisheries Serv.-Caribbean Office, to Edgar W. Garcia, Regulatory Project Manager, U.S. Army Corps of Engineers-Antilles Office (Nov. 19, 2010, 4:17:58 PM).

potential impacts on "listed corals, sea turtles, and ESA-designated coral critical habitat, along Puerto Rico's north coast."[306] On March 24, 2011, NMFS again requested that the Corps initiate consultation in light of the "nature and extent of this project" and its impacts on species and habitat under NMFS's purview.[307] In addition to requesting consultation, NMFS provided the Corps with eight specific concerns regarding the project's effects on Sea Turtles, Corals, and their critical habitat and asked the Corps to address these concerns when producing its Biological Assessment.[308]

After a draft of the Biological Assessment was submitted by PREPA's consultant to the Corps and NMFS in April 2011, NMFS reiterated to the Corps its concerns regarding the lack of consultation with its Protected Resources Division, stating that "to date, the project consultants have not worked with PRD in order to meet the section 7 ESA requirements for the Via Verde project."[309] For example, NMFS stated that it was not appropriate for PREPA's consultants to merely refer to materials that it had previously provided to the Corps in place of fully "detailing potential impacts to our listed species and their habitat and avoidance and minimization measures . . ." when producing a Biological Assessment.[310] In particular, NMFS was concerned with the effects of the Project on listed Corals and critical habitat in Peñuelas, Arecibo, Barceloneta, Manatí, Vega Baja, Dorado, and Toa Baja and the effects of the project on listed Sea Turtles in Manatí, Dorado, and Toa Baja.[311]

According to NMFS, in order for consultation to properly address the effects of the project on these species and their habitat, the Biological Assessment must include "maps of the route, staging areas, including staging areas for the bentonite mud to be used for HDD, access points, HDD pads, etc."[312] NMFS instructed the Corps to insure that the Biological Assessment include "all potential impacts of clearing, grading, and other site preparation, construction to install the pipeline, and maintenance activities to maintain the right-of-way and the pipeline, in coastal areas around water crossings and near the shoreline . . ." in all coastal municipalities affected by the project.[313] Similarly, FWS has also directed the Corps to initiate consultation with NMFS regarding impacts of the project on Sea Turtles, Corals, and critical habitat.[314]

As late as June 16, 2011, NMFS reiterated its earlier substantive concerns regarding the inadequacy of analysis of the Project's effects on listed Sea Turtles, Corals, and critical habitat, and it once again requested that the Corps initiate consultation.[315] Moreover, NMFS cited concerns over "recent changes in the pipeline route in Toa Baja," a municipality containing known Sea Turtle breeding sites and offshore coral colonies.[316] NMFS specifically requested that the Biological Assessment "clearly demonstrate avoidance and minimization of potential

[306] Letter from David M. Bernhart to Sindulfo Castillo (March 24, 2011), supra note 291.
[307] Id.
[308] Id.
[309] E-mail from Lisamarie Carrubba to Edgar W. Garcia (May 2, 2011, 14:26:42), supra note 290.
[310] Id.
[311] Id.
[312] Id.
[313] Id.
[314] Letter from Edwin Muniz to Robert Barron (May 20, 2011), supra note 50.
[315] Letter from David M. Bernhart to Robert Barron (June 16, 2011), supra note 292.
[316] Id.

impacts to our trust resources during site preparation, construction, and right-of-way maintenance activities in coastal areas around water crossings and near the shoreline in Peñuelas, Arecibo, Barceloneta, Manatí, Vega Baja, Dorado, and Toa Baja, Cataña, and Bayamón."[317] Despite this request, the final Biological Assessment failed to contain this information.

To our knowledge, based on numerous Freedom of Information Act requests, the Corps and NMFS have confirmed that no formal consultation has occurred or will occur between the agencies regarding the impact of the Via Verde Project on the Leatherback Sea Turtle, Hawksbill Sea Turtle, Loggerhead Sea Turtle, Green Sea Turtle, Staghorn Coral, Elkhorn Coral or their critical habitat.[318] Since the proposed Via Verde Project "may affect" these species and their habitat, the Corps' failure to consult with NMFS violates Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2).

4. Consequences of Failure to Engage in Formal Consultation with NMFS

For the reasons discussed above, the Corps has completely failed to analyze the impacts of the Project on listed Corals and their critical habitat in the Biological Assessment, and it has inadequately analyzed the impacts of the Project on listed Sea Turtles and their habitat. As a result, the Corps has not engaged in formal consultation with FWS concerning the six species of Corals and Sea Turtles listed above, in violation of Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2).

The formal consultation process includes procedural requirements that are designed to insure "no jeopardy" and to minimize "take" of listed species. By failing to enter into formal consultation, the Corps has deprived these six species of these robust procedural protections, including: (1) careful analysis of species impacts in a Biological Opinion utilizing the expertise of NMFS and its biologists; (2) analysis and selection of Reasonable and Prudent Alternatives (RPAs) for the project; (3) monitoring of the project and its impacts to insure the success of RPAs; (4) preparation and issuance of an Incidental Take Statement (ITS) to minimize "take" of listed species; and (5) any additional permit conditions deemed necessary by FWS to avoid "jeopardy" to listed species or "adverse modification" of critical habitat.[319] Moreover, formal consultation prohibits the Corps from undertaking any agency action "that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and *recovery* of a listed species in the wild."[320] During the formal consultation process with NMFS, the Corps and PREPA are also prohibited from making any irretrievable commitments of resources toward Project development. All of these procedural requirements help to insure that the project is designed to protect listed species and reduce all direct and indirect impacts on such species. Because the Corps did not initiate formal consultation with NMFS, it has deprived the

[317] Letter from David M. Bernhart to Robert Barron (June 16, 2011), supra note 292.
[318] FOIA Request to FWS (May 3, 2011); FOIA Request to NMFS (June 23, 2011); FOIA Request to FWS (returned Aug. 15, 2011) (all on file with ENRLC, Inter American University Environmental Law Clinic, and University of Puerto Rico Environmental Law Clinic).
[319] 50 C.F.R. § 402.14(h) (2010).
[320] 50 C.F.R. § 402.02 (2010) (emphasis added). See also Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 524 F. 3d 917, 931–33 (9th Cir. 2008) (holding a Biological Opinion legally deficient because it failed to consider both the impact on survival and recovery).

Leatherback Sea Turtle, Hawksbill Sea Turtle, Loggerhead Sea Turtle, Green Sea Turtle, Staghorn Coral, Elkhorn Coral, and their critical habitat of these procedural protections.

B. VIOLATIONS OF 16 U.S.C. § 1536(A)(2) BASED ON FAILURE TO INSURE "NO JEOPARDY" FOR SIX SPECIES

As discussed above, the fundamental purpose of the ESA is to "halt and reverse the trend toward species extinction,"[321] and this objective takes precedence over the primary missions of federal agencies.[322] The Corps has an affirmative duty to insure that its permitting decisions are "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species . . . determined . . . to be critical . . ."[323]

The Via Verde Project will traverse the entire island of Puerto Rico from its southern coast, across the mountainous interior, and along the northern coast, requiring major construction and operational activities in a wide variety of habitats and ecosystems. The Project will also necessitate additional projects and activities both on-shore and off-shore, including those designed to provide the necessary gas supply and ongoing maintenance of the pipeline and related facilities. The species descriptions in Appendix B provide background information showing the general locations and habitats where the six Coral and Sea Turtle species listed above are known to occur or have the potential to occur within the vicinity of the proposed Project. The following are a few examples of the ways in which the Via Verde Project threatens jeopardy and adverse modification for these six species:

- Death or injury during construction and operation of project (including potential poisoning from drilling chemicals, fire or explosion of pipeline or related facilities, collisions with heavy equipment, vehicles, or vessels, etc.)
- Disturbance or destruction of nests
- Interference with foraging, breeding, rearing of young, sheltering, and other behaviors
- Increased exposure to predators, parasites, and/or disease
- Destruction, degradation, or interference with available food resources
- Harassment or displacement due to noise, vibration, lights, and other impacts associated with human activities
- Destruction, degradation, or fragmentation of suitable habitat (including hydrological systems, composition of coral reefs or vegetation, sedimentation, etc.)
- Isolation of individuals
- Exacerbation of difficulty maintaining genetic diversity
- Exacerbation of climate change-related impacts

Moreover, the failure of the Corps to consider the potential for the Project to cause "destruction or adverse modification" of designated critical habitat for Staghorn and Elkhorn Corals also violates Section 7(a) of the ESA.[324] For example, inevitable increase in sedimentation into the

[321] Tennessee Valley Auth. v. Hill, 437 U.S. 153, 184 (1978).
[322] Id. at 185.
[323] 16 U.S.C. § 1536(a)(2) (2006).
[324] 16 U.S.C. § 1536(a)(2) (2006).

ocean from hydrologic disruption of rivers and tributaries due to Project construction will adversely modify designated critical habitat for Staghorn and Elkhorn Coral species. Moreover, projected water crossings at coastal streams and wetlands through use of Horizontal Directional Drilling, trenching, boring, sandbagging will lead to increased sedimentation in Coral critical habitat.

For the reasons discussed above, the Corps has violated the key procedures designed to help it insure no jeopardy and no adverse modification for these six species by implementing a cursory and unduly rushed review process. The Corps is basing its permitting decision on a wholly inadequate Biological Assessment and no formal consultation with NMFS. The Corps has thus failed to gather or analyze enough information to even *determine* whether or to what extent the proposed Via Verde Project would put some or all of these six species at risk of jeopardy or adverse modification, much less taken adequate steps to insure that these consequences do not occur. As a result, the Corps is in violation of its duty to insure no jeopardy and no adverse modification under 16 U.S.C. § 1536(a)(2) of the ESA.

C. VIOLATIONS OF 16 U.S.C. § 1538 BASED ON A REASONABLE LIKELIHOOD OF "TAKE" FOR SIX SPECIES

Section 9 of the ESA strictly prohibits any person, including federal agencies, from "taking" any endangered or threatened fish or wildlife species.[325] Since the overall purpose of the consultation process is to insure that agency actions will not result in "jeopardy" and will minimize "take" of endangered and threatened species, a violation of Section 7 typically leads to a violation of Section 9 as well. The Corps has violated Section 7 in multiple ways, including its complete lack of analysis of the Project's impacts on Elkhorn and Staghorn Corals, inadequate analysis of the Project's impacts on Leatherback, Hawksbill, Green, and Loggerhead Sea Turtles, and failure to engage in consultation with NMFS regarding these species despite repeated requests from the agency to do so. The Corps' failure to adhere to the procedural requirements of the ESA has resulted in a reasonable likelihood that the Corals and Sea Turtles will be taken.

In addition, since the Corps has failed to obtain a Biological Opinion with accompanying Incidental Take Statements for the two Corals and four Sea Turtles discussed above, any take of these listed species is not properly authorized. The Via Verde Project will result in a reasonable likelihood of "take" of each species. For example, the Project's construction using Horizontal Directional Drilling or sandbags to temporarily dam streams will increase water pollution and significantly degrade the Sea Turtle and Coral habitat along the north coast to the extent it injures the Turtles. Damming will releasing sediment and Horizontal Directional Drilling will release toxic Bentonite drilling mud into Sea Turtle and Coral habitat. The use of Horizontal Directional Drilling and stream damming, in addition to the increased ship traffic and resultant pollution, will also likely disrupt feeding patterns of the Sea Turtles and Corals. Corals, for instance, feed mostly on zooplankton, which are highly sensitive to chemical changes in the water column. The costal marine environment surrounding Puerto Rico is extremely sensitive, and even modest increases in pollution can seriously impact these species.

[325] 16 U.S.C. § 1538(a)(1) (2006); 50 C.F.R. § 17.31 (2010).

Also, the increased shipping traffic for LNG delivery will significantly degrade the habitat of both the Sea Turtles and Corals. Increases in ship traffic result in increased likelihood for oil spills, sewage (greywater and blackwater) spills, bilge water spills, ballast water discharges bringing invasive species, and ship strikes. Burying a pipeline transporting explosive and pressurized gas through a seismically active location could potentially lead to explosions. If this pipeline is buried beneath beaches, such as in Levittown, where Sea Turtles breed, this would certainly cause take if an explosion were to occur. Also, any use of artificial lights or nighttime construction could significantly disrupt the Sea Turtles' normal behavior patterns. The use of such lights can confuse infant turtles who mistake the lights for the moonlight that leads them back to the ocean. While the Corps' Biological Assessment recommends banning the use of artificial light in breeding habitat, these recommendations were never made binding during consultation. Therefore, there is no guarantee that artificial lights will not be used.

Since there is a reasonable likelihood that the Corps' authorization of the Via Verde Project will lead to a take of listed Sea Turtles or Corals, and since there is no ITS authorizing such take, the Corps is in violation of Section 9 of the ESA, 16 U.S.C. § 1538.

VI. CONCLUSION

Due to the Corps' failure to prepare an adequate Biological Assessment, failure to consult with FWS and NMFS at all for the vast majority of species, reliance on an inadequate Biological Opinion for a few species, and reliance on inappropriate and inadequately studied mitigation measures, the Corps is presently in violation of its procedural mandates under the Endangered Species Act. As a result of these procedural violations, the Corps has also violated its substantive duty to insure that its approval of the Via Verde Project is "not likely to jeopardize" over forty endangered and threatened species and not likely to "adversely modify" their designated critical habitat. Furthermore, as a result of the Corps' violations of these procedural and substantive duties, there is a reasonable likelihood that its permitting decision will lead to a violation of the ESA prohibition against "take" of listed species.

For the reasons discussed above, we hereby notify the Corps of our intent to sue the agency to compel compliance with its substantive and procedural obligations under the ESA, unless the Corps undertakes immediate and sufficient corrective actions within the 60-day notice period. If you would like to discuss the issues raised in this notice letter, please do not hesitate to contact us at (802) 831–1305 or via email at pparenteau@vermontlaw.edu.

Very truly yours,

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Enclosures: Appendix A –Plaintiffs
Appendix B – Species Descriptions

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Appendix A

PLAINTIFFS

Organizations:

Ciudadanos del Karso
(Citizens of the Karst)

CDK is a nongovernmental organization, nonprofit consisting of 30 active leaders, incorporated in 1994 under the laws of the Commonwealth of Puerto Rico, and dedicated to the protection and conservation of natural resources in the karst of Puerto Rico. Its mission is to protect and conserve the natural systems of Puerto Rico, especially the karst of Puerto Rico, and to encourage and develop actions that illustrate how the social organization and nature can and should be supported.

Sociedad Ornitológica Puertorriqueña, Inc.
(Puerto Rican Ornithological Society)

SOPI promotes the preservation, conservation, restoration and sustainable management of important sites for birds in Puerto Rico by encouraging the study, appreciation and protection of birds, and providing alternative technical and scientific support for those actions that may have a significant impact on birds. SOPI is recognized as the leading non-governmental entity and spokesman essential for the conservation, management and all matters relating to birds in Puerto Rico. As a vital organization for the conservation of the environment, with approximately 100 members, SOPI bases its opinions on the best scientific evidence available and participates actively in leading efforts to create awareness of the need to protect, restore and manage major areas for birds.

Federación Espeleológica de Puerto Rico
(Speleological Federation of Puerto Rico)

Founded in 1996 and consisting of approximately 70 members, FEPUR's mission is to coordinate and combine efforts between the various caving organizations in Puerto Rico in the study of the speleology and the Karst, its preservation and protection, as well as in other areas of common interest. The main objectives of the organization are to: coordinate the development of caving in Puerto Rico; provide a forum for discussion of situations, social problems and issues of common interest related to caving, cave rescue, conservation and protection of speleological resources and any resources, natural or historical related; and exchange information sources, bibliographies and literature on the subject of caving, cave rescuing and related topics.

Vegabajeños Impulsando un Desarrollo Ambiental Sustentable
(Vegabajeños Supporting Sustainable Environmental Development)

V.I.D.A.S. is a non-partisan NGO, recognized as an institution that works for the defense of the coastal ecosystems of Puerto Rico, its surrounding communities, and public natural resources through environmental education and projects. V.I.D.A.S. believes that, at the end of the day, we all breathe the same air and use the same waters. Therefore, V.I.D.A.S. respects the environment and nature for all. V.I.D.A.S. consists of a steering committee of 9 members and approximately 30 volunteers and collaborators.

Sierra Club

The Sierra Club is a national, nonprofit organization dedicated to protecting and restoring the quality of the natural and human environment. The mission of the Sierra Club is: To explore, enjoy, and protect the wild places of the earth; To practice and promote the responsible use of the earth's ecosystems and resources; To educate and enlist humanity to protect and restore the quality of the natural and human environment; and to use all lawful means to carry out these objectives. Sierra Club has approximately 1.3 million members as well as sixty-three Chapters and twenty-seven Field Offices throughout the United States, including a Chapter in Puerto Rico.

Comite Utuadeño Contra el Gasoducto (The Utuadeño Committee Against the Gas Pipeline)

The Utuadeño Committee Against the Gas Pipeline (Comité Utuadeño Contra el Gasoducto) was organized in August 2010 to fight against the construction and placement of the gas pipeline in Puerto Rico. The Committee is composed of several families and individual citizens, many of whom will be directly affected by the pipeline. Among the goals of the Committee are to educate communities about the dangers of such project and the effects it will have on the flora and fauna (environmental issues), security and eminent domain issues. The CUCG has a radio program every week on Mondays in a local radio station. They also visit communities located in the pipeline route and provide orientation to their residents. The CUCG has a steering committee composed of ten persons.

Center for Biological Diversity

The Center for Biological Diversity is a national, nonprofit organization whose mission is to protect and restore endangered species and wild places through science, policy, education, advocacy, and environmental law. The Center has over 320,000 members and on-line activists, some of whom reside and recreate in Puerto Rico.

Individuals:

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Carlos Juan Caban Cañedo

Jesús García Oyola

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Appendix B

SPECIES DESCRIPTIONS

I. SPECIES NOT CONSIDERED IN FWS BIOLOGICAL OPINION

A. PUERTO RICAN NIGHTJAR (*CAPRIMULGUS NOCTITHERUS*)[1]

The Puerto Rican Nightjar (locally known as "Guabario") is a rare endangered bird species, endemic to Puerto Rico.[2] It is a small-sized (24cm) nocturnal insectivorous bird with mottled dark brown, black, and gray fluffy plumage.[3] The species is active only at night, venturing from a perch approximately 8 feet above the forest floor to hunt nocturnal flying insects.[4] The Nightjar vocalizes for breeding purposes, with its calls peaking between February to July.[5] The bird nests on the ground, laying eggs directly onto supporting leaf litter and beneath scrub vegetation.[6] Its nesting technique requires a dense and undisturbed forest canopy so that both male and female Nightjars may incubate eggs and fledge young without threat from predators.[7] Eggs are incubated by both males and females on the ground for 19 days prior to hatching.[8] Both male and female Nightjars actively fledge young chicks on the ground for 14 days before they are capable of short flights.[9] Due to its elusive nature, the Nightjar was believed by scientists to be extinct for over 70 years until it was re-discovered in 1961.[10]

The Nightjar population is restricted to subtropical dry and subtropical moist forest life zones, and it is found within extensively wooded areas in the southwestern limestone region of Puerto

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[1] Picture taken From: The Cornell Lab of Omithology, Neotropical Birds, Puerto Rican Nightjar, http://neotropical.birds.cornell.edu/portal/species/overview?p_p_spp=24854

[2] U.S. Fish & Wildlife Serv., Biological Opinion for Issuance of an Incidental Take Permit Pursuant to Section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended, for the WindMar RE Project, Guayanilla, Puerto Rico 9 (2006) [hereinafter WindMar Biological Opinion], available at http://coalicionventanasverraco.org/files/Signed_BO_Windmar_9_7_2006.pdf.

[3] U.S. Fish & Wildlife Serv., Recovery Plan for the Puerto Rican Whip-Poor-Will 1 (1984) [hereinafter Puerto Rican Nightjar Recovery Plan], available at http://ecos fws.gov/docs/recovery_plan/840419d.pdf.

[4] WindMar Biological Opinion, supra note 2, at 9.

[5] Id. at 9.

[6] Id. at 9.

[7] Id. at 9.

[8] Puerto Rican Nightjar Recovery Plan, supra note 3, at 5.

[9] WindMar Biological Opinion, supra note 2, at 10.

[10] Id. at 10.

Rico, including the Guánica Forest, the Susa Forest, and the Guayanilla Hills.[11] These three habitats represent approximately 3% of the Nightjar's former species range on the island.[12] At the time of its listing under the ESA in 1973, the known Nightjar population was approximately 450 to 500 breeding pairs.[13] The current Nightjar population is estimated at 1,400 to 2,000 individuals throughout its densely-forested southwestern Puerto Rico habitat.[14] Partly due to the presence of Nightjars, the Guánica Forest was recognized as a Biosphere Reserve by UNESCO, "emphasizing its ecological importance and need for conservation."[15]

The Nightjar population is currently threatened by "habitat modification, by destruction of habitat for urban, industrial, and tourism development and by predation by exotic species such as the small Indian mongoose and cats."[16] Nightjar habitat modification and degradation is of particular concern in Colinas de Peñuelas, the second most important habitat for the Nightjar in the world.[17]

Several proposed projects in southwestern Puerto Rico have threatened Nightjar habitat and have led to formal consultation with FWS. For example, in 1991, FWS evaluated a proposed 404 Permit for the construction of an access road across a salt flat for resort development in Guánica, and FWS concluded "that the action would jeopardize the continued existence of the endangered nightjar."[18] As a result, the project was subsequently abandoned and the area was set aside for Nightjar conservation purposes.[19]

B. PUERTO RICAN PARROT (*AMAZONA VITTATA*)[20]

The Puerto Rican Parrot (locally known as "Cotorra Puertorriqueña") is endemic to Puerto Rico, and it has been listed as endangered throughout its range since 1967.[21] It is considered one of the ten most endangered birds in the world.[22] This small Parrot, measuring about 11 inches in length, is mostly green in color with a red forehead and bright blue flight feathers.[23] Its diet consists primarily of fruit, and it is highly dependent on dense and diverse forest habitats.[24] The

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[11] Puerto Rican Nightjar Recovery Plan, supra note 3, at 3.
[12] WindMar Biological Opinion, supra note 2, at 11.
[13] Id. at 23.
[14] Id. at 23.
[15] Puerto Rican Nightjar Recovery Plan, supra note 3, at 7.
[16] WindMar Biological Opinion, supra note 2, at 15–16.
[17] Letter from Carlos A. Delannoy, Ph.D. Avian Ecology and Conservation Specialist, Departamento de Biologíca, Universidad de Puerto Rico, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (Sept. 6, 2011) [hereinafter Letter from Carlos A. Delannoy, Ph.D. to Robert Barron (Sept. 6, 2011)]; Letter from Dr. Héctor E. Quintero, Interamerican University of Puerto Rico to Col. Alfred A. Panatno, Jr., Dist. Commander, U.S. Army Corps Eng's-Jacksonville Dist. 3 (Aug. 25, 2011).
[18] WindMar Biological Opinion, supra note 2, at 16.
[19] WindMar Biological Opinion, supra note 2, at 16.
[20] Picture taken From: U.S. Fish and Wildlife Serv., Southeast Region, Puerto Rican Parrot Aviary Images http://www fws.gov/southeast/news/2007/PRAviary/images/IMG_5025.jpg
[21] U.S. Fish & Wildlife Serv., Recovery Plan for the Puerto Rican Parrot 8 (2009) [hereinafter Puerto Rican Parrot Recovery Plan], available at http://ecos fws.gov/docs/recovery_plan/090617.pdf.
[22] Id. at 8.
[23] Id. at 9.
[24] Id. at iii.

Parrot utilizes mature trees capable of supporting large cavities for nesting.[25] It is also known to nest in other types of cavities, such as the limestone cliff pot-holes prevalent throughout the northwestern karst region of the island.[26] The Puerto Rican Parrot matures at 3 to 5 years of age, at which point it forms mating pairs through its courtship and territorial displays.[27] From February to March, a female will lay three eggs on average and spend approximately 26 days incubating the eggs inside nest cavities.[28] Both males and females will forage for the hatched chicks until they are able to fledge at about 9 weeks of age.[29]

Historically, the Puerto Rican Parrot was abundant throughout the Puerto Rican Archipelago's major islands, potentially exceeding one million individuals.[30] Currently, Puerto Rico maintains only two remaining wild Parrot populations – located in the El Yunque National Forest and in the Rio Abajo Forest in the northern karst region – for a total population of approximately 50 wild Parrots.[31] The Rio Abajo population was recently established in 2006 by FWS and the Puerto Rico Department of Natural and Environmental Resources (DNER) with the release of 45 Parrots into the wild "to help prevent extinction of the parrot."[32] Survival estimates from this release ranged from approximately 53 to 60 percent, with most Parrot deaths occurring as a result of predation and disease.[33] The Rio Abajo Forest was chosen for reintroduction of wild Parrots because its irregular karst topography creates an undisturbed and suitable habitat for Parrot nesting.[34] Subsequent to release in the Rio Abajo Forest, several Puerto Rican Parrots have begun nesting in the area.[35] The Via Verde Project will pass through the eastern boundary of the Rio Abajo Forest in "two locations for a total distance of approximately 3.5 miles."[36]

[25] Puerto Rican Parrot Recovery Plan at iii.
[26] Id. at iii.
[27] Id. at 16.
[28] Id. at 16.
[29] Id. at 16.
[30] Id. at 10.
[31] Id. at iii; 8-9.
[32] Id. at 33; 29.
[33] Id. at 33.
[34] Id. at 20; 32.
[35] Letter from Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Robert Barron, Regulatory Program Manager, U.S. Army Corps Eng's-Jacksonville Dist. (May 20, 2011) [hereinafter Letter from Edwin Muniz to Robert Barron (May 20, 2011)].
[36] Puerto Rico Electric Power Authority, Via Verde Natural Gas Pipeline Project Biological Assessment 19 (April 2011, modified July 2011) [hereinafter Final Biological Assessment].

C. CARIBBEAN ROSEATE TERN (*STERNA DOUGALLII DOUGALLII*)[37]

The island of Puerto Rico is home to approximately 200 to 800 breeding pairs of threatened the Caribbean Roseate Tern.[38] The total population of Roseate Terns within the entire Caribbean ranges between an estimated 3,000 to 6,000 breeding pairs, distributed southeast from Florida through the West Indies to the islands off the coasts of Central and northern South America.[39] The Roseate Tern is primarily white with slender wings, a long tail streamer, and a black crown. The Caribbean Roseate Tern is consistently lighter and shorter than the Northeastern population of Roseate Tern, listed separately as an endangered Distinct Population Segment due to marked its population decline since the 1970s.[40]

Throughout the Caribbean, Roseate Terns breed primarily offshore on small islands or on marine rocks, cays, and islets, usually near vegetation or jagged limestone rock, on open sandy beaches, close to the water line, or among coral rubble.[41] Most nests are completely exposed directly on the beach or rock substrate, with chicks fledging with little or no vegetative protection, making chicks extremely vulnerable to predation.[42] Roseate Terns in Puerto Rico generally lay one or two eggs, usually in the month of May, with hatching occurring from mid-June through early July. Nest abandonment and reinitiation of nesting in a separate location is common during a single breeding season. Reasons for abandonment of nesting and colony sites are unknown and require further studies.[43] Chicks grow in the nest for 22 to 29 days until they fledge, with growth rates largely dependent on availability of food in the nesting habitat.[44]

Caribbean Roseate Tern nesting colonies in Puerto Rico include small coral islets near Guánica and Guayanilla on the south coast and Cayos de Barceloneta between Manatí and Barceloneta in northern Puerto Rico.[45] Roseate Terns in Puerto Rico are known to use estuarine wetlands and lagoons, located nearby known breeding habitats, for foraging and feeding on small fish. Such estuarine wetlands include Caño Tiburones, located on the north coast between the Manatí and

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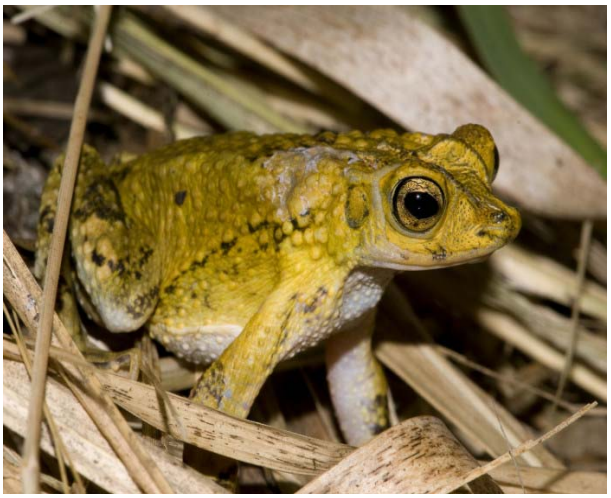
[37] Picture taken From: Jorge Salvia, U.S. Fish & Wildlife Serv., Five Year Status Review for the Roseate Tern http://www fws.gov/southeast/news/2010/images/RoseateTern1.jpg.
[38] Verónica Méndez-Gallardo and José A. Salguero-Faría, Important Bird Areas in the Caribbean, Puerto Rico [hereinafter Important Bird Areas in the Caribbean], available at http://www.birdlife.org/datazone/userfiles/file/IBAs/CaribCntryPDFs/puerto_rico_%28to_usa%29.pdf.
[39] U.S. Fish & Wildlife Serv., Recovery Plan, Caribbean Roseate Tern 9 (1993) [hereinafter Caribbean Roseate Tern Recovery Plan], available at http://ecos fws.gov/docs/recovery_plan/930924_v2.pdf.
[40] Id. at 1-2.
[41] Id. at 3.
[42] Id. at 3.
[43] Id. at 4.
[44] Id. at 4.
[45] Important Bird Areas in the Caribbean, supra note 38.

Arecibo rivers.[46] Throughout Puerto Rico, all Roseate Tern colonies showed a "dramatic decrease" in the number of nesting pairs in 2005, as compared to previous years.[47]

The main threats to the Caribbean Roseate Tern population include nest predation from invasive hawks, gulls, crabs, and rats; human disturbance of nests and illegal collection of eggs; habitat modification and destruction from changing sea levels, disruptive weather events, and human encroachment; and nest abandonment.[48] In 2006, FWS included the Roseate Tern in its Biological Opinion for the WindMar project, determining that the action area of the project extended to the La Parguera cays, Roseate Tern colonies located 16 miles from the project construction site.[49]

D. PUERTO RICAN CRESTED TOAD (*PELTOPHRYNE LEMUR*)[50]



The Puerto Rican Crested Toad (locally known as "Sapo Concho") is a rare toad endemic only to Puerto Rico and the Virgin Islands, with a present population reduced to a mere two isolated areas within Puerto Rico and considered extirpated from the Virgin Islands.[51] The toad is medium-sized (2.5 to 4.5 inches), yellowish-olive to blackish-brown in color, with a distinctive long, upturned snout.[52] The toad inhabits the island's lower elevations, living mostly in habitats with exposed limestone offering fissures and cavities with well drained soils.[53] Crested Toads are mostly found utilizing crevices in limestone, under rocks, in holes in limestone walls, and in holes in dead wooden tree trunks.[54] Adults are adapted to living partially underground in these fissures and cavities, accessing underground chambers through small holes, leaving this underground habitat only to seek vernal freshwater ponds during breeding events.[55] In the wild, Crested Toad breeding is sporadic and highly dependent on occasional heavy rains

[46] Important Bird Areas in the Caribbean, supra note 38.
[47] U.S. Fish & Wildlife Serv., Caribbean Roseate Tern and North Atlantic Roseate Tern 5-Year Review 81 (Sept. 2010), available at http://ecos.fws.gov/docs/five_year_review/doc3588.pdf.
[48] Caribbean Roseate Tern Recovery Plan, supra note 39, at 18-21.
[49] WindMar Biological Opinion, supra note 2, at 30.
[50] Picture taken From: Wikipedia, Puerto Rican Crested Toad: http://en.wikipedia.org/wiki/File:Puerto_Rican_crested_toad.jpg
[51] U.S. Fish & Wildlife Serv., Recovery Plan for the Puerto Rican Crested Toad 1–3 (1992) [hereafter Puerto Rican Crested Toad Recovery Plan], available at http://ecos.fws.gov/docs/recovery_plan/920807a.pdf.
[52] Id. at 1.
[53] Proposed Threatened Status for the Puerto Rican Crested Toad, 51 Fed. Reg. 45923 (proposed Dec. 23, 1986) (to be codified at 50 C.F.R. pt. 17).
[54] Letter from Edwin Muniz, Field Supervisor, U.S. Fish & Wildlife Serv. Boqueron Field Office, to Sindulfo Castillo, Chief, Regulatory Section U.S. Army Corps of Eng's-Antilles Office 5 (Oct. 18, 2010) [hereinafter Letter from Edwin Muniz to Sindulfo Castillo (Oct. 18, 2010)].
[55] Proposed Threatened Status for the Puerto Rican Crested Toad, 51 Fed. Reg. at 45923.

concentrated over short time periods.[56] Heavy rain events attract local Crested Toad populations from up to one mile away to a single vernal breeding pond where the males call for mates while the females will lay a single string of eggs.[57] The eggs hatch within 24 hours with tadpoles metamorphosing and dispersing from ponds within 18 to 25 days.[58]

The largest known Crested Toad population consists of approximately 2,000 individuals and is located in southwestern Puerto Rico in the Guánica Forest.[59] However, potential habitat occurs throughout the island's limestone formations. In particular, the dry limestone forest between Ponce and Guayanilla in the south and the stack hills between Manatí and Bayamón in the north – two locations for the proposed Via Verde Project – harbor suitable habitat for the Crested Toad.[60] Many known breeding sites for the Toad on both the north and south coasts of Puerto Rico have been eliminated due to habitat destruction by means of filling or draining of breeding ponds or other alteration of watershed drainage patterns.[61] When the Crested Toad was federally listed as threatened in 1987, both the northern and southern Crested Toad populations were threatened by development in areas adjacent to breeding sites.[62] In fact, FWS noted that the destruction of one breeding pond "may result in the elimination of that particular population."[63]

Due to its extremely secretive behavior, "the location or even presence of adult toads in an area being developed is difficult to detect in advance."[64] Continuing threats to the Crested Toad include habitat destruction and human interference with breeding through filling, draining, or otherwise altering the species' historic breeding sites.[65] To address some of these concerns, FWS is currently collaborating with the Fideicomiso de Conservación de Puerto Rico to introduce the Crested Toad in at least three new locations on the island.[66]

E. COQUÍ LLANERO (*ELEUTHERODACTYLUS JUANARIVEROI*)[67]

The Coquí Llanero is the smallest Puerto Rican *Eleutherodactylus* and is the only known Herbaceous wetland specialist in Puerto Rico within the taxonomic genus *Eleutherodactylus*. It has a mean snout-vent length of 14.7 millimeters (mm) (0.58 inches (in)) in males, and 15.8 mm (0.62 in) in females. The species is yellow to yellowish brown with a light, longitudinal, reversed comma mark on each side. Coquí Llanero is insectivorous (feeds on small insects).[68]

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[56] Puerto Rican Crested Toad Recovery Plan, supra note 51, at 3.
[57] Id. at 4.
[58] Id. at 4.
[59] Id. at 1–3.
[60] Letter from Edwin Muniz to Sindulfo Castillo (Oct. 18, 2010), supra note 54, at 2.
[61] Proposed Threatened Status for the Puerto Rican Crested Toad, 51 Fed. Reg. at 45923.
[62] Puerto Rican Crested Toad Recovery Plan, supra note 51, at 4.
[63] Id.
[64] Proposed Threatened Status for the Puerto Rican Crested Toad, 51 Fed. Reg. at 45923.
[65] Puerto Rican Crested Toad Recovery Plan, supra note 51, at 5.
[66] Letter from Dr. Rafael L. Joglar, University of Puerto Rico, Dep't of Biology, to Col. Alfred A. Pantano, Jr., Dist. Commander, U.S. Army Corps Eng's-Jacksonville Dist. (June 7, 2011) [hereinafter Letter from Dr. Rafael L. Joglar to Col. Alfred A. Pantano, Jr. (June 7, 2011)].
[67] Picture taken From: U.S. Fish and Wildlife Serv., Southeast Region, Coquí Llanero Proposed Listing and Critical Habitat Designation http://www.fws.gov/caribbean/es/images/CoquiLlanero1.jpg.
[68] 12-Month Petition Finding, Proposed Listing of Coquí Llanero as Endangered, Designation of Critical Habitat for Coquí Llanero, 76 Fed. Reg. 63420 (proposed Oct. 12, 2011) (to be codified at 50 C.F.R. pt. 17).

The species' communication call consists of a series of short high-pitched notes with call duration varying from 4 to 21 seconds. The advertisement call has the highest frequency among all Puerto Rican *Eleutherodactylus*, between 7.38 and 8.28 kilohertz. The calling activity starts at approximately 4:30 p.m. and decreases significantly before midnight.[69]

The Coquí Llanero is only known to occur in the Sabana Seca-Ingenio Ward, Toa Baja type locality, which consists of approximately 180 hectares (ha) (444.8 acres (ac)) of seasonally flooded palustrine (marshy, non-tidal wetlands substantially covered with emergent vegetation such as trees, shrubs, and moss, or freshwater herbaceous wetland), at 17 m (55.8 ft) above sea level.[70] This species' habitat may represent a relic of an endemic habitat type.[71] The habitat is categorized as within the subtropical moist forest life zone.[72] The main vegetation in this herbaceous wetland consists of toothed mid-sorus fern (*Blechnum serrulatum*), willdenow's maiden fern (*Thelypteris interrupta*), bulltongue arrowhead (*Sagittaria lancifolia*), flat sedges (*Cyperus sp.*), spike rushes (*Eleocharis sp.*), and vines and grasses.[73] There are few or no wetlands with plant composition similar to that found in the Sabana-Seca type locality.[74]

The species has been observed to reproduce only on the plant *Sagittaria lancifolia*. Egg clutches were found on leaf axils (21 egg clutches) or leaf surfaces (3 egg clutches) of only *S. lancifolia* within the wetland area. Coquí Llanero has the lowest reproductive output of any Coquí species in Puerto Rico; egg clutches are comprised of one to five eggs and are found on leaf axils or leaf surfaces between 1.3 feet (ft) (0.4 meters (m)) and 3.9 ft (1.2 m) above water level. Observers did not witness parental care in the field.[75]

The majority of the individuals were found perching and calling on the toothed midsorus fern and willdenow's maiden fern. Reproduction, however, only occurs on the bulltongue arrowhead.[76] All specimens (45 individuals) were collected while perching, sitting, or calling on herbaceous vegetation, mainly on ferns. Egg clutches were found on leaf axils (21 egg clutches) or leaf surfaces (3 egg clutches) of only *S. lancifolia*.[77]

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[69] 90-Day Finding on a Petition to List the Coquí Llanero (Eleutherodactylus juanariveroi) as Endangered, 74 Fed. Reg. 32510, 32511 (proposed July 8, 2009) (to be codified at 50 C.F.R. pt. 17).
[70] Id.
[71] Id.
[72] Id.
[73] Id.
[74] Id.
[75] 12-Month Petition Finding, Proposed Listing of Coquí Llanero as Endangered, Designation of Critical Habitat for Coquí Llanero, 76 Fed. Reg. 63420 at 63421.
[76] 90-Day Finding on a Petition to List the Coquí Llanero (Eleutherodactylus juanariveroi) as Endangered, 74 Fed. Reg. at 32511.
[77] Id.

Due to the Coquí Llanero's low reproductive output, remote isolation in an unique wetland, and threat of pollution and man-made wild fires, FWS announced that the Coquí Llanero will be listed as endangered under the Endangered Species Act.[78] Furthermore, the Coquí Llanero will be listed as endangered throughout its range and the inhabited wetland will be designated as critical habitat.[79] The 60 day comment period on the proposed rulemaking ends December 12, 2011.[80] The Coquí Llanero was discovered outside of the habitat originally described for these species.[81] Six Coquí Llanero individuals were detected during surveys between mile markers 78 and 79 of the proposed ROW.[82]

F. ANTILLEAN MANATEE (*TRICHECHUS MANATUS MANATUS*)[83]

The West Indian Manatee – sometimes called a "sea cow" – is the largest surviving member of the order *Sirenia*. The Antillean Manatee (also known as the Caribbean Manatee) is a sub-species. Most adult Manatees are about 10 feet long and weigh 800 to 1,200 pounds, although some larger than 12 feet and weighing as much as 3,500 pounds have been recorded. These "gentle giants" have tough, rubbery, wrinkled brown-to-gray skin that is continuously being sloughed off. Hair is distributed sparsely over the body. With stiff whiskers around its mouth, the Manatee's face looks like a walrus without tusks. Manatees have paddle-like forelimbs, no hind limbs, and a paddle-like, horizontally flattened tail. The Manatee maneuvers through the water moving its tail up and down and steering with its flippers. It is very agile for such a large animal, sometimes somersaulting and doing barrel rolls in the water. The Manatee often rests suspended just below the water's surface with only the snout above water. It feeds underwater, but it must surface periodically to breathe. Although the Manatee can remain underwater for as long as 12 minutes, the average time is 4.5 minutes.[84]

Manatees are herbivorous, feeding opportunistically on marine, estuarine, and freshwater plants. For example, they commonly feed on water hyacinths, hydrilla, and eelgrass. Manatees consume 4 to 9 percent of their body weight each day, i.e., 32 pounds of plants for an 800-pound animal. To do this, Manatees must spend 5 to 8 hours a day eating.[85]

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[78] 12-Month Petition Finding, Proposed Listing of Coquí Llanero as Endangered, Designation of Critical Habitat for Coquí Llanero, 76 Fed. Reg. 63420.
[79] Id.
[80] Id.
[81] Final Biological Assessment, supra note 36, at 81.
[82] Id.
[83] Picture taken From: http://endangeredwestindianmanatee.blogspot.com/
[84] See generally, Final Biological Assessment, supra note 36, at 77–80; http://www.fws.gov/endangered/esa-library/pdf/manatee.pdf (Feb. 2008).
[85] Id.

Manatees can tolerate a range of salinities and can travel between fresh-water, brackish, and saltwater environments, but they do require a source of fresh water. They prefer large, slow-moving rivers, river mouths, and shallow coastal areas such as coves and bays. Manatees are cold-sensitive and require water temperatures above 68°F to prevent thermal shock. Young manatees are especially susceptible to the effects of cold temperatures. Manatees may travel great distances as they migrate between winter and summer grounds. During the winter, Manatees congregate around warm springs and other warm water areas.[86]

Manatees reach breeding maturity between 3 and 10 years of age. Mating activity can occur throughout the year, and calves may be born at any time during the year. The gestation period is approximately 13 months. Usually a single calf is born, but twins do occur. An adult Manatee will usually give birth to a calf once every 2 to 5 years. Newborn calves weigh 60 to 70 pounds and are 4 to 4.5 feet long. They nurse underwater for about three minutes at a time from a nipple located behind their mother's forelimb. Born with teeth, calves begin eating plants within a few weeks but remain with their mother for up to two years. Manatees may live for several decades.[87]

Manatees communicate with each other by emitting underwater sounds that are audible to humans. The vocalizations, which sound like squeaks and squeals, are especially important for maintaining contact between mother and calf. One field report described a mother and her calf, separated by a flood gate, calling to each other for three hours without interruption until they were reunited.[88]

The Antillean Manatee is found along the coast of Florida and throughout the Caribbean, and they can also be found from Mexico, east to the Greater Antilles, and south to Brazil. They are found in the following countries: French Guiana, Suriname, Guyana, Trinidad, Venezuela, Columbia, Panama, Costa Rica, Nicaragua, Honduras, Guatemala, Belize, Mexico, Cuba, Haiti, Dominican Republic, Jamaica, and in the United States (Puerto Rico).[89]

Antillean Manatees are known to heavily utilize areas along the southwestern coast of Puerto Rico. Coastal waters from Ponce to Guayanilla have been identified as areas of distribution and movement for the Antillean Manatee, and they are known to occur in the Vieques National Wildlife Refuge. They appear to occur less frequently along the northern coast. The Antillean Manatee population in Puerto Rico is estimated at between 150 and 350 animals. The population is believed to be stable and potentially increasing in certain areas.[90]

Manatees, however, face many threats to their survival throughout their range. Historically, they were hunted extensively. Today, the greatest threats to Manatee survival are collisions with

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[86] See generally Final Biological Assessment, supra note 36, at 77–80; http://www fws.gov/endangered/esa-library/pdf/manatee.pdf.

[87] See generally Final Biological Assessment, supra note 36, at 77–80; http://www fws.gov/endangered/esa-library/pdf/manatee.pdf.

[88] http://www fws.gov/endangered/esa-library/pdf/manatee.pdf.

[89] See generally Final Biological Assessment, supra note 36, at 77–80; http://www fws.gov/endangered/esa-library/pdf/manatee.pdf.

[90] See generally Final Biological Assessment, supra note 36, at 77–80; http://www fws.gov/endangered/esa-library/pdf/manatee.pdf.

boats and habitat loss and degradation. Collisions with boats can injure and kill manatees that are submerged just below the surface. Habitat loss and degradation result from many human activities. For instance, increasing demands on water usage from development can lead to the loss of natural springs. Additional threats include flood gates and canal locks, which can kill Manatees either by crushing them or drowning them; fishing lines and other trash discarded into the water; natural events such as unusually cold winters; periodic red tide blooms in which toxic microorganisms can kill Manatees; harassment from divers, fishermen, and boaters which can interrupt feeding and breeding and drive Manatees into cooler water where they are susceptible to disease and cold stress. In light of these many threats, the Antillean Manatee is listed as "endangered" under the federal Endangered Species Act.[91]

G. LEATHERBACK SEA TURTLE (*DERMOCHELYS CORIACEA*)[92]

The Leatherback Sea Turtle is the largest of all living sea turtles. Its average length is between 3.3 and 6.6 feet, and adults weigh between 500 and 1,500 pounds. The Leatherback Sea Turtle is easily distinguishable from other sea turtles because it alone has a non-bony shell, and its carapace is covered by skin and oily flesh. The Leatherback's dorsal surface is colored dark grey to black with white blotches and spots. The hydrodynamic carapace and large flippers are key characteristics that make the Leatherback well-equipped for long distance foraging migrations.[93]

The Leatherback's diet typically consists of soft-bodied pelagic prey, such as jellyfish and salps (barrel-shaped, planktonic tunicates). Unlike other sea turtles, Leatherbacks feed in areas of colder water where there is an abundance of jellyfish and other prey, and they also forage in coastal waters. Due to their obligate feeding nature, Leatherback Sea Turtles help control jellyfish populations. Leatherbacks follow their jellyfish prey throughout the day, and they can dive deeper than 1,200 meters.[94]

Female Leatherbacks lay clutches of approximately 100 eggs on sandy, tropical beaches. Females nest several times during a nesting season, typically at 8-12 day intervals. After 60-65 days, Leatherback hatchlings emerge from the nest with white striping along the ridges of their backs and on the margins of the flippers.[95]

Leatherbacks are the most migratory and wide ranging of sea turtle species. They can be found in all tropical and subtropical oceans, and their range extends into the Arctic circle. In the

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[91] See generally Final Biological Assessment, supra note 36, at 77–80; http://www fws.gov/endangered/esa-library/pdf/manatee.pdf.
[92] Picture Taken From NOAA: http://www.nmfs noaa.gov/pr/species/turtles/photos.htm
[93] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/leatherback.htm.
[94] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/leatherback.htm.
[95] http://www nmfs.noaa.gov/pr/species/turtles/leatherback.htm.

Atlantic Ocean, the Leatherback Sea Turtle population ranges across the entire region and can be found as far north as the North Sea and as far south as the Cape of Good Hope. Leatherbacks tagged with satellite transmitters at sea off Nova Scotia were tracked to waters adjacent to nesting beaches along the northeast coast of South American, the Antilles (Caribbean Islands), Panama and Costa Rica. Leatherbacks mate in the waters adjacent to nesting beaches and along migratory corridors. After nesting, female Leatherbacks migrate from tropical waters to more temperate latitudes, which support high densities of jellyfish prey in the summer.[96] Nesting grounds for the Leatherback Sea Turtle are found around the world. The largest nesting assemblages are found on the coasts of northern South America and West Africa. Puerto Rico and the U.S. Virgin Islands also support nesting colonies. These colonies represent the most significant Leatherback nesting activity within the United States.

The Leatherback Sea Turtle has been listed as "endangered" under the federal Endangered Species Act since 1970. Designated critical habitat for the Leatherback includes coastal waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands. In February 2010 and again in November 2010, the Sierra Club petitioned NMFS to revise the critical habitat designation for Leatherback Sea Turtles to include waters adjacent to major nesting beaches in the Northeast Ecological Corridor of Puerto Rico. As explained in the November 2010 petition, "[a]dults using the nesting beaches must ... pass through adjacent waters, as must juveniles dispersing from the Corridor beaches. There is also substantial evidence that leatherbacks mate not far offshore of their nesting beaches. Disturbances to these migration and mating patterns – ranging from fishing activities to permanent structures to degraded water quality – therefore necessarily have the potential to degrade or destroy high quality nesting areas."[97] To date, however, the critical habitat designation for the Leatherback has not been revised to include these coastal waters in Puerto Rico.[98]

Nevertheless, in Puerto Rico, all sandy beaches are considered suitable sea turtle nesting habitat, according to NOAA's Environmental Sensitivity Index. The marine beaches associated with the Via Verde Project include those in the Levittown Beachfront area along PR-165. The central and western ends of this shoreline include some sandy expanses with natural vegetation above the mean high water line. The Leatherback has been known to use similar areas in Puerto Rico for nesting purposes.[99]

H. HAWKSBILL SEA TURTLE (*ERETMOCHELYS IMBRICATA*)[100]

The Hawksbill Sea Turtle is small- to medium-sized compared to other sea turtles and weighs an average of 100 to 150 pounds. It can, however, grow up to 200 pounds. The carapace of an adult Hawksbill ranges from dark to golden brown with streaks of orange, red, and/or black. The shells of hatchlings are mostly brown. The rear edge of the carapace is usually serrated. The Hawksbill Sea Turtle's head is elongated, tapering to a point, with a beak-like mouth, which

[96] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/leatherback.htm.
[97] http://www nmfs noaa.gov/pr/pdfs/petitions/leatherback_criticalhabitat_nov2010.pdf.
[98] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/leatherback.htm.
[99] See generally Final Biological Assessment, supra note 36, at 113–127.
[100] Picture Taken From NOAA: http://www.nmfs noaa.gov/pr/species/turtles/photos htm

allows the Hawksbill to reach into holes and crevices of coral reefs for sponges and other invertebrates. The primary food source for the Hawksbill is sponges. Coral reefs are recognized as the resident foraging habitat for juveniles, sub-adults, and adults. Post-hatchlings are considered pelagic and often take shelter in floating weed lines and debris that accumulate in convergence zones.[101]

Hawksbill Sea Turtles occur in the tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. This species is widely distributed in the Caribbean Sea and western Atlantic Ocean. The Hawksbill is common in Puerto Rico and its associated islands as well as in the U.S. Virgin Islands. Hawksbills can also be seen along the Gulf states and Eastern seaboard. Research indicates that adult Hawksbill turtles are capable of migrating long distances between nesting beaches and foraging areas, which are comparable to migrations of Green and Loggerhead Sea Turtles.[102]

Females return to the beaches where they were born (natal beaches) to nest, which occurs every 2-3 years at night and approximately every 14-16 days during the nesting season. A female Hawksbill generally lays 3-5 nests per season, which contain an average of 130 eggs. Hawksbill Sea Turtles usually nest high up on the beach under or in the beach/dune vegetation on both calm and turbulent beaches. They commonly nest on pocket beaches, with little or no sand. Hawksbills are capable of nesting faster than any other species of sea turtles and can complete the entire process in less than 45 minutes. Nesting occurs on beaches in Puerto Rico and the U.S. Virgin Islands. The most important sites within the jurisdiction of the United States are Mona Island, Puerto Rico, and Buck Island, St. Croix, U.S. Virgin Islands. Nesting also occurs on other beaches of St. Croix, Culebra Island, Vieques Island, mainland Puerto Rico, St. John, and St. Thomas. Within their range, Hawksbill Sea Turtles typically nest in low densities.[103]

Hawksbill Sea Turtles use different habitats at different stages of their life cycle, but are most commonly associated with healthy coral reefs. Post-hatchlings (oceanic stage juveniles) are believed to occupy the pelagic environment, taking shelter in floating algal mats and drift lines of flotsam and jetsam in the Atlantic. After a few years in the pelagic zone, small juveniles recruit to coastal foraging grounds. This shift in habitat also involves a shift in feeding strategies, from feeding primarily at the surface to feeding below the surface primarily on animals associated with coral reef environments. Here, juveniles begin feeding on a varied diet. In the Caribbean,

[101] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/hawksbill.htm.
[102] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/hawksbill.htm.
[103] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/hawksbill.htm.

as Hawksbills grow, they begin exclusively feeding on only a few types of sponges. The ledges and caves of coral reefs provide shelter for resting Hawksbills both during the day and at night. Hawksbills are known to inhabit the same resting spot night after night. Hawksbills are also found around rocky outcrops and high energy shoals, which are also optimum sites for sponge growth. They are also known to inhabit mangrove-fringed bays and estuaries.[104]

Hawksbills face threats on both nesting beaches and in the marine environment. The primary global threat to Hawksbills is habitat loss of coral reef communities. Coral reefs are vulnerable to destruction and degradation caused by human activities. Humans can alter coral reefs either gradually (e.g., through pollution and degradation of habitat quality) or catastrophically (for example, toxic spills and vessel groundings). Recent evidence suggests that global climate change is negatively impacting coral reefs in multiple ways. Hawksbill Sea Turtles rely on coral reefs for food resources and habitat. As these communities continue to decline in quantity and quality, Hawksbills will have reduced foraging opportunities and limited habitat options.[105]

The Hawksbill Sea Turtle has been listed as "endangered" under the federal Endangered Species Act since 1970. In June 1982 and September 1998, critical habitat was designated for Hawksbill Sea Turtles on selected beaches and/or waters of Mona Island, Monito Island, Culebrita Island, and Culebra Island, Puerto Rico.[106]

In Puerto Rico, all sandy beaches are considered suitable sea turtle nesting habitat, according to NOAA's Environmental Sensitivity Index. The marine beaches associated with the Via Verde Project include those in the Levittown Beachfront area along PR-165. The central and western ends of this shoreline include some sandy expanses with natural vegetation above the mean high water line. Hawksbill Sea Turtles have been known to utilize similar areas for nesting.[107]

I. GREEN SEA TURTLE (*CHELONIA MYDAS*)[108]

Green Sea Turtles are the largest of all the hard-shelled sea turtles, but they have a comparatively small head. Green Sea Turtles grow to a length of approximately 5 feet long and can weigh up to 690 pounds. The average weight of a mature Green Sea Turtle is approximately 330 pounds. The Green Sea Turtle is anatomically similar to other members in its family but may be distinguished by its short snout and its unhooked beak. Adult green turtles are unique among sea turtles in that they eat only

[104] http://www nmfs.noaa.gov/pr/species/turtles/hawksbill.htm.
[105] http://www nmfs.noaa.gov/pr/species/turtles/hawksbill.htm.
[106] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/hawksbill.htm.
[107] See generally Final Biological Assessment, supra note 36, at 113–127.
[108] Picture Taken From NOAA: http://www.nmfs noaa.gov/pr/species/turtles/photos htm

plants; they are herbivorous, feeding primarily on seagrasses and algae. This diet is thought to give them greenish-colored fat, from which they take their name.[109]

The carapace of the Green Sea Turtle has variations in color and pattern that change over time. The carapaces of hatchlings are mostly black with light colored plastrons. Juveniles turn dark brown to olive. Adult carapaces are largely brown, spotted or marbled with variegated rays. Green Sea Turtle ecology changes drastically with each stage of its life history. Hatchlings are carnivorous pelagic organisms. Juvenile and adult Green Sea Turtles are commonly found closer to shore in seagrass meadows, and they are herbivorous grazers. Green Sea Turtles reach maturity at 20-50 years old.[110]

The Green Sea Turtle is globally distributed and generally found in tropical and subtropical waters along the continental coast and islands. There are two distinct populations of Green Sea Turtles: the Atlantic subpopulation and the Indo-Pacific subpopulation. The Atlantic subpopulation can generally be found throughout the entire Atlantic Ocean.[111]

Green Sea Turtles primarily use three types of habitat: beaches for nesting; open ocean convergence zones; and coastal areas for "benthic" feeding. While nesting season varies from location to location, in the southeastern United States, females generally nest in the summer between June and September and peak nesting occurs in June and July. During the nesting season, females nest at approximately two-week intervals. They lay an average of five nests, or "clutches." In Florida, green turtle nests contain an average of 135 eggs, which will incubate for approximately 2 months before hatching.[112]

Adult females migrate from foraging areas to mainland or island nesting beaches and may travel hundreds or thousands of kilometers each way. After emerging from the nest, hatchlings swim to offshore areas, where they are believed to live for several years, feeding close to the surface on a variety of pelagic plants and animals. Once the juveniles reach a certain age/size range, they leave the pelagic habitat and travel to nearshore foraging grounds. Once they move to these nearshore benthic habitats, adult Green Sea Turtles are almost exclusively herbivores, feeding on sea grasses and algae.[113]

Female Green Sea Turtles return to the same beaches where they were born ("natal" beaches) every 2 to 4 years to lay eggs, generally in the summer months. Major nesting sites for this population are found on islands in the Caribbean, along the eastern shores of the continental United States, the eastern coast of South America, and on isolated North Atlantic islands. In the Caribbean Sea, major nesting sites have been found on Aves Island, the U. S. Virgin Islands, Puerto Rico, and Costa Rica.[114]

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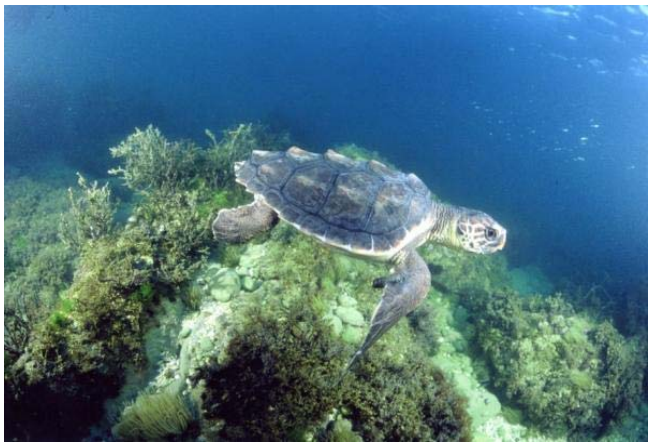
[109] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/green htm.
[110] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/green htm.
[111] See generally Final Biological Assessment, supra note 36, at 113–127.
[112] http://www nmfs.noaa.gov/pr/species/turtles/green htm.
[113] http://www nmfs.noaa.gov/pr/species/turtles/green htm.
[114] http://www nmfs.noaa.gov/pr/species/turtles/green htm.

The Green Sea Turtle has been listed under the federal Endangered Species Act since 1978. Breeding populations in Florida and on the Pacific coast of Mexico are listed as "endangered," while elsewhere the species is listed as "threatened." Critical habitat was designated in 1998 for Green Sea Turtles in the coastal waters around Culebra Island, Puerto Rico. The nesting/mating season varies between populations. The nesting season of the Caribbean population of Green Sea Turtle is from June to September. [115]

In Puerto Rico, all sandy beaches are considered suitable sea turtle nesting habitat, according to NOAA's Environmental Sensitivity Index. The marine beaches associated with the Via Verde Project include those in the Levittown Beachfront area along PR-165. The central and western ends of this shoreline include some sandy expanses with natural vegetation above the mean high water line.[116]

J. LOGGERHEAD SEA TURTLE (*CARRETTA CARRETTA*)[117]

The English common name for this species, Loggerhead, was coined because of its relatively large head, which supports powerful jaws and enable it to feed on hard-shelled prey, such as whelks and conch. The top shell (carapace) is slightly heart-shaped and reddish-brown in adults and sub-adults, while the bottom shell (plastron) is generally a pale yellowish color. The neck and flippers are usually dull brown to reddish brown on top and medium to pale yellow on the sides and bottom. An adult Loggerhead Sea Turtle weighs approximately 300 pounds, and its length is approximately 84 inches. Its skin color ranges from yellow to brown, and the carapace is typically reddish brown.[118]



Adult Loggerheads are omnivorous, feeding mainly on bottom-dwelling invertebrates such as gastropods, bivalves, and decapods. The Loggerhead's large and powerful jaws are used to crush hard-shelled prey, such as whelks and conch. Other food items include sponges, corals, sea pens, polychaete worms, sea anemones, cephalopods, barnacles, brachiopods, isopods, insects, bryozoans, sea urchins, sand dollars, sea cucumbers, starfish, hatchling turtles, algae, and vascular plants. During migrations through the open ocean, this species is also known to consume jellyfish, floating mollusks, floating egg clusters, squid, and flying fish. In addition to being good swimmers, Loggerheads

[115] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/green htm.
[116] See generally Final Biological Assessment, supra note 36, at 113–127.
[117] Picture Taken From NOAA: http://www.nmfs noaa.gov/pr/species/turtles/photos htm
[118] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/loggerhead htm.

have callus-like traction scales beneath their flippers that allow them to "walk" on the ocean floor. Loggerhead Sea Turtles reach maturity at about 35 years of age.[119]

The Loggerhead Sea Turtle occurs throughout temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. In the Atlantic, the Loggerhead Sea Turtle's range extends from Newfoundland to as far south as Argentina. The Atlantic subpopulation is commonly found in the North Atlantic, including the Gulf of Mexico, the northern Caribbean, and the Bahamas Archipelago. In the United States, Loggerhead Sea Turtles are found from Texas to Virginia, as well as in waters off the eastern United States, the Bahamas, Greater Antilles, Yucatan Peninsula, and throughout the Gulf of Mexico.[120]

In the southeastern United States, Loggerhead Sea Turtles mate from late March to early June, and females lay eggs between late April and early September. Females lay 3 to 5 nests, and sometimes more, during a single nesting season. The eggs incubate approximately two months before hatching sometime between late June and mid-November. During the 3 months or so that a female Loggerhead breeds, she will travel hundreds of miles to nest, lay 35 lbs of eggs or more and then swim back to her home foraging area, all without eating anything significant.[121]

Loggerheads occupy three different ecosystems during their lives: beaches (terrestrial zone); water (oceanic zone); and nearshore coastal areas ("neritic" zone). Loggerheads nest on ocean beaches, generally preferring high energy, relatively narrow, steeply sloped, coarse-grained beaches. Immediately after hatchlings emerge from the nest, they begin a period of frenzied activity. During this active period, hatchlings move from their nest to the surf, swim, and are swept through the surf zone, and continue swimming away from land for up to several days. After this swim frenzy period, post-hatchling Loggerheads take up residence in areas where surface waters converge to form local downwellings. These areas are often characterized by accumulations of floating material, such as seaweed (for example, *Sargassum*). Post-hatchlings within this habitat are observed to be low-energy float-and-wait foragers that feed on a wide variety of floating items. As post-hatchlings, Loggerheads may linger for months in waters just off the nesting beach or become transported by ocean currents within the Gulf of Mexico and North Atlantic. Loggerheads may continue some oriented swimming in order to keep from being swept into cold North Atlantic currents. Once individuals get transported by ocean currents farther offshore, they've entered the oceanic zone.[122]

Somewhere between 7 and 12 years old, oceanic juveniles migrate to nearshore coastal areas (neritic zone) and continue maturing until adulthood. In addition to providing critically important habitat for juveniles, the neritic zone also provides crucial foraging habitat, inter-nesting habitat, and migratory habitat for adult loggerheads in the western North Atlantic. To a large extent, these habitats overlap with the juvenile stage. The predominant foraging areas for western North Atlantic adult Loggerheads are found throughout the relatively shallow

[119] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/loggerhead htm.
[120] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/loggerhead htm.
[121] http://www nmfs.noaa.gov/pr/species/turtles/loggerhead htm.
[122] http://www nmfs.noaa.gov/pr/species/turtles/loggerhead htm.

continental shelf waters of the United States, Bahamas, Cuba, and the Yucatán Peninsula, Mexico. Migration routes between foraging habitats and nesting beaches for a portion of the population are restricted to the continental shelf, while other routes involve crossing oceanic waters to and from the Bahamas, Cuba, and the Yucatán Peninsula. Seasonal migrations of adult Loggerheads along the mid- and southeastern United States coasts have also been documented.[123]

Loggerhead Sea Turtles face threats on both nesting beaches and in the marine environment. The Loggerhead was first listed under the Endangered Species Act as "threatened" in 1978. In September 2011, NMFS and FWS listed 9 Distinct Population Segments (DPSs) of Loggerhead Sea Turtles under the ESA, with four listed as "endangered" (including the Northwest Atlantic DPS and South Atlantic DPS) and five listed as "threatened."[124]

Loggerhead nesting throughout the Caribbean is sparse. Nevertheless, in Puerto Rico, all sandy beaches are considered suitable sea turtle nesting habitat, according to NOAA's Environmental Sensitivity Index. The marine beaches associated with the Via Verde Project include those in the Levittown Beachfront area along PR-165. The central and western ends of this shoreline include some sandy expanses with natural vegetation above the mean high water line.[125]

K. TREES, SHRUBS, AND OTHER PLANTS

According to the Corps' Biological Assessment (BA), a "total of 29 species of plants on the federal list have the potential to occur within the identified pipeline corridor."[126] This includes twenty-five species listed as "endangered" under the ESA, three species listed as "threatened" under the ESA, and one species that has been designated as a "candidate" for listing as endangered. These plant species consist primarily of trees and shrubs, including numerous trees and shrubs bearing tropical flowers, fruit, herbs, legumes, and/or nuts, many evergreens, one palm tree, a tree fern, and several other types of ferns. The following is a brief summary of background information set forth in the BA and other sources concerning each species.

1. Palo de Ramón (*Banara vanderbilitii*)[127]

The Palo de Ramón is a member of the Willow family that reaches 10 meters high and 12 cm in diameter. The Palo de Ramón has rough, hairy leaves up to 12 cm long by 4 cm wide. The flowers are yellow and have many stamens. The fruit consists of berries with many seeds, deep red to purple, with an enlarged calyx and long tip style, and these red-purple fruits provide food for birds, including the Bananaquit (*Coereba flaveola*) and the Western Spindalis

[123] http://www nmfs.noaa.gov/pr/species/turtles/loggerhead htm.
[124] http://www nmfs.noaa.gov/pr/species/turtles/loggerhead htm.
[125] See generally Final Biological Assessment, supra note 36, at 113–127; http://www nmfs.noaa.gov/pr/species/turtles/loggerhead htm.
[126] Final Biological Assessment, supra note 36, at 28.
[127] Picture Taken From: http://globalspecies.org/ntaxa/840375

(*Spindalis zena*). The species is endemic to Puerto Rico, and it grows in moist forests on limestone substrates. The Palo de Ramón is found in the karstic northern regions of Puerto Rico and in the Central Highlands area. Specifically, the Palo de Ramón is found in semi-evergreen forests in two locations in northern Puerto Rico; one from Toa Baja to Bayamón and one in the municipality of Salinas. Two populations consist of six individuals less than 16 meters square in the vicinity of Toa Baja and five individuals in Salinas. It has also been found in Dorado and San Juan. Potential suitable habitat for this species may exist on the limestone hills of the northern section of the Via Verde Project route.[128]

2. Diablito de Tres Cuernos or Vahl's Boxwood (*Buxus vahlii*)[129]

The Diablito de Tres Cuernos is a member of the Boxwood family. It grows 4.5 meters tall with a trunk up to 13 cm in diameter. The stem has two grooves below each node, an identifying characteristic. The oblong leaves are dark green and shiny, and they grow to 3-4 cm long and about 2 cm wide. The flower groups are small, about 6-7 mm long. Clusters of flowers produce fruits from December to early April. The fruits are horned capsules producing shiny black seeds from 3-4 cm long. The Diablito de Tres Cuernos grows on limestone substrates, and it is found in three locations in Puerto Rico: (1) on the nuclear energy property of the Commonwealth of Puerto Rico at Punta Higüero, Rincón; (2) at the plant in Hato Tejas, Bayamón, near Highway No. 2, 650 meters west of the intersection with the road No. 167 (on land owned by Pan American Investment, Inc.); and (3) at Isabela. In 1984, there was an estimate of 16 individuals at the Rincón site and 24 individuals at Hato Tejas, Bayamón. FWS and DNER have confirmed the presence of this species between Guayanilla and Ponce. DNER found a population of approximately 500 individuals of this species in that area. Potential suitable habitat for this species may be present in the limestone hills of Peñuelas and the northern section of the Via Verde Project route.[130]

3. Turtlefat (*Aueurodendron pauciflorum*)

The Turtlefat is a flowering evergreen in the Buckthorn family that can reach 5 meters high. The Turtlefat has black-dotted green leaves up to 15 cm long and 6 cm wide with tiny black glandular spots. Two or three flowers are found in the axils of the leaves. The species is endemic to Puerto Rico, and it is native to the subtropical moist forests of the limestone hills in north and northwest Puerto Rico. Only 19 individuals are known for the four groups in the Barrio Coto de Isabela area near the intersection of Highway 113 road and Highway 2. Potential suitable habitat

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[128] See generally Final Biological Assessment, supra note 36, at 30–31; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q266; http://en.wikipedia.org/wiki/Banara_vanderbiltii.

[129] Picture Copyright Pedro Acevedo-Rodriguez

[130] See generally Final Biological Assessment, supra note 36, at 31–33; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q26G; http://en.wikipedia.org/wiki/Buxus_vahlii.

may exist on the Rio Abajo State Forest region, as well as the limestone hills of the northern section of the Via Verde Project route.[131]

4. Mata Buey or Beautiful Goetzea (*Goetzea elegans*)[132]

The Mata Buey is endemic to Puerto Rico, and it is a flowering evergreen within the Nightshade family. The Nightshade family is highly ethnobotanical, meaning the species within this family are frequently used by humans as medicines, spices, or food. The Mata Buey grows approximately 9 meters high, and it has a trunk 13 cm thick. The Mata Buey's oval leaves can grow to 10 cm long and 5 cm wide. The upper surface of the leaves is a bright dark green, and the bottom is pale green. The flowers are small, yellow-orange, and funnel-shaped, and they are found in the axils of the leaves. The fruit is a yellow-orange berry up to 2.5 cm long and usually occurs between May and August, during the same period in which the plant flowers. The habitat of the Mata Buey is on the edge of the forested semi-evergreen limestone hills below 200 meters, and the species is present in multiple locations in the northwest part of Puerto Rico in the area of Quebradillas and Isabela. Approximately 40 to 50 individuals are known in these places. Potential suitable habitat may exist on the limestone hills of the northern section of the Via Verde Project route.[133]

5. Erubia (*Solanum drymophilum*)[134]

The Erubia is another member of the Nightshade family. It can grow up to 6 m tall and 7.5 cm or more in basal diameter. It may have a single stem or multiple branches from the base or near the base, and it is supported primarily by semiflexible lateral roots. The foliage is concentrated near the ends of twigs. Its lanceolate or oblong leaves are 8 to 20 cm long, 2 to 4 cm wide, long-pointed at the tip, and have stalks up to 1 cm long. There are sharp, stiff, yellow spines up to 1 cm long on the mid-vein of the leaves and sometimes on the twigs and stems. Five-lobed white flowers about 2 cm

[131] See generally Final Biological Assessment, supra note 36, at 29–30; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2ZU; http://en.wikipedia.org/wiki/Auerodendron_pauciflorum; http://ecos.fws.gov/docs/recovery_plan/970929b.pdf.
[132] Picture Taken From FWS: http://www.fws.gov/caribbean/es/Endangered-Plants html
[133] See generally Final Biological Assessment, supra note 36, at 47–48; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2AL; http://en.wikipedia.org/wiki/Goetzea_elegans.
[134] Picture Taken From: http://www.centerforplantconservation.org/Collection/CPC_ViewProfile.asp?CPCNum=4028

across with yellow anthers are grouped in lateral or subterminal racemes. The fruits are spherical, shiny black berries about 6 mm in diameter that contain many tiny seeds. The Erubia appears to flower and produce these black berries throughout the year. Historically, the Erubia could be found in the Sierra de Cayey, Sierra de Naguabo, and the town of Lares. The Erubia is known to be still present the town Sierra of Cayey in the center of Puerto Rico. Nursery production appears to be easy, but field planting must be accompanied by at least 2 years of weed control. Approximately 100 to 150 individuals exist in this field, which is at 840 m in elevation and marked with volcanic outcroppings. Potential suitable habitat for this species may exist on the volcanic hills along the northern Peñuelas, Adjuntas, and Utuado sections of the Via Verde Project route.[135]

6. Rosewood or Palo de Rosa (*Ottoschulzia rhodoxylon*)[136]

The Rosewood is an evergreen tree within the *Icacinaceae* family which grows up to 4 to 5 meters tall. Its thick, smooth, leathery leaves are elliptical to oval. The flowers can be found at the base in single layers or in groups. The fruit is a drupe (a fruit with a stone pit similar to a peach) with a thin shell and that occurs irregularly throughout the year, as well as flowers. The heartwood is red in color and prized for woodworking. The Rosewood is found in well-drained, alkaline, rocky soils derived from limestone or serpentine. Presently, approximately 200 individuals are known from 17 populations in the following areas of Puerto Rico: Guaynabo; Quebradillas / Isabela; Cambalache Forest; Guánica Forest; Cabo Rojo; and close to the Rio Abajo Forest. The map for species occurrence also includes this species as potentially present in Barceloneta, Vega Baja, Vega Alta, Toa Baja, and Dorado, all of which fall within the Via Verde Project corridor route. Types of habitats are semi-evergreen forest about 100 meters in Bayamón, located at low elevations, dry forests in limestone, semi-deciduous, on the southwest coast in Guánica Forest. A tree in the Maricao Forest only survives in a montane, semi-evergreen green forest in outcrops 600 meters elevation. It generally exists in subtropical dry forest and subtropical moist forest habitats, and it has been reported to occur in Aguadilla, Bayamón, Guaynabo, Arecibo, Camuy, Hatillo, Barceloneta, Vega Baja, Vega Alta, Fajardo, Toa Baja, Ciales, Quebradillas, Isabela, Dorado, Mayaguez, Maricao, Cabo Rojo, San Germán, Guayanilla, Yauco, Sabana Grande, Guánica, and Ponce. Three individuals were found during a survey conducted by Franklin Axelrod, Ph.D. in the Municipality of Manatí. Potential suitable habitat for this species may be present on the limestone hills of Peñuelas, and northern limestone hills along the Via Verde Project route.[137]

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[135] See generally Final Biological Assessment, supra note 36, at 59–60; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2J3; http://www fs.fed.us/global/iitf/pdf/shrubs/Solanum%20drymophilum.pdf.

[136] Picture Taken From FWS: http://www.fws.gov/caribbean/es/Endangered-Plants html

[137] See generally Final Biological Assessment, supra note 36, at 53–54; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2EK; http://en.wikipedia.org/wiki/Ottoschulzia_rhodoxylon.

7. Chupacallos *(Pleodendron macranthum)*

The Chupacallos is a member of the *Canellaceae* family, which includes aromatic species of evergreens often used to produce essential oils. The Chupacallos grows up to 10 meters in height and 20 cm in diameter. Its leaves are simple, leathery, and elliptical with a dark glossy green upper surface, pale green underside, and sunken central veins. The leaves grow to about 8-12 cm long and 5 cm wide. The wood is hard and white in color. The Chupacallos has solitary whitish flowers about 2 cm wide. Its black-purple aromatic fruit is about 2 cm in diameter and contains many seeds. The Chupacallos is endemic to Puerto Rico, and there are less than 50 individuals known to be present at seven locations in the wet tropical montane forests in the North and East of Puerto Rico. These locations are within the Caribbean National Forest (aka El Yunque National Forest), and four are within the Rio Abajo Forest. The Chupacallos is found in semi-open areas of the subtropical rainforest in the limestone slopes at elevations of 150-350 meters. Potential suitable habitat for this species may exist along the Arecibo/Utuado section of the Via Verde Project route.[138]

8. Bariaco (*Trichilia triacantha*)[139]

The Bariaco is a small evergreen tree endemic to Puerto Rico, and it is a member of the Mahogany family. The Bariaco is easily recognized by its three to seven small wedge-shaped palmate leaves, each with three sharp, spiny tooth lobes. The Bariaco can reach about 9 meters tall with a trunk diameter of about 8 cm. Floral clusters are short and located on the ends of the twigs. The flowers are white and about 3-4 mm in size. The fruits are in the form of capsules with a red outgrowth. The Bariaco produces flowers between January and March, and its fruits ripen in the summer months. The Bariaco tree is currently known in Guánica, Yauco, and Guaniquilla in the Cabo Rojo area. It is estimated there are approximately seventy individuals. The map for species occurrence also includes the tree in Peñuelas, Sabana Grande, and Guánica. The species is found in the deciduous forests and semi-evergreen forests on soils comprised of limestone in dry forest habitat, often near intermittent streams. In Guánica, some individuals are located in the State Forest. Attempts to propagate the Bariaco have not been successful so far. Potential suitable habitat may exist within subtropical dry forest habitat in the Peñuelas section of the Via Verde Project route.[140]

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[138] See generally Final Biological Assessment, supra note 36, at 54–56; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2GH; http://en.wikipedia.org/wiki/Pleodendron_macranthum.

[139] Picture Copyright Pedro Acevedo-Rodriguez

[140] See generally Final Biological Assessment, supra note 36, at 68–69; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2KU; http://en.wikipedia.org/wiki/Trichilia_triacantha.

9. St. Thomas Prickly Ash (*Zanthoxylum thomasianum*)[141]

The St.Thomas Prickly Ash is a small evergreen tree. It is a member of the genus *Zanthoxylum*, which includes several species used to make Sichuan pepper, many species used as bonsai trees, and historically the bark of some species within this genus were widely used for toothache, colic, and rheumatism. The St. Thomas Prickly Ash grows up to 6 meters in height. Its natural habitats are tropical and subtropical dry broadleaf forests and shrublands. A total population was estimated to be around 300–350 mature individuals in 1985. Potential suitable habitat for this species may exist on the limestone hills of southern and northern sections of the Project route.[142]

10. Nogal or West Indian Walnut Tree (*Juglans jamaicensis*)[143]

The Nogal Walnut Tree is a large distinctive tree with fissured bark that can reach heights of up to 25 meters. Twigs, buds, and leaf axes have minute rusty hairs. The leaves consist of from 16 to 20 mostly paired, nearly stalkless leaflets. Leaflets are from 2.2 to 3.5 inches long and 0.9 to 1.6 inches wide, thin and hairless, except on the veins beneath. Leaflets are lanceolate, finely toothed, long-pointed and rounded, and unequal at the base. Staminate or male flowers are numerous and in drooping catkins (slim, cylindrical flower clusters), 3.5 to 4.3 inches long, that are born on the twigs of the previous year. The fruit is an edible walnut, which is composed of a blackish husk, a brown rough-ridged hard shell and one large, oily seed. The habitat for the Nogal Walnut Tree is in the subtropical lower montane wet forest life zone. In Puerto Rico, this species was known only from 14 individuals at one locality in the municipality of Adjuntas. The recovery plan includes past specimens in Peñuelas and Yauco, and the map for species occurrence includes this species in Utuado and Guayanilla. The existing known population of the Nogal Walnut Tree is near the Monte Guilarte Commonwealth Forest, located west of the proposed Via Verde Project corridor. Potential suitable habitat for this species may exist where a segment of the route crosses the subtropical lower montane wet forest. Associated forest community species (*Prestoea montana*, among others) were found close to that segment during the Coll Rivera Environmental flora study.[144]

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[141] Picture Taken From Wikipedia: http://en.wikipedia.org/wiki/Zanthoxylum_thomasianum

[142] See generally Final Biological Assessment, supra note 36, at 69–71; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2MX; http://en.wikipedia.org/wiki/Zanthoxylum_thomasianum.

[143] Picture Taken From USDA: http://plants.usda.gov/java/profile?symbol=JUJA

[144] See generally Final Biological Assessment, supra note 36, at 48–49; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q34N; http://en.wikipedia.org/wiki/Juglans_jamaicensis.

11. Cana Gorda Girdlepod (*Mitracarpus polycladus*)[145]

The Cana Gorda Girdlepod is a flowering perennial herb and a member of the Coffee family, which includes gardenia, cinchona (whose bark contains quinine), sweet woodruff, partridgeberry, gambier, ixora, and noni. It is native to a sub-tropical dry forest in southwestern Puerto Rico and can also be found on the Island of Saba. The Cana Gorda Girdlepod has many erect or spreading branches growing up to about 45 cm tall. The linear or lance-shaped leaves grow up to about 5 cm long. The inflorescence is a rounded head of tiny white flowers. The seed capsule is 1.5 mm in diameter, splitting open transversely to produce black seeds. The Cana Gorda Girdlepod grows in coastal scrub forest and dwarf forest with limestone gravel substrates.[146]

12. Maxwell's Girdlepod (*Mitracarpus maxweliiae*)[147]

The Maxwell's Girdlepod is another member of the Coffee family. It is a low, densely-branching, mound-like shrub which may reach approximately 20 cm in height. The somewhat woody branches are striated and sharply angled. The leaves are opposite, sessile, linear or linear-lanceolate, densely scabrous, and from 1 to 3 cm long and 2 to 5 mm wide. The flower corolla is white, narrowly funnelform, minutely glandular-papillose, and 5 to 6 mm long. The capsule is about 1.5 mm, opening by a transverse circular split at about the middle, and produces elliptical brownish-black seeds. The Maxwell's Girdlepod is known to exist in the Guánica Commonwealth Forest in Guayanilla, and it is found along an unpaved road, growing on dry exposed gravel. Approximately 1,443 individuals, including mature flowering plants and seedlings, were counted within an area of about 7,500 square meters.[148]

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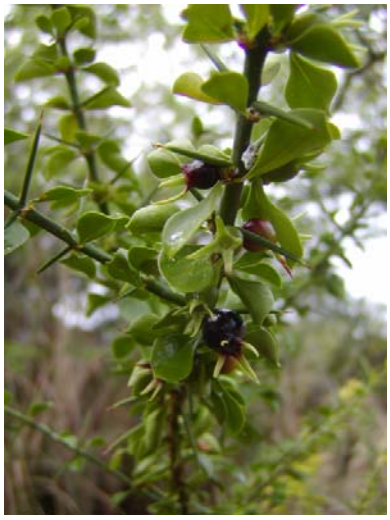
[145] Picture Taken From FWS: http://www.fws.gov/caribbean/es/Endangered-Plants html

[146] See generally Final Biological Assessment, supra note 36, at 51; http://www fws.gov/ecos/ajax/docs/federal_register/fr2685.pdf; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q34N; http://en.wikipedia.org/wiki/Mitracarpus_polycladus.

[147] Picture Taken From FWS: http://www.fws.gov/caribbean/es/Endangered-Plants html

[148] See generally Final Biological Assessment, supra note 36, at 50; http://www fws.gov/ecos/ajax/docs/federal_register/fr2685.pdf.

13. Tropical Lilythorn (*Catesbaea melanocarpa*)[149]



The Tropical Lilythorn is a third flowering shrub within the Coffee family that may reach approximately 3 m in height. Its spreading branches are lined with spines up to 2 cm long. Between the spines are clusters of green leaves with blades up to 2.5 cm long by 1.5 wide. The flower is white, funnel-shaped, and about 1 cm long. The fruit of the Tropical Lilythorn is round and black in color and about 0.25 inches in diameter. Its flowers are solitary or grow in pairs from the leaf axils. The Tropical Lilythorn occurs in subtropical dry forests. This species was previously known from only one individual location in Cabo Rojo. Its present distribution includes Sabana Grande, Yauco, Guanica, Guayanilla, Peñuelas, and Ponce. Potential suitable habitat for this species may exist within the Peñuelas section of the Via Verde Project route.[150]

14. Elfin Tree Fern (*Cyathea dryopteroides*)[151]

The Elfin Tree Fern is a tree fern of the order *Cyatheales*. The genus name *Cyathea* is derived from the Greek kyatheion, meaning "little cup," and refers to the cup-shaped sori (clusters of structures producing spores) on the underside of the fronds. The Elfin Tree Fern grows about 2 feet tall, with a trunk about an inch in diameter and fronds about 3 feet long. This species is endemic to Puerto Rico and grows at elevations over 2,700 feet. The species was discovered in Peñuelas in 1915. Later, it was discovered in Monte Jayuya, Cerro Rosa in Ciales, and Monte Guilarte. This fern grows in the type of forest known as Delfin Forest, in the peaks of the highest mountains of the Cordillera Central Mountain Range in Puerto Rico. In this type of forest, trees are short in height, grow slowly, and have twisted branches and thick leaves. Many of these characteristics are related to environmental factors, such as wind exposure, precipitation and soil characteristics, among others. Some areas in this type of forest are made up almost exclusively of Sierra Palm, *Prestoea montana*. The Elfin Tree Fern grows in regions of Sierra Palms in the lower part of the forest, in the understory, which is less exposed to sun and wind. The map of species occurrence also includes this species in Adjuntas, Orocovis,

[149] Picture Taken From FWS: http://www.fws.gov/southeast/news/2007/images/CatesbaeaMelanocarpa.jpg
[150] See generally Final Biological Assessment, supra note 36, at 34–35; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q30M; http://en.wikipedia.org/wiki/Catesbaea_melanocarpa.
[151] Picture Taken From: http://www.enciclopediapr.org/ing/article.cfm?ref=08031802

Ponce, and Juana Diaz. Potential suitable habitat may exist in the Peñuelas and Adjuntas sections of the Via Verde Project route.[152]

15. Monte Guilarte Hollyfern (*Polystichum calderonense*)

The Monte Guilarte Hollyfern is a member of the *Polystichum* genus, which includes terrestrial or rock-dwelling ferns of warm-temperate and montane-tropical regions and reach 1-2 m in height. Ferns of this genus have stout, slowly-creeping rootstocks that form a crown, with a vase-like ring of evergreen fronds 30-200 cm long. The sori (clusters of structures producing spores) are round, and the stipes have prominent scales. The Monte Guilarte Hollyfern is known from two localities. Forty-five individual plants are known from the summit of La Silla de Calderón in the Monte Guilarte Commonwealth Forest. Additionally, 12 individuals have been found in Cerrote Peñuelas in the municipality of Peñuelas. The Monte Guilarte Hollyfern was identified by FWS in its Technical Assistance Letter (June 30, 2010) as having the potential to occur in the Central Mountain Range (volcanic) of the Project corridor route. Potential suitable habitat for this species may exist on the volcanic hills of the north Peñuelas and Adjuntas sections of the Project route and other mountainous segments of the pipeline corridor.[153]

16. Puerto Rico Halberd Fern (*Tectaria estremerana*)[154]

The Puerto Rico Halberd Fern is a fern endemic to Puerto Rico with woody rhizomes averaging 10 -15 mm in length. This fern has several loosely clustered fronds up to 80 cm long, each with a hairy, orange brown stipe, and the leaf is divided into a few elongated leaflets. The Halberd Fern is found in the karstic northwest region of Puerto Rico. In particular, this species has been found in two locations. The first is wet, shaded regions in or around limestone in wooded rocky slopes at elevations of 250-300 meters in the municipality of Arecibo. This location is inside the property of the Arecibo Radio Telescope and had 23 individual plants when the registration was made. The second location is in the down river area in the municipality of Florida, where it was observed in 1994. Potential suitable habitat for this species may exist on the limestone hills of the northern section of the Via Verde Project route.[155]

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[152] See generally Final Biological Assessment, supra note 36, at 42–43; http://www fws.gov/ecos/ajax/speciesProfile/profile/speciesProfile.action?spcode=S01J; http://en.wikipedia.org/wiki/Cyathea_%C3%97_dryopteroides.

[153] See generally Final Biological Assessment, supra note 36, at 56–57; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=S01V.

[154] Picture Taken From Wikipedia: http://en.wikipedia.org/wiki/Tectaria_estremerana

[155] See generally Final Biological Assessment, supra note 36, at 62–63; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=S01W; http://en.wikipedia.org/wiki/Tectaria_estremerana.

17. Cordillera Maiden Fern (*Thelypteris inabonensis*)

The Cordillera Maiden Fern is a fern endemic to Puerto Rico. It has fronds up to 60 cm long divided into 25 or 30 pairs of lightly hairy segments. The sori are arranged around the veins on the undersides. The blades are narrowly elliptical, up to 55 cm long. The Cordillera Maiden Fern is currently known to be present in two localities, one protected population in the municipality of Ponce and the other in the municipality of Quberadillas. The Ponce population is made up of 34 individuals, whereas that in Quebradillas is composed of 12 individuals. This fern favors high elevations (3,680-4,100 feet) in wet montane forests. The fern may also be found on high limerock outcrops in the understory of sub-tropical moist forests. Potential suitable habitat for this species may exist on the Utuado/Adjuntas section and other mountainous segments of the Via Verde Project route.[156]

18. Barrio Charcas Maiden Fern (*Thelypteris verecunda*)

The Barrio Charcas Maiden Fern is a terrestrial fern endemic to Puerto Rico with 2-3 mm thick climbing rhizomes. This fern has two types of fronds, sterile leaves just a few cm long and narrower fertile fronds up to 15 cm long. The blades are covered in hairs, and the sori have tufts of white hair. The Barrio Charcas Maiden Fern is found in wet, shaded limestone areas at elevations of approximately 200 m. The species has been found in the Charcas Barrio in the Municipality of Quebradillas. Other locations with known specimens include: Barrio Bayaney, Hatillo, and Barrio Cidral in the Municipality of San Sebastian. In Quebradillas and San Sebastian, one individual has been collected from each location. At Barrio Bayaney, around 20 plants are known. Potential suitable habitat for this species may exist on the limestone hills of the Arecibo section of the Via Verde Project route.[157]

19. Puerto Rico Maiden Fern (*Thelypteris yaucoensis*)[158]

The Puerto Rico Maiden Fern is a terrestrial fern endemic to Puerto Rico. Its fronds reach 52 cm long with the blades divided into 13-15 pairs of segments, which have lustrous light brown, glabrous, 18 to 22 cm long stipes. The Puerto Rico Maiden Fern has an erect, 0.5 mm-thick rhizome, which is bearded at the apex with a tuft of brown scales. The few fronds are 44 to 52 cm long. This fern prefers steep, shady, rocky banks at high elevations of 2780-3940 feet. As of 1993, the species was known to exist at three locations, two in Yauco and one in Ciales. The total number of plants from all populations is estimated to be fewer than 65 individuals. Potential suitable habitat for this

[156] See generally Final Biological Assessment, supra note 36, at 63–65; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=S01Y; http://en.wikipedia.org/wiki/Thelypteris_inabonensis.
[157] See generally Final Biological Assessment, supra note 36, at 65–66; http://www fws.gov/ecos/ajax/speciesProfile/profile/speciesProfile.action?spcode=S01Z; http://en.wikipedia.org/wiki/Thelypteris_verecunda.
[158] Picture Taken From FWS: http://www.fws.gov/caribbean/es/Endangered-Plants html

species may exist on the volcanic hills of north Peñuelas and Utuado sections of the Via Verde Project route.[159]

20. Palo de Nigua (*Cornutia obovata*)[160]

The Palo de Nigua is an evergreen tree that is a member of the Mint family, and it is endemic to forested slopes in Puerto Rico. It grows up to 10-15 m high and 25 cm in trunk diameter. The oppositely arranged leaves are oval in shape and hairy on the undersides, and the tree bears clusters of tubular purple flowers. The fruit is a purple drupe (stone fruit) containing 3 to 4 seeds. Flowering occurs between the months of May and July, the fruits are present in September and October. The species is found in semi-evergreen or evergreen forests with limestone and serpentine substrates at elevations of 150-350 m and higher. The Palo de Nigua is known from three areas: limestone hillsides of the Rio Abajo Forest (five individuals have been identified at five different locations); one individual on a limestone slope near the Arecibo Observatory; and one individual in the Monte Torrecilla of Barranquitas. The map of species occurrence also includes it in Camuy, Hatillo, Florida, Ciales, Utuado, Jayuya, Orocovis, Ponce, Yauco and Sabana Grande as potential habitat areas.[161]

21. Woodbury's Stopper (*Eugenia woodburyana*)[162]

The Woodbury's Stopper is an evergreen tree endemic to Puerto Rico than can reach a height of about 6 meters. It is a member of the *Myrtaceae* family, which also includes myrtle, clove, guava, feijoa, allspice, and eucalyptus.

The Woodbury's Stopper has hairy oval leaves up to 2 cm long by 1.5 wide which are oppositely arranged. It produces clusters of up to 5 white flowers in the leaf axils, and the fruit is a striking eight-winged red berry up to 2 cm long. The Woodbury's Stopper is endemic to subtropical dry forest in the southwest of Puerto Rico. Currently, the Woodbury's Stopper is found in the Guánica State Forest, Cabo Rojo Wildlife Refuge, and Laguna Cartagena Wildlife

[159] See generally Final Biological Assessment, supra note 36, at 66–68; http://www fws.gov/ecos/ajax/speciesProfile/profile/speciesProfile.action?spcode=S020; http://en.wikipedia.org/wiki/Thelypteris_yaucoensis.
[160] Picture Copyright Pedro Acevedo-Rodriguez
[161] See generally Final Biological Assessment, supra note 36, at 40–42; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q27I; http://en.wikipedia.org/wiki/Cornutia_obovata.
[162] Picture Taken From USDA: http://plants.usda.gov/java/profile?symbol=EUWO2

Refuge. The total population consists of approximately about 150 individuals in various locations in the Sierra Bermeja in Cabo Rojo and Lajas municipalities. The most recent map for species occurrence also includes this species as potentially occurring in Sabana Grande, Yauco, and Peñuelas. Potential suitable habitat for this species may exist within the Peñuelas section of the Via Verde Project route.[163]

22. Ausu (*Myrcia paganii*)

The Ausu is another member of the *Myrtaceae* family. It is an evergreen tree that can grow up to 9 meters high with a trunk 13 cm in diameter. The bark is iridescent and flaky with an orange-brown inner bark. Young branches are flat and have numerous soft, brown hairs. The leaves are opposite, simple, leathery, aromatic, and glandular below. The leaf is elliptical-oblong reaching 10-16 cm long and 4-9 cm wide. The Ausu is found in semi-evergreen and evergreen forests in limestone slopes at elevations of 150-350 m. All known locations are in the limestone hills of northwest of Puerto Rico. Eight individuals were reported in three locations in the area south of Arecibo Biáfra-Vietnam and Quebradillas. Potential suitable habitat for the Ausu may exist on the limestone hills of the northern section of the Via Verde Project route.[164]

23. Heller's Cieneguillo (*Daphnopsis helleriana*)[165]

The Heller's Cieneguillo is a small tree or shrub endemic to Puerto Rico. It is a member of the *Daphne* genus, which is known for noted for scented flowers and poisonous berries. The Heller's Cieneguillo grows to 6 m in height and five cm in diameter. The leaves have oval blades up to 13 cm long by 6 cm wide. New leaves are golden in color, and the leaves and branches have golden hairs when the plant is young. Mature leaves are green and hairless on the upper surface, drying to reddish brown. While both flowers are small, male flowers are tubular with fine hairs outside and female flowers are bell-shaped and also have hairs inside and outside. Flowering occurs in February through April. The fruit is an elliptical white berry under 2 cm in length and containing one seed. Groups of flowers are found between February and April. The fruit is an elliptical, white berry less than 2 cm long. The Heller's Cieneguillo is found in semi-evergreen or evergreen forests of the subtropical rainforest on limestone slopes at elevations from 150 to 350 meters on the northwest coast of the island. Four

[163] See generally Final Biological Assessment, supra note 36, at 45–46;
http://www fws.gov/ecos/ajax/docs/federal_register/fr2685.pdf;
http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q3D7;
http://en.wikipedia.org/wiki/Eugenia_woodburyana.
[164] See generally Final Biological Assessment, supra note 36, at 52–53;
http://ecos fws.gov/docs/recovery_plan/970929b.pdf;
http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2Q6.
[165] Picture Taken From FWS: http://www.fws.gov/caribbean/es/Endangered-Plants html

populations are known to exist in the areas of Isabela / Quebradilla; Lajas River, Dorado; and the limestone hills in Nevárez; and the grounds of the National Health Institute near Sabana Seca, Toa Baja. As of 1992, approximately 125 individuals were known to exist. Potential suitable habitat for this species may exist on the limestone hills of the northern section of the Via Verde Project route.[166]

24. Jamaican Broom (*Chamaecrista glandulosa* var. *mirabilis*)[167]

Despite its name, the Jamaican Broom is a small shrub endemic to the white silica sands of the northern coast of Puerto Rico at elevations near sea level. It is a member of the Legume family, which includes many edible agricultural plants, such as soybeans, beans, peas, chickpeas, alfalfa, peanut, carob, and licorice. The Jamaican Broom may reach up to 1 meter in height with slender, straight, wire-like branches. Its leaves are alternate, evenly one-pinnate, 1 to 3 cm long, 0.5 to 1 cm wide, with some scattered whitish hairs. The leaflets are usually in 18 pairs, 3 to 6 mm long and 0.5 to 1.5 mm wide. The flowers of the Jamaican Broom are yellow and solitary, with one petal much larger than the others, and its fruits are glabrous, linear, 2.5 to 4 cm long, 3 to 4 mm wide, flat, elastically dehiscent, and 12 to 15 seeded. The Jamaican Broom is scattered along the southern shore of the Tortuguero Lagoon and is also found at one location in Dorado and one in Vega Alta. These populations have been estimated at 100 individual plants. The Dorado population is located just to the east of the Dorado airport, where 20 to 50 individual plants have been observed. Its distribution also includes Manati and Vieques. It is possible that other small populations may remain. Potential suitable habitat for this species may exist in the silica sands area of the northern section of the Via Verde Project route.[168]

25. Serpentine Manjack (*Cordia bellonis*)

The Serpentine Manjack is a shrub endemic to Puerto Rico, and it is a member of the Forget-Me-Not family. It is 1 to 2 meters in height, with light branches and slender twigs with short hairs. The plants are dense and shrubby, with shade branches that become divergent at obtuse angles. These branches ensnare the plant to adjacent trees. The flowers are white with four subcylindrical lobes. Fruit, appearing from October to January, is a dotted, drupe (stone fruit) 5

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[166] See generally Final Biological Assessment, supra note 36, at 43–45; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q28N; http://en.wikipedia.org/wiki/Daphnopsis_hellerana.

[167] Picture Copyright Pedro Acevedo-Rodriguez

[168] See generally Final Biological Assessment, supra note 36, at 36–37; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q26W; http://www fws.gov/caribbean/es/PDF/Recovery%20Plans/Chamaecrista%20glansulosa%20var%20mirabilis.pdf; http://en.wikipedia.org/wiki/Chamaecrista_glandulosa.

mm long. The Serpentine Manjack has been found in serpentine and limestone soils at road edges, river margins, sunny banks, on steep slopes, or in open saddles between limestone hills. Historically, the Serpentine Manjack was found in the western part of the Cordillera Central of Puerto Rico in open areas exposed to the sun. Today, the Serpentine Manjack is known to exist in the Maricao Forest, Susúa Forest, and Rio Abajo Forest. In the Susúa and Maricao areas, it is found along roadsides, on the banks of rivers, and on steep slopes at elevations between 230-250 m in Susúa and between 441-820 m in Maricao. In the Rio Abajo Forest area, the species is found in open areas in the understory, growing in the forest litter, and also among the open, sunny exposed portions of the limestone hills. Potential suitable habitat for this species may exist on the limestone hills of the northern section of the Via Verde Project route.[169]

26. Palma de Manaca (*Calyptronoma rivalis*)[170]

The Palma de Manaca is a palm tree that reaches approximately 8-10 m tall. Its trunk is soft and can grow up to 13-25 cm in diameter. The species has pen-shaped leaves that can reach up to 3-4 meters long. Its large flowers are stacked, branched, and downward. The flowers are arranged into triads of two males and one female. Its fruits are imperfect and reddish, born in the summer, rounded when ripe , and less than 6 mm wide. It grows in waterlogged areas near the banks of streams. Three natural populations are located in the semi-evergreen limestone forests of northwestern Puerto Rico at elevations between 100 to 150 meters. In the southern portion of the Camuy River, some individuals are located at the bottom of deep canyons. The Palma de Manaca was previously known to exist only in three wild populations in Puerto Rico: (1) adjacent to the Quebrada Collazo, a small Creek near San Sebastián; (2) near the Camuy River, and; (3) near the Rio Guajataca. The combined total population identified at these three locations is about 265 individuals. The distribution for the Palma de Manaca has been revised to include Arecibo and Utuado. Potential suitable habitat may exist in the Arecibo/Utuado section of Via Verde Project route.[171]

27. Cobana Negra (*Stahlia monosperma*)[172]

The Cobana Negra is an evergreen tree endemic to Puerto Rico and Hispaniola which can grow up to 50 feet in height. It is another member of the Legume family. The Cobana Negra produces

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[169] See generally Final Biological Assessment, supra note 36, at 37–39; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q27F; http://www.answers.com/topic/cordia-bellonis.

[170] Picture Taken From http://www.centerforplantconservation.org/Collection/CPC_ViewProfile.asp?CPCNum=701

[171] See generally Final Biological Assessment, supra note 36, at 33; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q26M; http://en.wikipedia.org/wiki/Calyptronoma_rivalis.

[172] Picture Taken From FWS: http://www.fws.gov/caribbean/es/Endangered-Plants html

an abundance of clustered-yellow flowers that give way to fleshy red fruits which smell like ripe apples. Possible native seed dispersers include fruit-eating bats and land crabs that may take fruit into their burrows. The Cobana Negra grows in brackish, seasonally flooded wetlands in association with mangrove communities, and it can be found in seasonally flooded wetlands in association with mangrove communities.

It is usually found close to black mangrove and drier, elevated microclimates that are absent of mangrove species. Scattered populations can be found in Puerto Rico, Vieques, and the eastern portion of the Dominican Republic. The largest known population is from southwestern Puerto Rico. Potential suitable habitat for this species may exist on northern and southern wetland areas along the Via Verde Project route.[173]

28. Arana (*Schoepfia arenaria*)[174]

The Arana is a smaller evergreen tree or shrub within the Legume family, growing to 6 meters high. The Arana is endemic to Puerto Rico. It often has several trunks arising from the base, each reaching 10 cm in diameter. Its leaves are simple, alternate, and green on the upper surface and slightly green on the underside. The bark is grey, or thick, deeply furrowed, dead external crust color chocolate inside. The inner bark is dark pink. It has two or three tubular flowers at the base of the leaf. The Arana mainly flowers in spring and autumn, usually with two or three slightly yellow flowers and tubular at the end of the stems. The fruit, which appears during the summer and winter, is elliptical, one-seeded, shiny red and 12 m in diameter. The Arana is found in the evergreen or semi-evergreen forests of Puerto Rico. It is found at lower elevations in densely wooded portions of the limestone hills in northern Puerto Rico, typically occurring at elevations of 150 to 350 meters. The Arana is known to exist in four locations: Isabela, pine nuts [*sic*?], Fajardo, and the Rio Abajo Forest. The map for species occurrence also includes it in Quebradillas, San Juan, Loiza and Vega Baja. In the Isabela area, about 100 individuals of all sizes are known, from woody upper slopes of the mountains to the West of the mouth of the River Guajataca. Potential suitable habitat for this species may exist on the limestone hills of the northern section of the Via Verde Project route.[175]

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[173] See generally Final Biological Assessment, supra note 36, at 60–62; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2JA; http://en.wikipedia.org/wiki/Stahlia.

[174] Picture Taken From Wikipedia: http://en.wikipedia.org/wiki/Schoepfia_arenaria

[175] See generally Final Biological Assessment, supra note 36, at 57–59; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2W3; http://en.wikipedia.org/wiki/Schoepfia_arenaria.

29. Puerto Rico Manjack (*Cordia rupicola*)[176]

The one "candidate" plant species that may occur within or near the project area is the Puerto Rico Manjack, another member of the Forget-Me-Not family. It is a large shrub reaching up to 5 meters in height. Its leaves are oval to elliptical in shape, 2-9 cm long. Flowers are in solitary globular heads of 20, and about 1 cm in diameter. The flower corolla is white, 7 mm long, and the fruit is a one-seeded red drupe (stone fruit) about 4-5 mm long. Two reports of a single specimen exist from the island of Vieques, but no population has been confirmed. In 1995, fifteen plants were found east of the historical locations at El Peñón in Peñuelas. El Peñón is a subtropical dry forest site located in a limestone substrate. Two Anegada sites, each with a few dozen individuals, have also been confirmed. Both sites are located in the western part of the island and cover an area of less than 1,200 acres. In Anegada, the species is locally abundant in limestone and sand dunes, showing a slight preference for limestone. Potential suitable habitat for this species may exist within the Peñuelas section of the Via Verde Project route.[177]

II. SPECIES CONSIDERED IN FWS BIOLOGICAL OPINION

A. PUERTO RICAN BOA (*EPICRATES INORNATUS*)[178]

The Puerto Rican Boa is the largest native snake species within Puerto Rico and endemic to the island.[179] It may grow to a length of approximately 6 to 7 ft, although there are claims of larger snakes.[180] Boa color varies from tan to very dark brown, with some having cross bars or spots along its body.[181] Puerto Rican Boas have been known to live nearly 24 years.[182] The Puerto Rican Boa is not poisonous and kills its prey by asphyxiation.[183] It preys on rats, mice, bats, lizards, domestic fowl chicks, ground doves, and various invertebrates.[184]

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[176] Picture Taken From FWS: http://www.fws.gov/caribbean/es/Endangered-Plants html
[177] See generally Final Biological Assessment, supra note 36, at 39–40; http://ecos fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q0GP; http://en.wikipedia.org/wiki/Cordia_rupicola.
[178] Picture Taken From FWS: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=C00P
[179] U.S. Fish & Wildlife Serv., RE: Biological Opinion Via Verde Project, Puerto Rico SAJ 2010-02881 (IP-EWG) (Aug. 23, 2011), available at http://www fws.gov/Caribbean/PDF/BiologicalOpinion_ViaVerde.pdf [hereinafter Via Verde Biological Opinion].
[180] Id. at 24.
[181] Id. at 24.
[182] Id. at 27.
[183] Id. at 24.
[184] Id. at 24–25.

The Boa reproduces every two years.[185] Courtship and mating is seasonal,[186] and most mating occurs at the beginning of the wet season (late April through May) and most births occur during the later part of the wet season (August through October).[187] The female Boa does not lay eggs, but retains her eggs inside her body until they are ready to hatch alive.[188] The snake gives birth to about 12 to 32 babies at once. Boas are extremely inert, spending, on average, over 40 days at the same location.[189] Boas typically spend an average of over ten consecutive days without significant movement.[190] Boas move significantly more often at night than during daylight hours.[191]

The Puerto Rican Boa was abundant during the early years of colonization.[192] However, Boa populations declined during a period of intense deforestation in the late 1800s.[193] The Federal government added the Puerto Rican Boa to the Endangered Species list in 1970,[194] but has yet to designate any critical habitat.[195] However, due to the widespread nature of potential boa habitat, FWS has produced eight Biological Opinions addressing the impact of proposed projects on the Puerto Rican Boa over the past fifteen years.[196]

FWS believes that 46.3% of the island is suitable habitat for the boa (9% of which occurs in protected areas).[197] However, the Boa is most abundant in the northern, karst region[198]—especially amongst the limestone caves where it utilizes cave features to hunt for prey.[199] The total population of the Puerto Rican Boa throughout the island remains unknown.[200] Various studies have attempted to quantify Boa population, yet all were either regionally focused or lacked sufficient data.[201] Some experts suggest that the Boa's apparent rarity stems from the

[185] Via Verde Biological Opinion, supra note 179, at 27.
[186] Id. at 27.
[187] Id. at 27.
[188] Id. at 27.
[189] Id. at 28.
[190] Id. at 28.
[191] Id. at 28.
[192] Id. at 34.
[193] Id. at 34.
[194] Id. at 34.
[195] Id. at 25.
[196] Id. at 39.
[197] Id. at 39 (citing the Puerto Rico GAP predicted habitat model).
[198] Id. at 24–25, 31, 34; Final Biological Assessment, supra note 36, at Appendix (while the Boa can be found in many areas, "it is most often found in the northern limestone karst belt from western Carolina to Aguadilla").
[199] Via Verde Biological Opinion, supra note 179, at 25. Most boa sightings happen amongst the limestone caves of the karst, which represent a highly productive habitat for the boa. Id. Two independent studies of the same cave document an abundance of boas (over 20 different snakes sighted in a single night). Id. at 31.
[200] Id. at 31.
[201] Id. at 31.

difficulty in detecting the species.[202] For example, one research team failed 85% of the time to visually detect even telemetry-tracked Boas.[203] In its Via Verde Biological Opinion, the FWS describes the Puerto Rican Boa as a "cryptic and secretive species."[204]

The Puerto Rican Boa faces many threats, including: direct human impacts such as medicinal oil extraction and intentional killings for prejudice against snakes; habitat destruction; and predation by mongoose and house cats.[205] Recently, the loss, destruction, and fragmentation of Boa habitat have become issues of increasing concern, [206] particularly in the karst region. Karst destruction is marked by transformation of the karst landscape by removing "mogotes" (haystacks), filling sinkholes and caves and wetlands, and generally paving over karst to facilitate intense land use.[207]

B. PUERTO RICAN SHARP-SHINNED HAWK (*ACCIPITER STRIATUS VENATOR*)[208]

The Puerto Rican Sharp-Shinned Hawk was first discovered in 1912 in the Maricao and described as a distinct subspecies *Accipiter striatus venator*.[209] It is locally known as "Falcon de Sierra" and is a small hawk with dark slate-gray upperparts and heavily barred rufous underparts.[210] Its known habitat is the northern karst and six forests in Puerto Rico: Maricao Commonwealth Forest, Toro Negro Commonwealth Forest, Guilarte Commonwealth Forest, Carite Commonwealth Forest, Rio Abajo Forest, and El Yunque National Forest.[211] It prays on small birds the size of tanagers or smaller.[212] The Puerto Rican Sharp-Shinned Hawk was listed as an endangered species on September 9, 1994.[213] No critical habitat has yet been designated for this species.[214]

The species was thought to be absent from the karst and secondary growth forest until biologists detected the species in the north karst area.[215] The Sharp-Shinned Hawk shows a clumped distribution within their range, most evident in Maricao

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[202] Via Verde Biological Opinion, supra note 179, at 31.
[203] Id. at 32.
[204] Id. at 31.
[205] Id. at 34.
[206] Id. at 34.
[207] Id, at 34.
[208] Picture Taken From FWS: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B06Z
[209] U.S. Fish & Wildlife Serv., Recovery Plan for the Puerto Rican Broad-Winged Hawk and Puerto Rican Sharp-Shinned Hawk, at 2 (1997) [hereinafter Puerto Rican Hawk Recovery Plan], available at http://www fws.gov/caribbean/PDF/Recovery_Plans/Buteo_platypterus_and_Accipiter_striatus.pdf.
[210] Via Verde Biological Opinion, supra note 179, at 27.
[211] Id. at 27.
[212] Id. at 34.
[213] Id. at 27.
[214] Id. at 27.

and Carite Commonwealth forests, and less so in Toro Negro Commonwealth Forest.[216] Yet, the distribution pattern of this species has not been determined in El Yunque National Forest and Rio Abajo Commonwealth Forest.[217]

Sharp-Shinned Hawks show high site fidelity within subtropical wet forest and subtropical lower montane wet forest life zone.[218] It appears that Sharp-Shinned Hawks select certain habitat — high stem density, closed-canopy, and tall-large diameter trees are important habitat features for sharp-shinned Hawks — over others.[219] These habitats appear to provide adequate requisites for nesting and foraging, while the absence of Puerto Rican Sharp-Shinned Hawks from other montane habitats may indicate that some important requirement is missing.[220]

Puerto Rican Sharp-Shinned Hawk mortality is attributed to warble fly parasitism, particularly in some forests.[221] The parasitic larvae of the botfly *(Philornis pici* and *P. obscura)* can debilitate and cause permanent damage to tissues and organs; very few Puerto Rican Sharp-Shinned Hawk nestlings survive once they are parasitized.[222]

The Sharp-Shinned Hawk's population is estimated at around 150 individuals island-wide, much lower than earlier estimates.[223] In 1992, Delannoy conducted a census of the Sharp-Shinned Hawk's primary habitats: Maricao, Toro Negro, Carite, and Caribbean National Forest.[224] He estimated there were 129 individuals within these forests.[225] The species' home range size is approximately 369.4 acres.[226] Sharp-Shinned Hawk density and population estimates decrease consistently from the west (Maricao Commonwealth Forest) to the east (El Yunque National Forest).[227]

The destruction and modification of forested habitats in Puerto Rico may be among the most significant factors affecting the numbers and distribution of the Puerto Rican Sharp-Shinned Hawk. Moreover, such destruction and modifications are among the most important threats to the species.[228] The patchy distribution of the Puerto Rican Sharp-Shinned Hawk may have resulted from the fragmentation of forested habitats.[229] Poor forest mismanagement at the beginning of the 20th century resulted in intensive agricultural practices. During the latter part of the 20th century, land no longer used in cultivation reverted to secondary forests which fragmented previously connected old mature forests.[230] For a species already limited in its

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[215] Via Verde Biological Opinion, supra note 179, at 30.
[216] Id. at 30.
[217] Id. at 30.
[218] Final Biological Assessment, supra note 36, at 92.
[219] Id.
[220] Via Verde Biological Opinion, supra note 179, at 30–31.
[221] Id. at 31.
[222] Id. at 31.
[223] Id. at 34.
[224] Puerto Rican Hawk Recovery Plan, supra note 209, at 4.
[225] Id.
[226] Via Verde Biological Opinion, supra note 179, at 34.
[227] Id. at 34.
[228] Id. at 37.
[229] Id. at 37.
[230] Id. at 37.

abundance and distribution, these activities can reduce effective population size resulting in detriment to the species.[231]

Raptors are particularly sensitive to disturbance near their nesting territories.[232] In the Maricao Commonwealth Forest, hawk experts Cruz and Delannoy found that the third most important factor in nest failure, related to direct human harassment.[233] Additionally, 61 percent of Sharp-Shinned Hawk nestling deaths are attributed to parasitism by the warble fly *Philornis* sp. in the Maricao Commonwealth Forest.[234]

C. PUERTO RICAN BROAD-WINGED HAWK (*BUTEO PLATYPTERUS BRUNNESCENS*)[235]

The Puerto Rican Broad-Winged Hawk was first reported by Gundlach as common to the interior of the island in 1878.[236] By 1927, the species was believed extinct.[237] Eight years later a specimen was collected from Luquillo and described as a distinct resident subspecies, *Buteo platypterus brunnescens*.[238] The Broad-Winged Hawk is locally known as "Guaraguao de Bosque" and is a small hawk with dark chocolate-brown upperparts, heavily streaked rufous breast, and a broadly banded black and white tail.[239] In the Rio Abajo Forest, Broad-Winged Hawk feeds primarily on rats, lizards, and small birds.[240] This species occurs in Elfin Woodland, Sierra Palm, Caimitillo-granadillo, and tabonuco forest types of the Rio Abajo Commonwealth Forest, Carite Forest, and El Yunque National Forest as well as within hardwood plantations, shade coffee plantations, and mature secondary forests.[241] According to a 2010 U.S. Fish and Wildlife report, the Puerto Rican Broad-Winged Hawk population is estimated at about 125 individuals island-wide.[242] The Puerto Rican Broad-Winged hawk was listed as an endangered species on September 9, 1994.[243] No critical habitat has been designated for this species.[244]

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[231] Via Verde Biological Opinion, supra note 179, at 37.
[232] Id. at 37.
[233] Id. at 37.
[234] Id. at 37–38.
[235] Picture Taken From FWS: http://www.fws.gov/caribbean/es/Endangered-Animals html
[236] Puerto Rican Hawk Recovery Plan, supra note 209, at 2.
[237] Id.
[238] Id.
[239] Via Verde Biological Opinion, supra note 179, at 26.
[240] Id. at 30.
[241] Id. at 26.
[242] Id. at 26.
[243] Id. at 26.
[244] Id. at 26.

The Puerto Rican Broad-Winged Hawk is found in mature forests within the subtropical moist, subtropical wet, and rain forest life zones.[245] It shows a clumped spatial pattern within the forests.[246] At the Rio Abajo Commonwealth Forest, the species inhabits the limestone hillsides, sinkholes, and valleys between haystack hills or "mogotes."[247] Hengstenberg and Vilella found that the vast majority (97%) of Puerto Rican Broad-Winged Hawk movements and home ranges within the Rio Abajo Commonwealth Forest were confined to the boundaries of the forest.[248] Adult birds used private lands less than 1% of the time, whereas juveniles used private lands 6% of the time, suggesting that adults are able to secure the most suitable tracts of continuous, closed canopy forest while juvenile birds used areas on the periphery of the forest.[249] Hengstenberg and Vilella suggested that adult Puerto Rican Broad-Winged Hawks at Rio Abajo Forest maintain relatively exclusive territories; with overlap limited to the outside borders of their respective home ranges.[250]

Red-Tailed Hawks (*Buteo jamaicensis*) have been reported preying on juvenile Puerto Rican Broad-Winged Hawks in the Rio Abajo.[251] Broad-Winged Hawks fiercely antagonize red-tailed hawks intruding into their territories.[252] This suggests that predation and/or competition play an important role in Puerto Rican Broad-Winged Hawk nest-site selection, nest attendance, and juvenile survival.[253] Parasitism by the warble fly is not currently considered a threat to the Puerto Rican Broad-Winged Hawk because it has not been reported in populations of this species.[254]

The Puerto Rican Broad-Winged Hawk population is estimated at about 125 individuals island-wide.[255] In 1980, little was known of the Rio Abajo Forest population but it was estimated that no more than 50 individuals resided in it.[256] Currently, there are approximately 52 individuals in the Rio Abajo.[257] In 1980, there was an estimated 40 to 60 individuals in the Caribbean National Forest.[258] Within 12 years the Caribbean Forest population dropped to an estimated 22 individuals.[259] This is a population drop between 45 and 63 percent. Further, Delannoy conducted a census of Broad-Winged Hawks in their three known habitats (Rio Abajo, Carite, and Caribbean National Forest).[260] He determined there were an estimated 124 individuals island-wide.[261] In the following two decades, the Broad-Winged Hawk population has all but flat lined.

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[245] Via Verde Biological Opinion, supra note 179, at 29.
[246] Id. at 29.
[247] Id. at 30.
[248] Id.
[249] Id.
[250] Id.
[251] Id.
[252] Id.
[253] Id.
[254] Id.
[255] Id. at 26.
[256] Puerto Rican Hawk Recovery Plan, supra note 209, at 3.
[257] Via Verde Biological Opinion, supra note 179, at 32.
[258] Puerto Rican Hawk Recovery Plan, supra note 209, at 3.
[259] Id.
[260] Id.
[261] Id.

It appears the Puerto Rican Broad-Winged Hawk density and populations are highest in the Rio Abajo Forest and lowest in El Yunque Forest.[262] Broad-Winged Hawks have a high pair fidelity; a nest survival rate of 0.67 across breeding seasons; and an average annual productivity of 1.1 young per nest.[263] Their average annual home range is reported to be 262 ac with a breeding home range of 204 ac within the Rio Abajo.[264] Closed canopy forests may be the major characteristic for suitable Broad-Winged Hawk habitat.[265] However, adult and juvenile Broad-Winged Hawks did not use all available suitable habitat.[266] Hengstenberg and Vilella suggested that Puerto Rican broad-winged hawks do not limit their activities to the Rio Abajo Forest, and that their fate in the surrounding private lands may be uncertain.[267] Additionally, they believe that the future patterns of land use around the forest boundary directly and indirectly may affect the ability of the Rio Abajo Forest to function as an effective conservation unit for the Broad-Winged Hawk.[268]

Status surveys conducted in 1991 and 1992 indicate that the Puerto Rican Broad-Winged Hawk experienced recent population declines.[269] The Puerto Rican broad-winged hawk experienced a local population decline of approximately 50 percent in the El Yunque National Forest from 50 individuals in 1984 to 22 individuals in 1992.[270] Destruction and modification of forested habitats in Puerto Rico appear to be the most significant factors affecting the population and distribution of Broad-Winged Hawks and are among the most important threats to the species.[271] Patchy distribution of the species may have resulted from the fragmentation of forested habitats.[272]

Poor forest mismanagement at the beginning of the 20th century resulted in intensive agricultural practices. During the latter part of the 20th century, land no longer used in cultivation reverted to secondary forests which fragmented previously connected old mature forests.[273] Raptors are particularly sensitive to disturbance near their nesting territories.[274] For a species already limited in its abundance and distribution, these activities can reduce effective population size resulting in detriment to the species.[275]

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[262] Via Verde Biological Opinion, supra note 179, at 32.
[263] Id. at 32–33.
[264] Id. at 33.
[265] Id.
[266] Id.
[267] Id.
[268] Id.
[269] Id. at 35.
[270] Id. at 33.
[271] Id. at 35.
[272] Id.
[273] Id.
[274] Id. at 36.
[275] Id. at 35.

III. SPECIES UNDER JURISDICTION OF NMFS

A. SEA TURTLES

Sea turtles known to inhabit Puerto Rico's shorelines and surrounding waters include the Leatherback Sea Turtle, Hawksbill Sea Turtle, Loggerhead Sea Turtle, and Green Sea Turtle.[276] NMFS and FWS share joint jurisdiction under for proposed project effects on these sea turtles.[277] Background information concerning these species is provided in Section I (subsections G, H, I, and J) of this Appendix.

B. STAGHORN CORAL *(ACROPORA CERVICORNIS)*[278]

Staghorn Coral is a branching coral with cylindrical branches that can grow to over 2 meters. Their shape resembles male deer antlers ("stag horn"). The dominant mode of reproduction is fragmentation, with new colonies forming when branches break off a colony and reattach to the substrate. Reproduction also occurs via broadcast spawning of gametes into the water column once each year in August or September. Individual colonies will release millions of "gametes." The coral larvae (*planula*) live in the plankton for several days until finding a suitable area to settle and metamorphose into new colonies.

This coral exhibits the fastest growth of all known western Atlantic corals, with branches increasing in length by 10-20 cm per year. Staghorn Coral has been one of the three most important Caribbean corals in terms of its contribution to reef growth and fish habitat. Tropical corals, like Staghorn Coral, get as much as 90 percent of their energy from the organic byproducts of photosynthesis thanks to a symbiotic relationship with algae. They may also capture and consume live prey, such as small fish and zooplankton, using their tentacles. Some massive coral species reach maturity when their polyps grow to about 10 cm in diameter, which occurs when they are about eight years old. Staghorn Coral, which are faster-growing, likely reach maturity at a younger age.[279]

Staghorn Coral is found in the Atlantic Ocean, Caribbean Sea, and western Gulf of Mexico. Specifically, Staghorn Coral is found throughout the Caribbean Islands, including Puerto Rico,

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[276] See generally Final Biological Assessment, supra note 36, at 113–127.
[277] Memorandum of Understanding Defining the Roles of the U.S. Fish and Wildlife Service and the National Marine Fisheries Service in Joint Administration of the Endangered Species Act of 1973 as to Marine Turtles (July 18, 1977).
[278] Picture Taken From NOAA: http://www.nmfs noaa.gov/pr/species/invertebrates/staghorncoral.htm
[279] http://www nmfs.noaa.gov/pr/species/invertebrates/staghorncoral htm.

as well as the Florida Keys, Bahamas, and Venezuela. Staghorn Coral occur in back- and fore-reef environments from 0 to 30 meters deep. The upper limit is defined by wave forces, and the lower limit is controlled by suspended sediments and light availability. Fore-reef zones at intermediate depths of 5-25 meters were formerly dominated by extensive single species stands of Staghorn Coral until the mid 1980s.[280]

Since 1980, Staghorn Coral populations have collapsed throughout their range from various threats, as detailed below. Populations have declined by up to 98 percent throughout their range, and localized "extirpations" have occurred. This species is particularly susceptible to damage from sedimentation and is sensitive to temperature and salinity variation. Additional threats include hurricanes, predation, bleaching, algae overgrowth, diseases (such as "white band" disease), human impacts, and other factors. Efforts to re-attach coral fragments have been made in Puerto Rico and the U.S. Virgin Islands, but they have had mixed success. Attempts to culture and settle coral larvae have also had very limited success.[281]

In 1998, the U.S. Coral Reef Task Force was established by Presidential Executive Order 13089 to coordinate and strengthen efforts for protecting coral reef ecosystems. The Task Force is co-chaired by the U.S. Departments of Commerce and Interior, and it includes leaders of twelve federal agencies, seven U.S. states and territories, and three freely associated states. In 2002, the Task Force adopted a resolution calling for the development of Local Action Strategies, which are locally-driven plans for collaborative and cooperative action among federal, state, territory, and non-governmental partners to reduce key threats on valuable coral reef resources. Florida, Puerto Rico, and the U.S. Virgin Islands have developed Local Action Strategies. These strategies were implemented over a 3-year period (FY2005-FY2007).[282]

NMFS listed Staghorn Coral as "threatened" under the ESA on May 4, 2006.[283] NMFS also designated critical habitat for Staghorn Coral in Puerto Rico, Florida, St. John/St. Thomas, and St. Croix in November 2008.[284]

C. ELKHORN CORAL *(ACROPORA PALMATA)*[285]

Elkhorn Coral is a large, branching coral with thick and sturdy antler-like branches. Branches can grow to over 2 meters, and their shape resembles elk antlers ("elk horn"). The dominant mode of reproduction is fragmentation, with new colonies forming when branches break off of a colony and reattach to the substrate. Reproduction also occurs via broadcast spawning of gametes into the water column once each year in August or September. Individual colonies will typically release millions of "gametes." The coral larvae (*planula*) live in the plankton for several days until finding a suitable area to settle and metamorphose into new colonies.[286]

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[280] http://www nmfs.noaa.gov/pr/species/invertebrates/staghorncoral htm.
[281] http://www nmfs.noaa.gov/pr/species/invertebrates/staghorncoral htm.
[282] http://www nmfs.noaa.gov/pr/species/invertebrates/staghorncoral htm.
[283] Final Listing Determinations for Elkhorn and Staghorn Coral, 71 Fed. Reg. 26852 (final rule May 4, 2006) (to be codified at 50 C.F.R. pt. 223).
[284] http://www nmfs.noaa.gov/pr/species/invertebrates/staghorncoral htm.
[285] Picture Taken From NOAA: http://www.nmfs noaa.gov/pr/species/invertebrates/elkhorncoral.htm
[286] http://www nmfs.noaa.gov/pr/species/invertebrates/elkhorncoral htm

Colonies of Elkhorn Coral are fast growing, with branches increasing in length by 5-10 cm per year, and with colonies reaching their maximum size in approximately 10-12 years. Over the last 10,000 years, Elkhorn Coral has been one of the three most important Caribbean corals contributing to reef growth and development and providing essential fish habitat. Tropical corals, like Elkhorn Coral, get as much as 90 percent of their energy from the organic byproducts of photosynthesis thanks to a symbiotic relationship with algae. They may also capture and consume live prey, such as small fish and zooplankton, using their tentacles.[287]

Elkhorn Coral is found on reefs throughout the Caribbean, including Puerto Rico, and their range includes southern Florida and the Bahamas and extends south to Venezuela. Elkhorn Coral colonies prefer exposed reef crest and fore-reef environments in depths of less than 6 meters, although isolated corals may occur in depths of up to 20 meters. Elkhorn Coral was formerly the dominant species in shallow water 1-5 meters deep throughout the Caribbean and on the Florida Reef Tract, forming extensive, densely aggregated thickets or stands in areas of heavy surf.[288]

Since 1980, populations of Elkhorn Coral have collapsed throughout their range. Once found in continuous stands that extended along the front side of most coral reefs, the characteristic Elkhorn Coral zone supported a diverse assemblage of other invertebrates and fish. These zones have been largely transformed into rubble fields with a few isolated living colonies. In areas where loss has been quantified, estimates are in the range of 90-95 percent reduction in abundance since 1980. Additional drastic reductions (e.g., 75-90 percent) were recently observed in some areas, such as the Florida Keys, in 1998 due to bleaching and hurricane damage.[289]

Elkhorn Coral is particularly susceptible to damage from sedimentation. Additional threats include elevated temperatures, salinity variation, hurricanes, increased predation, bleaching, algae overgrowth, outbreaks of disease (such as “white band” disease), human impacts, and other factors. Efforts to re-attach coral fragments have been made in Puerto Rico and the U.S. Virgin Islands, but they have had mixed success. Attempts to culture and settle coral larvae have also had very limited success.[290]

[287] http://www nmfs.noaa.gov/pr/species/invertebrates/elkhorncoral htm
[288] http://www nmfs.noaa.gov/pr/species/invertebrates/elkhorncoral htm
[289] http://www nmfs.noaa.gov/pr/species/invertebrates/elkhorncoral htm
[290] http://www nmfs.noaa.gov/pr/species/invertebrates/elkhorncoral htm

In 1998, the U.S. Coral Reef Task Force was established by Presidential Executive Order 13089 to coordinate and strengthen efforts for protecting coral reef ecosystems. The Task Force is co-chaired by the U.S. Departments of Commerce and Interior, and it includes leaders of twelve federal agencies, seven U.S. states and territories, and three freely associated states. In 2002, the Task Force adopted a resolution calling for the development of Local Action Strategies, which are locally-driven plans for collaborative and cooperative action among federal, state, territory, and non-governmental partners to reduce key threats on valuable coral reef resources. Three Local Action Strategies were developed within the range of Elkhorn Coral for Puerto Rico, Florida, and the U.S. Virgin Islands. These strategies were implemented over a 3-year period (FY2005-FY2007).[291]

NMFS listed Elkhorn Coral as "threatened" under the ESA on May 4, 2006.[292] NMFS also designated critical habitat for Elkhorn Coral in Puerto Rico, Florida, St. John/St. Thomas, and St. Croix in November 2008.[293]

[291] http://www nmfs.noaa.gov/pr/species/invertebrates/elkhorncoral htm.
[292] Final Listing Determinations for Elkhorn and Staghorn Coral, 71 Fed. Reg. 26852 (final rule May 4, 2006) (to be codified at 50 C.F.R. pt. 223).
[293] http://www nmfs.noaa.gov/pr/species/invertebrates/elkhorncoral htm.