

privately owned land. Its distribution also includes Manati and Vieques (Map of Species Occurrence, Species Profile, USFWS). Urban, industrial, and agricultural expansion, as well as sand extraction, may have eliminated other known populations. Although few areas of silica sands have not been explored, it is possible that other small populations may remain.

#### 5.1.6.3 *Current Conditions*

***C. glandulosa var. mirabilis* was not observed during the Coll Rivera Environmental field surveys of the project's proposed corridor. Additionally, this species was not observed during the threatened and endangered vegetation survey conducted by Franklin Axelrod, Ph.D.; however, potential suitable habitat may exist in the silica sands area of the northern section of Project route. Silica sands were only found in Arecibo (near the sanitary landfill area) and the species was not found.**

#### 5.1.6.4 *Summary of Impacts*

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected.

#### 5.1.6.5 *Indirect, Interdependent, Interrelated and Cumulative Effects*

Given that potential suitable habitat may exist in some sections of the Project route (as mentioned above), indirect impacts to this species may occur if its habitat is significantly diminished by the construction of the Project. According to available scientific literature, no relation with other flora or faunal species is known, therefore, interdependent or interrelated effects cannot be assessed in the present. Cumulative effects may occur when the construction of the Project and other construction or development projects reduce the amount of available habitat of *C. glandulosa var. mirabilis*.

#### 5.1.6.6 *Conservation Measures and Recommendations*

Conservation measures include:

- The acquisition of land where individuals or populations of *C. glandulosa var. mirabilis* are known to exist, or other areas with suitable habitat for this species;
- Reduction of the construction ROW width from 100 feet to a total of 60 feet on steep slopes and narrow ridges;
- The restoration of habitat between the construction ROW (100 feet) and the permanent ROW (50 feet);
- Conducting specific surveys for this species before construction takes place within suitable *C. glandulosa var. mirabilis* habitat;

- Conducting specific surveys for this species before construction takes place within suitable *C. melanocarpa* habitat;
- Transplanting *C. melanocarpa* individuals (if found) when appropriate.
- Collecting seeds and seedlings if available.
- Reproducing individuals through softwood cutting methodology;
- Establishment of a propagation project for the species.

#### 5.1.5.7 Conclusion

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected. Therefore, the Project may affect, but is not likely to adversely affect *C. melanocarpa* species.

#### 5.1.6 *Chamaecrista glandulosa* var *mirabilis* – (No Common Name)

Federal Status: Endangered

##### 5.1.6.1 General Species Biology

*Chamaecrista glandulosa* var. *mirabilis* is a small shrub endemic to the white silica sands of the northern coast of Puerto Rico at elevations near sea level. *C. glandulosa* var. *mirabilis* is a prostrate, ascending, or erect shrub which may reach up to 1 meter in height. The branches are slender, straight, and wire-like. Leaves are alternate, evenly one-pinnate, 1 to 3 centimeters long, 0.5 to 1 centimeter wide, with some scattered whitish hairs. The stipules are persistent, striate, and about 2 millimeters long. The leaflets are usually in 18 pairs, 3 to 6 millimeters long and 0.5 to 1.5 millimeters wide. The petioles have one to two stipitate glands. The flowers are solitary, with a pedicel about as long as the leaves. The corolla is yellow, about 2 centimeters in diameter, with one petal much larger than the others. Mature fruits (legumes) are glabrous, linear, 2.5 to 4 centimeters long, 3 to 4 millimeters wide, flat, elastically dehiscent, and 12 to 15 seeded (Vivaldi and Woodbury 1980).

##### 5.1.6.2 Distribution and Abundance

This species is scattered along the southern shore of the Tortuguero Lagoon and is also found at one location in Dorado and one in Vega Alta. Although the Tortuguero Lagoon area has been designated by the Puerto Rico Planning Board as a Natural Reserve, the majority remains in private ownership or in public ownership by agencies such as the Puerto Rico Land Administration, not an agency that is responsible for the protection of natural resources. 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 on this

so few individuals of *Catesbaea melanocarpa* are known to occur in limited areas. Additionally, the species is threatened by catastrophic natural events, such as hurricanes, as well as human induced fires. *Catesbaea melanocarpa* was listed as endangered under the Endangered Species Act of 1973 on March 17, 1999. Its present distribution includes: Sabana Grande, Yauco, Guanica, Guayanilla, Peñuelas, and Ponce (Map of Species Occurrence, Species Profile, USFWS).

#### 5.1.5.3 *Current Conditions*

***C. melanocarpa* was not observed during the Coll Rivera Environmental field surveys of the project's proposed corridor. Additionally, this species was not observed during the threatened and endangered vegetation survey conducted by Franklin Axelrod, Ph.D.; however, potential suitable habitat for this species may exist within the Peñuelas section of the Project route.**

#### 5.1.5.4 *Summary of Impacts*

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected.

#### 5.1.5.5 *Indirect, Interdependent, Interrelated and Cumulative Effects*

Given that potential suitable habitat may exist in some sections of the Project route (as mentioned above), indirect impacts to this species may occur if its habitat is significantly diminished by the construction of the Project. According to available scientific literature, no relation with other flora or faunal species is known, therefore, interdependent or interrelated effects cannot be assessed in the present. Cumulative effects may occur when the construction of the Project and other construction or development projects reduce the amount of available habitat of *C. melanocarpa*.

#### 5.1.5.6 *Conservation Measures and Recommendations*

Conservation measures include:

- The acquisition of land where individuals or populations of *C. melanocarpa* are known to exist, or other areas with suitable habitat for this species;
- Reduction of the construction ROW width from 100 feet to a total of 60 feet on steep slopes and narrow ridges;
- The restoration of habitat between the construction ROW (100 feet) and the permanent ROW (50 feet);

of the Project and other construction or development projects reduce the amount of available habitat of *C. rivalis*.

#### 5.1.4.6 Conservation Measures and Recommendations

Conservation measures include:

- The acquisition of land where individuals or populations of *C. rivalis* are known to exist, or other areas with suitable habitat for this species;
- Reduction of the construction ROW width from 100 feet to a total of 60 feet on steep slopes and narrow ridges;
- The restoration of habitat between the construction ROW (100 feet) and the permanent ROW (50 feet);
- Conducting specific surveys for this species before construction takes place within suitable *C. rivalis* habitat;
- Transplanting *C. rivalis* individuals (if found) when appropriate.
- Collecting seeds and seedlings if available.
- Establishment of a propagation project for the species.

#### 5.1.4.7 Conclusion

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected. Therefore, the Project may affect, but is not likely to adversely affect *C. rivalis* species.

#### 5.1.5 *Catesbaea melanocarpa*- (No Common Name)

Federal Status: Endangered

##### 5.1.5.1 General Species Biology

*Catesbaea melanocarpa* is a branching shrub that may reach approximately 9.8 feet in height. Spines are borne at every internode and are from 0.39 to 0.78 inches. Leaves are small (0.19 to 1.0 inches long and 0.07 to 0.58 inches wide), often opposite. The flowers are white, solitary or paired, and almost lacking a stalk in the axils. The petals are united in the form of a funnel and measure from 0.31 to 0.39 inches long. The fruit is black, spherical, and 0.19 to 0.23 inches in diameter. This species resembles *Randia aculeata* (Tintillo).

##### 5.1.5.2 Distribution and Abundance

*Catesbaea melanocarpa* is extremely rare; and was previously known from only one individual location in Cabo Rojo. The one location is on privately-owned land, which is subject to development pressure for residential and tourism projects. The risk of extinction is high because

#### 5.1.4.1 General Species Biology

The Palma de mánaca is a palm tree that reaches approximately 8-10 m (26-33 ft) tall. Its trunk is soft and can grow up to 13-25 centimeters (5-10 inches) in diameter. The species has pen-shaped leaves that can reach up to 3-4 meters (10-13 feet) long. The base of the petiole can be measured approximately 61 cm (two feet) long. Its large flowers are stacked, branched and downward. The flowers are arranged into triads of two males and one female. Fruits, less than 6 mm (0.25 inch) wide, are imperfect and reddish, rounded when ripe and are born in summer.

#### 5.1.4.2 Distribution and Abundance

This species was designated as threatened on February 6, 1990. *Calyptronoma rivalis* was previously known only from three wild populations in Puerto Rico: (1) adjacent to the Quebrada Collazo, a small Creek near San Sebastián; (2) for the Camuy River, and; (3) in the Rio Guajataca (USFWS 1990). The combined total population identified at these three locations is about 265 individuals. Three natural populations are located in the semi-evergreen limestone forests of northwestern Puerto Rico at elevations between 100 to 150 meters (490 to 325 feet). In the southern portion of the Camuy River, some individuals are located at the bottom of deep canyons. Its distribution has been revised to include Arecibo and Utuado (Map of Species Occurrence, Species Profile, USFWS). Deforestation caused by development, flash floods (compounded by the effect of deforestation) and forest fires are the most serious threats to these plants.

#### 5.1.4.3 Current Conditions

**C. rivalis was not observed during the Coll Rivera Environmental field surveys of the project's proposed corridor; however, potential suitable habitat may exist in the Arecibo/Utuado section of Project route.**

#### 5.1.4.4 Summary of Impacts

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected.

#### 5.1.4.5 Indirect, Interdependent, Interrelated and Cumulative Effects

Given that potential suitable habitat may exist in some sections of the Project route (as mentioned above), indirect impacts to this species may occur if its habitat is significantly diminished by the construction of the Project. According to available scientific literature, no relation with other flora or faunal species is known, therefore, interdependent or interrelated effects cannot be assessed in the present. Cumulative effects may occur when the construction

#### 5.1.3.4 Summary of Impacts

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected.

#### 5.1.3.5 Indirect, Interdependent, Interrelated and Cumulative Effects

Given that potential suitable habitat may exist in some sections of the Project route (as mentioned above), indirect impacts to this species may occur if its habitat is significantly diminished by the construction of the Project. According to available scientific literature, no relation with other flora or faunal species is known, therefore, interdependent or interrelated effects cannot be assessed in the present. Cumulative effects may occur when the construction of the Project and other construction or development projects reduce the amount of available habitat of *B. vahlii*.

#### 5.1.3.6 Conservation Measures and Recommendations

Conservation measures include:

- The acquisition of land where individuals or populations of *B. vahlii* are known to exist, or other areas with suitable habitat for this species;
- Reduction of the construction ROW width from 100 feet to a total of 60 feet on steep slopes and narrow ridges;
- The restoration of habitat between the construction ROW (100 feet) and the permanent ROW (50 feet);
- Conducting specific surveys for this species before construction takes place within suitable *B. vahlii* habitat;
- Transplanting *B. vahlii* individuals (if found) when appropriate.
- Collecting seeds and seedlings if available.
- Reproducing individuals through softwood cutting methodology;
- Establishment of a propagation project for the species.

#### 5.1.3.7 Conclusion

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected. Therefore, the Project may affect, but is not likely to adversely affect *B. vahlii* species.

#### 5.1.4 *Calyptronoma rivalis* – (Palma de manaca)

Federal Status: Threatened

#### 5.1.2.7 Conclusion

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected. Therefore, the Project may affect, but is not likely to adversely affect *B. vanderbiltii* species.

#### 5.1.3 *Buxus vahlii* – Diablito de tres cuernos

Federal Status: Endangered

##### 5.1.3.1 General Species Biology

The diablito de tres Cuernos is an evergreen shrub that grows 4.5 meters (15 feet) tall with a trunk up to 13 cm (5 inches) in diameter. Branches have two channels below each pair of leaves. Oblong leaves are simple, opposite, green dark shiny, and grow to 3-4 cm (1.2 - 1.6 inches) long and about two centimeters (0.75 inch) wide. Flowers group is small, about 6-7 mm (0.25 inches) long, and is composed of a single female flower at the end of several male flowers just below it. Fruiting occurs December to early April, producing black, shiny seeds from 3-4 cm (1.2-1.6 inches) long in a capsule type horn.

##### 5.1.3.2 Distribution and Abundance

The species is found in three locations in Puerto Rico: on the nuclear energy property of the Commonwealth of Puerto Rico at Punta Higüero, Rincón; at the plant in Hato Tejas, Bayamón, near of Highway No. 2, 650 meters (2,130 feet) west of the intersection with the road No. 167 (on land owned by Pan American Investment, Inc.) (USFWS 1990); and at Isabela. In 1984, there was an estimate of 16 plants at the Rincón site and 24 plants at Hato Tejas, Bayamón.

##### 5.1.3.3 Current Conditions

The Diablito de tres cuernos was listed as a Federal Endangered species on August 13, 1985. Potential threats to the Diablito de tres cuernos include the destruction or modification of its habitat, the pollution of air and water, and development. The vulnerability generally increases due to the small size of the population, easy access, low rate of reproduction, and likely loss of genetic variation in species from both locations. *B. vahlii* was not observed during the Coll Rivera Environmental field surveys of the project's proposed corridor. Additionally, this species was not observed during the threatened and endangered vegetation survey conducted by Franklin Axelrod, Ph.D. The USFWS and the DNER confirmed the presence of this species between Guayanilla and Ponce. The DNER found a population of approximately 500 individuals of this species in that area. Potential suitable habitat for this species may be present on the limestone hills of Peñuelas and of the northern section of the Project route.

#### 5.1.2.3 *Current Conditions*

***B. vanderbiltii*** was not observed during the Coll Rivera Environmental field surveys of the project's proposed corridor. Additionally, this species was not observed during the threatened and endangered vegetation survey conducted by Franklin Axelrod, Ph.D.; however, potential suitable habitat for this species may exist on the limestone hills of the northern section of the Project route.

#### 5.1.2.4 *Summary of Impacts*

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected.

#### 5.1.2.5 *Indirect, Interdependent, Interrelated and Cumulative Effects*

Given that potential suitable habitat may exist in some sections of the Project route (as mentioned above), indirect impacts to this species may occur if its habitat is significantly diminished by the construction of the Project. According to available scientific literature, no relation with other flora or faunal species is known, therefore, interdependent or interrelated effects cannot be assessed in the present. Cumulative effects may occur when the construction of the Project and other construction or development projects reduce the amount of available habitat of *B. vanderbiltii*.

#### 5.1.2.6 *Conservation Measures and Recommendations*

Conservation measures include:

- The acquisition of land where individuals or populations of *B. vanderbiltii* are known to exist, or other areas with suitable habitat for this species;
- Reduction of the construction ROW width from 100 feet to a total of 60 feet on steep slopes and narrow ridges
- The restoration of habitat between the construction ROW (100 feet) and the permanent ROW (50 feet);
- Conducting specific surveys for this species before construction takes place within suitable *B. vanderbiltii* habitat;
- Transplanting *B. vanderbiltii* individuals (if found) when appropriate.
- Collecting seeds and seedlings if available.
- Reproducing individuals through softwood cutting methodology;
- Establishment of a propagation project for the species.



- Reduction of the construction ROW width from 100 feet to a total of 60 feet on steep slopes and narrow ridges
- The restoration of habitat between the construction ROW (60 to 100 feet) and the permanent ROW (50 feet);
- Conducting specific surveys for this species before construction takes place within suitable *A. pauciflorum* habitat;
- Transplanting *A. pauciflorum* individuals (if found) when appropriate.
- Collecting seeds and seedlings if available.
- Reproducing individuals through softwood cutting methodology;
- Establishment of a propagation project for the species.

#### 5.1.1.7 Conclusion

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected. Therefore, the Project may affect, but is not likely to adversely affect *A. pauciflorum* species.

#### 5.1.2 *Banara vanderbiltii* – (Palo de Ramón)

Federal Status: Endangered

##### 5.1.2.1 General Species Biology

Palo de Ramón is an evergreen shrub or small tree that reaches 10 meters (33 feet) high and 12 cm (5 inches) in diameter. Leaves are alternate in a single plane, have a toothed margin and are densely pubescent on both sides. The older leaves become rough textured similar to the role of sandpaper on the upper surface. Flowers are bisexual and pollinate themselves. The fruit was discovered in 1985 and consists of berries with many seeds, deep red to purple, with an enlarged calyx and long tip style.

##### 5.1.2.2 Distribution and Abundance

The species is known 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 that are privately owned in northern Puerto Rico; one from Toa Baja to Bayamón and one in the municipality of Salinas (USFWS 1990). Two populations consist of six plants less than 16 meters square (52 sq ft) in the location of Toa Baja and five individuals in Salinas. It has also been found in Dorado and San Juan, according to the Map of Species Occurrence, USFWS Species Profile. The species was included in the list of federal protection on January 14, 1987.

#### 5.1.1.1 *General Species Biology*

The *Auerodendron pauciflorum* is a shrub or small evergreen tree that can reach 5 meters (16.5 feet) high. The leaves are opposite or sub-opposite, glabrous, and elliptical, 15.6 cm (2.5 to 6 inches) long and 3.5 to 6 centimeters (1.5 to 2.5 inches) wide with tiny black glandular spots. Two or three flowers are found in the axils of the leaves. The fruit are not described and seeds have not been observed in the field.

#### 5.1.1.2 *Distribution and Abundance*

The species is found in limestone elevations in northwest Puerto Rico. Only 19 individual plants are known for the four groups in the Barrio Coto de Isabela area near the intersection of Highway 113 road and Highway 2. *A. pauciflorum* was included in the Federal Endangered species list on 2 March 1994 due to habitat destruction.

#### 5.1.1.3 *Current Conditions*

***A. pauciflorum* was not observed during the Coll Rivera Environmental field surveys of the project's proposed corridor. Additionally, this species was not observed during the threatened and endangered vegetation survey conducted by Franklin Axelrod, Ph.D.; however, potential suitable habitat may exist on the Rio Abajo State Forest region, as well as the limestone hills of the northern section of Project route.**

#### 5.1.1.4 *Summary of Impacts*

**No direct impacts are expected to this species.** However, there is a possibility of indirect impacts if its habitat is affected.

#### 5.1.1.5 *Indirect, Interdependent, Interrelated and Cumulative Effects*

Given that potential suitable habitat may exist in some sections of the Project route (as mentioned above), indirect impacts to this species may occur if its habitat is significantly diminished by the construction of the Project. According to available scientific literature, no relation with other flora or faunal species is known, therefore, interdependent or interrelated effects cannot be assessed in the present. Cumulative effects may occur when the construction of the Project and other construction or development projects reduce the amount of available habitat of *A. pauciflorum*.

#### 5.1.1.6 *Conservation Measures and Recommendations*

Conservation measures include:

- The acquisition of land where individuals or populations of *A. pauciflorum* are known to exist, or other areas with suitable habitat for this species;

Conservation measures for each species have been described below; however, it is recommended that all species of threatened or endangered plants that are found within the proposed construction corridor, be transplanted, when appropriate. Unless limited by the size (e.g. large trees), all listed species of plants found inside the established construction right of way which will be or have the potential to be impacted by the pipeline construction, will be relocated pursuant to an agreement to be established between Departamento de Recursos Naturales y Ambientales (DNER) and the United States Fish and Wildlife Service (USFWS). The relocation of threatened and endangered plant species will be accomplished by DRNA biologists, with prior notification to the USFWS. Relocations will be to established protection areas (Guajataca and Río Abajo forest, and other public properties) whenever possible to ensure long-term protection. The area chosen for the transplantation of individuals will be selected in conjunction with the USFWS (for species listed by the federal Government) and/or the DNER; with concurrent permission from the Manager/Owner of the forest or place where sowing or transplants will occur. The characteristics of the premises where transplants (soils, geology, associated vegetation, etc.) are carried out shall be similar to the affected location.

Relocation methodology could include transplantation, spreading seed, and/or division by vegetative methods. Propagation of seeds and cuttings may be more appropriate for woody species since transplantation of these species often fails. Seeds and cuttings will be taken of all individuals affected to the maximum extent possible.

In those areas where listed species have been identified, detailed studies of the vegetation will be undertaken by professional botanists prior to commencing clearing activities. The purpose of this study is to identify and mark all plants listed by the USFWS and the DNER for relocation. After of this study, a plan detailing specific procedures will be prepared for the USFWS (for species listed by the federal Government) or the DNER (for species listed by the State Government) for final approval. These procedures will be developed or compiled by botanical professionals or horticulturists. Methodology of relocation for transplants of trees will be prepared by a certified arborist (International Society of Arboriculture) and will comply with ANSI 300 "Transplanting Standards" (parameters of transplants). Once the relocation procedures are completed, funds will be provided to the DNER for the long-term maintenance and monitoring required for the relocated species.

5.1.1 *Auerodendron pauciflorum* – (No Common Name)

Federal Status: Endangered

## 5.1 Vegetation

A total of 29 species of plants on the federal list have the potential to occur within the identified pipeline corridor. No critical habitats have been published for these species in Puerto Rico.

The threatened and endangered vegetation survey was conducted by Franklin Axelrod, Ph.D. during the months of November 2010 through March 2011. As a result of the survey, three (3) individuals of a single species were observed in the Manati study segment. No other species were observed in the field. In order to avoid and/or minimize impacts to the observed species and potential habitat for listed species, the pipeline has been realigned and the construction corridor will be reduced.

The areas included in this survey and the associated listed vegetation were identified by USFWS and Franklin Axelrod, Ph.D. These areas were as follows:

*Area 1 - Dry limestone hills in Peñuelas:*

Target species identified by USFWS: 1) *Ottoschulzia rhodoxylon* (palo de rosa), 2) *Trichilia triacantha* (bariaco), 3) *Buxusvahlii* (diablito de trescuemos), 4) *Eugenia woodburyana*, 5) *Catesbaea melanocarpa*, 6) *Cordia rupicola*, 7) *Mitracarpus maxwelliae*, and 8) *Mitracarpus polycladus*.

*Area 2 - Central Mountain Range (Volcanic):*

Target species identified by USFWS: 1) *Thelypteris inabonensis*, 2) *Thelypteris yaucoensis*, 3) *Thelypteris verecunda*, 4) *Juglan jamaicensis* (nogal), and 5) *Polystichum calderoense*.

*Area 3 - Moist limestone (Manati):*

Target species identified by USFWS: 1) *Cordia bellonis*, 2) *Ottoschulzia rhodoxylon* (palo de rosa), 3) *Daphnopsis helleriana*, 4) *Solanum drymophilum* (erubia), 5) *Pleodendron macranthum* (chupacallos), 6) *Myrcia paganii*, 7) *Shoepfia arenaria*, 8) *Tectarea estremerana*, and 9) *Auerodendron pauciflorum*.

Coll Rivera Environmental conducted two Flora and Fauna studies for the proposed project. Results from these studies have been provided to USACE. These studies cataloged all of the species of flora within the designated study areas.

purpose of this biological assessment is to provide the USACE with information that will assist it in determining whether the proposed action is "likely to adversely affect" a listed species or its designated critical habitat.

The status, life history, habitat requirements, current conditions, conservation measures, and conclusions are provided for each listed species in Sections 5 (USFWS species) and 6 (NMFS species) of this BA. Table 15 presents those species considered by this Biological Assessment.

## 5 USFWS and DNER Listed Species

As previously mentioned, a total of 46 species are reviewed in this Biological Assessment. Of these species, USFWS has jurisdiction over 38. In a letter dated December 15, 2010 (Appendix 3), USFWS concurred with the USACE's determination that the "proposed project may affect the following listed species: Puerto Rican nightjar (*Caprimulgus nocitherus*); Puerto Rican parrot (*Amazonia vittata vittata*); Puerto Rican crested toad (*Peltyophryne nocitherus*); Puerto Rican boa (*Epicrates inornatus*); Puerto Rican sharp-shinned hawk (*Accipiter striatus venator*); Puerto Rican broad-winged hawk (*Buteo platypterus brunnescens*); Puerto Rican plain pigeon (*Patagioenas inornata wetmorei*); and the listed plant species *Aurodendron pauciflorum*, Palo de Ramon (*Banara vanderbiltii*), diabilto de tres cuernos (*Buxus valhi*), *Cordia bellonis*, *Daphnopsis helleriana*, palo de rosa (*Ottoshulzia rhodoxylon*), *Myrica paganii*, *Tectarea estremerana*, *Thelypteris inabonensis*, *Thelypteris verecunda*, *Thelypteris yaucoensis*, *Chamaecrista glandulosa*, cobana negra (*Stahlia monosperma*), *Polystichm calderoense*, nogal (*Juglans jamaicensis*), *Mitricarpus mexwelliae*, *Mitricarpus polycladus*, *Cordia rupicola*, *Catesbaea melanocarpa*, *Eufenia woodburyana*, bariaco (*Thrichilia triacantha*), and St. Thomas prickly ash (*Zanthoxylum thomasianum*). USFWS recommended "surveys of the petitioned species coqui llanero (*Eleutherodactylus juanariveroi*). In the same letter, USFWS stated that the USACE "needs to make an effect determination with regards to the endangered Antillean manatee (*Trichechus manatus*)." All of the above mentioned species have been included in this Biological Assessment and are reviewed below. Additional plant and wildlife species have been included when past studies have shown their potential presence in the vicinity of the proposed project.

### 3.1.12 Guaynabo

According to the U.S. Fish and Wildlife Service 2007 *Caribbean Endangered Species Map*, six federally listed species, including the Yellow Shouldered Black Bird (*Agelaius xanthomus*) and the rosewood (*Ottoschulzia rhodoxylon*) have been identified from the municipality of Guaynabo.

Table 14: Protected Species- Guaynabo

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
<i>Agelaius xanthomus</i>	Yellow-Shouldered Black Bird	Coastal Forest	Endangered
<i>Patagioenas (Columba) inornata wetmorei</i>	Puerto Rican Plain Pigeon	Lower Montane Forest and Riparian Habitats	Endangered
<i>Ottoschulzia rhodoxylon</i>	Stick of roses	Hata Tejas, Parque de las Ciencias	Threatened
<i>Epicrates inornatus</i>	Puerto Rican Boa	Forested Volcanic / Limestone (Karst) Hills	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Coastal Zones, No Nesting	Endangered
<i>Trichechus manatus manatus</i>	Antillean Manatee	Coastal Zones	Endangered

## 4 Species Account

The following criteria were used to determine the list of sensitive species covered in this document:

- Species considered by the agencies that are federally or state listed as threatened, endangered, candidate or proposed and occur or have the potential to occur within the project area. Non-federally listed species are examined if there is the potential for future federal listing.
- Species observed in the project area as recorded in the Flora and Fauna Study.
- Species that have the potential to occur in the project area as determined or suggested by USFWS and NMFS
- Species suggested presence as recorded in previous studies
- Species identified as occurring in or near the project area during past studies

As required, this biological assessment addresses all listed and proposed species found within the action area, not just those listed and proposed species that are likely to be affected. The

The project will not result in any impacts to marine or mangrove forested coastal zone habitats and open water crossings will be directionally drilled, therefore no impacts to those federally listed threatened and endangered species identified as marine/coastal are anticipated. All impacts to herbaceous wetlands will be temporary and all disturbed areas will be restored to natural grade and allowed to naturally revegetate.

### 3.1.11 Bayamón

The U.S. Fish and Wildlife Service's Caribbean Endangered Species List for the Municipality of Bayamón identifies six species, four of which are endangered plant species. The four endangered plant species include: *Banara vanderbiltii*, *Buxus vahlii*, *Daphnopsis hellerana*, and *Ottoschulzia rhodoxylon*. The only terrestrial faunal species identified is the Puerto Rican Boa. Due to the wide range of habitats and overall distribution of the boa, this species will be considered to have the potential to occur throughout the entire project construction corridor right-of-way. A boa monitoring and protection plan will be implemented for this species. A copy of this document has been included as part of this Biological Evaluation.

The remaining species is the Puerto Rican Plain Pigeon.

Table 13: Protected Species- Bayamón

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
<i>Banara vanderbiltii</i>	Ramón stick	PR-2	Endangered
<i>Buxus vahlii</i>	Val's Boxwood	Hato Tejas, Parque de las Ciencias	Endangered
<i>Daphnopsis hellerana</i>	No Common Name	Sabana Seca, PR-2	Endangered
<i>Epicrates inornatus</i>	Puerto Rican Boa	Forested Volcanic / Limestone (Karst) Hills	Endangered
<i>Ottoschulzia rhodoxylon</i>	Stick of roses	Hata Tejas, Parque de las Ciencias	Endangered
<i>Patagioenas (Columba) inornata wetmorei</i>	Puerto Rican Plain Pigeon	Lower Montane Forests and Riparian Habitats	Endangered

Sections 5 and 6 include a brief description of the federally listed species.

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
<i>Banara vanderbiltii</i>	Ramón stick	Rio Lajas Hills	Endangered
<i>Chelonia mydas</i>	Green Sea Turtle	Coastal Zones	Threatened
<i>Daphnopsis hellerana</i>	No Common Name	Nevarés Limestone Hills, Near Sabana Seca, Primate Center	Endangered
<i>Epicrates inornatus</i>	Puerto Rican boa	Forested Volcanic and Limestone hills	Endangered
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	Coastal Zones	Endangered
<i>Ottoschulzia rhodoxylon</i>	Stick of roses	Media Luna Ward, Candelaria Ward	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Coastal Zones	Endangered
<i>Trichechus manatus manatus</i>	Antillean manatee	Coastal Zones	Endangered

### 3.1.10 Cataño

Cataño has several environmentally sensitive areas of high natural value that must be protected. These areas include: La Esperanza Park, the Laguna Secreta, remnant wetlands from channelizing the Bayamón River, and the historic mouth of the River Bayamón. Remnants of wetlands can also be found along the project construction right-of-way at the Hondo River.

The vegetation associated with these estuarine wetlands includes black mangrove (*Avicennia germinans*) and white mangrove (*Laguncularia racemosa*). The Laguna Secreta is located 100 meters north of the project right-of-way. This area is dominated by cattail marsh with several remnants of marshy areas occupied by the black mangrove.

The U.S. Fish and Wildlife Service's Caribbean Endangered Species List for the Municipality of Catano identifies four species, all of which are characterized as marine or coastal zone species.

Table 12: Protected Species- Catano

Federal Protected Species - Caribbean List			
Scientific name	Common name	Location	Status
<i>Chelonia mydas</i>	Green Sea Turtle	Coastal Zones	Threatened
<i>Eretmochelys imbricata</i>	Hawksbill Sea Turtle	Marine Coastal	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Coastal Zones, No Nesting	Endangered
<i>Trichechus manatus manatus</i>	Antillean Manatee	Coastal Zones	Endangered



### 3.1.8 Dorado

The U.S. Fish and Wildlife Service's Caribbean Endangered Species List for the Municipality of Dorado identifies nine species, four of which are characterized as marine or coastal zone species. The only terrestrial faunal species identified is the Puerto Rican Boa. Due to the wide range of habitats and overall distribution of the boa, this species will be considered to have the potential to occur throughout the entire project construction corridor right-of-way. A boa monitoring and protection plan will be implemented for this species. The project will not result in any impacts to marine or coastal zone habitats and all open water crossings will be directionally drilled, therefore no impacts to those federally listed threatened and endangered species identified as marine/coastal are anticipated.

The Ramon stick (*Banara vanderbiltii*), rosewood (*Ottoschulzia rhodoxylon*), and *Daphnopsis hellerana* are listed as endangered plants. In Dorado, most of the route goes through herbaceous areas, or the PR-22 right of way. Suitable habitat for the above mentioned species (except *Chamaecrista*) is typically limited to haystacks. *Chamaecrista* was not found. It prefers silica sands, which were not found in that segment of the route.

Table 10: Protected Species- Dorado

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
<i>Banara vanderbiltii</i>	Ramón stick	Near Rio Lajas Limestones	Endangered
<i>Chamaecrista glandulosa</i> <i>var mirabilis</i>	No Common Name	Sardinera	Endangered
<i>Daphnopsis hellerana</i>	No Common Name	Rio Lajas	Endangered
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	Coastal Zones	Endangered
<i>Epicrates inornatus</i>	Puerto Rican Boa	Forested Volcanic / Limestone (Karst) Hills	Endangered
<i>Ottoschulzia rhodoxylon</i>	Rosewood	Cerro Higuillar, Espinosa Ward, Maguayo Ward	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Coastal Zones	Endangered
<i>Trichechus manatus</i> <i>manatus</i>	Antillean manatee	Coastal Zones	Endangered

### 3.1.9 Toa Baja

None of the federally listed species known to exist within the Municipality of Toa Baja were found in the project corridor.

Table 11: Protected Species- Toa Baja

<i>Trichechus manatus manatus</i>	Antillean Manatee	Coastal Zones	Endangered
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The remainder of this segment of the project corridor (from Mile Marker 54.75 mile to Mile Marker 63.45) includes vegetation consisting of weeds and shrubs commonly found on the northern coast of Puerto Rico. None of the vegetation within the corridor was identified as threatened or endangered.

### 3.1.7 Vega Baja and Vega Alta

Vega State forest includes six areas that are distributed between the municipalities of Vega Alta and Vega Baja. Vega Alta and Vega Baja have been considered as one region since all parts of the corridor pass through a single preserve area, the Bosque Estatal de Vega. This preserve area is found within the construction right-of-way for both Municipalities.

These areas are classified as moist subtropical forest. Forest flora is represented by seventy-two species of trees. Four federally listed plant species have been identified as possibly occurring within the project right-of-way for these two municipalities. These include the Erubia (*Chamaecrista glandulosa var mirabilis*), *Daphnopsis hellerana*, rosewood (*Ottoschulzia rhodoxylon*), and *Schoepfia arenaria*.

Table 9: Protected Species- Vega Baja and Vega Alta

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
<i>Chamaecrista glandulosa var mirabilis</i>	No Common Name	Tortuguero Lagoon Natural Reserve	Endangered
<i>Chelonia mydas</i>	Green Sea Turtle	Coastal Zones	Threatened
<i>Daphnopsis hellerana</i>	No Common Name	Bloques Carmelo	Endangered
<i>Dermochelys coriacea</i>	Leatherback sea turtle	Coastal Zones	Endangered
<i>Epicrates inornatus</i>	Puerto Rican boa	Forested Volcanic and Limestone hills	Endangered
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	Coastal Zones	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Coastal Zones	Endangered
<i>Ottoschulzia rhodoxylon</i>	Stick of roses	Sabana Ward	Endangered
<i>Schoepfia arenaria</i>	No Common Name	Tortuguero Lagoon Natural Reserve	Threatened
<i>Trichechus manatus manatus</i>	Antillean manatee	Coastal Zones	Endangered

### 3.1.6 Manati

The project corridor will pass through approximately 1.1 miles of the Hacienda La Esperanza nature reserve in the municipality of Manati. The importance of this reserve lies mainly in its diversity of terrestrial and marine natural resources. It is classified as an important area for wildlife that uses this area for foraging and reproduction. The forest located within the mogotes (haystacks) area in the southeast of the Municipality consists of a secondary forest composed mostly of invasive species, secondary spiny forest composed mostly of tintillo (*Randia aculeata*), a new growth area of invasive herbaceous vegetation, mostly of exotic origin, bamboo forest, tall herbaceous species (brava cane) and other exotic species that grow on the edge of the Manati River. Portions of this system are brackish water due to past flood control. These areas are populated by tidal marsh species. Salterns, mostly devoid of vegetation due to high salinity (irregularly inundated by extreme high tides) and fringed by red, white, and black mangroves, and buttonwood are also an important vegetative community in this system. The forest along the route in Manati is within the mogotes (haystacks). It is in the southeast of the municipality. The rest of the route crosses basically herbaceous areas associated with the Rio Grande de Manati floodplain.

One species listed as Endangered, the rosewood (*Ottoschulzia rhodoxylon*), has the potential to occur within the limits of the construction right of way, although it was not included in the federal list for Manati nor was it identified during the flora and fauna study conducted for the Via Verde Pipeline. One specimen of this species has, however, been previously documented approximately 2,650 meters north of the project right-of-way.

Table 8: Protected Species - Manati

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
<i>Agelaius xanthomus</i>	Yellow-Shouldered Black Bird	Coastal Forest	Endangered
<i>Chamaecrista glandulosa var mirabilis</i>	No Common Name	Tortuguero Lagoon Natural Reserve	Endangered
<i>Chelonia mydas</i>	Green Sea Turtle	Coastal Zones	Threatened
<i>Epicrates inornatus</i>	Puerto Rican Boa	Forested Volcanic / Limestone (Karst) Hills	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Coastal Zones, No Nesting	Endangered
<i>Schoepfia arenaria</i>	No Common Name	Tortuguero Lagoon Natural Reserve	Threatened
<i>Sterna dougallii</i>	Roseate Tern	Coastal Areas and Offshore Cays, Nesting	Threatened

Sections 5 and 6 include a brief description of these species.

### 3.1.5 Barceloneta

A part of the Caño Tiburones natural reserve lies in this municipality, approximately 543 meters north of the project corridor right-of-way, at Mile Marker 51.0 to 51.30. This reserve is the longest herbaceous marsh on the Island, and the second largest in the Caribbean. This coastal wetland plays an important role in quantity and quality of storm water treatment.

The U.S. Fish and Wildlife Service's Caribbean Endangered Species List for the Municipality of Barceloneta identifies seven species, six of which are characterized as marine or coastal zone species. The only terrestrial species identified is the Puerto Rican Boa. Due to the wide range of habitats and overall distribution of the boa, this species will be considered to have the potential to occur throughout the entire project construction corridor right-of-way. A boa monitoring and protection plan will be implemented for this species. The project will not result in any impacts to marine or coastal zone habitats and all of these open water crossings will be directionally drilled, therefore no impacts to federally listed threatened and endangered species that may occur in those areas are anticipated.

Table 7: Protected Species- Barceloneta

Federal Protected Species – Caribbean List			
Scientific Name	Common Name	Location	Status
<i>Chelonia mydas</i>	Green Sea turtle	Marine Coastal	Threatened
<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	Marine Coastal	Endangered
<i>Epicrates inornatus</i>	Puerto Rican Boa	Forested Volcanic Limestone (Karst) Hills	Endangered
<i>Eretmochelys imbricata</i>	Hawksbill Sea Turtle	Marine Coastal	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Coastal Zones	Endangered
<i>Sterna dougallii</i>	Roseate Tern	Coastal Zones	Threatened
<i>Trichechus manatus manatus</i>	Antillean Manatee	Marine Coastal	Endangered

Flora found in the project corridor throughout the municipality varied. The land cover within the project right-of-way corridor ranges from farmlands (pineapple and other minor fruits) and fallow uncultivated areas to herbaceous wetlands and open freshwater wetlands with floating aquatics.

At the border with the municipality of Utuado, the pipeline corridor will pass through the eastern boundary of the Río Abajo Forest in two locations for a total distance of approximately 3.5 miles. The project corridor will additionally pass through approximately 1.54 miles of the Caño Tiburones.

Several species of flora that are federally listed as threatened or endangered species have been identified in these two natural systems. Those species identified as potentially occurring in the path of the project are: *Auerodendron pauciflorum*, Palm of Manaca (*Calyptronoma rivalis*), *Cordia bellonis*, chigger stick (*Cornutia obovata*), *Myrcia paganii*, matabuey (*Goetzea elegans*), rosewood (*Ottoschulzia rhodoxylon*), chupacallos (*Pleodendron macranthum*), *Schoepfia arenaria*, erubia (*Solanum drymophilum*), and *Tectaria estremerana*.

Table 6: Protected Species- Arecibo  
Federal Protected Species – Caribbean List

Scientific Name	Common Name	Location	Status
<i>Accipiter striatus venator</i>	Puerto Rican Sharp-shinned hawk	Rio Abajo State Forest	Endangered
<i>Amazona vittata vittata</i>	Puerto Rican Parrot	Rio Abajo State Forest	Endangered
<i>Auerodendron pauciflorum</i>	No Common Name	Rio Abajo State Forest	Endangered
<i>Buteo platypterus brunnescens</i>	Puerto Rican Broad-winged Hawk	Rio Abajo State Forest	Threatened
<i>Calyptronoma rivalis</i>	No Common Name	Rio Abajo State Forest	Endangered
<i>Chelonia mydas</i>	Green sea turtle	Coastal Zones	Threatened
<i>Cordia bellonis</i>	No Common Name	Rio Abajo State Forest	Endangered
<i>Cornutia obovata</i>	chigger stick	Rio Abajo State Forest	Endangered
<i>Dermochelys coriacea</i>	Leatherback sea turtle	Coastal Zones	Endangered
<i>Epicrates inornatus</i>	Puerto Rican boa	Forested Volcanic and Limestone (karst) hills	Endangered
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	Coastal Zones	Endangered
<i>Goetzea elegans</i>	Matabuey	Cambalachee State Forest	Endangered
<i>Myrcia paganii</i>	No Common Name	Biafara Arrozal	Endangered
<i>Ottoschulzia rhodoxylon</i>	Rosewood	Cambalachee State Forest, Sabana Hoyos	Threatened
<i>Pelicanus occidentalis</i>	Brown Pelican	Coastal Zones, no nesting	Endangered
<i>Peltyophryne lemur</i>	Puerto Rico crested toad	Northern karst regions	Threatened
<i>Pleodendron macranthum</i>	chupacallos	Rio Abajo State Forest	Endangered
<i>Schoepfia arenaria</i>	No Common Name	Rio Abajo State Forest (Cuesta de los Perro)	Threatened
<i>Solanum drymophilum</i>	Erubia	Rio Abajo State Forest	Endangered
<i>Tectaria estremerana</i>	No Common Name	Rio Abajo State Forest	Endangered
<i>Trichechus manatus</i>	Antillean Manatee	Coastal Zones	Endangered

Both have been identified from previous corridor studies: the locations are approximately 3,000 meters from the project.

The proposed project corridor follows, and will be co-located within, an existing transportation right-of way for about 2.3 miles (MM 30.5 - 31 and 25.2 - 27) within the municipality of Utuado.

Table 5 (below) lists the federally threatened or endangered species identified on the USFWS Caribbean Endangered Species Map within the municipality of Utuado.

Table 5: Protected Species- Utuado

Federally Protected Species- Caribbean List			
SCIENTIFIC NAME	COMMON NAME	DISTRIBUTION	STATUS
<i>Accipiter striatus venator</i>	PR Sharp-Shinned Hawk	Monte Guilarte State Forest	Endangered
<i>Amazona vittata vittata</i>	Puerto Rican Parrot	Rio Abajo State Forest	Endangered
<i>Auerodendron pauciflorum</i>	No Common Name	Rio Abajo State Forest	Endangered
<i>Buteo platypterus brunnescens</i>	Puerto Rican Broad-Winged Hawk	Monte Guilarte State Forest	Endangered
<i>Calyptronoma rivalis</i>	No Common Name	Rio Abajo State Forest	Threatened
<i>Cordia bellonis</i>	No Common Name	Rio Abajo State Forest	Endangered
<i>Cornutia obovata</i>	No Common Name	Rio Abajo State Forest	Endangered
<i>Epicrates inornatus</i>	Puerto Rican Boa	Forested Volcanic and Limestone (Karst) Hills	Endangered
<i>Juglans jamaicensis</i>	West Indian Walnut	Monte Guilarte State Forest (La Silla de Calderón)	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Lago Dos Bocas, no nesting	Endangered
<i>Patagioenas (Columba) inornata wetmorei</i>	Puerto Rican Plain Pigeon	Lower Montane Forest and Riparian Habitats	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Coastal Zones, Lago Dos Bocas, No Nesting	Endangered
<i>Pleodendron macranthum</i>	No Common Name	Rio Abajo State Forest	Endangered
<i>Schoepfia arenaria</i>	No Common Name	Río Abajo State Forest (Cuesta de los Perros)	Threatened
<i>Solanum drymophilium</i>	Erubia	Rio Abajo State Forest	Endangered
<i>Tectaria estremarana</i>	No Common Name	Rio Abajo State Forest	Endangered

#### 3.1.4 Arecibo

The municipality of Arecibo has several protected areas. These include the Río Abajo Forest, Cambalache Forest and the Caño Tiburones Reserve. These protected areas have been designated by the Puerto Rico Department of Natural and Environmental Resources (DRNA), as critical habitat for several flora and fauna species.

SCIENTIFIC NAME	COMMON NAME	DISTRIBUTION	STATUS
<i>Accipiter striatus venator</i>	PR Sharp-Shinned Hawk	Monte Guilarte State Forest	Endangered
<i>Buteo platypterus brunnescens</i>	Puerto Rican Broad-Winged Hawk	Monte Guilarte State Forest	Endangered
<i>Cyathea dryopteroides</i>	Elfin Tree Fern	Monte Guilarte State Forest	Endangered
<i>Eleutherodactylus jasperi</i>	Golden Coqui	Forested Mountains w/ elevations over 700 m.	Threatened
<i>Epicrates inornatus</i>	Puerto Rican Boa	Forested Volcanic and Limestone (Karst) Hills	Endangered
<i>Juglans jamaicensis</i>	West Indian Walnut	Monte Guilarte State Forest (La Silla de Calderón)	Endangered
<i>Polystichum calderonense</i>	No Common Name	Cerrote Peñuelas	Endangered

### 3.1.3 Utuado

In the municipality of Utuado, in the barrios of Río Abajo, Río Arriba, and Hato Viejo, the pipeline corridor will run 400 meters to the south and east of the Río Abajo State Forest Reserve from mile marker 28.4 to mile marker 35.

This forest and its associated wetlands have a great diversity of wildlife and varied vegetation. Within the forest, one hundred and seventy-five tree species were identified in past fauna studies; forty-seven of which are considered threatened or endangered. As a result of past deforestation that occurred in Puerto Rico during the 1930's, the Government of Puerto Rico began, and currently maintains, programs for tree planting in Commonwealth forests. Some representative species of the native vegetation found in the forest are: algarrobo, almácigo, hairy camasey, canelilla, white capá, ceboruquillo, male cedar, kapok, cojoba, heart, Cork, rubial Hawthorn, guano, guara, higuerrillo, jobo, magician, Palm coyor and tabaiba. Several research projects involving multiple endangered species that inhabit the forest are currently being conducted. Endemic and endangered species included are: erubia (*Solanum drymophilum*), rosewood (*Ottoschulzia rhodoxylon*), *Daphosis hellerana*, chigger (*Cornutia obovata*), and *Cordia bellonis*.

In the Río Abajo barrio, approximately 1,050 meters from the project corridor (Mile Marker 29.6), the endangered plant species, chupacallos (*Pleodendron macranthum*), was found during other flora studies. The species was not identified in the corridor during the PREPA flora study conducted by Coll Environmental or the Threatened and Endangered Plant Survey. Other species found in the municipality of Utuado include: *Calyptronoma rivalis* and *Cornutia obovata*.

Federal Protected Species- Caribbean List			
<i>Caprimulgus noctitherus</i>	Puerto Rican Nightjar	Coastal Forest	Endangered
<i>Chelonia mydas</i>	Green Sea Turtle	Coastal Zones	Threatened
<i>Cyathea dryopteroides</i>	Elfin Tree Fern	Monte Guilarte State Forest	Endangered
<i>Eretmochelys imbricata</i>	Hawksbill Sea Turtle	Coastal Zones	Endangered
<i>Eugenia woodburyana</i>	No Common Name	Encarnacion West of Las Cucharas	Endangered
<i>Pelecanus occidentalis</i>	Brown Pelican	Coastal Zones, No Nesting	Endangered
<i>Polystichum calderonense</i>	No Common Name	Cerrote Peñuelas	Endangered
<i>Stahlia monosperma</i>	No Common Name	Tallaboa	Endangered
<i>Sterna dougallii</i>	Roseate Tern	Coastal Areas and Offshore Cays, Nesting	Threatened
<i>Trichechus manatus manatus</i>	Antillean Manatee	Coastal Zones	Endangered
<i>Trichilia triacantha</i>	No Common Name	Encarnacion, (Urb. El Peñon), Tallaboa Poniente	Endangered

### 3.1.2 Adjuntas

Within the municipality of Adjuntas, the proposed Via Verde project corridor will run from approximately mile marker 14.5 to mile marker 21.7. Within this municipality, the proposed project corridor does not pass through any reserves or protected areas.

The municipality of Adjuntas is located in three ecological life zones: Subtropical Wet Forest, Subtropical Moist Forest, and Subtropical Lower Montane Wet Forest (Ewel and Whitmore 1973). The USFWS identified the following federally threatened or endangered species as likely to occur in those ecological life zones: *Accipter striatus venator*, *Amazona vittata vittata*, *Auerodendron pauciflorum*, *Banara vanderbilii*, *Buteo platypterus brunnescens*, *Buxus vahlii*, *Cordia bellonis*, *Daphnopsis hellerana*, *Juglans jamaicensis*, *Myrcia paganii*, *Ottoschulzia rhodoxylon*, *Pleodendron macranthum*, *Polystichum calderoense*, *Shoepfia arenaria*, *Tectaria*, *Thelypteris inabonensis*, *Thelypteris verecunda*, and *Zanthoxylum thomasianum*. Table 4 (below) lists the federally threatened or endangered species identified on the USFWS Caribbean Endangered Species Map within the municipality of Adjuntas.

Table 4: Protected Species- Adjuntas

Federally Protected Species- Caribbean List
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PARKS AND RESERVES HABITAT SUMMARY ENTIRE VIA VERDA CORRIDOR ROUTE (MM 0.0 TO MM 90.3)				
Municipality	Mile Marker	Map Number	Park/Reserve Name	Comments
Penuelas, Adjuntas	13.75 to 16.3	1	No habitat identified	2 occurrences, verify species status
Utua	22.35 to 55	2	No critical habitat identified	See Hengstenberg report for Focal Area 1
Utua, Arecibo	29.1 to 30.05	3	Bosque Estatal de Rio Abjo	corridor route follows transportation ROW of PR 10 for entire length
Arecibo	31.1 to 32.5	4	Bosque Estatal de Rio Abjo	Check Hengstenberg data for Focal Area 2
Arecibo	45.4 to 45.7	5	Reserva Cano Tiburones	check Coll data for % cover TE, flora/fauna
Arecibo	47.2 to 48.7	6	Reserva Cano Tiburones	outside of ROW
Arecibo	49.0 to 49.7	7	Reserva Cano Tiburones	check Coll data for % cover TE, flora/fauna
Barceloneta	53.2 to 54.2	8	Reserva Natural Hacienda la Esperanza	corridor route traverses disturbed agricultural lands, temp herbaceous impacts
Vega Baja, Vega Alta	70.6 to 71.5	9	Bosque Estatal de Vega	Check Hengstenberg data for Focal Area 2
Vega Alta	72.4 to 73.6	10	No critical habitat identified	Check Hengstenberg data for Focal Area 2
Dorado, Toa Baja	80.4 to 81.8	11	No critical habitat identified	Horizontal directional drill, no surface impacts

**Notes:**  
Mile Marker - Via Verde Pipeline, begin Penuelas MM 0.0 to end Guayanabo MM 92  
Map Number - BCPeabody Critical Habitats and Wildlife Elements August 27, 2010  
Critical Habitat Name - Local, Commonwealth, Federal Protection Areas identified

### 3.1.1 Peñuelas

Within the municipality of Peñuelas, the proposed Via Verde project corridor will run from mile 0 to approximately mile 14.5. Within this municipality, the proposed project corridor does not pass through any reserves or protected areas. The areas adjacent to the project corridor are a mix of industrial/developed areas and native shrubby vegetation commonly found along the southern coast of Puerto Rico.

Peñuelas is located within the Subtropical Dry Forest and the Subtropical Moist Forest life zones (Ewel and Whitmore, 1973). The USFWS identified the following federally threatened or endangered species as likely to occur in the Subtropical Dry Forest life zone: Palo de rosa (*Ottoschulzia rhodoxylon*), Bariaco (*Trichilia triacantha*), Diablito de tres cuernos (*Buxus vahlii*), *Eugenia woodburyana*, *Catesbaea melanocarpa*, *Cordia rupicola*, *Mitracarpus maxwelliae*, *Mitracarpus polycladus*, Guabairo (*Caprimulgus noctitherus*). Table 3 (below) lists the federally threatened or endangered species identified on USFWS Caribbean Endangered Species Map within the municipality of Peñuelas.

Table 3: Protected Species- Peñuelas

Federal Protected Species- Caribbean List			
Scientific Name	Common Name	Distribution	Species
<i>Accipiter striatus venator</i>	PR Sharp-Shinned Hawk	Monte Guilarte State Forest	Endangered
<i>Buxus vahlii</i>	Val's Boxwood	Tallaboa Limestone Hills	Endangered

Subtropical Wet Forest	12.25 – 13.5, 15 - 25	11.25	147.53	13.48
Lower Montane Rain Forest	13.5 – 15.0	1.50	10.59	0.97
Subtropical Moist Forest	5.25 – 12.25, 25 – 92	72.30	872.51	79.74

Detailed descriptions of existing conditions have been presented in the:

Coll Environmental *Wetlands and U.S. Waters Jurisdictional Determination Study – Via Verde Pipeline Project* and *Estudio Descriptivo de Flora Y Fauna – Via Verde Pipeline Project* reports and the PREPA - Via Verde Project, *Declaración de Impacto Ambientales*.

Copies of these reports have been included in the PREPA, Via Verde Project, *Declaración de Impacto Ambientales*. (Appendix D of the USACE Joint Permit Application)

The project path includes and exhibits a variety of land uses. Some of the land uses are still active, while other historic uses are recognized by their marks left on the landscape. Examples of current uses include: cattle grazing in varied intensities, sugar cane plantations, shade and sun grown coffee plantations, pineapple plantations, rice fields, and fallow agricultural lands.

While many of the species found during this survey are typical to habitats modified by anthropogenic means, there are species in some areas of the project showing ecological succession towards a more mature state. These trees are typical of secondary forest in Puerto Rico. The greatest diversity of trees was observed in the subtropical moist forest, which is present along both the north segment and part of the south section.

A composite list of protected, listed or endangered, species found within or likely to occur within the pipeline corridor route is found in Table 15. Descriptions and locations, when available, for Commonwealth parks and preserves associated with each municipality are presented and discussed below.

Table 2: Commonwealth Forests and Nature Preserves

### 3 Description of Proposed Action

Installation of the approximately 92 mile pipeline will require an initial construction right-of-way (ROW) approximately 100 feet wide and, in uplands, a maintained post-construction ROW of 50 feet. The total project area encompasses approximately 1,114 acres (92 miles X 100 foot ROW); approximately 369 acres of which are Waters of the United States. The actual construction corridor within the ROW will vary from 50 feet in some sensitive habitats to a maximum of 100 feet. In areas of sensitive habitat, the construction corridor will be reduced to limit the amount of temporary impacts (i.e. wetland habitat = max. 60 feet wide; estuarine habitat = max 50 feet wide). The pipeline will traverse 235 waterbodies (rivers, wetlands, canals); however, the pipeline will not traverse any shorelines or coastal beaches. The project will temporarily impact approximately 369 acres of jurisdictional bodies of water (Waters of the U.S.).

The project will not result in any permanent wetland impacts since all disturbed wetlands will be restored to pre-construction grades, stabilized, and revegetated. The total temporary impact area has been limited to 1.7 square miles. Although the project is being reviewed as an Individual Permit (IP), the project was designed to qualify for review and verification through the USACE Nationwide Section 404 Permit Program.

#### 3.1 Existing Conditions

The topography of the project corridor varies from flat to semi-level along the north segment (Mile Marker 40 to Mile Marker 92) to mostly steep in the southern segment (MM 4 to MM 40) that crosses the central range from Arecibo to Peñuelas. The project area includes four of the six life zones identified in Puerto Rico (Ewel and Whitmore, 1973). These life zones include: the Subtropical Dry Forest, Subtropical Wet Forest, Lower Montane Rain Forest, and Subtropical Moist Forest. Location data and relative coverage of each zone within the project corridor are included in the table below.

Table 1: Project Life Zones

Project Life Zones				
Zone Type	Location, MM	Length, miles	Total Area, acres	% Project Area
Subtropical Dry Forest	0 – 5.25	5.25	63.50	5.80

On January 6, 2011, the applicant's consultants held a meeting with NMFS at its St. Petersburg, Florida offices. This meeting was held to discuss the particulars of an Essential Fish Habitat (EFH) survey.

Between January 13, 2011 to January 23, 2011, two site visits were conducted by USFWS biologists to evaluate the methods and field work of the ongoing raptors surveys.

On February 7, 2011, the applicant met with USFWS personnel to discuss the protocol and the survey area to be sampled as part of the Nightjar (Guabairo) study. This meeting was held at the USACE office in San Juan. This meeting confirmed the protocol and dates to complete the survey for the nightjar study.

On February 11, 2011, a technical meeting was held between the applicant and USFWS at its Cabo Rojo facility. This meeting again involved discussion of the nightjar study. The meeting participants were Mr. Jose (Tito Chabert), Julio Cardona, the applicant's consultant, and USFWS Biologist Rafael Gonzalez. As a result of this meeting, in mid February 2011, USFWS Biologist Rafael Gonzalez and Omar Monsegur performed a site visit with Mr. Tito Chabert and Julio Cardona to evaluate the proposed study area at Peñuelas dry limestone. On February 23, 2011, USFWS biologist Rafael Gonzalez, made a site visit to review survey methods of the ongoing Guabairo field work being performed by Mr. Jose (Tito Chabert) and Julio Cardona.

On March 9, 2011 a third technical meeting was held at the USFWS Boquerón Offices. The applicant provided the USFWS with an update of all the field work performed to that date and the status of additional work required. A brief report on each of the field studies developed following the protocol approved was presented and discussed in great detail.

Again on March 17, 2011, USFWS Biologists Omar Monsegur and Carlos Pacheco performed a site visit with Frank Axelrod, Ph.D. and the applicant's consultant to the Peñuelas dry limestone study area in relation to the plant survey. A portion of the plant survey area was reviewed to verify plant survey transect locations and to demonstrate the general characteristics of the habitat.

In addition to the above mentioned meetings, supplementary formal correspondence with USFWS and NMFS has further refined the protected plant and animal species reviewed in this BA. Based on the information provided by USFWS and NMFS, species specific surveys were completed and are attached to this BA in Appendix 1. All formal correspondence from USFWS and NMFS has been included in Appendix 3 of this document.

exemption for such action by the Committee pursuant to subsection (h) of this section. In fulfilling the requirements of this paragraph each agency shall use the best scientific and commercial data available".

A total of 36 federally listed plant and animal species (25 plants and 14 animals) have been identified as potentially occurring within the project limits. Species list presented includes all individual species that are known to exist or have the potential to occur in the pipeline corridor, as identified by the USFWS and NMFS. The lists of protected plants and animals for each municipality were used as a baseline. Subsequent review of the pipeline corridor route by the USFWS in June of 2010 further refined the target species for on-site field reconnaissance.

## **2 Correspondence with Federal Agencies**

The applicant has made extensive efforts to coordinate with the involved federal agencies prior to and throughout the permit process. Pre-application meetings to discuss the proposed project were held with USFWS and USACE on June 8 and June 28, 2010, respectively.

As it relates to this biological assessment, the applicant coordinated with USFWS and NMFS to ensure that all necessary surveys were performed appropriately and all data/information were properly collected. The applicant provided the USFWS with proposals for the necessary field surveys and field protocols. USFWS responded to these proposals on November 10, 2010 and December 2, 2010. These letters are available in Appendix 3.

The applicant attended a meeting on December 8, 2010 with USFWS at its Boquerón offices to discuss the survey protocols for the following listed species: 1) Vegetation survey, 2) Raptor survey, 3) Nightjar (Guabairo) Presence Study, 4) Crested toad (Sapo Concho) and Coqui Llanero surveys, and 5) Puerto Rican Boa survey. In response to this meeting, two site visits to the Peñuelas Dry Limestone area were conducted. The first site visit was conducted by USFWS biologists Omar Monsegur and Carlos Pacheco on December 13, 2010. The second site visit was attended by Biologists Monsegur, Pacheco and Rafael Gonzalez. Franklin Axelrod, Ph.D. and the applicant's consultant were present during these site visits.

On January 4, 2011 a site inspection was performed by USFWS biologists Mr. Rafael Gonzalez and Omar Monsegur with the applicant's consultant to evaluate the proposed observation points for the raptors study.

Asesores Ambientales y Educativos, Inc. *Via Verde Federally Listed Plant Species Report*. March 2011. Appendix 1.

Coll Environmental, *Wetlands and U.S. Waters Jurisdictional Determination Study – Via Verde Pipeline Project, Puerto Rico* (Wetland JD report), August 2010. A copy of this report has been included in the PREPA, Via Verde Project, Declaración de Impacto Ambientales. (Appendix D of the USACE Joint Permit Application)

Coll Environmental, *Estudio Descriptivo de Flora Y Fauna – Via Verde Pipeline Project, Puerto Rico* (Flora and Fauna report), August 2010. A copy of this report has been included in the PREPA, Via Verde Project, Declaración de Impacto Ambientales. (Appendix D of the USACE Joint Permit Application)

PREPA - Via Verde Project, *Declaración de Impacto Ambientales (DIA)*, August 2010. A copy of this report has been included in Appendix D of the USACE Joint Permit Application.

This BA has been prepared as part of the Joint Permit Application (JP) evaluation process to comply with the requirements of Section 7(a)(2) of the Endangered Species Act (ESA). This BA was designed to provide information to the U.S. Army Corps of Engineers (USACE) to assist it in consultations with the U. S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) with respect to Section 7 of the Endangered Species Act (ESA). This document has been prepared to:

- clarify whether and what listed, proposed, and candidate species or designated or proposed critical habitats may be in the action area;
- determine what effect the action may have on these species or critical habitats;
- explain the ways the project has been modified to reduce or remove adverse effects to the species or critical habitats;
- determine the need to enter into consultation for listed species or designated critical habitats, or conference for proposed species or proposed critical habitats; and
- explore the design or modification of an action to benefit the species.

As cited in the ESA under provisions of Section 7(a)(2), "Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of the habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical, unless such agency has been granted an

## 1 Introduction

This Biological Assessment (BA) was prepared by BCPeabody Construction Services, Inc. and Coll Rivera Environmental for Asesores Ambientales y Educativos, Inc. and Puerto Rico Electric Power Authority (PREPA, the applicant). The purpose of this BA is to evaluate the effects of PREPA's proposed construction of a 24-inch diameter steel natural gas (NG) pipeline from the EcoEléctrica LNG Terminal in Peñuelas, north to the Cambalache Termoeléctricas Authority Central electric power plant (PES) in Arecibo, then east to the Palo Seco and San Juan power plants. The approximately 92 mile pipeline will pass through the municipalities of Peñuelas Adjuntas, Utuado, Arecibo, Barceloneta, Manati, Vega Alta, Vega Baja, Dorado, Toa Baja, Cataño, Bayamón, and Guaynabo.

Principal resources used to develop this report included:

The 2007 Puerto Rico GAP Final Report

Gould, W., et al. 2007. Puerto Rico Gap Analysis Project – Final Report. USGS, Moscow, ID and the USDA Forest Service International Institute of Tropical Forestry, Río Piedras, PR. 159pp. plus appendices.

U.S. Fish and Wildlife Service. 2000. Endangered Species List (Puerto Rico/Virgin Islands)

U.S. Fish and Wildlife Service. 2000. Endangered Species List (Puerto Rico/Virgin Islands). Division of Endangered Species. U.S. Fish and Wildlife Service. 2007. Caribbean Endangered Species Map. Ecological Services in the Caribbean.

Environmental Sensitivity Index: Puerto Rico  
Interactive Map Atlas and Associated Data

Cardona Alonzo, J. E, and J. L. Chabert Llompert. *Preliminary Population Assessment of the Puerto Rican Nightjar (Caprimulgus noctitherus) at the Via Verde Proposed Right of Way, Peñuelas, Puerto Rico*. March 8, 2011. Appendix 1.

Coll Rivera Environmental. *Descriptions of Impacts to the Puerto Rican Boa (Epicrate normatus) Habitat*. February 2010. Appendix 1.

Tetra Tech, Inc. *2011 Endangered Raptor Survey Report for the Puerto Rican Broad-winged Hawk and Puerto Rican Sharp-shinned Hawk*. February 2011. Appendix 1.

Tetra Tech, Inc. *2011 Survey Report for the Endangered Puerto Rican Parrot*. March 2011. Appendix 1.

Vega-Casillo, Sondra I. *Search of the Puerto Rican crested toad (Peltodytes lemur) and coqui llanero (Eleutherodactylus juanariveroi) in areas proposed for the construction of Via Verde*. Appendix 1.

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Via Verde NG Pipeline

Biological Assessment

# Via Verde NG Pipeline Project

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## Biological Assessment

**Puerto Rico Electric Power Authority**  
**August 2010**

**Updated April 2011**

DATE: 31 MARCH 2011

US ARMY CORPS OF ENGINEERS  
ANTILLES REGULATORY SECTION - VIA VERDE MEETING

Pipe line Safety

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**Via Verde Follow Up Letter**  
Teresita Rodriguez to: Sindulfo.Castillo  
Cc: Jose Soto, Carl Soderberg

04/01/2011 05:28 PM

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History: This message has been forwarded.

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Mr. Castillo,

Attached you will find USEPA's follow up letter concerning the Via Verde Natural Gas Pipeline Project. Please, do not hesitate to contact me or Jose Soto at (787) 977-5829 should you have any questions.

Tere Rodriguez  
Chief  
Multimedia Permits and Compliance Branch  
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VIA VERDE.pdf





**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
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APR 01 2011

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San Juan, Puerto Rico 00901-3299

Re: Vía Verde Natural Gas Pipeline; SAJ-2010-02881 (IP-EWG)

Dear Mr. Castillo:

This is in further reference to the Vía Verde Natural Gas Pipeline project proposed by the Puerto Rico Electric Power Authority (PREPA). Since our December 23, 2010 letter, additional information has been provided by PREPA and its consultants to address the U.S. Environmental Protection Agency's (EPA's) concerns. In addition, the applicant met with EPA representatives on several occasions to present and/or discuss such additional information, including chapters four and six of the local Environmental Impact Statement (EIS) for the project, plus several summary sections.

In our previous letter, EPA objected to the issuance of a Department of the Army permit for the project based on the lack of a detailed alternatives analysis, concerns regarding the use of directional drilling, the lack of suitable compensatory mitigation to address wetlands impacts, and the need to complete a federal Environmental Impact Statement (EIS) for the project. The comments provided herein are based on a thorough review of the additional information furnished by the applicant and its consultants.

To address the alternatives analysis issue, PREPA provided information on the alternatives contained in the local EIS prepared for the project. These included a no action alternative, the construction of a natural gas import terminal on the north coast of the island, tanker and buoy systems and/or transfer platforms for receipt of natural gas at PREPA's Palo Seco, San Juan and Cambalache plants, gravity based systems, floating storage and re-gasification units, and several terrestrial alignments for a natural gas pipeline system. While this represents a significant milestone in the review of alternatives for the project, the documents provided included an additional option: the use of natural gas at PREPA's existing Costa Sur and Aguirre power generating facilities on the south coast of Puerto Rico, combined with the conversion of the nearby Las Mareas Port facility to receive liquefied natural gas (LNG) as means to achieve significant energy production using an alternative fuel. This project, formerly known as the "Gasoducto del Sur", was previously considered by PREPA as means to address the diversification of the electric power supply methods in Puerto Rico. The project was briefly



mentioned in response to comments from the U.S. Army Corps of Engineers and the Puerto Rico Engineers and Surveyors Association. EPA believed that PREPA's dismissal of this alternative was inconsistent with the current project's overall project purpose, since it would provide PREPA with an alternative fuel option for two major generating facilities with lesser environmental impacts. However, after evaluating additional information furnished by the applicant's environmental consultant, it appears that *Gasoducto del Sur* was geared to provide natural gas to the combined cycle units located at the Aguirre Power Plant with a 592 MW operational capacity. On the other hand, Via Verde would provide natural gas and an increase in PREPA's operational capabilities to a total of 1,519 MW. Moreover, the Via Verde Project would provide PREPA with the flexibility to operate the most efficient power generating units on the island, which are located on the north coast, through the monitoring of each unit's rated capacity, individual fuel consumption and the type of fuel that fosters the lowest power generating costs. The Via Verde project would thus allow a more efficient use of such power generating units, allowing reductions in the transmission losses, as observed in other PREPA electric power transfer systems. EPA also defers to PREPA's expertise on the fact that "*Gasoducto del Sur*" may destabilize the island's electrical system, resulting in frequent collapses of the electric network of Puerto Rico. Upon further consideration of the supplied information, EPA believes that the alternatives analysis issues have been addressed by the applicant.

In regards to EPA's concerns about the use of directional drilling in wetlands and karst terrain, PREPA provided additional information regarding best management practices, the monitoring to be performed and the presence of specialized personnel during drilling operations to monitor the process and stop work immediately if any escape of bentonite mud into karst formations and/or waters of the United States is suspected. In addition, during a March 2, 2011 meeting at the Corps of Engineers, PREPA's consultants announced that directional drilling operations in karst terrain would be greatly reduced, since the pipeline route would be altered to circumvent haystack hills ("*mogotes*"), light equipment would be used, and a pipeline pull method would be required to further reduce impacts. We commend PREPA on these impact reduction measures, and now believe that best management practices, combined with adequate monitoring by qualified personnel should minimize any undesirable impacts from directional drilling. EPA recommends that that a special condition to the Corps of Engineers permit, requiring the presence of a trained independent geologist/engineer with expertise on karst terrain in the field at all times during drilling operations to closely monitor the process and stop work if any issues or abnormalities are detected be included. We also urge the Corps to consider additional special conditions requiring the avoidance of major karst formations during pipeline construction.

In our previous letter, we commented on the unsuitability of the initially proposed compensation for unavoidable impacts to aquatic resources. Additional information supplied by PREPA to address this issue includes, among others, a commitment to coordinate with the Department of Natural and Environmental Resources (DNER) to develop suitable on-site mitigation in a 3:1 ratio for any unavoidable impacts to aquatic resources. While PREPA has repeatedly stated that a suitable mitigation plan would be developed in a timely manner, EPA believes that such plan must be reviewed and accepted by the Corps of Engineers, EPA and all



natural resource agencies before construction of the project begins. In addition, questions remain regarding the concept of "temporary impacts". PREPA expresses that after placing the pipeline, areas would be immediately brought back to initial conditions so that natural re-colonization by prevailing vegetation begins. However, sections of the local Environmental Impact Statement (EIS) prepared for the project indicate a willingness to enhance areas by suppressing invasive and/or nuisance species at locations such as Caño Tiburones or other ecologically valuable areas. If PREPA plans to pursue such wetlands enhancement options, the areas need to be identified, quantified, and a specific plan to address local conditions must be developed. Additional details on the management/maintenance methods to be used need to be clarified. EPA believes that any mitigation and/or wetlands enhancement plans should include performance/success rates to evaluate their suitability and long term viability. Furthermore, please be advised that on January 14, 2011 the Council on Environmental Quality (CEQ) provided guidance for departments and agencies of the Federal government on mitigation and monitoring of activities. As highlighted in this guidance, "Mitigation measures included in the project design are integral components of the proposed action, are implemented with the proposed action, and therefore should be clearly described as part of the proposed action." Therefore, EPA believes that a more robust description of the mitigation and monitoring plans needs to be developed to ensure that this federal objective is fulfilled. The guidance further states that "Mitigation commitments needed to lower the level of impacts so that they are not significant should be clearly described in the mitigated FONSI [finding of no significant impact] document and in any other relevant decision documents related to the proposed action." Therefore, any Corps-issued Environmental Assessment coupled with a FONSI for this project should include that information. We look forward to receiving and reviewing the mitigation plan documents as they become available.

One additional remaining concern for EPA is the proposed project's right-of-way (ROW). At various times throughout the documents supplied by PREPA, the ROW is described as being 100, 150 or 50 feet wide. The applicant's consultant has provided a brief description of the ROW categories, but we would appreciate a written, detailed explanation of the concept and its implementation along the final pipeline route in order to include it in the project review file for future reference.

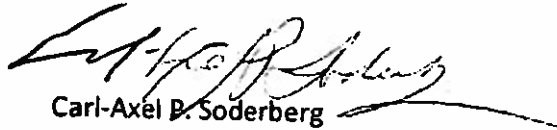
In summary, we believe PREPA has addressed most of our major concerns regarding the Via Verde Natural Gas Pipeline project. However, additional information is required to fully comply with the Clean Water Act, Section 404(b)(1) Guidelines requirements. We, therefore, condition our approval of the proposed project to receiving, for review and approval, a comprehensive mitigation plan which addresses compensation for both, temporary and permanent impacts to wetlands and a detailed explanation of the project's variable right-of-way before project construction activities begin. In addition, we request that the permit includes a special condition requiring the presence of independent qualified personnel during drilling operations to closely monitor the process and stop work if any issues or abnormalities are detected.





If you have any questions or require additional information on this matter, please contact Ms. Teresita Rodríguez, Chief of the Multimedia Permits and Compliance Branch (MPCB), at 787-977-5864 or Mr. José Soto, of the MPCB, at 787-977-5829.

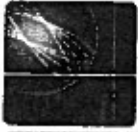
Sincerely,



Carl-Axel B. Soderberg  
Director

CC: USFWS-Cabo Rojo, PR  
DNER- San Juan, PR  
PRPB- San Juan, PR  
PREQB- San Juan, PR





**Re: Via Verde - Draft Follow Up Letter**  
Jose Soto to: Teresita Rodriguez  
Cc: Carl Soderberg, Jose Font

03/31/2011 06:49 AM

Hello!

Upon review of the draft, I found that after our discussion of the alternatives analysis section yesterday, you apparently repeated a portion of the paragraph in the editing. Attached is a corrected version. Please update your files accordingly.

Jose Soto  
Multimedia Permits and Compliance Branch  
Phone: (787) 977-5829



Via Verde Draft Follow Up letter - CORRECTED.docx

Teresita Rodriguez Carl, Attached you'll find a draft letter which incl...

03/30/2011 06:46:23 PM

From: Teresita Rodriguez/R2/USEPA/US  
To: Carl Soderberg/R2/USEPA/US@EPA  
Cc: Jose Font/R2/USEPA/US@EPA, Jose Soto/R2/USEPA/US@EPA  
Date: 03/30/2011 06:46 PM  
Subject: Via Verde - Draft Follow Up Letter

Carl,

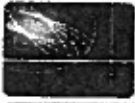
Attached you'll find a draft letter which includes our latest comments on the Via Verde project based on a review of the information submitted by PREPA. Please, let us now if you have any questions.

Thanks,

Tere

[attachment "Draft Follow Up letter.docx" deleted by Jose Soto/R2/USEPA/US]





**Fw: Via Verde Follow Up Letter**  
Jose Soto to: Stephanie Lamster

04/26/2011 03:28 PM

Hi. The letter is attached.

Jose Soto  
Multimedia Permits and Compliance Branch  
Phone: (787) 977-5829

----- Forwarded by Jose Soto/R2/USEPA/US on 04/26/2011 03:36 PM -----

From: Teresita Rodriguez/R2/USEPA/US  
To: Sindulfo.Castillo@usace.army.mil  
Cc: Jose Soto/R2/USEPA/US@EPA, Carl Soderberg/R2/USEPA/US@EPA  
Date: 04/01/2011 05:28 PM  
Subject: Via Verde Follow Up Letter

---

Mr. Castillo,

Attached you will find USEPA's follow up letter concerning the Via Verde Natural Gas Pipeline Project. Please, do not hesitate to contact me or Jose Soto at (787) 977-5829 should you have any questions.

Tere Rodriguez  
Chief  
Multimedia Permits and Compliance Branch  
(787) 977-5864



VIA VERDE.pdf





**RE: Via Verde Follow Up Letter (UNCLASSIFIED)**  
Castillo, Sindulfo SAJ to: Teresita Rodriguez  
Cc: Jose Soto, Carl Soderberg

04/05/2011 10:34 AM

Classification: UNCLASSIFIED  
Caveats: NONE

Acknowledge receipt. Thank you.

Sindulfo Castillo, P.E.  
Chief, Antilles Regulatory Section  
400 Fernandez Juncos Avenue, San Juan, PR 00901  
Tel: 787-729-6905 ext. 3054; Fax: 787-729-6906

-----Original Message-----

From: Rodriguez.Teresita@epamail.epa.gov  
[mailto:Rodriguez.Teresita@epamail.epa.gov]  
Sent: Friday, April 01, 2011 5:28 PM  
To: Castillo, Sindulfo SAJ  
Cc: Soto.Jose@epamail.epa.gov; Soderberg.Carl@epamail.epa.gov  
Subject: Via Verde Follow Up Letter

Mr. Castillo,

Attached you will find USEPA's follow up letter concerning the Via Verde Natural Gas Pipeline Project. Please, do not hesitate to contact me or Jose Soto at (787) 977-5829 should you have any questions.

Tere Rodriguez  
Chief  
Multimedia Permits and Compliance Branch  
(787) 977-5864

Classification: UNCLASSIFIED  
Caveats: NONE







**RE: SAJ-2010-02881 Biological Assessment (UNCLASSIFIED)**

Garcia, Edgar W SAJ, lisamarie  
Garcia, Edgar W SAJ to: carrubba, Carl Soderberg, Carlos A.  
Rubio, Miguel Bonini, jaime.torres,  
Cc: "Castillo, Sindulfo SAJ", "Collazo, Osvaldo SAJ"

04/20/2011 04:55 PM

5 attachments



Via Verde BA Final\_April 15 2011.pdf



Appendix 1.pdf



Appendix 2.pdf



Appendix 3.pdf



Appendix 4.pdf

Classification: UNCLASSIFIED  
Caveats: NONE

Ladies and Gentlemen,

Please find enclosed the Biological Assessment provided by PREPA's consultant.

The Corps is proposing May 11, 2011 at 9:30 AM for an Interagency Meeting for PREPA to present their BA, Flora and Fauna report, and Phase 1B Archeological document. Also, PREPA would need to explain changes in the project route (alignment), etc.

Please let me know,

Respectfully,

Edgar W. García  
Project Manager  
Army Corps of Engineers  
Jacksonville District  
Antilles Regulatory Section  
Tel: (787) 729-6905 Ext. 3059  
Fax: (787) 729-6906

Classification: UNCLASSIFIED  
Caveats: NONE





U.S. Department of Transportation  
Pipeline and Hazardous Materials  
Safety Administration

# Enforcement

- ✓ Enforcement Policies
- ✓ Support Regions on Enforcement Cases



# Regulations

- ✓ Develop regulations for the pipeline safety/environmental protection
- ✓ Response to interpretation request and inquiries about the regulations



# Engineering and Research

- ✓ Special Permits
- ✓ Support to Regions/Regulations
- ✓ Technical Issues
- ✓ Securing Targeted R&D Projects and Implementing Results

and Implementing Results



U.S. Department of Transportation  
Pipeline and Hazardous Materials  
Safety Administration

# Training and Qualifications

- ✓ Train the state and federal inspectors
- ✓ Provide technical support to the inspectors and the Groups within OPS

within OPS  
inspec





# Pipeline Safety R&D

## **Pipeline Safety R&D Program Mission:**

**To sponsor research and development projects focused on providing near-term solutions that will improve the safety, reduce environmental impact, and enhance the reliability of the Nation's pipeline transportation system.**

## **What do we want you to know?**

- We employ a collaborative approach to address mutual challenges
- We help remove technical barriers on a given challenge
- We measure our research results/impacts
- We are transparent - <http://primis.phmsa.dot.gov/rd/>

**Pipeline Safety Improvement Act of 2002 established our modern program**





# Research Program Objectives

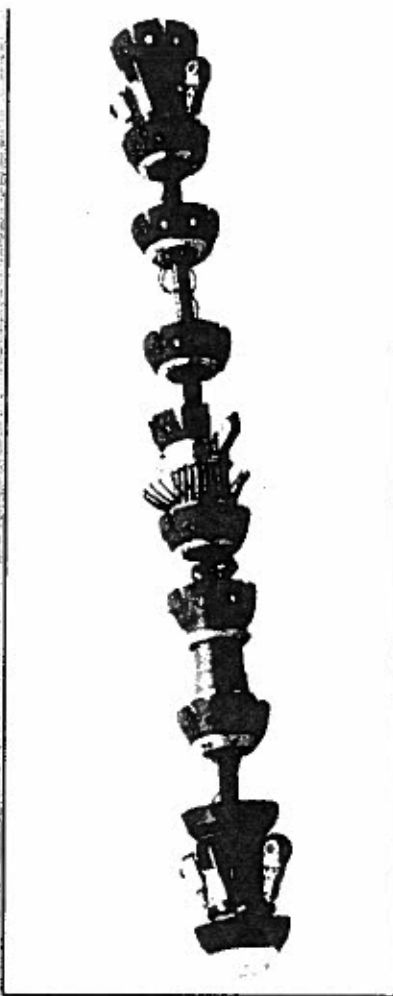
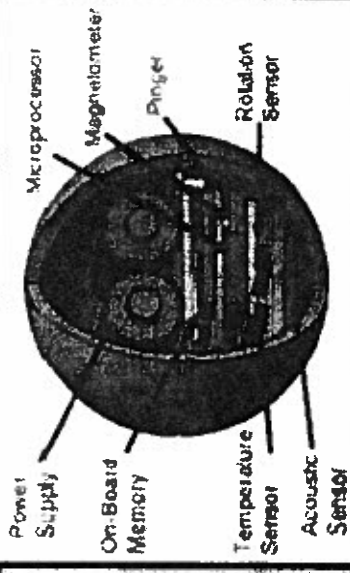
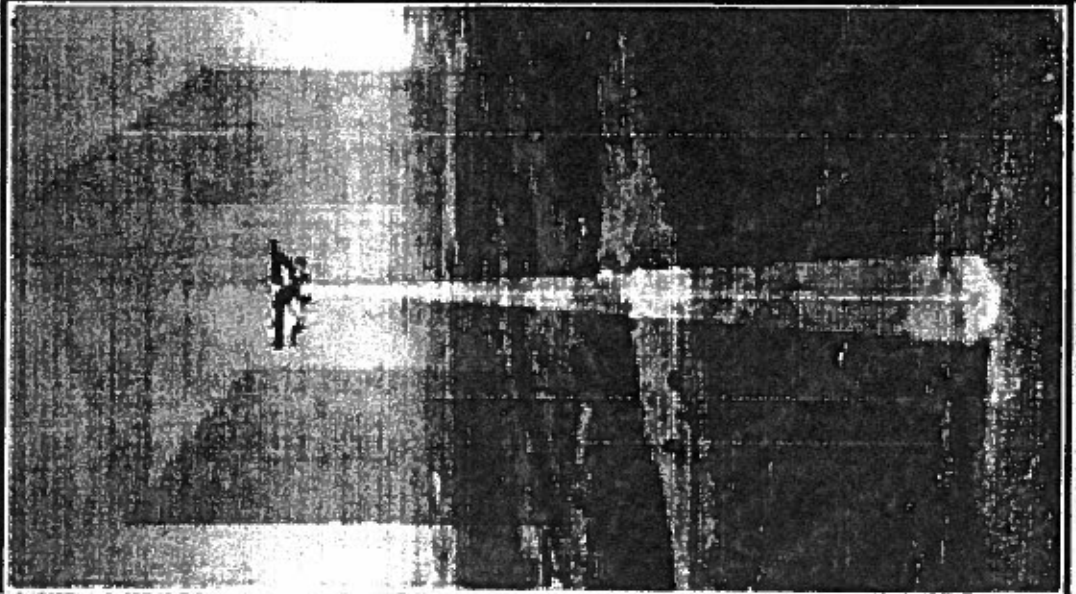
<b>Developing Technology</b>	<b>Strengthening Consensus Standards</b>	<b>Promoting Knowledge</b>
Fostering the development of new technologies so that pipeline operators can improve safety performance and more effectively address regulatory requirements.	Targeting and feeding new knowledge into the process of keeping standards relevant to their purpose.	Generating and promoting general knowledge to decision makers.



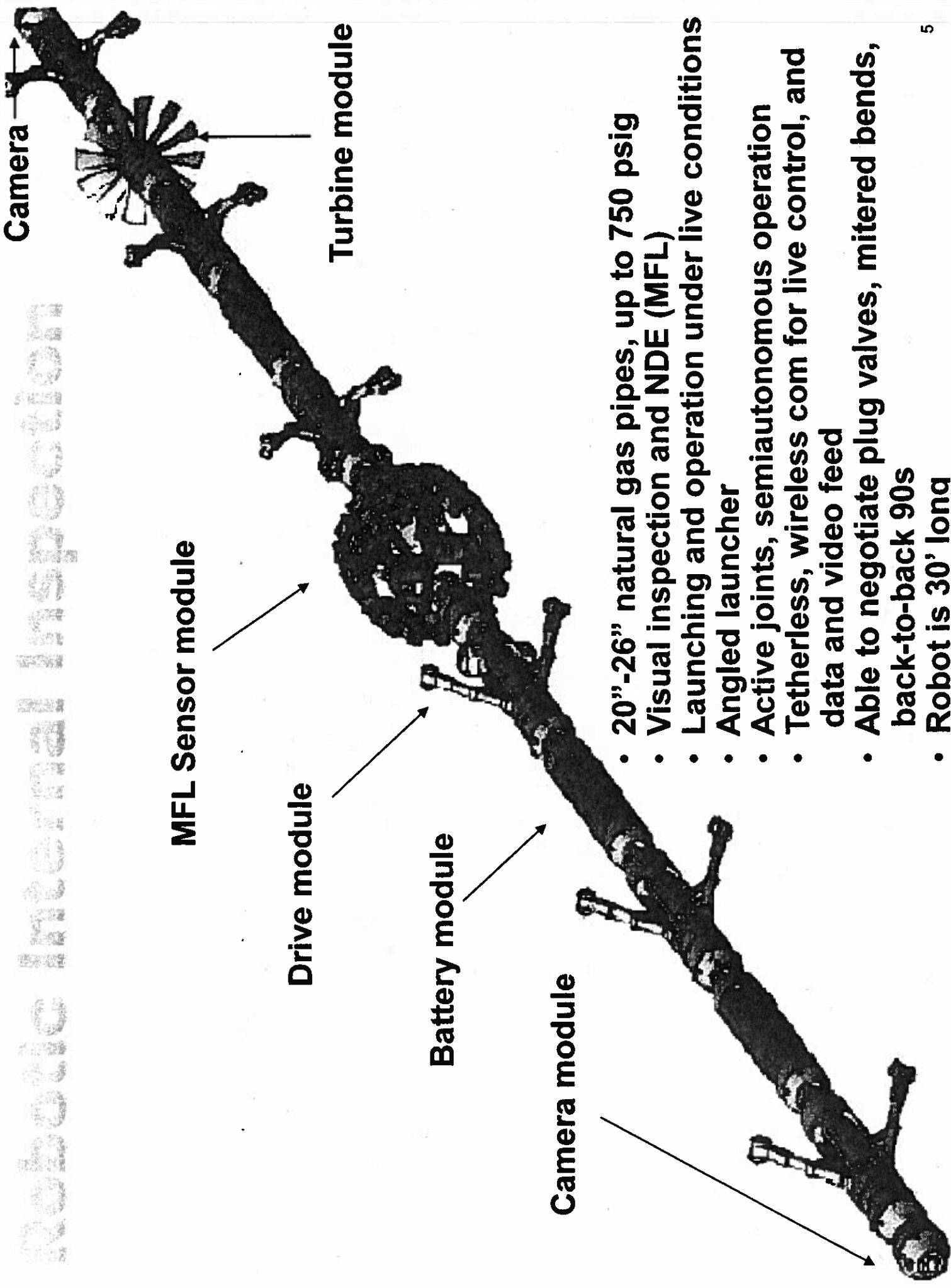


U.S. Department of Transportation  
Pipeline and Hazardous Materials  
Safety Administration

# Technology Development



# Robotic Internal Inspection



Camera

MFL Sensor module

Drive module

Battery module

Camera module

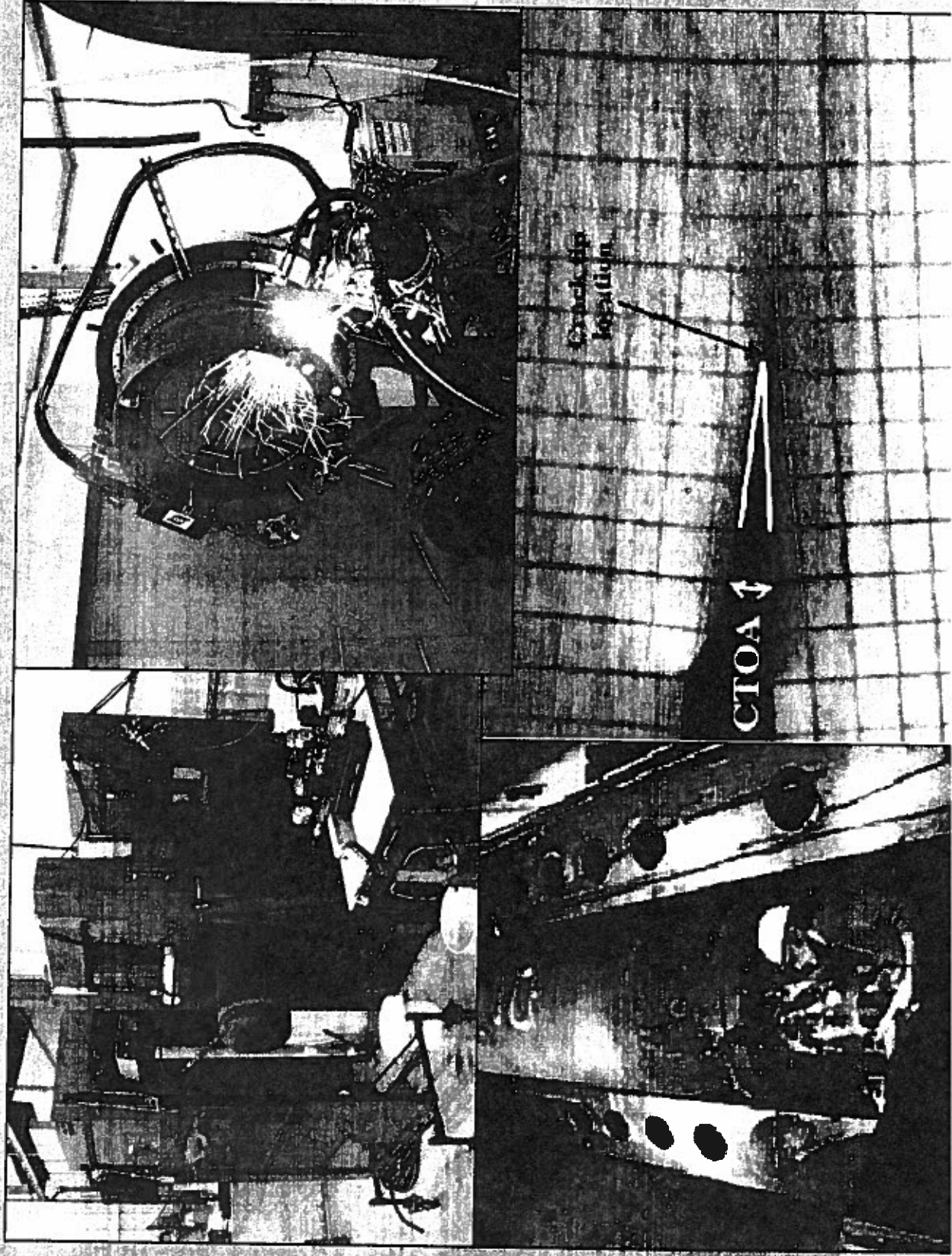
Turbine module

- 20"-26" natural gas pipes, up to 750 psig
- Visual inspection and NDE (MFL)
- Launching and operation under live conditions
- Angled launcher
- Active joints, semiautonomous operation
- Tetherless, wireless com for live control, and data and video feed
- Able to negotiate plug valves, mitered bends, back-to-back 90s
- Robot is 30' long



U.S. Department of Transportation  
Pipeline and Hazardous Materials  
Safety Administration

# Material Testing and Welding





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# USAJOBS

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BRIEF VIEW

DETAILED VIEW

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**Closing**

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Expand
- 1/31/2011 [GENERAL ENGINEER, GS-0801-12/13. \(Open to ALL US Citizens\) - FI](#)  
Expand
- 1/31/2011 [General Engineer \(CATS Manager\) GS-801-13 \(Open to U.S. Citizens\) - SD](#)  
Expand
- 1/31/2011 [Program Analyst, GS-343-12 \(Open to All U.S. Citizens\) - TRO](#)  
Expand
- 2/1/2011 [Supervisory General Engineer, GS-0801-14 \(Open to all U.S. citizens\) - DB](#)  
Expand
- 2/7/2011 [Chemist GS-1320-12/13/14 \(Open to All U.S. Citizens\) - TRO](#)  
Expand

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What: Pipeline

Agency	Location	Salary
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Transportation, Pipeline & Hazardous Materials Safety Admin View Map	DC-Washington Save job   More like this	\$74,872.00+
Transportation, Pipeline & Hazardous Materials Safety Admin View Map	TX-Houston Save job   More like this	\$92,252.00+
Transportation, Pipeline & Hazardous Materials Safety Admin View Map	DC-Washington Save job   More like this	\$74,872.00+
Transportation, Pipeline & Hazardous Materials Safety Admin View Map	TX-Houston Save job   More like this	\$109,014.00+
Transportation, Pipeline & Hazardous Materials Safety Admin View Map	DC-Washington Save job   More like this	\$74,872.00+



U.S. Department of Transportation  
Pipeline and Hazardous Materials  
Safety Administration

# Via Verde Pipeline Team

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# Thank You! / Questions?

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Email [gregory.c.hindman@dot.gov](mailto:gregory.c.hindman@dot.gov)



U.S. Department of Transportation  
Pipeline and Hazardous Materials  
Safety Administration

# Southern Regional Director

Mr. Wayne Lemoi

Department of Transportation

Pipeline & Hazardous Materials Safety Administration

Office of Pipeline Safety

404-832-1160

Wayne.Lemoi@dot.gov

