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HABITAT CHARACTERIZATION AT AREAS OF CONCERN (AOC) AOC-R, PI-4, PI-7, PAOC-J, K, and S FOR THE FORMER VIEQUES NAVAL TRAINING RANGE (VNTR) AND NAVAL AMMUNITION SUPPORT DETACHMENT (NASD), VIEQUES ISLAND, PUERTO RICO

FINAL REPORT

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ACRONYMS AND ABBREVIATIONS

°	degree
%	Percent
ac	Acres
AOC	Areas of Concern
EMA	Eastern Maneuver Area
F	Farenheit
Ft	Feet/Foot
LIA	Live Impact Area
mi	Miles
NASD	Naval Ammunition Support Detachment
NSRR	Naval Site Roosevelt Roads
PI	Photo Identified
U.S.	United States
USFWS	United States Fish and Wildlife Service
VNTR	Vieques Naval Training Range

1.0 INTRODUCTION

Biological field assessments were conducted at Areas of Concern (AOC), Potential AOC, and photo identified (PI) as part of a Comprehensive Long-Term Environmental Action Navy (CLEAN) III Contract, Contract Task Order 007 and 39 Vieques Island, Puerto Rico. The purpose of this evaluation was to identify habitat or potential habitat that currently is or could be used by the Least Tern, Roseate Tern, or any other listed endangered, threatened, critical or sensitive avian species, within the specified areas of concern. Additionally, a survey of the flora was conducted to determine if any State or Federally listed plant species were present

2.0 SITE LOCATION

Puerto Rico is located on the Antillean Island Arc separating the Caribbean Sea from the Atlantic Ocean. The island of Vieques is located approximately 6 miles (mi) southeast of Puerto Rico (**Figure 1**). It is approximately 21 mi long (east to west) and 4.5 mi wide (north to south), encompassing a total of 32,986 acres (ac). There are two towns on the island, Esperanza on the south side and Isabel Segunda on the north side.

The Navy administered approximately 22,437 ac on the west and east ends of the island. The former Naval Ammunition Support Detachment (NASD) was located on the western side of Vieques and encompasses 8,265 ac. The Eastern Maneuver Area (EMA) was composed of approximately 11,000 acres. This report covers AOC-R (former construction staging area) located within the former NASD and five sites (PI-4, PI-7, PAOC-J, K, and S) on eastern Vieques in the former Vieques Naval Training Range (VNTR) (**Figure 2**).

3.0 METHODS

To support this evaluation a field survey was conducted at each site in order to determine the presence of plant and animal species, and to determine whether preferred habitat was present for any federally endangered or threatened plant and/or animal species.

To support these assessments, a habitat characterization was conducted at each of the six sites. The objectives of the habitat characterization are listed below:

1. Identify terrestrial (upland), wetland (palustrine and estuarine), and marine habitat units, including subunits within and contiguous to each site;
2. Identify the dominant and subdominant plant species within each site habitat unit and contiguous habitat units and, where applicable, identify any vegetative gradients;
3. Identify wildlife species residing within or utilizing each site's habitat unit and contiguous habitat units, as well as species relative abundance;
4. Identify any critical habitat for federally designated threatened and endangered species within and contiguous to each site; and
5. Determine the known occurrences of federally designated threatened or endangered species, as well as the identification of habitat that may potentially support federally designated threatened and endangered species within and contiguous to each site.

Prior to field reconnaissance, vegetation communities were characterized into broad community types based on color signatures from true-color aerial photographs (November 4, 1999: scale, 1 inch equal 500 feet [ft]). Before conducting the fieldwork, a literature search was conducted for each federally protected species. During the September 19-20, 2005 surveys, 3 biologists (Mr. Carlos Laboy – animals and plants, Dr. Alberto E. Areces-Mallea – plants, and Dr. Dan Wilkinson – plants and animals) walked throughout each site and identified any federally protected species seen and evaluated the site for the presence or absence of preferred habitat for the species. Community types were verified in the field by walking the perimeter and the interior of the sites. Most plant species were identified in the field; however, some specimens were collected for identification using taxonomic references (Acevedo-Rodriguez 1996; Liogier 1982, 1985, 1988, 1994, 1995, 1997; Little and Wadsworth 1964; Little et al. 1964).

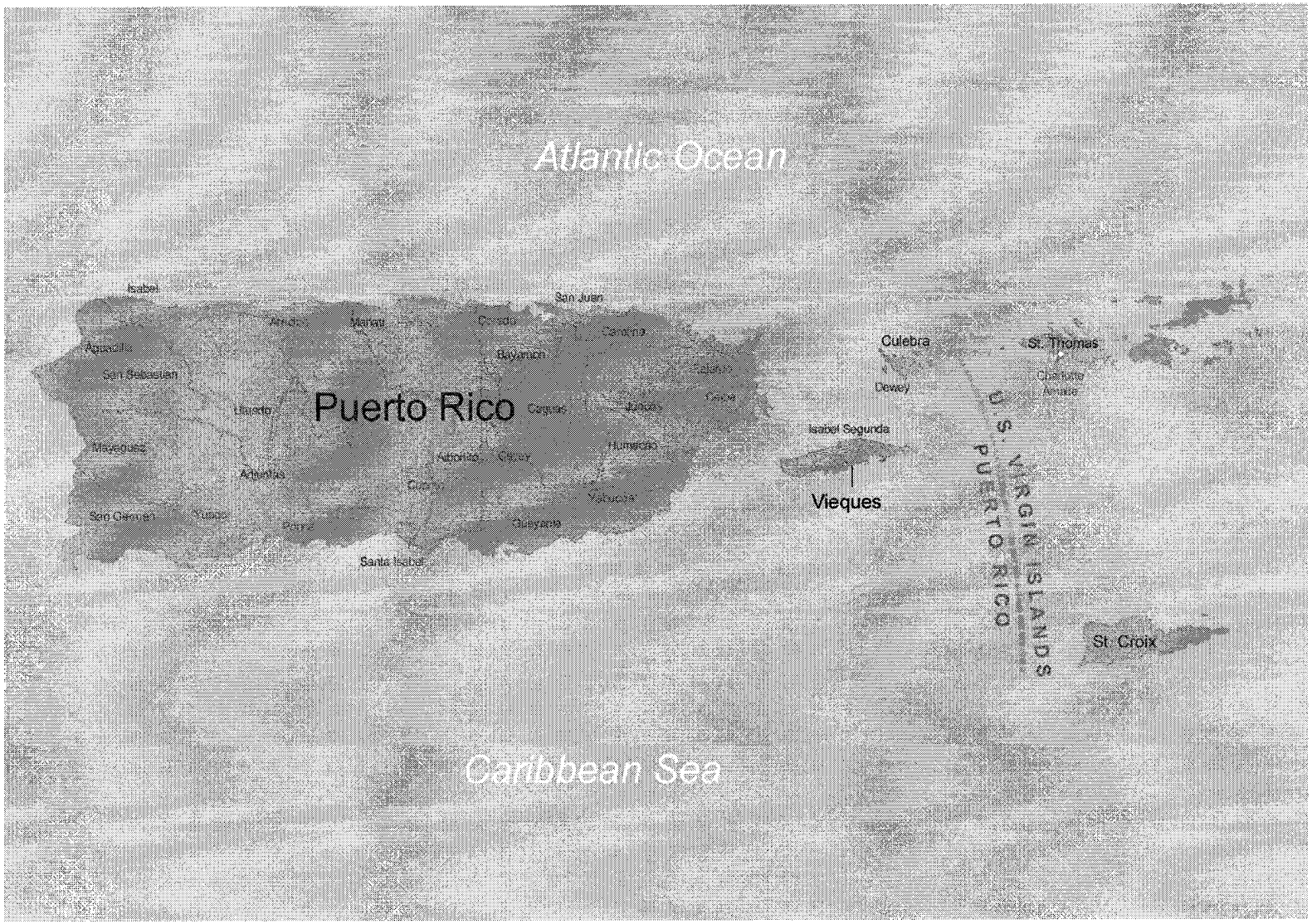

Figure 1. General Location of Vieques Island, Puerto Rico.

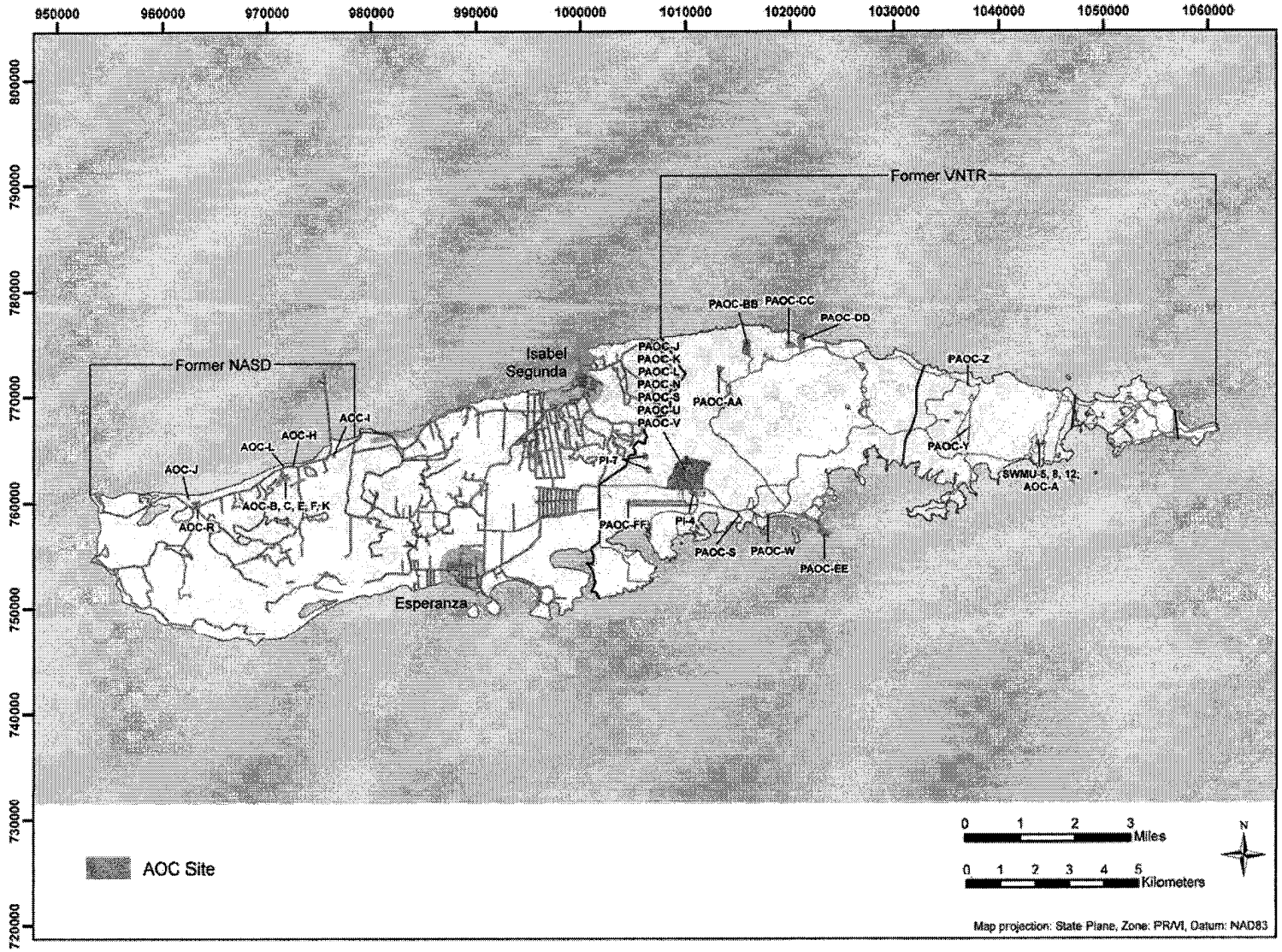

Figure 2. Location of the Areas of Concern (AOC) within the Former Naval Ammunition Support Detachment (NASD) and Former Vieques Naval Training Range (VNTR).

Wildlife species such as birds, mammals, and lizards that were found residing within or utilizing each site's habitat were identified during the field surveys. Wildlife habitat was also identified. A wildlife biologist characterized the habitats and determined the types of wildlife that could potentially inhabit the plant communities or sites. Any wildlife species observed, were identified in the field with the aid of 8 x 40 binoculars and reference guides (Raffaele 1989; Raffaele et al. 1998).

Several terrestrial and marine species that occur on or around Vieques are listed as protected by the United States (U.S.) Fish and Wildlife Service (USFWS). Sixteen federally listed species are known to occur or have the potential to occur within the former NASD and former VNTR (**Table 1**).

Table 1
Federally Listed Species Occurring or Potentially Occurring at the Former NASD and former VNTR

***Scientific Name* (Common Name)**	**Federal Status**
Plants	
Chaemacrista glandulosa var. *mirabilis* (Herb)	Endangered
Stahlia monosperma (Cobana negra)	Threatened
Calyptranthes thomasiana (Tree)	Endangered
Eugenia woodburyana (Evergreen tree)	Endangered
Goetzea elegans (Beautiful goetzea)	Endangered
Reptiles and Amphibians	
Chelonia mydas (Green sea turtle)	Threatened
Dermochelys coriacea (Leatherback sea turtle)	Endangered
Caretta caretta (Loggerhead sea turtle)	Threatened
Eretmochelys imbricata (Hawksbill sea turtle)	Endangered
Birds	
Falco peregrinus tundrius (Arctic peregrine falcon)	Threatened
Pelecanus occidentalis occidentalis (Brown pelican)	Endangered
Sterna dougalli dougalli (Roseate tern)	Endangered
Mammals	
Physeter macrocephalus (Sperm whale)	Endangered
Balaenoptera physalus (Fin whale)	Endangered
Megaptera novaeangliae (Humpback whale)	Endangered
Trichechas manatus (West Indian manatee)	Endangered

Source: Geo-Marine, Inc. 2001

In addition to identification of wildlife in the field, existing literature sources were used to identify any additional species that may have occurred on the sites but were not observed. Most of the wildlife that occurs in the area are bird and lizard species.

This report includes figures of each site showing the habitat units and subunits, landscaped areas, roadways, and structures where applicable. For each site, a list of plant species observed within the habitat unit is given, as well as a list of observed wildlife species. The location of known federally designated threatened and endangered species is given. Where applicable, a descriptive comparison of wildlife utilization between the site habitat and reference site habitat is given with a generalized food web applicable to each habitat unit.

4.0 RESULTS AND DISCUSSION

4.1 NATURAL HABITAT DESCRIPTION

Mean annual precipitation on Vieques is 45 inches, with the wet season extending from May to November and the dry season from December to April. Relative humidity in Vieques averages about 75%. Mean annual temperature is about 79.8°F with a record low of 60°F and a high of 98°F. The western part of the island is wetter than the eastern portion. Vegetation on the western part, where a portion of this survey took place, is mesic in nature.

Vieques lies within the subtropical dry forest life zone, covering about 66% of the island and the subtropical moist forest life zone at the higher elevations (Ewel and Whitmore 1973). Nine vegetation types have been identified on Vieques: (1) sandy beach; (2) beach scrub; (3) dry evergreen beach woodland; (4) mixed dry evergreen and deciduous woodland of the rocky coastal slopes; (5) ucar forest; (6) seasonal forests of high moisture areas such as ravines and drainage areas; (7) moist deciduous formation of the inner hills and slopes; (8) thorn scrub; and (9) mangroves. The vast majority of Navy land at Vieques is undeveloped and supports a variety of habitat types with thorn scrub communities the most common and interspersed with forested ravines and other upland forest types. Mangrove swamps, lagoons, coconut flats, and salt/sand flats occur along coastal areas.

The original dominant vegetation where the surveys took place was subtropical dry forest with subunits of thorn scrub, sandy beach, and mixed forests along the coast referred to as "coastal forest." Small subunits of mixed mangrove and seasonal forests were present near lagoons. Today all that remains are areas of highly modified disturbed vegetation at most of the sites that included former buildings, foundations, roadways, parking areas, trails, grassy areas, and quarries.

4.2 Protected Species

Cobana negra (*Stahlia monosperma*), a federally threatened tree, has been found between the boundary of black mangrove (*Avicennia germinans*) communities, salt flats, and the upland communities in the NASD and in the EMA. This species is also known to occur in coastal forests of southeastern Puerto Rico (Little and Wadsworth 1964). Based on recent surveys conducted within the NASD by Geo-Marine, Inc., there were only two locations where cobana negra is found (Wilkinson and Cubina 2000); neither of the two locations are located within the sites evaluated as part of this report. The preferred habitat for cobana negra was not thought to be present at the PI/PAOC sites discussed in this report.

The threatened Arctic peregrine falcon (*Falco peregrinus tundrius*) has been observed at former Naval Site Roosevelt Roads (NSRR) (GMI 1998). This species utilizes open grassland areas for potential feeding areas. The brown pelican (*Pelecanus occidentalis occidentalis*) and the roseate tern (*Sterna dougalli dougallii*) are not likely to utilize this terrestrial site but may be seen nearby due to the proximity of nearby marine habitat.

4.3 AOC-R (Former Construction Staging Area)

4.3.1 Site Description

AOC-R, the Former Construction Staging Area, located north and south of Highway 200 near a pump station was approximately 12 ac in size (**Figure 3**). There were two dirt trails leading to the site; one ran along the western edge of the site and one ran diagonally along the eastern edge of the site. Several habitats and man-made structure components were present. The southern boundary of the site was adjacent to a grassy mowed area along Highway 200. A pump station was inset about midway along the road. Behind the grassy area was a dense, scrubby, brushy area. A large concrete pad was located north of this scrub and extended the full width of the site. The pad was completely vegetated in the 1999 aerial photographs but in January 2001 during a previous survey the pad was sparsely covered with vines and weeds. Currently the pad is densely covered with vegetation. The vegetation surrounding the concrete pad had been cleared in the past. The western dirt path led past the concrete pad to a northern area that was separated from the pad by dense thorn scrub and coastal forest. The site is by secondary plant communities consisting of dense growth of vines, shubs, and herbaceous plants.

4.3.2 Vegetation Community Description

Although the concrete pad area had been cleared, a large number of weeds and vines were observed growing on top of the concrete pad and its surroundings The concrete pad was dominated by woody vegetation and vines. The original vegetation community at AOC-R from the road to near the coast is practically nonexistent. The area is covered by secondary communities consisting of an open mixture of

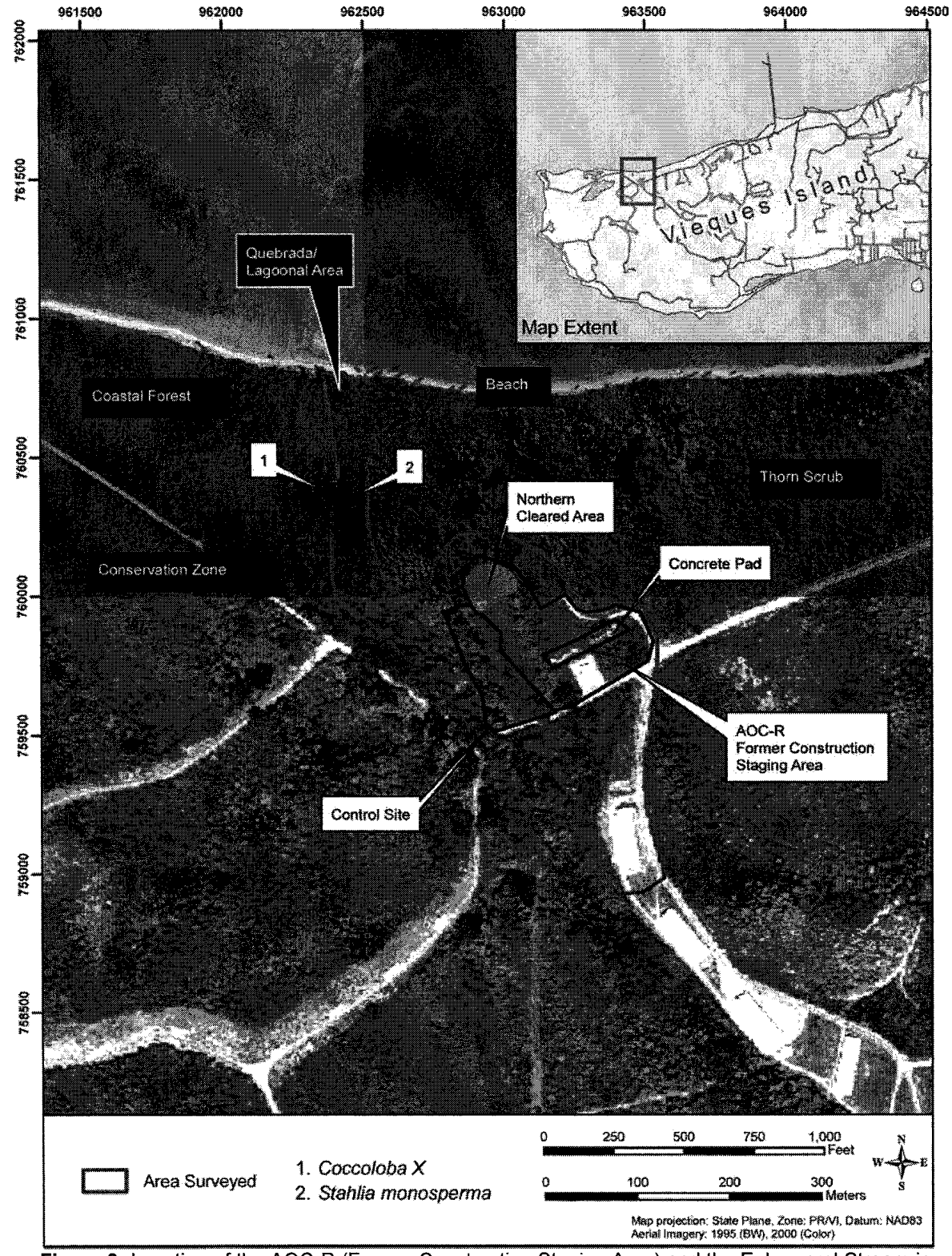

Figure 3. Location of the AOC-R (Former Construction Staging Area) and the Ephemeral Stream in the Former NASD.

native and invasive trees with an impressive overgrowth of vines and opportunistic shrubs and herbaceous plants. There are also open patches, grasses patches, densely covered with weedy plants. Much less disturbed and thus, much more interesting is the creek or ephemeral stream that borders the site on the west side. There are several native species that occur along this riparian area. On the east bank there is one large individual of a hybrid *Coccoloba* species (N 18 07' 05.6" and W 65 33' 04.4") that has been recorded recently on the east end of the island in the former Live Impact Area (LIA). On the west bank near the inland edge of the mangrove community we discovered two individuals of *Stahlia monosperma* (N18 07' 05.7' and W 65 33' 05.1") There were 140 plant species recored in this area, primarily weedy herbaceous invasive species (**Table 2**).

Table 2
List of All Plants Recorded in the AOC-R and AOC-J (in part) of the Former NASD, Vieques, 19 September 2005 (140 Species Total)

Family	Species	Common Name(s)
MIMOSACEAE	*Acacia farnesiana* (L.) Willd.	Aroma; Casha
MIMOSACEAE	*Acacia retusa* (Jacq.) Howard	Acacia zarza
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
FABACEAE	*Andira inermis* (W. Wr.) DC.	Moca; Angelin tree
POLYGONACEAE	*Antigonon leptopus* Hook & Arn.	Bellísima; Love chain
CAESALPINACEAE	*Bauhinia monandra* Kurz	Mariposa; Butterfly Bauhinia
ASTERACEAE	*Bidens alba* (L.) DC. var. (CH. Schulz) Melchert	Margarita
NYCTAGINACEAE	*Boerhavia diffusa* L.	Mata pavo; Hog-weed
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
BORAGINACEAE	*Bourreria succulenta* Jacq.	Palo de vaca
POACEAE	*Brachiaria fasciculata* (Sw.) S. T. Blake	----
POACEAE	*Brachiaria* sp.	----
COMBRETACEAE	*Bucida buceras* L.	Úcar
BURSERACEAE	*Bursera simaruba* (L.) Sarg.	Almácigo
BRASSICACEAE	*Cakile lanceolata* (Willd.) O. E. Schulz	Mostacilla; Sea-rocket
COMMELINACEAE	*Callisia repens* (Jacq.) L.	Cohitre enano
FABACEAE	*Canavalia rosea* (Sw.) DC.	Canavalia; Bay-bean
CAPPARACEAE	*Capparis hastata* Jacq.	Burro; Broad-leaved caper
SOLANACEAE	*Capsicum annuum* L. var. *glabriusculum* (Dunal) H. & P.	Ají picante; Bird pepper
CARICACEAE	*Carica papaya* L.	Lechosa, Papaya; Papaw
FLACOURTIACEAE	*Casearia guianensis* (Aubl.) Urban	Cafeíllo; Wild coffee
MORACEAE	*Cecropia schreberiana* Miq.	Yagrumo hembra; Trumpet tree
ULMACEAE	*Celtis trinervia* Lam.	Almez, Ruiseñor
POACEAE	*Cenchrus incertus* M. A. Curtis	Abrojo de dunas; Sand bur grass
FABACEAE	*Centrosema pubescens* Benth.	Flor de conchitas; Butterfly pea
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce messembryanthemifolia* (Jacq.) Dugand	Lecherito de costa
POACEAE	*Chloris petraea* Sw.	Yerba de dedo; Finger grass
POACEAE	*Chloris radiata* (L.) Sw.	Grama de costa; Plush-grass
MENISPERMACEAE	*Cissampelos pareira* L.	Oreja de ratón
VITACEAE	*Cissus verticillata* (L.) Nicolson & Jarvis	Bejuco de Caro; Pinakoop
VERBENACEAE	*Citharexylum fruticosum* L.	Palo de guitarra; Old woman bitter

Table 2 (Continued)
List of All Plants Recorded in the AOC-R and AOC-J (in part) of the former NASD, Vieques, 19 September 2005 (140 Species Total)

Family	Species	Common Name(s)
RUTACEAE	*Citrus aurantium* L.	Naranja, Naranja agria; Sour orange
POLYGONACEAE	*Coccoloba uvifera* (L.) L.	Uva de playa; Sea grape
POLYGONACEAE	*Coccoloba venosa* L.	Calambreña; Chiguery grape
POLYGONACEAE	*Coccoloba* sp. (hybrid?)	----
ARECACEAE	*Coccothrinax alta* (O. F. Cook) Becc.	Palma plateada; Silver palm
ARECACEAE	*Cocos nucifera* L.	Cocotero; Coconut palm
COMMELINACEAE	*Commelina diffusa* Burm. f.	Cohitre; Blue day flower
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
BORAGINACEAE	*Cordia dentata* Poir.	Capá blanco; White manjack
BORAGINACEAE	*Cordia polycephala* (Lam.) I. M. Johnst.	Basora prieta; Black sage
EUPHORBIACEAE	*Croton astroites* Dryand.	Maná
ASCLEPIDACEAE	*Cryptostegia grandiflora* R. Brown	Bejuco de goma; Rubber vine
CYPERACEAE	*Cyperus alternifolius* L.	Paragüita; Umbrella sage
CYPERACEAE	*Cyperus rotundus* L.	Coquí; Nut grass
FABACEAE	*Dalbergia ecastaphyllum* (L.) Taub.	Maraimaray
EUPHORBIACEAE	*Dalechampia scandens* L.	----
CAESALPINACEAE	*Delonix regia* (Bojer in Hook.) Raf.	Flamboyán; Flamboyant
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
DIOSCOREACEAE	*Dioscorea alata* L.	Ñame de agua; White yam
BIGNONIACEAE	*Distictis lactiflora* (Vahl) DC.	Liana fragante
ERYTHROXYLACEAE	*Erythroxylum brevipes* DC.	Brisselet
MYRTACEAE	*Eugenia biflora* (L.) DC.	Hoja menuda; Black rod-wood
EUPHORBIACEAE	*Euphorbia heterophylla* L.	Acerca amor
MORACEAE	*Ficus citrifolia* P. Miller	Jagüeillo; Boislaglu
FABACEAE	*Galactia striata* (Jacq.) Urban	----
RHAMNACEAE	*Gouania lupuloides* (L.) Urban	Bejuco de indio; Soap stick
NYCTAGINACEAE	*Guapira fragans* (Dum.-Cours.) Little	Corcho; Black mampoo
STERCULIACEAE	*Guazuma ulmifolia* Lam.	Guácima; Bastard cedar
AMARANTHACEAE	*Hymenocallis caribaea* (L. emend Gawl.) Herb.	Lirio blanco; Spider lily
LAMIACEAE	*Hyptis capitata* Jacq.	Botoncillo negro; Wild hops
MIMOSACEAE	*Inga laurina* (Sw.) Willd.	Guamá; Pomshock
CONVOLVULACEAE	*Ipomoea alba* L.	Bejuco de vaca; Moon-vine
CONVOLVULACEAE	*Ipomoea hederifolia* L.	Cambustera
CONVOLVULACEAE	*Ipomoea nil* (L.) Roth.	Bejuco de gloria
CONVOLVULACEAE	*Ipomoea tiliacea* (Willd.) Choisy in DC.	Bejuco blanco; Goat foot
CONVOLVULACEAE	*Ipomoea violacea* L.	Bejuco de luna; COSAT moon-vine
OLEACEAE	*Jasminum fluminense* Vell.	Jasmín oloroso
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona
RHAMNACEAE	*Krugiodendron ferreum* (Vahl) Urban	Bariaco; Black iron-wood
COMBRETACEAE	*Laguncularia racemosa* (L.) Gaertn.	Mangle blanco; Mangrove
POACEAE	*Lasiacis ligulata* Hitch. & Chase	Millo trepador
MIMOSACEAE	*Leucaena leucocephala* (Lam.) De Wit	Acacia pálida; Wild tamarind

Table 2 (Continued)
List of All Plants Recorded in the AOC-R and AOC-J (in part) of the former NASD, Vieques, 19 September 2005 (140 Species Total)

Family	Species	Common Name(s)
VERBENACEAE	*Lippia nodiflora (L.) Michx.*	Cidrón, Yerba de sapo; Cape-wood
FABACEAE	*Lonchocarpus heptaphyllus* (Poir.) A. DC.	Forteventura, Palo hediondo
ONAGRACEAE	*Ludwigia octovalvis* (Jacq.) Raven	Cangá; Primrose willow
BIGNONIACEAE	*Macfadyena unguis-cati* (L.) A. Gentry	Bejuco de gato; Cat´s claw
FABACEAE	*Macroptilium lathyroides* (L.) Urban	Habichuela parada; Wild bush bean
MALVACEAE	*Malachra alceifolia* Jacq.	Malva de caballo; Bastard okra
ANACARDIACEAE	*Mangifera indica* L.	Mango; Mango tree
SAPINDACEAE	*Melicoccus bijugatus* Jacq.	Quenepa; Ginep
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
STERCULIACEAE	*Melochia tomentosa* L.	Bretónica afelpada
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. f.	Batatilla blanca
MIMOSACEAE	*Mimosa pudica* L.	Moriviví; Sensitive plant
CUCURBITACEAE	*Momordica charantia* L.	Cundeamor; Wild balsam apple
NYCTAGINACEAE	*Neea buxifolia* (Hook.f.) Heimerl	Nea, Nia; Neea
ORCHIDIACEAE	*Oeceoclades maculata* (Lindley) Lindley	Lengua africana
POACEAE	*Panicum laxum* Sw.	Malojillo de monte
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
POACEAE	*Paspalidium geminatum* (Forssk.) Stapf.	Yerba de agua; Water grass
POACEAE	*Paspalum distichum* L.	----
POACEAE	*Paspalum millegrana* Schrad.	Cortadora, Paja brava
POACEAE	*Paspalum virgatum* L.	Cortadero, Matojo blanco
PASSIFLORACEAE	*Passiflora foetida* L.	Tagua-Tagua
PASSIFLORACEAE	*Passiflora suberosa* L.	Flor de pasion
SAPINDACEAE	*Paullinia pinnata* L.	Bejuco de paloma
PHYTOLACACEAE	*Petiveria alliacea* L.	Anamú; Garlic weed
EUPHORBIACEAE	*Phyllanthus niruri* L.	Quinino; Gale of the wind
PIPERACEAE	*Piper aduncum* L.	Higuillo de hoja menuda
PIPERACEAE	*Piper amalago* L.	Higuillo de limón; Shot-shot
NYCTAGINACEAE	*Pisonia aculeata* L.	Uña de gato; Prickly mampoo
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Psychotria nervosa* Sw.	Bálsamo, Palo moro
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
APOCYNACEAE	*Rauvolfia viridis* Willd. ex Roem. & Schultes	Cachimbo blanco; Bitter bush
FABACEAE	*Rhynchosia reticulata* (Sw.) DC.	Frijolillo de monte
PHYTOLACCACEAE	*Rivina humilis* L.	Carmín; Cat´s blood
ACANTHACEAE	*Ruellia tuberosa* L.	Saltaperico; Many-roots
MIMOSACEAE	*Samanea saman* (Willd.) Merrill	Samán; Rain tree
LILIACEAE	*Sansevieria hyacinthoides* (L.) Druce	Lengua de vaca; Sweet Sansevieria
SAPINDACEAE	*Serjania polyphylla* (L.) Radlk.	Bejuco de canastas; Basket wood
FABACEAE	*Sesbania sericea* (Willd.) Link	Papagayo
AIZOACEAE	*Sesuvium portulacastrum* (L.) L.	Verdolaga rosada; Sea purslane

Table 2 (Continued)
List of All Plants Recorded in the AOC-R and AOC-J (in part) of the former NASD, Vieques, 19 September 2005 (140 Species Total)

Family	Species	Common Name(s)
POACEAE	*Setaria geniculata* (Lam.) Beauv.	Arrocillo; Yellow fostail
MALVACEAE	*Sida rhombifoiia L.*	Escoba colorada
POACEAE	*Spartina patens (Ait.) Muhl.*	Yerba de sal; Salt grass
RUBIACEAE	*Spermacoce sp.*	----
LOGANIACEAE	*Spigelia anthelmia* L.	Lombricera; Waterweed
ANACARDIACEAE	*Spondias mombin* L.	Jobo; Hogplum
POACEAE	*Sporobolus jacquemontii* Kunth	Pelo de burro
CAESALPINACEAE	*Stahlia monosperma* (Tul.) Urban	Cóbana negra, Polisandro
MALPIGHIACEAE	*Stigmaphyllon emarginatum* (Cav.) A. Juss.	Bejuco de San Pedro
CAESALPINACEAE	*Tamarindus indica* L.	Tamarindo; Tamarind
MYRTACEAE	*Syzygium malaccensis* (L.) Merr. & Perry	Manzana malaya; Malay apple
COMBRETACEAE	*Terminalia catappa* L.	Almendra; Indian almond
THELYPTERIDACEAE	*Thelypteris tetragona* (Sw.) Small	Helecho
MALVACEAE	*Thespesia populnea* (L.) Soland ex Correa	Emajagüilla; Cork tree
BORAGINACEAE	*Tournefortia hirsutissima* L.	Nigua
EUPHORBIACEAE	*Tragia volubilis* L.	Pringamoza; Stinging vine
ULMACEAE	*Trema micranthum* (L.) Blume.	Guacimilla, Palo de cabra
MELIACEAE	*Trichilia hirta* L.	Retamo; Broomstick
PHYTOLACACEAE	*Trichostigma octandrum* (L.) H. Walt.	Bejuco de nasa
TILIACEAE	*Triumpheta semitriloba* Jacq.	Cadillo de perro
FABACEAE	*Vigna luteola* (Jacq.) Benth.	Frijol silvestre
RUTACEAE	*Zanthoxylum martinicense* (Lam.) DC.	Ayúa, Cenizo; Prickly ash
RUTACEAE	*Zanthoxylum monophyllum* (Lam.) P. Wilson	Carrubio, Espino rubial; Yellow prickle
RHAMNACEAE	*Ziziphus mauritiana* Lam.	Aprín; Indian jujube

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, we distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988). This treatment is strongly supported by molecular data and no doubt will prevail in the future.

4.3.3 Wildlife Description

Several wildlife species were observed utilizing the vegetated areas, concrete pad, edges of the cleared areas, and woody vegetation. The sides of the concrete pad provided shade, foraging areas, and hiding places for the common, garden and spotted anoles, which were abundant. A mongoose was seen crossing a trail in a cleared area. Wildlife observed at AOC-R, and adjacent habitat, presented in **Table 3**.

Habitat for birds included thorn scrub, coastal forest, and the adjacent riparian forest (vegetation along the stream). Many birds were seen along the edges of the cleared area around the concrete pad, along the trails, and were using the vegetation associated with the concrete pad for perches. A total of 16 species of birds were seen at the AOC-R site during this survey,and an additional 6 species during a previous survey. An additional six species were found along the riparian site. The most common birds at the site were gray kingbirds, bananaquits, and greater Antillean grackles. Bird species included those that would typically be found in coastal forest and thorn scrub habitat. A Brown pelican was observed flying along the coast north of the site.

Table 3
Wildlife Observed at AOC-R and in the Adjacent Quabrada

Common Name	Scientific Name	AOC-R	Adjacent Habitat
Mammals			
Mongoose	*Herpestes auropunctatus*	X	
Reptiles and Amphibians			
Anole (Common Lizard)	*Anolis cristatellus*	X	X
Grass Anole (Garden Lizard)	*Anolis pulchellus*	X	X
Anole (Spotted Lizard)	*Anolis stratulus*	X	X
Birds			
Green Mango	*Anthracothorax viridis*	X	
Great Egret	*Ardea alba*		X
Great Blue Heron	*Ardea herodias*		X
Green Heron	*Butorides virescens*	X	
Mangrove Cuckoo	*Coccyzus minor*		X
Bananaquit	*Coereba flaveola*	X	X
Scaly-naped pidgeon	*Columba squamosa*		x
Common ground Dove	*Columbina passerina*	X	X
Smooth-billed Ani	*Crotophaga ani*	X	X
Adelaide's Warbler	*Dendroica adelaidae*	X	X
Caribbean Elaenia	*Elaenia martinica*		X
Magnificent Frigatebird	*Fregata magnificens*		X
Puerto Rico Woodpecker	*Melanerpes portoricensis*	X	X
Puerto Rican Flycatcher	*Myiarchus antillarum*		X
Yellow-crowned Night-Heron	*Nyctanassa violacea*	X	
Antillean-crested Hummingbird	*Orthorhyncus cristatus*	X	
Osprey	*Pandion haliaetus*		X
Cave swallow	*Pterochelidon fulva*		X
Greater Antillean Grackle	*Quiscalus niger*	X	X
Puerto Rican Lizard Cuckoo	*Saurothera vieilloti*		X
Black-faced Grassquit	*Tiaris bicolor*	X	
Yellow-faced Grassquit	*Tiaris olivacea*		X
Loggerhead Kingbird	*Tyrannus caudifasciatus*	X	X
Gray Kingbird	*Tyrannus dominicensis*	X	X
Pin-tailed Whydah	*Vidua macroura*	X	
White-winged dove	*Zenaida asiatica*	X	X
Zenaida Dove	*Zenaida aurita*	X	X

4.3.4 Protected Species

The site was located within thorn scrub and mixed coastal forest habitat. There were no federally protected species or preferred habitats observed at this upland site. However, along the adjacent stream bank on the west side there were two individuals of *Stahlia monosperma.* On the west bank near the inland edge of the mangrove community we discovered two individuals of *Stahlia monosperma* (N18 07' 05.7' and W 65 33' 05.1") This is a new site for this species, althought there are two previously recorded sites along the north shore in the former NASD. On the east bank there is one large individual of a hybrid *Coccoloba* species (N 18 07' 05.6" and W 65 33' 04.4") that has been recorded recently on the east end of the island in the former LIA, although this plant is of scientific interest it has no protected status.

4.4 PAOC-S (FORMER POL PIPELINE)

4.4.1 Site Description

This site parallels existing roads from near the shoreline to where it exits near the east end of the airstrip (**Figure 4**). The terrain was modified to create a level site for placement of the pipeline. We could not determine where the original pipeline was located since it has been taken out of service. Much of the old pipe is scattered on other side of what appears to be the original pipeline route.

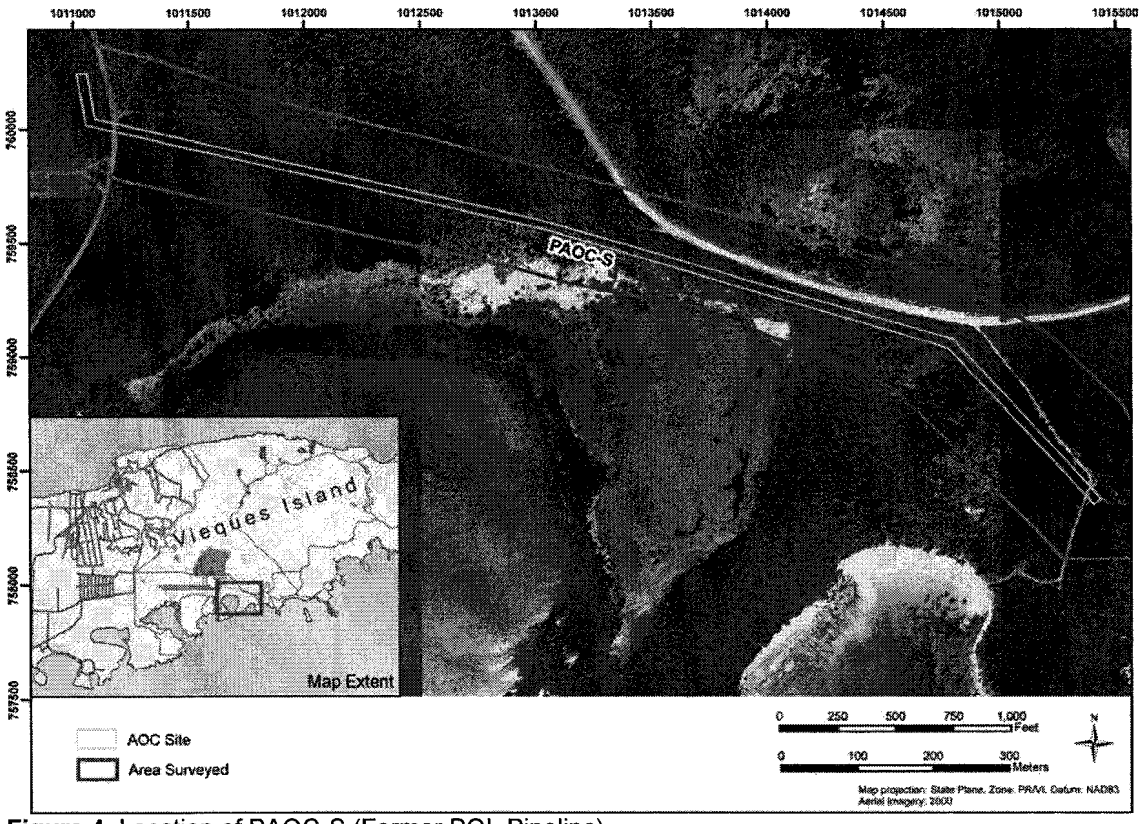

Figure 4. Location of PAOC-S (Former POL Pipeline).

4.4.2 Vegetation Community Description

The original plant community along the road was obviously cleared years ago when the pipeline was constructed. Currently, there are rocky mounds, leveled ground, built up areas, as well as other evidences of substrate disturbance (e.g., by bulldozer activity). The vegetation is basically a thorn scrub dominated by opportunistic acacias and *Prosopis*. There are many weedy invaders and at places there is a nearly continuous herbaceous layer. The pipeline borders a black mangrove forest (mangrove fringe of Bahia Tapon) for much of its length; however, previous wetlands examinations in this area have noted the pipeline and reported that no *Stahlia* trees were present in the available habitat at the edge of the tidal community. There were 116 plant species recorded along the pipeline route (**Table 4**). Most of which were invasive species that are characteristic of young secondary forest found on Vieques.

4.4.3 Wildlife Description

Several common wildlife species were observed utilizing the vegetated areas, pipes, edges of the cleared areas, and soil piles, and vegetation. Wildlife observed at PAOC-S, and adjacent habitat, is presented in **Table 5**.

Table 4
List of All Plants Recorded in the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005 (116 Species Total)

Family	Species	Common Name(s)
MALVACEAE	*Abutilon umbellatum* (L.) Sweet	Malvavisco cimarrón
MIMOSACEAE	*Acacia retusa* (Jacq.) Howard	Acacia zarza
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
AMARANTHACEAE	*Achyrantes aspera* L.	Rabo de gato; Man-better man
EUPHORBIACEAE	*Adelia ricinella* L.	Escambrón
RUTACEAE	*Amyris elemifera* L.	Cuabilla
AVICENNIACEAE	*Avicennia germinans* (L.) L.	Mangle negro; Black mangrove
BATIDACEAE	*Batis maritima* L.	Barilla; Salt wort
NYCTAGINACEAE	*Boerhavia coccinea* Mill.	Mata de pavo
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
BORAGINACEAE	*Bourreria succulenta* Jacq.	Palo de vaca
POACEAE	*Bouteloua americana* (L.f.) Scribn.	Yerba mesquite
POACEAE	*Brachiaria adspersa* (Trin.) Parodi	Millito; Brown top millet
POACEAE	*Brachiaria* sp.	----
BURSERACEAE	*Bursera simaruba* (L.) Sarg.	Almácigo
CAPPARACEAE	*Capparis flexuosa* (L.) L.	Palinguán; Caper tree
CAPPARACEAE	*Capparis indica* (L) Fawc. & Rendle	Sapo prieto; Linguam
SCROPHULARIACEAE	*Capraria biflora* L.	Té del país; Goat weed
SOLANACEAE	*Capsicum annuum* L. var. *glabriusculum* (Dunal) H. & P.	Ají picante; Bird pepper
SAPINDACEAE	*Cardiospermum microcarpum* HBK	Farolito; Ballon vine
FLACOURTIACEAE	*Casearia guianensis* (Aubl.) Urban	Cafeíllo; Wild coffee
POACEAE	*Cenchrus echinatus* L.	Abrojo; Bur grass
FABACEAE	*Centrosema pubescens* Benth.	Flor de conchitas; Butterfly pea
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
CAESALPINACEAE	*Chamaecrista nictitans* (L.) Moench ssp. *Nictitans*	Moriviví bobo
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce hyssopifolia* (L.) Small	Lechera
POACEAE	*Chloris inflata* Link	Horquetilla morada; Blue grass
POACEAE	*Chloris radiata* (L.) Sw.	Grama de costa; Plush-grass
VITACEAE	*Cissus trifoliata* L.	Caro costero
VITACEAE	*Cissus verticillata* (L.) Nicolson & Jarvis	Bejuco de Caro; Pinakoop
VERBENACEAE	*Citharexylum fruticosum* L.	Palo de guitarra; Old woman bitter
VERBENACEAE	*Clerodendron aculeatum* (L.) Schlecht.	Botón de oro; Crab prickly
FABACEAE	*Clitoria ternatea* L.	Bejuco de conchitas
ARECACEAE	*Coccothrinax alta* (O. F. Cook) Becc.	Palma plateada; Silver palm
RHAMNACEAE	*Colubrina arborescens* (Mill.) Sarg.	Abeyuelo, Sanguinaria; Greenheart
COMMELINACEAE	*Commelina diffusa* Burm. F.	Cohitre; Blue day flower
CONVOLVULACEAE	*Convolvulus nodiflorus* Desr.	Aguinaldo blanco
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
FABACEAE	*Crotalaria lotifolia* L.	Cascabelillo axilar
EUPHORBIACEAE	*Croton astroites* Dryand.	Maná

Table 4 (Continued)
List of All Plants Recorded in the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005 (116 Species Total)

Family	Species	Common Name(s)
EUPHORBIACEAE	*Croton betulinus* Vahl	----
EUPHORBIACEAE	*Croton discolor* Willd.	Lechecillo
EUPHORBIACEAE	*Croton rigidus* (Muell. Arg.) Britton	Guayacancillo; Yellow balsam
ASCLEPIDACEAE	*Cryptostegia grandiflora* R. Brown	Bejuco de goma; Rubber vine
EUPHORBIACEAE	*Dalechampia scandens* L.	----
POACEAE	*Digitaria bicornis* (L.) R. & S.	----
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
POACEAE	*Digitaria* sp.	----
BIGNONIACEAE	*Distictis lactiflora* (Vahl) DC.	Liana fragante
CELASTRACEAE	*Elaeodendrum xylocarpum* (Vent.) DC.	Coscorrón; Marble-tree
OLEACEAE	*Forestiera segregata* (Jacq.) Krug & Urban	Florida privet, Ink-bush
FABACEAE	*Galactia dubia* DC.	----
FABACEAE	*Galactia striata* (Jacq.) Urban	----
RHAMNACEAE	*Gouania lupuloides* (L.) Urban	Bejuco de indio; Soap stick
NYCTAGINACEAE	*Guapira fragans* (Dum.-Cours.) Little	Corcho; Black mampoo
BORAGINACEAE	*Heliotropium indicum* L.	Cotorrera; Indian heliotrope
CACTACEAE	*Hylocereus trigonus* (Haw.) Safford.	Pitajaya; Night blooming cereus
FABACEAE	*Indigofera suffruticosa* Miller	Añil; Índigo
CONVOLVULACEAE	*Ipomoea hederifolia* L.	Cambustera
CONVOLVULACEAE	*Ipomoea triloba* L.	Bejuquillo de puerco
CONVOLVULACEAE	*Jacquemontia havanensis* (Jacq.) Urban	Aguinaldo de costa
THEOPHRASTACEAE	*Jacquinia armillaris* Jacq.	Azúcares
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona
RHAMNACEAE	*Krugiodendron ferreum* (Vahl) Urban	Bariaco; Black iron-wood
COMBRETACEAE	*Laguncularia racemosa* (L.) Gaertn.	Mangle blanco; Mangrove
VERBENACEAE	*Lantana camara* L.	Cariaquillo; Yellow sage
VERBENACEAE	*Lantana involucrata* L.	Santa María; Button sage
MIMOSACEAE	*Leucaena leucocephala* (Lam.) De Wit	Acacia pálida; Wild tamarind
VERBENACEAE	*Lippia nodiflora* (L.) Michx.	Cidrón, Yerba de sapo; Cape-wood
BIGNONIACEAE	*Macfadyena unguis-cati* (L.) A. Gentry	Bejuco de gato; Cat´s claw
MALVACEAE	*Malvastrum* sp.	----
SAPINDACEAE	*Melicoccus bijugatus* Jacq.	Quenepa; Ginep
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
STERCULIACEAE	*Melochia pyramidata* L.	Bretónica piramidal
STERCULIACEAE	*Melochia tomentosa* L.	Bretónica afelpada
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. F.	Batatilla blanca
CACTACEAE	*Opuntia repens* Bello	Olaga; Suckers
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
POACEAE	*Paspalum vaginatum* Sw.	----
PASSIFLORACEAE	*Passiflora suberosa* L.	Flor de pasion
FABACEAE	*Pictetia aculeata* (Vahl) Urban	Tachuelo; Fustic
CACTACEAE	*Pilosocereus royenii* (L.) Byles & Rowley	Dildo; Organ pipe
FABACEAE	*Piscidia carthagenensis* Jacq.	Ventura; Fish poison
NYCTAGINACEAE	*Pisonia subcordata* Sw.	Corcho blanco; Water mampoo

Table 4 (Continued)
List of All Plants Recorded In the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005 (116 Species Total)

Family	Species	Common Name(s)
MIMOSACEAE	*Pithecellobium unguis-cati* (L.) Mart.	Escambrón colorado; Black bean
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
APOCYNACEAE	*Rauvolfia viridis* Willd. Ex Roem. & Schultes	Cachimbo blanco; Bitter bush
RHIZOPHORACEAE	*Rhizophora mangle* L.	Mangle rojo; Red mangrove
FABACEAE	*Rhynchosia minima* (L.) DC.	Frijolillo
FABACEAE	*Rhynchosia reticulata* (Sw.) DC.	Frijolillo de monte
PHYTOLACCACEAE	*Rivina humilis* L.	Carmín; Cat´s blood
ACANTHACEAE	*Ruellia tuberosa* L.	Saltaperico; Many-roots
CELASTRACEAE	*Schaefferia frutescens* Jacq.	Cafeíllo; Florida boxwood
SAPINDACEAE	*Serjania polyphylla* (L.) Radlk.	Bejuco de canastas; Basket wood
MALVACEAE	*Sida cordifolia* L.	Escoba acorazonada
MALVACEAE	*Sida stipularis* Cav.	Escoba blanca; Wire weed
MALVACEAE	*Sidastrum multiflorum* (Jacq.) Fryxell	Sidastro
SAPOTACEAE	*Sideroxylon obovatum* Lam.	Alquitrán; Break hill
SOLANACEAE	*Solanum lanceifolium* Jacq.	Tomatillo de paloma
POACEAE	*Spartina patens* (Ait.) Muhl.	Yerba de sal; Salt grass
POACEAE	*Sporobolus jacquemontii* Kunth	Pelo de burro
VERBENACEAE	*Stachytarpheta jamaicensis* (L.) Vahl	Bretónica
MALPIGHIACEAE	*Stigmaphyllon emarginatum* (Cav.) A. Juss.	Bejuco de San Pedro
FABACEAE	*Stylosanthes hamata* (L.) Taubert in Verh.	Zarzabacoa enana; Pencil flower
FABACEAE	*Tephrosia cinerea* (L.) Pers.	Añil cenizo
BROMELIACEAE	*Tillandsia fasciculata* Sw.	Nido parásito; Bunch moss
BORAGINACEAE	*Tournefortia volubilis* L.	Nigua enredadera
EUPHORBIACEAE	*Tragia volubilis* L.	Pringamoza; Stinging vine
POACEAE	*Tragus berteronianus* Schult.	Hincadora; Prickle grass
PHYTOLACACEAE	*Trichostigma octandrum* (L.) H. Walt.	Bejuco de nasa
FABACEAE	*Vigna luteola* (Jacq.) Benth.	Frijol silvestre
MALVACEAE	*Wissadula periplocifolia* (L.) Presl	Pichona
RUTACEAE	*Zanthoxylum monophyllum* (Lam.) P. Wilson	Carrubio, Espino rubial; Yellow prickle
COMMELINACEAE	Indet.*	----

*In sterile condition (no flowers or fruits available for determination)

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, we distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988).

Table 5
List of All Animals Recorded in the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005

Common Name	Scientific Name	POCS
Mammals		
Mongoose	*Herpestes auropunctatus*	x
Reptiles and Amphibians		
Anole (Common Lizard)	*Anolis cristatellus*	x
Grass Anole (Garden Lizard)	*Anolis pulchellus*	x
Anole (Spotted Lizard)	*Anolis stratulus*	x
Birds		
Green Mango	*Anthracothorax viridis*	x
Cattle Egret	*Bubulcus ibis*	x
Green Heron	*Butorides virescens*	x
Killdeer	*Charadrius vociferus*	x
Mangrove Cuckoo	*Coccyzus minor*	x
Bananaquit	*Coereba flaveola*	x
Scaly-naped pidgeon	*Columba squamosa*	x
Adelaide's Warbler	*Dendroica adelaidae*	x
Caribbean Elaenia	*Elaenia martinica*	x
Scaly-Breasted Thrasher	*Margarops fuscus*	x
Puerto Rico Woodpecker	*Melanerpes portoricensis*	x
Northern Mockingbird	*Mimus polyglottos*	x
Yellow-crowned Night-Heron	*Nyctanassa violacea*	x
Greater Antillean Grackle	*Quiscalus niger*	x
Puerto Rican Lizard Cuckoo	*Saurothera vieilloti*	x
Gray Kingbird	*Tyrannus dominicensis*	x
White-winged dove	*Zenaida asiatica*	x

4.4.4 Protected Species

The site was located within thorn scrub and mangrove fringe forest habitat. There were no federally protected species observed at this site. The former pipeline ran near the edge of a mangrove community which appreared to have potential habitat for *Stahlia,* however a extensive search during this field effort and previous searches conducted in 2001 did not find any plants. The orginal construction of the pipeline would have potentially impacted *Stahlia* habitat.

4.5 PAOC J AND K (CAMP GARCIA SITES)

4.5.1 Site Description

This site is located at or adjacent to the former Camp Garcia Area (**Figure 5**). The area is maintained mowed grassland. Around the perimeter of Camp Garcia and parts of the PAOC-J and PAOC-K had been recently scraped of vegetation and pushed into piles to create a clear zone around the fence. The cleared vegetation had not grown back.

4.5.2 Vegetation Community Description

The vegetation at PAOC-J and PAOC-K is a moderately sparse thorn scrub community dominated by Mesquite (*Prosopis juliflora),* aroma *(Acacia farnesian)* and twisted acacia (*A. tortuosa).* These species create a sparse canopy with adequate light penetration for good herbaceous ground cover. Camp Garcia

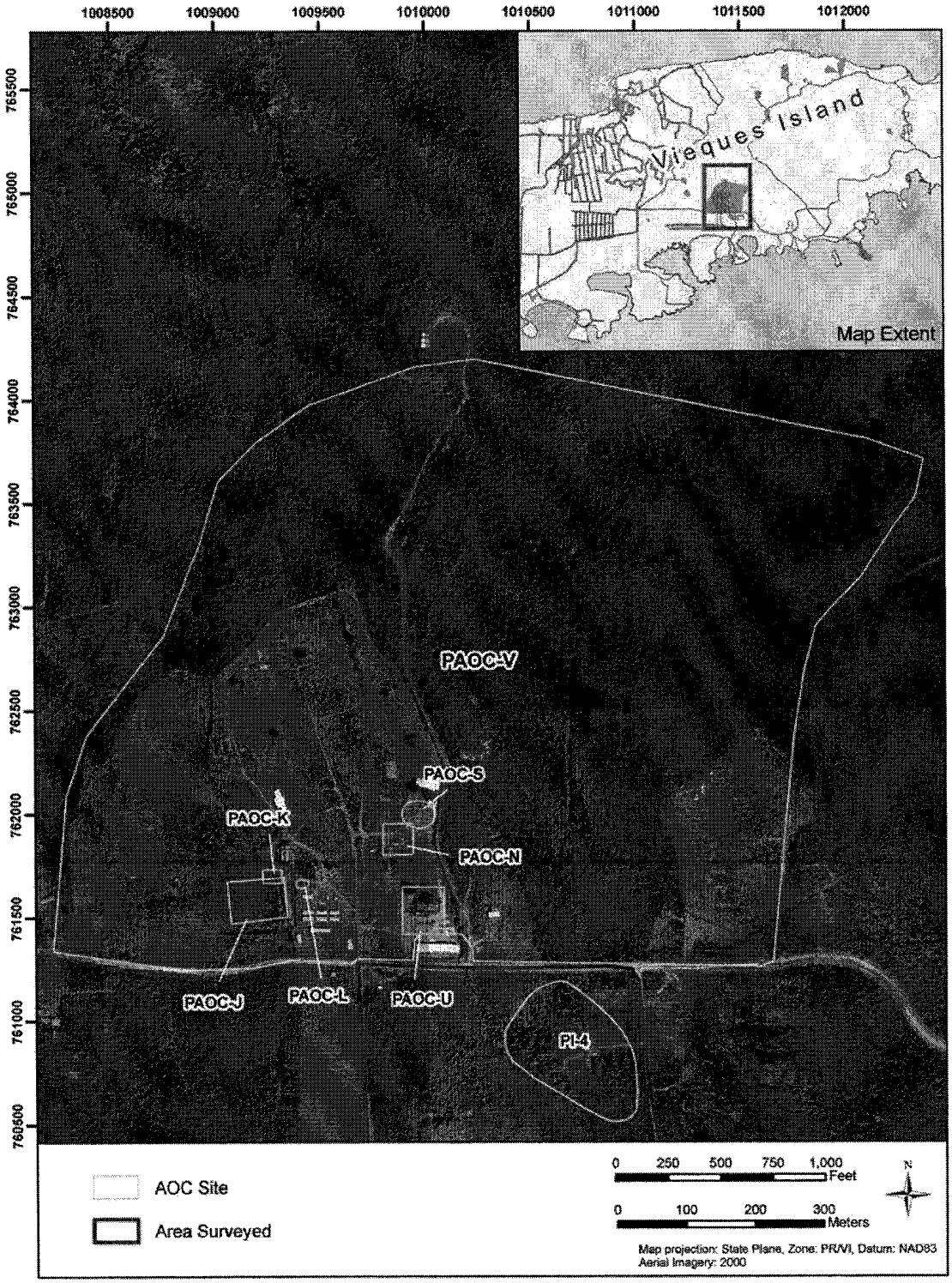

Figure 5. Locations of PAOC J, K and PI-4 at or Adjacent to the Former Camp Garcia Area.

is a combination of a grassy maintained area with few isolated trees around the housing and utilitarian facilities. A wire fence transformed in a sort of paradise for weedy climbers, and a highly disturbed, relatively open area surrounding the whole site, dominated by mesquite and two *Acacia* species. Due to the heavy human impact, this area has the largest percentage of herbaceous and weedy vegetation recored for any of the sites visited (74%). There were 54 species of plants recored for all two sites (**Table 6**).

Table 6
List of All Plants Recorded in the PAOC J and K Areas of the former Camp Garcia Area within the Former VNTR, 20 September 2005 (54 Species Total)

Family	Species	Common Name(s)
MALVACEAE	*Abutilon hirtum* (Lam.) Sweet	Buenos días
MIMOSACEAE	*Acacia farnesiana* (L.) Willd.	Aroma; Casha
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
AMARANTHACEAE	*Achyrantes aspera* L.	Rabo de gato; Man-better man
ANNONACEAE	*Annona reticulata* L.	Corazón; Custard apple
NYCTAGINACEAE	*Boerhavia coccinea* Mill.	Mata de pavo
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
ASCLEPIADACEAE	*Calotropis procera* (Ait.) Ait. f.	Algodón de seda; Giant milkweed
SCROPHULARIACEAE	*Capraria biflora* L.	Té del país; Goat weed
CARICACEAE	*Carica papaya* L.	Lechosa, Papaya; Papaw
FLACOURTIACEAE	*Casearia sylvestris* Sw.	Cafeíllo cimarrón, Sarna de perro
POACEAE	*Cenchrus brownii* Roem. & Schult.	Abrojito
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
CAESALPINACEAE	*Chamaecrista diphylla* (L.) Greene	Hediondilla; Wild peaunt
CAESALPINACEAE	*Chamaecrista nictitans* (L.) Moench	Moriviví bobo
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce hyssopifolia* (L.) Small	Lechera
EUPHORBIACEAE	*Chamaesyce prostrata* (Ait.) Small	Lechecillo
POACEAE	*Chloris inflata* Link	Horquetilla morada; Blue grass
CAPPARACEAE	*Cleome gynandra* L.	Jazmín de río; White massambee
CAPPARACEAE	*Cleome viscosa* L.	Volantín amarillo; Yellow massambee
COMMELINACEAE	*Commelina diffusa* Burm. f.	Cohitre; Blue day flower
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
FABACEAE	*Crotalaria incana* L.	Cascabelillo vacio; Shake-shake
FABACEAE	*Crotalaria retusa* L.	Cascabelillo
CUCURBITACEAE	*Cucumis anguria* L.	Pepinillo silvestre
POACEAE	*Cynodon dactylon* (L.) Pers.	Yerba bermuda; Bermuda grass
EUPHORBIACEAE	*Dalechampia scandens* L.	----
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
POACEAE	*Eleusine indica* (L.) Gaertn.	Grama de caballo; wire grass
EUPHORBIACEAE	*Euphorbia heterophylla* L.	Acerca amor
RUBIACEAE	*Hedyotis corymbosa* (L.) Lam.	Graciosa
BORAGINACEAE	*Heliotropium indicum* L.	Cotorrera; Indian heliotrope
CONVOLVULACEAE	*Ipomoea tiliacea* (Willd.) Choisy in DC.	Bejuco blanco; Goat foot
OLEACEAE	*Jasminum fluminense* Vell.	Jasmín oloroso
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona

Table 6 (Continued)
List of All Plants Recorded in the PAOC J and K Areas of the former Camp Garcia Area within the Former VNTR, 20 September 2005 (54 Species Total)

Family	Species	Common Name(s)
VERBENACEAE	*Lantana camara* L.	Cariaquillo; Yellow sage
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. f.	Batatilla blanca
CUCURBITACEAE	*Momordica charantia* L.	Cundeamor; Wild balsam apple
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
POACEAE	*Paspalum fimbriatum* Kunth	Pata de conejo
PASSIFLORACEAE	*Passiflora foetida* L.	Tagua-Tagua
EUPHORBIACEAE	*Phyllanthus amarus* Schumach.	Quinino de pobre
PORTULACACEAE	*Portulaca oleracea* L.	Verdolaga; Purs lane
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
FABACEAE	*Rhynchosia minima* (L.) DC.	Frijolillo
ACANTHACEAE	*Ruellia tuberosa* L.	Saltaperico; Many-roots
MALVACEAE	*Sida abutifolia* Mill.	Escoba tendida
MALVACEAE	*Sida stipularis* Cav.	Escoba blanca; Wire weed
FABACEAE	*Stylosanthes hamata* (L.) Taubert in Verh.	Zarzabacoa enana; Pencil flower
PHYTOLACACEAE	*Trichostigma octandrum* (L.) H. Walt.	Bejuco de nasa
ASTERACEAE	*Tridax procumbens* L.	Pancha, San Juan del monte; Tridax

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, we distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988).

4.5.3 Wildlife Description

Several common wildlife species were observed utilizing the grassy areas and thorn scrub habitat. Wildlife observed at PAOC-J and PAOC-K, and adjacent habitat, are presented in **Table 7**.

4.5.4 Protected Species

The PAOC-K and PAOC-J sites were located in thorn scrub forest habitat. There were no federally protected species or preferred habitats observed at PAOC-K or PAOC-J.

4.6 PI-4 (Former Waste Treatment Site)

4.6.1 Site Description

This site is located south of Camp Garcia across the road and north of the east end of the airfield (**Figure 6**). This site appears to have been a former treatment area for waste. There are numerous concrete foundations, concrete culverts with ditches and piles of rubble and soil.

4.6.2 Vegetation Community Description

Habitat in this area is mostly a man-made *Prosopis/Acacia* successional savanna with a dense, nearly continuous herbaceous layer (*Commelina diffusa)* covering most ground surface including the concrete pads. There are also many invasive shrubs and vines, the great majority of which are weeds (22% of all

Figure 6. Location of PI-4 (Former Waste Treatment Site).

Table 7
List of All Animals Recorded in the former Camp Garcia Area within the Former VNTR, 20 September 2005

Common Name	Scientific Name	PAOC-J,K,S
Mammals		
Mongoose	*Herpestes auropunctatus*	x
Reptiles and Amphibians		
Anole (Common Lizard)	*Anolis cristatellus*	x
Grass Anole (Garden Lizard)	*Anolis pulchellus*	x
Anole (Spotted Lizard)	*Anolis stratulus*	x
Birds		
Bananaquit	*Coereba flaveola*	x
American Kestrel	*Falco sparverius*	x
Northern Mockingbird	*Mimus polyglottos*	x
Puerto Rican Flycatcher	*Myiarchus antillarum*	x
Greater Antillean Grackle	*Quiscalus niger*	x
Gray Kingbird	*Tyrannus dominicensis*	x
Zenaida Dove	*Zenaida aurita*	x

species recorded here correspond to creepers, climbers and vines). Non-leguminous trees are scarce, both in number of species and individuals. These are: *Ziziphus mauritiana*, *Bucida buceras*, *Citharexylum fruticosum*, *Zanthoxylum monophyllum*, *Bursera simaruba*, and *Bourreria succulenta*. Low herbaceous plants dominate the area surrounding the former runway. There were 99 species of plants recorded from this area (**Table 8**).

Table 8
List of All Plants Recorded in the PI-4 and Runway Areas within the former VNTR, 20 September 2005 (99 Species Total)

Family	Species	Common Name(s)
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
EUPHORBIACEAE	*Acalypha indica* L.	----
AMARANTHACEAE	*Achyrantes aspera* L.	Rabo de gato; Man-better man
FABACEAE	*Aeschynomene americana* L.	Yerba Rosario
ASTERACEAE	*Ageratum conyzoides* L. ssp. *conyzoides*	Mentastro, Yerba de cabrío
STERCULIACEAE	*Ayenia insulicola* Cristóbal	----
ASTERACEAE	*Bidens alba* (L.) DC. var. (CH. Schulz) Melchert	Margarita
NYCTAGINACEAE	*Boerhavia coccinea* Mill.	Mata de pavo
NYCTAGINACEAE	*Boerhavia diffusa* L.	Mata pavo; Hog-weed
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
BORAGINACEAE	*Bourreria succulenta* Jacq.	Palo de vaca
POACEAE	*Bouteloua americana* (L.f.) Scribn.	Yerba mesquite
POACEAE	*Brachiaria fasciculata* (Sw.) S. T. Blake	----
POACEAE	*Brachiaria* sp.	----
COMBRETACEAE	*Bucida buceras* L.	Úcar
BURSERACEAE	*Bursera simaruba* (L.) Sarg.	Almácigo
ASCLEPIADACEAE	*Calotropis procera (Ait.) Ait. f.*	Algodón de seda; Giant milkweed
CAPPARACEAE	*Capparis flexuosa* (L.) L.	Palinguán; Caper tree

Table 8 (Continued)
List of All Plants Recorded in the PI-4 and Runway Areas within the former VNTR, 20 September 2005 (99 Species Total)

Family	Species	Common Name(s)
SCROPHULARIACEAE	*Capraria biflora* L.	Té del país; Goat weed
POACEAE	*Cenchrus myosuroides* HBK.	Abrojo de espiga; Spiked-bur grass
FABACEAE	*Centrosema pubescens* Benth.	Flor de conchitas; Butterfly pea
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
CAESALPINACEAE	*Chamaecrista diphylla* (L.) Greene	Hediondilla; Wild peaunt
CAESALPINACEAE	*C. nictitans* ssp. *pattelaria* (Colladon) Irwin & Barneby	Moriviví bobo
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce hyssopifolia* (L.) Small	Lechera
EUPHORBIACEAE	*Chamaesyce turpinii* (Boiss.) Millsp.	Lecherita
POACEAE	*Chloris inflata* Link	Horquetilla morada; Blue grass
POACEAE	*Chloris radiata* (L.) Sw.	Grama de costa; Plush-grass
VITACEAE	*Cissus verticillata* (L.) Nicolson & Jarvis	Bejuco de Caro; Pinakoop
VERBENACEAE	*Citharexylum fruticosum* L.	Palo de guitarra; Old woman bitter
CAPPARACEAE	*Cleome viscosa* L.	Volantín amarillo; Yellow massambee
COMMELINACEAE	*Commelina diffusa* Burm. f.	Cohitre; Blue day flower
TILIACEAE	*Corchorus hirsutus* L.	Malvaté
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
FABACEAE	*Crotalaria retusa* L.	Cascabelillo
CUCURBITACEAE	*Cucumis anguria* L.	Pepinillo silvestre
FABACEAE	*Dalbergia ecastaphyllum* (L.) Taub.	Maraimaray
EUPHORBIACEAE	*Dalechampia scandens* L.	----
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
POACEAE	*Eragrostis pilosa* (L.) Beauv.	----
POACEAE	*Eragrostis* sp.	----
CONVOLVULACEAE	*Evolvulus convolvuloides* Stearn	----
FABACEAE	*Galactia dubia* DC.	----
FABACEAE	*Galactia striata* (Jacq.) Urban	----
BORAGINACEAE	*Heliotropium curassavicum* L.	Cotorra de playa; Seaside heliotrope
CONVOLVULACEAE	*Ipomoea indica* (Burm. f.) Merr.	Bejuco de gloria
CONVOLVULACEAE	*Ipomoea tiliacea* (Willd.) Choisy in DC.	Bejuco blanco; Goat foot
CONVOLVULACEAE	*Ipomoea triloba* L.	Bejuquillo de puerco
OLEACEAE	*Jasminum fluminense* Vell.	Jasmín oloroso
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona
VERBENACEAE	*Lantana camara* L.	Cariaquillo; Yellow sage
VERBENACEAE	*Lantana involucrata* L.	Santa María; Button sage
MIMOSACEAE	*Leucaena leucocephala* (Lam.) De Wit	Acacia pálida; Wild tamarind
BIGNONIACEAE	*Macfadyena unguis-cati* (L.) A. Gentry	Bejuco de gato; Cat´s claw
MALVACEAE	*Malvastrum americanum* (L.) Torrey	Malva silvestre
MALVACEAE	*Malvastrum corchorifolium* (Desr.) Britton	Escoba blanca
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
STERCULIACEAE	*Melochia pyramidata* L.	Bretónica piramidal

Table 8 (Continued)
List of All Plants Recorded in the PI-4 and Runway Areas within the former VNTR, 20 September 2005 (99 Species Total)

Family	Species	Common Name(s)
CUCURBITACEAE	*Melothria pendula* L.	Pepinillo
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. f.	Batatilla blanca
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
CAESALPINACEAE	*Parkinsonia aculeata* L.	Palo de rayo; Horsebean, Jerusalem thorn
POACEAE	*Paspalum distichum* L.	----
POACEAE	*Paspalum fimbriatum* Kunth	Pata de conejo
POACEAE	*Paspalum virgatum* L.	Cortadero, Matojo blanco
POACEAE	*Paspalum* sp.	----
PASSIFLORACEAE	*Passiflora suberosa* L.	Flor de pasion
MALVACEAE	*Pavonia spinifex* (L.) Cav.	Cadillo espinoso
EUPHORBIACEAE	*Phyllanthus niruri* L.	Quinino; Gale of the wind
PORTULACACEAE	*Portulaca oleracea* L.	Verdolaga; Purs lane
PORTULACACEAE	*Portulaca quadrifida* L.	Yerba de pollo; Chicken weed
PORTULACACEAE	*Portulaca teretifolia* Kunth	Yerba verdolaga
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
APOCYNACEAE	*Rauvolfia viridis* Willd. ex Roem. & Schultes	Cachimbo blanco; Bitter bush
FABACEAE	*Rhynchosia reticulata* (Sw.) DC.	Frijolillo de monte
PHYTOLACCACEAE	*Rivina humilis* L.	Carmín; Cat´s blood
ACANTHACEAE	*Ruellia tuberosa* L.	Saltaperico; Many-roots
POACEAE	*Setaria geniculata* (Lam.) Beauv.	Arrocillo; Yellow fostail
MALVACEAE	*Sida ciliaris* L.	Escoba peluda, Escoba pestañosa
MALVACEAE	*Sidastrum multiflorum* (Jacq.) Fryxell	Sidastro
POACEAE	*Spartina patens* (Ait.) Muhl.	Yerba de sal; Salt grass
RUBIACEAE	*Spermacoce verticillata* L.	Botón blanco
LOGANIACEAE	*Spigelia anthelmia* L.	Lombricera; Waterweed
POACEAE	*Sporobolus jacquemontii* Kunth	Pelo de burro
VERBENACEAE	*Stachytarpheta jamaicensis* (L.) Vahl	Bretónica
POACEAE	*Stenotaphrum secundatum* (Walt.) Kuntze	Cinta; Crab grass
MALPIGHIACEAE	*Stigmaphyllon emarginatum* (Cav.) A. Juss.	Bejuco de San Pedro
FABACEAE	*Stylosanthes hamata* (L.) Taubert in Verh.	Zarzabacoa enana; Pencil flower
FABACEAE	*Tephrosia cinerea* (L.) Pers.	Añil cenizo
BORAGINACEAE	*Tournefortia volubilis* L.	Nigua enredadera
EUPHORBIACEAE	*Tragia volubilis* L.	Pringamoza; Stinging vine
MALVACEAE	*Urena lobata* L.	Cadillo; Bur
STERCULIACEAE	*Waltheria indica* L.	Basora prieta, Malvavisco
MALVACEAE	*Wissadula periplocifolia* (L.) Presl	Pichona
RUTACEAE	*Zanthoxylum monophyllum* (Lam.) P. Wilson	Carrubio, Espino rubial; Yellow prickle
RHAMNACEAE	*Ziziphus mauritiana* Lam.	Aprín; Indian jujube

*In sterile condition (no flowers or fruits available for determination)

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, I distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988). This treatment is strongly supported by molecular data and no doubt will prevail in the future.

4.6.3 Wildlife Description

Common wildlife species were observed utilizing the vegetated areas, pipes, concrete pads, concrete culverts, edges of the cleared areas, and soil piles, and vegetation. Wildlife observed at PI-4, and adjacent habitat, is presented in **Table 9**.

Table 9
List of All Animals Recorded in the PI-4 Area within the former VNTR, 20 September 2005

Common Name	Scientific Name	PI-4
Mammals		
Mongoose	*Herpestes auropunctatus*	x
Reptiles and Amphibians		
Anole (Common Lizard)	*Anolis cristatellus*	x
Grass Anole (Garden Lizard)	*Anolis pulchellus*	x
Anole (Spotted Lizard)	*Anolis stratulus*	x
Birds		
Cattle Egret	*Bubulcus ibis*	x
Killdeer	*Charadrius vociferus*	x
Mangrove Cuckoo	*Coccyzus minor*	x
Bananaquit	*Coereba flaveola*	x
Scaly-naped pidgeon	*Columba squamosa*	x
Common ground Dove	*Columbina passerina*	x
Smooth-billed Ani	*Crotophaga ani*	x
Adelaide's Warbler	*Dendroica adelaidae*	x
Caribbean Elaenia	*Elaenia martinica*	x
American Kestrel	*Falco sparverius*	x
Scaly-Breasted Thrasher	*Margarops fuscus*	x
Puerto Rico Woodpecker	*Melanerpes portoricensis*	x
Northern Mockingbird	*Mimus polyglottos*	x
Puerto Rican Flycatcher	*Myiarchus antillarum*	x
Antillean-crested Hummingbird	*Orthorhyncus cristatus*	x
Greater Antillean Grackle	*Quiscalus niger*	x
Gray Kingbird	*Tyrannus dominicensis*	x
White-winged dove	*Zenaida asiatica*	x

4.6.4 Protected Species

The site was located within young thorn scrub forest habitat. There were no federally protected species or preferred habitats observed at this site

4.7 PI-7 (FORMER RADAR AND QUARRY SITES)

4.7.1 Site Description

The two PI-7 sites are located northeast of Camp Garcia and east of Vieques township (**Figure 7**). This site appears to have been a former radar and quarry site.

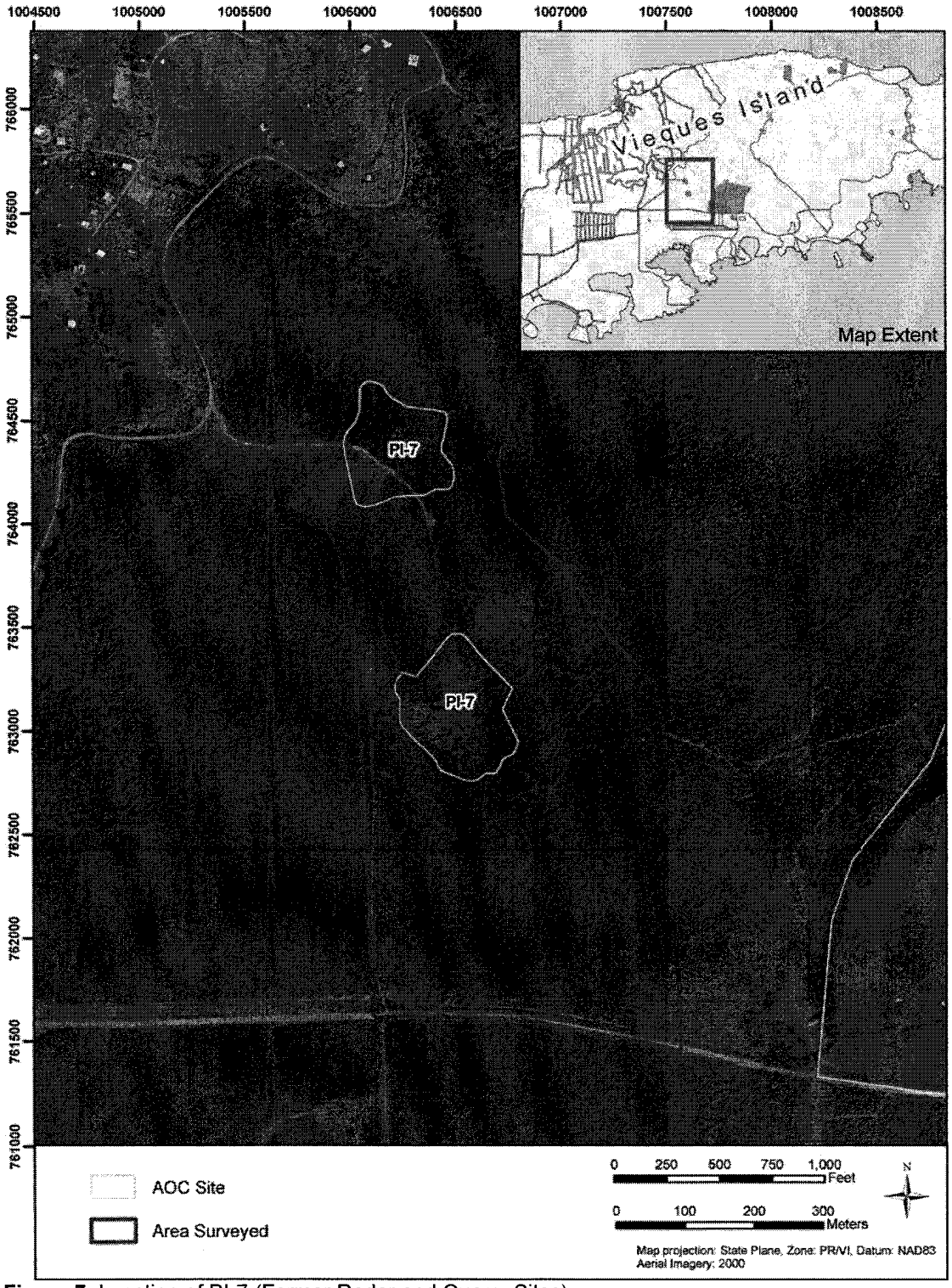

Figure 7. Location of PI-7 (Former Radar and Quarry Sites).

4.7.2 Vegetation Community Description

This site is a mixed woodland/upland forest (moist deciduous formation) which is found mostly on the inner hill and slopes primarily on the western side of Vieques. Dominant vegetation was seasonal forests and woodlands (on the moist humid side of the hills especially along drains and gullies), shrubs, and dense grassland areas on the south and southeastern slopes of radar hill, these were probably established by repeated fires during training activities (GMI 1996; 2001). Common trees are *Andira inermis*, *Prosopis juliflora*, various *Acacia* and *Casearia* species, *Trichilia hirta*, *Cordia collococca*, *Piscidia carthagenensis*, *Bursera simaruba*, *Guapira fragrans*, *Zanthoxylum monophyllum*, *Schaefferia frutescens*, and *Ziziphus mauritiana*. Despite the disturbance of former times and the great number of invasive weeds (mostly along the road and open areas), the site seems to be slowly recovering. There wer 101 plants recorded at these two sites (**Table 10**).

Table 10
List of All Plants Recorded in the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the Former VNTR, 20 September 2005 (101 Species Total)

Family	Species	Common Name(s)
FABACEAE	*Abrus precatorius* L.	Ojo de cangrejo; Crab´s eyes
MALVACEAE	*Abutilon umbellatum* (L.) Sweet	Malvavisco cimarrón
MIMOSACEAE	*Acacia farnesiana* (L.) Willd.	Aroma; Casha
MIMOSACEAE	*Acacia macracantha* Humb. & Bonpl.	Tamarindo silvestre; Tamarind
MIMOSACEAE	*Acacia retusa* (Jacq.) Howard	Acacia zarza
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
AMARANTHACEAE	*Achyrantes aspera* L.	Rabo de gato; Man-better man
FABACEAE	*Andira inermis* (W. Wr.) DC.	Moca; Angelin tree
EUPHORBIACEAE	*Argythamnia fasciculata* (Vahl) Muell. Arg.	----
MALVACEAE	*Bastardia viscosa* (L.) HBK	Escoba babosa; Viscid mallow
NYCTAGINACEAE	*Boerhavia coccinea* Mill.	Mata de pavo
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
POACEAE	*Brachiaria adspersa* (Trin.) Parodi	Millito; Brown top millet
BURSERACEAE	*Bursera simaruba* (L.) Sarg.	Almácigo
CAPPARACEAE	*Capparis flexuosa* (L.) L.	Palinguán; Caper tree
FLACOURTIACEAE	*Cassearia guianensis* (Aubl.) Urban	Cafeíllo; Wild coffee
FLACOURTIACEAE	*Cassearia sylvestris* Sw.	Cafeíllo cimarrón, Sarna de perro
APOCYNACEAE	*Catharanthus roseus* (L.) G. Don	Playera; Periwinkle
POACEAE	*Cenchrus echinatus* L.	Abrojo; Bur grass
FABACEAE	*Centrosema pubescens* Benth.	Flor de conchitas; Butterfly pea
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
CAESALPINACEAE	*Chamaecrista diphylla* (L.) Greene	Hediondilla; Wild peanut
CAESALPINACEAE	*Chamaecrista nictitans* (L.) Moench	Moriviví bobo
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce hyssopifolia* (L.) Small	Lechera
POACEAE	*Chloris inflata* Link	Horquetilla morada; Blue grass
VITACEAE	*Cissus trifoliata* L.	Caro costero
VITACEAE	*Cissus verticillata* (L.) Nicolson & Jarvis	Bejuco de Caro; Pinakoop
VERBENACEAE	*Citharexylum fruticosum* L.	Palo de guitarra; Old woman bitter
ARECACEAE	*Coccothrinax alta* (O. F. Cook) Becc.	Palma plateada; Silver palm
COMMELINACEAE	*Commelina diffusa* Burm. f.	Cohitre; Blue day flower
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
FABACEAE	*Crotalaria falcata* Vahl ex DC.	Matraca; Rattlebox

Table 10 (Continued)
List of All Plants Recorded in the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the Former VNTR, 20 September 2005 (101 Species Total)

Family	Species	Common Name(s)
FABACEAE	*Crotalaria retusa* L.	Cascabelillo
EUPHORBIACEAE	*Croton astroites* Dryand.	Maná
EUPHORBIACEAE	*Croton lobatus* L.	Croto lobulado
BIGNONIACEAE	*Cydista aequinoctialis* (L.) Miers	Bejuco blanco; Guard withe
CYPERACEAE	*Cyperus compressus* L.	----
POACEAE	*Dactyloctenium aegyptium* (L.) Beauv.	Yerba egipcia; Egyptian grass
EUPHORBIACEAE	*Dalechampia scandens* L.	----
MIMOSACEAE	*Desmanthus virgatus* (L.) Willd.	Desmanto
FABACEAE	*Desmodium* sp.	----
POACEAE	*Digitaria bicornis* (L.) R. & S.	----
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
BIGNONIACEAE	*Distictis lactiflora* (Vahl) DC.	Liana fragante
ERYTHROXYLACEAE	*Erythroxylum brevipes* DC.	Brisselet
EUPHORBIACEAE	*Euphorbia heterophylla* L.	Acerca amor
FABACEAE	*Galactia striata* (Jacq.) Urban	----
NYCTAGINACEAE	*Guapira fragans* (Dum.-Cours.) Little	Corcho; Black mampoo
BORAGINACEAE	*Heliotropium indicum* L.	Cotorrera; Indian heliotrope
FABACEAE	*Indigofera suffruticosa* Miller	Añil; Índigo
CONVOLVULACEAE	*Ipomoea indica* (Burm. f.) Merr.	Bejuco de gloria
CONVOLVULACEAE	*Ipomoea tiliacea* (Willd.) Choisy in DC.	Bejuco blanco; Goat foot
CONVOLVULACEAE	*Ipomoea triloba* L.	Bejuquillo de Puerco
OLEACEAE	*Jasminum fluminense* Vell.	Jasmín oloroso
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona
MIMOSACEAE	*Leucaena leucocephala* (Lam.) De Wit	Acacia pálida; Wild tamarind
BIGNONIACEAE	*Macfadyena unguis-cati* (L.) A. Gentry	Bejuco de gato; Cat´s claw
FABACEAE	*Macroptilium lathyroides* (L.) Urban	Habichuela parada; Wild bush bean
MALVACEAE	*Malachra alceifolia* Jacq.	Malva de caballo; Bastard okra
MALVACEAE	*Malvastrum* sp.	----
SAPINDACEAE	*Melicoccus bijugatus* Jacq.	Quenepa; Ginep
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. f.	Batatilla blanca
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
POACEAE	*Paspalum fimbriatum* Kunth	Pata de conejo
EUPHORBIACEAE	*Phyllanthus niruri* L.	Quinino; Gale of the wind
FABACEAE	*Piscidia carthagenensis* Jacq.	Ventura; Fish poison
MIMOSACEAE	*Pithecellobium unguis-cati* (L.) Mart.	Escambrón colorado; Black bean
PORTULACACEAE	*Portulaca oleracea* L.	Verdolaga; Purs lane
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
APOCYNACEAE	*Rauvolfia viridis* Willd. ex Roem. & Schultes	Bitter bush
FABACEAE	*Rhynchosia reticulata* (Sw.) DC.	Frijolillo de monte
PHYTOLACCACEAE	*Rivina humilis* L.	Carmín; Cat´s blood
MIMOSACEAE	*Samanea saman* (Willd.) Merrill	Samán; Rain tree
CELASTRACEAE	*Schaefferia frutescens* Jacq.	Cafeíllo; Florida boxwood
CAESALPINACEAE	*Senna obtusifolia* (L.) Irwin & Barneby	Dormidera, Dormilona

Table 10 (Continued)
List of All Plants Recorded in the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the Former VNTR, 20 September 2005 (101 Species Total)

Family	Species	Common Name(s)
CAESALPINACEAE	*Senna occidentales* (L.) Link	Hedionda; Coffee sena
SAPINDACEAE	*Serjania polyphylla* (L.) Radlk.	Bejuco de canastas; Basket wood
POACEAE	*Setaria setosa* (Sw.) Scribn.	Yerba suave
MALVACEAE	*Sida abutifolia* Mill.	Escoba tendida
MALVACEAE	*Sida ciliaris* L.	Escoba peluda, Escoba pestañosa
MALVACEAE	*Sida cordifolia* L.	Escoba acorazonada
MALVACEAE	*Sida rhombifolia* L.	Escoba colorada
MALVACEAE	*Sidastrum multiflorum* (Jacq.) Fryxell	Sidastro
SAPOTACEAE	*Sideroxylon salicifolium* (L.) Lam.	Sabina; Willow bustic
RUBIACEAE	*Spermacoce verticillata* L.	Botón blanco
POACEAE	*Sporobolus jacquemontii* Kunth	Pelo de burro
VERBENACEAE	*Stachytarpheta jamaicensis* (L.) Vahl	Bretónica
MALPIGHIACEAE	*Stigmaphyllon emarginatum* (Cav.) A. Juss.	Bejuco de San Pedro
FABACEAE	*Stylosanthes hamata* (L.) Taubert in Verh.	Zarzabacoa enana; Pencil flower
FABACEAE	*Tephrosia cinerea* (L.) Pers.	Añil cenizo
EUPHORBIACEAE	*Tragia volubilis* L.	Pringamoza; Stinging vine
MELIACEAE	*Trichilia hirta* L.	Retamo; Broomstick
ASTERACEAE	*Tridax procumbens* L.	Pancha, Tridax
TILIACEAE	*Triumpheta semitriloba* Jacq.	Cadillo de perro
STERCULIACEAE	*Waltheria indica* L.	Basora prieta, Malvavisco
RUTACEAE	*Zanthoxylum monophyllum* (Lam.) P. Wilson	Carrubio, Espino rubial; Yellow prickle
RHAMNACEAE	*Ziziphus mauritiana* Lam.	Aprí; Indian jujube
COMMELINACEAE	Indet.*	----

*In sterile condition (no flowers or fruits available for determination)

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, we distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988

4.7.3 Wildlife Description

Several common wildlife species were observed utilizing woody vines, brush piles and soil piles, and vegetation. Wildlife observed at PI-7 are presented in **Table 11**.

4.7.4 Protected Species

The site was located within thorn scrub forest habitat. There were no federally protected species or preferred habitats observed at this site.

Table 11
List of All Plants Recorded In the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the former VNTR, 20 September 2005

Common Name	Scientific Name	PI-7
Mammals		
Mongoose	*Herpestes auropunctatus*	x
Reptiles and Amphibians		
Anole (Common Lizard)	*Anolis cristatellus*	x
Grass Anole (Garden Lizard)	*Anolis pulchellus*	x
Anole (Spotted Lizard)	*Anolis stratulus*	x
Birds		
Green Mango	*Anthracothorax viridis*	x
Bananaquit	*Coereba flaveola*	x
Scaly-naped pidgeon	*Columba squamosa*	x
Common ground Dove	*Columbina passerina*	x
Smooth-billed Ani	*Crotophaga ani*	x
Adelaide's Warbler	*Dendroica adelaidae*	x
Caribbean Elaenia	*Elaenia martinica*	x
Puerto Rico Woodpecker	*Melanerpes portoricensis*	x
Northern Mockingbird	*Mimus polyglottos*	x
Puerto Rican Flycatcher	*Myiarchus antillarum*	x
Greater Antillean Grackle	*Quiscalus niger*	x
Zenaida Dove	*Zenaida aurita*	x

5.0 LITERATURE CITED

Acevedo-Rodriguez, P. 1996. Flora of St. John; U.S. Virgin Islands. New York Botanical Garden Press. Bronx, New York.

Cronquist, A. 1988. The Evolution and Classification of Flowering Plants. New York Botanical Garden Press; 2nd edition. New York.

Ewel, J.S. and J.L. Whitmore. 1973. Ecological Life Zones of Puerto Rico and the U.S. Virgin Islands. U.S. Department of Agriculture – Forest Service Research Paper ITF – 18. 72 p.

Geo-Marine, Inc. 1996. Land Use Management Plan for U.S. Naval Facilities Vieques, Puerto Rico. Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia.

Geo-Marine, Inc. 1998. Final Integrated Natural Resource Management Plan for U.S. Naval Station Roosevelt Roads, Puerto Rico. Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia.

Geo-Marine, Inc. 2001. Biological Assessment for Continuing Training Activities on the Inner Range, Vieques, Puerto Rico. Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia.

Liogier, H.A. 1985. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 1 Casuarinacae to Connaraceae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. 1988. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 2 Leguminosae to Anacardiaceae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. 1994. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 3. Cyrillaceae to Myrtaceae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. 1995. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 4. Melastomataceae to Lentibulariaceae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. 1997. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 5. Acanthaceae to Compositae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. and L.F. Wadsworth. 1982. Flora of Puerto Rico and Adjacent Islands: A Systematic Synopsis. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Little, E.L., and F.H. Wadsworth. 1964. Common Trees of Puerto Rico and the Virgin Islands. Agriculture Handbook No. 249. U.S. Department of Agriculture, Forest Service, Washington, D.C.

Little, E.L., R. Woodbury, and F.H. Wadsworth. 1964. Trees of Puerto Rico and the Virgin Islands. Vol. 2. Agriculture Handbook No. 449. U.S. Department of Agriculture, Forest Service, Washington, D.C.

Raffaele, H. A. 1989. A Guide to the Birds of Puerto Rico and the Virgin Islands. Princeton University Press, Princeton, New Jersey.

Raffaele, H., J. Wiley, O. Garrido, A. Keith, and J. Raffaele. 1998. A Guide to the Birds of the West Indies. Princeton University Press. Princeton, New Jersey.

Wilkinson, D.L., and A. Cubiña. 2000. Survey of Endangered, Threatened, and Candidate Plant Species, Naval Ammunition Support Department (NASD), Vieques, Puerto Rico. Draft Report. Fajardo, Puerto Rico.