

**ENVIRONMENTAL ASSESSMENT**

**Reintroduction of the Puerto Rican Parrot  
Río Abajo Commonwealth Forest  
Puerto Rico**

**August 2006**

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## **Reintroduction of the Puerto Rican Parrot Río Abajo Commonwealth Forest**

### **SECTION I - PURPOSE AND NEED FOR PROPOSED ACTION**

#### **1.1 PURPOSE**

The US Fish and Wildlife Service and the Puerto Rico Department of Natural and Environmental Resources plan to reintroduce the Puerto Rican Parrot (*Amazona vittata*) at the Río Abajo Forest in the municipality of Utuado, Puerto Rico (Appendix I). The reintroduction is a stated recovery objective of the draft Recovery Plan for the Puerto Rican Parrot. It is aimed at creating a second wild population in the north-central karst region of the island to minimize the species' risk of extinction and foster its recovery.

The purpose of this Environmental Assessment is to consider a range of reintroduction alternatives that have been proposed, evaluated, and discussed among concerned agencies, and to select a preferred alternative. Alternative B is the preferred alternative, which maximizes its ability to restore and manage the population in a portion of the species' historic range and manage the habitat selected for reintroduction with minimal ecological disruption. Cost-effective reintroduction of parrots will maximize benefit to wildlife and provide the most opportunities for public in the form of environmental education and awareness.

#### **1.2 NEED**

The goal of this action is to help achieve the recovery of the Puerto Rican Parrot. Specifically, the goals are to downlist and then delist the species, and assure its long-term viability in the wild. The Puerto Rican parrot is listed as endangered. This endemic species is the only native parrot in the United States and it is considered one of the ten most endangered birds in the world. Presently, 18-20 individuals survive in the wild and are restricted to the Caribbean National Forest in eastern Puerto Rico. Two captive population facilities hold an additional 159 individuals: the Luquillo Aviary and the José L. Vivaldi Aviary in eastern and west-central Puerto Rico, respectively.

The proposed action is a fundamental element of the Puerto Rican Parrot recovery program (Lacy et al. 1989, Muiznieks 2001, FWS 2005). It minimizes the risks of the species' extinction because it is less likely that catastrophic events (e.g., hurricanes), and other threats (e.g., predation), will affect equally and simultaneously two spatially segregated populations. The proposed action is expected to foster the recovery of the species because parrots would be released in an environment that should result in more vigorous population growth than what has characterized the extant wild population at the Caribbean National Forest over the past 35 years.

Actions needed include: 1) release of captive-reared parrots in the Río Abajo Forest, 2) protect and manage the reintroduced population; 3) protect and improve parrot habitat in the Río Abajo Forest; and 4) work with private landowners and stakeholders to develop and implement short and long term habitat conservation programs in the lands surrounding the release area as proposed in the Draft Río Abajo Forest Management Plan (2006).

### 1.3 REQUIRED DECISIONS

The Regional Director will determine whether and how to create the biological and physical conditions necessary to restore the Puerto Rican Parrot to its former range while protecting the ecological integrity of the Río Abajo Forest.

The Service's decision must incorporate measures to protect related resources if action is taken. In the meantime, any decision the Service reaches will include avoidance and minimization measures for reasonably foreseeable adverse impacts. The Service must coordinate and consult with its partners, in particular, the Puerto Rico Department of Natural and Environmental Resources who have management authority over the Río Abajo Forest.

### 1.4 BACKGROUND

Once abundant and widespread throughout the Puerto Rican archipelago, the Puerto Rican parrot (*Amazona vittata*) is presently one of the 10 most endangered birds in the world. Habitat loss together with natural enemies is considered among the major causes for the precipitous decline of the species during the 20th century. Currently, a single wild population of 18-20 individuals survives in the Caribbean National Forest (hereafter Luquillo Mountains.)

Intensive efforts to protect and recover the species started in 1968, a year after the species was designated as endangered by the Secretary of the Interior. In 1973, a captive rearing facility (Luquillo Aviary) was established to prevent the immediate extinction of the species, and later, to rear and foster chicks into wild nests to increase breeding productivity. Given the regularity of hurricane disturbance, a second aviary (José L. Vivaldi Aviary hereafter Vivaldi Aviary) was created in 1993 in the Río Abajo Commonwealth Forest in the limestone lowlands of north-central Puerto Rico to safeguard the population (Lacy et al. 1989). Presently, the two aviaries shelter 220 parrots (including the chicks produced in the 2006 breeding season).

At present, in addition to low numbers and a limited distribution, major threats are nest competition and predation of eggs and chicks by Pearly-eyed thrashers (*Margarops fuscatus*), predation of fledglings and adults by Red-tailed hawks (*Buteo jamaicensis*), predation by rats (*Rattus rattus* and *R. norvegicus*), parasitism by warble flies (*Philornis pici*), and the impact of hurricanes. Other threats include competition for cavities with

European and Africanized honeybees (*Apis mellifera*). Many of the threats have been controlled through management strategies.

The karst region of Puerto Rico, and specifically the Río Abajo Forest, has been identified for the reintroduction of the Puerto Rican Parrot outside the Caribbean National Forest (FWS 2005). Forests in this region receive less precipitation, contain many of the food plant species used by parrots, and harbor a lower density of Red-tailed Hawks ( $0.0023 \pm 0.0005/\text{ha}$ ) than the Caribbean National Forest ( $0.0156 \pm 0.0025/\text{ha}$ ; Cardona et al. 1986, Frank Rivera-Milán unpubl. data, Collazo and Groom 2000, Trujillo 2005). While tree nesting opportunities are not readily available, certainly not as in the Caribbean National Forest (Cardona et al. 1984, Thompson 2000, Trujillo 2005), crevices in the limestone-dominated landscape and artificial nest structures offer suitable alternatives (FWS 2005). The Río Abajo Forest offers two additional advantages as a release site. First, it is a protected area under governmental control, which facilitates the implementation of recovery actions. Second, it harbors the José L. Vivaldi Aviary. Captive birds could serve as a “surrogate” wild population providing a focal point where released birds could converge daily while they adjust to wild conditions, hopefully, prior to expanding their home range, or disperse from the release area.

## **SECTION II - ALTERNATIVES**

### **2.1 ALTERNATIVES NOT CONSIDERED FOR DETAILED ANALYSIS**

#### **2.1.1 – Create a second population within the Caribbean National Forest**

Under this alternative, the fundamental goal of the action would not be accomplished. Specifically, create a second, spatially segregated population of Puerto Rican Parrots. Although the creation of a second sub-population within the Caribbean National Forest is contemplated in the Recovery Plan of the species, its creation does not offset the benefits accrued by spatial segregation and the environmental characteristics (e.g., dryness) of a lowland forested area such as the Río Abajo Forest. At present, available resources and opportunities at the Caribbean National Forest are aimed at releasing captive-reared birds to bolster the extant population. Actions should not be mutually exclusive, but complementary of each other.

### **2.2 ALTERNATIVES ANALYZED IN DETAIL**

The alternatives under consideration include: (A) no action; (B) reintroduce parrots in the Río Abajo Forest; (C) reintroduce parrots in the Cambalache Forest; and (D) reintroduce parrots in the Guajataca Forest. The alternatives are presented separately to highlight salient strengths in terms of suitability and tradeoffs. Detailed site-specific assessments considered for reintroduction are summarized by Trujillo (2005).

### 2.2.1 Alternative A – No Action

Under this alternative, there would be no reintroduction of parrots in the Río Abajo Forest. Recovery activities would continue to be restricted to the Caribbean National Forest.

### 2.2.2 Alternative B – Reintroduce Puerto Rican Parrots in the Río Abajo Forest (Preferred Alternative)

Under this alternative, the Service and the Department of Natural and Environmental Resources would release Puerto Rican Parrots in the Río Abajo Forest starting in the fall of 2006. Population and habitat management would be required to foster establishment and population growth (Appendix II, White et. al., 2005a, White and Vilella, 2004, Snyder et. al. 1987).

### 2.2.3 Alternative C – Reintroduce Puerto Rican Parrots in the Guajataca Forest

Under this alternative, the Service and the Department of Natural and Environmental Resources would release Puerto Rican Parrots in the Guajataca Forest. Population and habitat management would be required to foster establishment and population growth as in Alternative B. The site lacks the benefit of a parrot aviary within its premises.

### 2.2.4 Alternative D – Reintroduce Puerto Rican Parrots in the Cambalache Forest

Under this alternative, the Service and the Department of Natural and Environmental Resources would release Puerto Rican Parrots in the Cambalache Forest. Population and habitat management would be required to foster establishment and population growth as in Alternative B. The site lacks the benefit of a parrot aviary within its premises. Site-specific facilities (e.g., recreational) would interfere directly with release facilities and efforts.

## **SECTION III - AFFECTED ENVIRONMENT**

### 3.1 PHYSICAL CHARACTERISTICS

#### 3.1.1 Location

The Río Abajo Commonwealth Forest (18°20'N, 66°42'W), is approximately 2,340 ha and is located between Dos Bocas Lake and the Tanamá River in the municipalities of Utuado and Arecibo (Appendix I).

### 3.1.2 Geomorphic/Physiographic

The Río Abajo Forest occurs within the northern karst region (Lugo et al. 2001). The karst region covers more than 27.5 percent of the surface of Puerto Rico. The forest has a very irregular topography, dominated by haystack hills whose elevation can reach 350-400 m (see Appendix III). The forest is also characterized by subterranean drainage, caves, natural depressions or sinkholes, all typical of karst geological developments. Formations in the reserve are dominated by Cibao-Montebellow limestone (Tcm) and Lares (T1) limestone. The former comprises 54% of the reserve (north, north-east, east) whereas the remaining percent (Lares) dominates the southeast, south and western portion of the reserve (RA Forest draft Management Plan 2006).

### 3.1.3 Soils

There are 19 types of soils reported for the Río Abajo Forest (DNR 2006). The most dominant belongs to the Soller-Rock outcrop complex. It extends over 1900 ha of the reserve. This soil type is considered inadequate for cultivation, but not so for pasture lands or forests.

### 3.1.4 Climate and Hydrology

The Río Abajo Forest is located in the Río Grande de Arecibo watershed. The forest makes significant contributions (recharging) to the aquifer located in the northern coast of the island, specifically, the lower aquifer. The North Coast Limestone aquifer system in Puerto Rico consists of an upper and lower aquifer separated by a confining unit and extends from the western part of Puerto Rico to east of San Juan (Ground Water Atlas of the United States Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands HA 730-N).

Based on a NOAA station located in the nearby Arecibo Observatory (18° 21'N; 66° 46' W), 13.7 mm of precipitation are recorded daily on average in the area encompassing the forest reserve. The driest months of the year are January/February through March/April. Conversely, the highest amount of precipitation is usually recorded in May and September and October.

Water from the forest flows into the Río Grande de Arecibo and Río Tanamá. The Jobos Creek is the only body of surface running water occurring in the forest. Its headwaters are located in the southern portion of the forest, flowing into the Dos Bocas Reservoir to the east-southeast of the reserve. Its drainage (catch) area is about 453 ha, and it runs for about 4.2 km. Other bodies of water exist within the reserve, but they are mostly ephemeral in nature (DNR 2006).

## 3.2 BIOLOGICAL ENVIRONMENT

### 3.2.1 Habitat/Vegetation

Forests in the karst region, which includes the Río Abajo Forest, are mostly within the Subtropical Moist Life zone (Ewel and Whitmore 1973). According to Chinae (1980) four vegetation types occur in the karst region. Mesic forest and dry woodland are the two major vegetation formations, occurring at the base of mogotes and slopes or exposed tops. The other two vegetation types are mixed woodland and cliff fringe occurring on several slopes and at the edges of the cliff (see Chinae 1980 for details).

As of 1974, 175 species of trees, contained in 53 families, had been reported for the forest (Little and Wadsworth 1964). Later Acevedo and Axelrod (1999) described 1,036 forms (taxa) of flora. Of these, 878 species were natives (included 88 endemics) and 158 were exotic or naturalized after cultivation. Families with most common species were Euphorbiaceae, Laureaceae, Leguminosae, Myrtaceae y Rubiaceae (Lugo et al. 2001).

Alvarez et al. (1997) conducted an evaluation and description of the vegetation of Río Abajo. *Prestoea montana*, the principal food for parrots in the Caribbean National Forest, was uncommon in Río Abajo. Many dominant tree species are potential food resources for the parrots and include *Petitia domingensis*, *Calophyllum calaba*, *Andira inermis*, *Guarea guidonia*, *Sideroxylon foetidissimum*. Cardona et al. (1986) studied the phenology of 19 plant species known to be part of the diet of parrots. They concluded that food would not be a limiting factor for parrots in Río Abajo. Cardona et al. (1985) also estimated the natural nest cavity availability in the forest, and concluded that nest cavities were rare as in the Caribbean National Forest. In a more recent vegetation study, Collazo and Groom (2000) concurred with the assertion that the Río Abajo Forest could be a suitable habitat for the reintroduction of parrots.

### 3.2.2 Threatened, Endangered, and Candidate Species

This region possesses extraordinary ecological diversity, including the habitats of several endangered and threatened species, as well as approximately 23% of Puerto Rico's endemic tree species (Lugo et al. 2001).

Four endangered avian species have been reported in the Río Abajo Forest, namely, the Puerto Rican Sharp-shinned Hawk (*Accipiter straitus venator*), Broad-winged Hawk (*Buteo platypterus brunnescens*), Peregrin Falcon (*Falco peregrinus*), and the Plain Pigeon (*Columba inornata wetmorei*). The forest also harbors the endangered Puerto Rican Boa (*Epicrates inornatus*).

Twenty four plant species belonging to 21 families are considered endangered, threatened, or vulnerable by Federal and Commonwealth agencies (Lugo et al. 2001). Of those, 21 plant species federally listed as threatened or endangered are found in the Río Abajo Commonwealth Forest and surrounding forested areas (Appendix IV).

### 3.2.3 Other Wildlife Species

Records indicate that 39 species of resident bird species have been reported for the northern karst forest. Records also indicate that there are 9 species of mammals (bats), 7 species of amphibians (mostly *Eleutherodactylus* tree frogs), and 16 of reptiles (mostly *Anolis* lizards).

### 3.3 LAND USE

The karst region represents some of the least disturbed karst habitats remaining in the Caribbean. Economic changes, including the shift to an industrial economy after 1940, resulted in the abandonment of agricultural lands, and concomitantly allowed an increase in the forest cover (Lugo et al., 2001). Although, forest reserves such as Cambalache, Río Abajo, Vega Alta, and Guajataca have been established within this region, protecting more of 4,000 ha, previous studies have emphasized that the karst region is vulnerable to human activities and is suffering radical changes (Lugo et al., 2001).

The PR Planning Zone Board has designated the Río Abajo Forest and surrounding lands as SREP (Suelo Rustico Especialmente Protegido; DNR 2006). Lands under this designation are not foreseen or permitted to be used for urban development due to its location, topography, or aesthetic, archeological, ecological or natural resources value.

The Department of Natural and Environmental Resources currently administers 2,340 ha in the Río Abajo Forest. As of 1983, land use in the forest was distributed as follows: 1335 ha young secondary forest, 692 ha of plantations, 855 ha of dense crown forest (not deforested at least since 1936), and about 12 ha were deforested or were used for agriculture. Other uses of the forest include research and management (e.g., J. L. Vivaldi Aviary) and recreation.

### 3.4 CULTURAL/PALEONTOLOGICAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966 requires the Service to evaluate the effects of any of its actions on cultural resources (historic, architectural, and archeological) that are listed or eligible for listing in the National Register of Historic Places (NRHP).

The activities associated with the reintroduction project will cause only very minor, localized soil disturbances, and will not require the demolition or alteration of any historic buildings or structures.

### 3.5 LOCAL SOCIO-ECONOMIC CONDITIONS

The north-central karst region where the Río Abajo Commonwealth Forest is located is one of the least populated areas in Puerto Rico. The economic activity within the area is restricted to very small (mostly less than 20-acre) agricultural settings scattered along the boundaries of the area. The entire north-central karst region plays a critical role in the protection of water and soil resources important for the adjacent communities and the San Juan metropolitan area.

## SECTION IV - IMPACTS ANALYSIS

Since 1996, the Puerto Rico Department of Natural and Environmental Resources and the US Fish and Wildlife Service have sponsored research to determine whether the Río Abajo Forest was a suitable habitat for the reintroduce of Puerto Rican Parrots and to develop management strategies to foster a successful reintroduction (Collazo and Groom 2000, Appendix V). Assessments of Río Abajo, Cambalache and Guajataca Forest Reserves included selected habitat features (e.g., availability of food plant species, cavity bearing trees) as well as factors such as abundance of predators (e.g., Pearly-eyed thrasher, Red-tailed hawks; Hengstenberg 2003, Gleffe 2005, Trujillo 2005, Llerandi-Roman 2005). Other studies have been designed to enhance food availability for parrots through regeneration of native species and prescribed plantings (e.g., Sierra Palm, *Prestoea Montana*, Royal Palm *Roystonea borinquena*; Inman 2005).

Releases in the karst region, specifically the Río Abajo Forest, are possible because the biological and methodological foundation to support the endeavor exists. Two aviaries currently support over 200 captive birds and are capable of producing birds to support a coordinated release program, both at Caribbean National Forest and Río Abajo. Prospective birds for release are selected on the basis of behavioral traits (e.g., group compatibility) and genetics (White et al. 2005b, Haig et al. 2004). Pre-release protocols and methods to quantify the success of releases (e.g., survival) exist (Collazo et al. 2000, 2003; White et al. 2005b).

The following alternatives are organized around the ability to successfully reintroduce the parrot into the selected forested areas in the karst region.

#### 4.1 ALTERNATIVE A – NO ACTION

Under this alternative, the Service would cease to actively pursue reintroducing the Puerto Rican Parrot in the Río Abajo Forest. This is the only option that does not require human intervention and active management of the system. This alternative is unlikely to achieve the recovery objectives outlined in the Recovery Plan of the species, that is, downlist and delist the species by 2020 (FWS 2005).

#### 4.1.1 Habitat Impacts

If this alternative were selected, there would be no need to manage habitat in the Río Abajo Forest.

#### 4.1.2 Biological Impacts

None. Even if management for parrots were effected (e.g., enhance food resources), other members of the resident avian community would have a minor benefit from such actions (Collazo and Groom 2000, Inman 2005, Trujillo 2005).

#### 4.1.3 Listed Species and Trust Resources

Choosing this alternative would result in a negative impact to the Puerto Rican Parrot because the probability of extinction would not be mitigated by the creation of a second population. This option would not affect any other species.

#### 4.1.4 Predator Control Impacts

There would be no need to implement management activities to control potential parrot predators.

#### 4.1.5 Public Use and Landowner Impacts

If this alternative was chosen, opportunities to diversify public use such as environmental education and interpretation, and wildlife observation and photography would be lost.

### 4.2 ALTERNATIVE B – Reintroduce Puerto Rican Parrots in the Río Abajo Forest (PREFERRED ALTERNATIVE)

Under this alternative, the Service would minimize risks of the species' extinction and foster the recovery of the species. The population and habitat would be managed to increase the likelihood of a successful reintroduction.

This alternative would require implementing many of the management activities used in the Caribbean National Forest (Appendix II, Appendix VI, White et. al., 2005a, White and Vilella, 2004, Snyder et. al. 1987). Other activities include implementing forest management practices that will promote greater availability of food resources. This action requires that Service and US Forest Service staff assist the Puerto Rico Department of Natural and Environmental Resources in monitoring and managing the population and habitat throughout the year. This alternative has the greatest likelihood of success because Río Abajo reunite a number of desirable features for reintroduction including year-round food resources, presence of an aviary, and management infrastructure (Trujillo 2005).

#### 4.2.1 Habitat Impacts

Provisioning artificial nest cavities is required to insure a successful reintroduction. This is a management practice commonly used in the Caribbean National Forest. Resident avian species should not be affected by this action. Monitoring population numbers, survival and reproduction will require maintaining (and creating) trails and setting up platforms to facilitate the said activities. Impact of these activities on forest resources is localized, restricted to the immediate area of the action. The Río Abajo Forest Management Plan (DNR 2006) calls for managing sectors of the forest for timber and habitat quality (e.g., food resources). Habitat management (e.g., enhance food resources) would only enhance the value of the forest to avifauna, and should not devalue its flora. The impact of the reintroduction on timber management activities can be minimized by maintaining the greatest distance between timber management areas and the release area (see DNR 2006).

#### 4.2.2 Biological Impacts

This alternative does not represent a threat and should not have a negative impact on avifauna, resident or migratory, or on any other biological resource. The Puerto Rican Parrot is an endemic species and was part of the biological community in the karst region as recent as the 1930s. The threat of disease by the reintroduction is minimized by releasing birds after they have undergone a medical examination.

#### 4.2.3 Listed Species and Trust Resources

Choosing this alternative will restore an endemic species that went locally extinct in the karst region since the 1930s. The habitat management and protection activities related to the restoration of the Puerto Rican parrot population may result in a positive impact to all listed bird species. The parrot is a frugivore, and for some plants, a disperser of seeds. This option would not affect other listed animal or plant species.

#### 4.2.4 Predator Control Impact

To foster a successful reintroduction and reproduction the suite of predator control programs implemented at the Caribbean National Forest needs to be implemented in Río Abajo (see Appendix VI). These include rat poisoning, measures to prevent thrasher predation (e.g., nest boxes), and Red-tailed Hawk removal. To prevent harm to non-target species, the same procedures and safety protocols used in the Caribbean National Forest will be adopted for the Río Abajo Forest. Poison application (for rats) and raptor removal will require staff time for planning and implementation.

#### 4.2.5 Public Use and Landowner Impacts

If this alternative is chosen, recreational activities (e.g., picnic areas, camping) might be restricted or prohibited in areas near parrot activity areas, or nesting areas. Restrictions and no-use zones will be designated and posted for the public. Criteria to impose restrictions have been defined for the Caribbean National Forest, and can be adapted to the Río Abajo Forest. Maintenance activities (e.g., power line corridors) could be affected if close to core parrot activity areas. Such activities could be allowed on a seasonal basis (e.g., non-breeding season). New/additional power line corridors or towers would not be allowed in or in close proximity of core parrot activity areas. Public use opportunities such as environmental education and interpretation, and wildlife observation and photography could be maximized.

#### 4.3 ALTERNATIVE C – Release Puerto Rican Parrots in the Guajataca Forest

Under this alternative, the Service would minimize risks of the species' extinction and foster the recovery of the species. The population and habitat would be managed to increase the likelihood of a successful reintroduction.

This alternative would require implementing many of the management activities used in the Caribbean National Forest (e.g., predator control). Other activities include implementing forest management practices that will promote greater availability of food resources. This action requires that Service and US Forest Service staff assist the Puerto Rico Department of Natural and Environmental Resources in monitoring and managing the population and habitat throughout the year. Guajataca is second to the Río Abajo Forest in terms of habitat suitability as a reintroduction site. A lower suitability was adjudicated primarily because the Guajataca Forest does not have the presence of an aviary (Trujillo 2005).

##### 4.3.1 Habitat Impacts

Provisioning artificial nest cavities is required to insure a successful reintroduction. This is a management practice commonly used in the Caribbean National Forest. Resident avian species should not be affected by this action. Habitat management (e.g., enhance food resources), if implemented, would only enhance the value of the forest to avifauna, and should not devalue its flora. Monitoring population numbers, survival and reproduction will require maintaining (and creating) trails and setting up platforms to facilitate the said activities. Impact of these activities on forest resources is localized, restricted to the immediate area of the action.

##### 4.3.2 Biological Impacts

This alternative should provide the greatest benefit to wildlife. It does not represent a threat or should not have a negative impact on avifauna, resident or migratory, nor on any other biological resource. The Puerto Rican Parrot is an endemic species and was part of

the biological community in the karst region as recent as the 1930s. The threat of disease by the reintroduction is minimized by releasing birds after they have undergone a medical examination.

#### 4.3.3 Listed Species and Trust Resources

Choosing this alternative will restore an endemic species that went locally extinct in the karst region since the 1930s, and should result in a positive impact to all listed bird species. The parrot is a frugivore, and for some plants, a disperser of seeds. This option would not affect other listed animal or plant species.

#### 4.2.4 Predator Control Impact

To foster a successful reintroduction and reproduction the range of predator control programs in use at the Caribbean National Forest needs to be implemented in Guajataca. These include rat poisoning, measures to prevent thrasher predation (e.g., nest boxes), and Red-tailed Hawk removal. To prevent harm to non-target species, the same procedures and safety protocols used in the Caribbean National Forest shall be adopted for the Río Abajo Forest. Poison application (for rats) and raptor removal will require staff time for planning and implementation.

#### 4.2.5 Public Use and Landowner Impacts

If this alternative is chosen, recreational activities (e.g., picnic areas, camping) might be restricted or prohibited in areas near parrot activity areas, or nesting areas. Restrictions and no-use zones will be designated and posted for the public, and should be based on the same criteria used in the Caribbean National Forest. Public use opportunities such as environmental education and interpretation, and wildlife observation and photography could be maximized.

### 4.4 ALTERNATIVE D – Release Puerto Rican Parrots in the Cambalache Forest

Under this alternative, the Service would minimize risks of the species' extinction and foster the recovery of the species. The population and habitat would be managed to increase the likelihood of a successful reintroduction.

This alternative would require implementing many of the management activities used in the Caribbean National Forest (e.g., predator control). Other activities include implementing forest management practices that will promote greater availability of food resources. This action requires that Service and US Forest Service staff assist the Puerto Rico Department of Natural and Environmental Resources in monitoring and managing the population and habitat throughout the year. Cambalache is the site with the lowest habitat suitability for a reintroduction site. Low suitability was adjudicated because the Guajataca Forest does not have the presence of an aviary, is embedded in a more densely human population area, and is more fragmented (Trujillo 2005).

#### 4.3.1 Habitat Impacts

Provisioning artificial nest cavities is required to insure a successful reintroduction. This is a management practice commonly used in the Caribbean National Forest. Resident avian species should not be affected by this action. Habitat management (e.g., enhance food resources), if implemented, would only enhance the value of the forest to avifauna, and should not devalue its flora. Monitoring population numbers, survival and reproduction will require maintaining (and creating) trails and setting up platforms to facilitate the said activities. Impact of these activities on forest resources is localized, restricted to the immediate area of the action.

#### 4.3.2 Biological Impacts

This alternative should provide the greatest benefit to wildlife. It does not represent a threat or should have a negative impact on avifauna, resident or migratory, nor on any other biological resource. The Puerto Rican Parrot is an endemic species and was part of the biological community in the karst region as recent as the 1930s. The threat of disease by the reintroduction is minimized by releasing birds after they have undergone a medical examination.

#### 4.3.3 Listed Species and Trust Resources

Choosing this alternative will restore an endemic species that went locally extinct in the karst region since the 1930s, and should result in a positive impact to all listed bird species. The parrot is a frugivore, and for some plants, a disperser of seeds. This option would not affect other listed animal or plant species.

#### 4.2.4 Predator Control Impact

To foster a successful reintroduction and reproduction the range of predator control programs in use at the Caribbean National Forest needs to be implemented in Cambalache. These include rat poisoning, measures to prevent thrasher predation (e.g., nest boxes), and Red-tailed Hawk removal. To prevent harm to non-target species, the same procedures and safety protocols used in the Caribbean National Forest shall be adopted in the Río Abajo Forest. Poison application (for rats) and raptor removal will require staff time for planning and implementation.

#### 4.2.5 Public Use and Landowner Impacts

If this alternative is chosen, recreational activities (e.g., picnic areas, bike paths) might be restricted or prohibited in areas near parrot activity areas, or nesting areas. Restrictions and no-use zones will be designated and posted for the public, and should be based on the same criteria used in the Caribbean National Forest. Public use opportunities such as environmental education and interpretation, and wildlife observation and photography

could be maximized. These need to be conceived and executed without impinging upon the species' biology and habitat requirements.

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White, T. H., Jr., J. A. Collazo, and F. J. Vilella. 2005b. Survival of captive-reared Puerto Rican Parrots released in the Caribbean National Forest. *Condor* 107:426-434.

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The U.S. Fish and Wildlife Service, Río Grande Field Office prepared this Environmental Assessment, with assistance from the Ecological Services Caribbean Field Office, the Southeast Regional Office, and the Puerto Rico Department of Natural and Environmental Resources. The primary author was Fernando Núñez-García (Río Grande Field Office Supervisor).

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This Environmental Assessment was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA). It is consistent with the NEPA-compliance procedures contained in the Service's manual (550 FW 1-3), and employs a systematic, interdisciplinary approach.

An Intra-Service Section 7 consultation was completed in compliance with the Endangered Species Act (ESA). The findings of this consultation were that no endangered bird species would be negatively affected by the proposed action.

Pursuant to Executive Order 12898 (Environmental Justice for Minority Populations), the Service has determined that the Preferred Alternative will not result in disproportionately high and adverse human health or environmental impacts on minority and low-income populations.

Other Federal and state issues reviewed for compliance for the proposed action include, but are not limited to Archeological and Historic Preservation Act of 1974; Executive Order 13186 (Protection of Migratory Birds).

On April 21 2005 an information table was set up at the Arecibo campus at the University of Puerto Rico. Over 76 students and professors were informed of the proposed parrot release at the nearby Rio Abajo Forest. On May 5, 2005 an all-day workshop was held at the Rio Abajo Forest Information Center. In attendance there were multiple community leaders as well as educators and law enforcement agents from the Ponce and Arecibo District Offices of the Puerto Rico Department of Natural and Environmental Resources. Representatives from the following organizations were also present: Ciudadanos Del Karso, Ciudadanos en Defensa Del Ambiente, and Organización Para la Promoción y el Desarrollo Humano Inc.

The Service met also with representatives and members of local communities at the Comunidad de Jobos Community Center, Rio Arriba, Arecibo (November 15, 2005). Forty participants assisted the informal meeting including representatives for the NGOs that attended May 5 workshop and representatives for the following organizations: The Puerto Rico Conservation Trust, Sociedad Ornitológica Puertorriqueña (SOPI), and Administración para el Adiestramiento de Futuros Empresarios y Trabajadores (AAFET). The proposed action was described and also helped clarify which alternatives were considered, and which alternative would be most beneficial. Transcripts are available in the Rio Grande Field Office and Ecological Service Caribbean Field Office (See list of preparers for addresses).

This environmental assessment will be available at the web page <http://www.fws.gov/southeast/prparrot> or at the Service Río Grande Field Office, Calle García de la Noceda #38, Río Grande Puerto Rico 00745

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**SECTION IX – LIST OF ALL FEDERAL, STATES AND LOCAL LAWS AND PERMITS:**

Endangered Species Act of 1973

Ley de Bosques- Ley Num. 133 del 1 Julio 1975

Ley para la protección patrimonio arqueológico – Ley Num. 112 del 20 Julio 1988

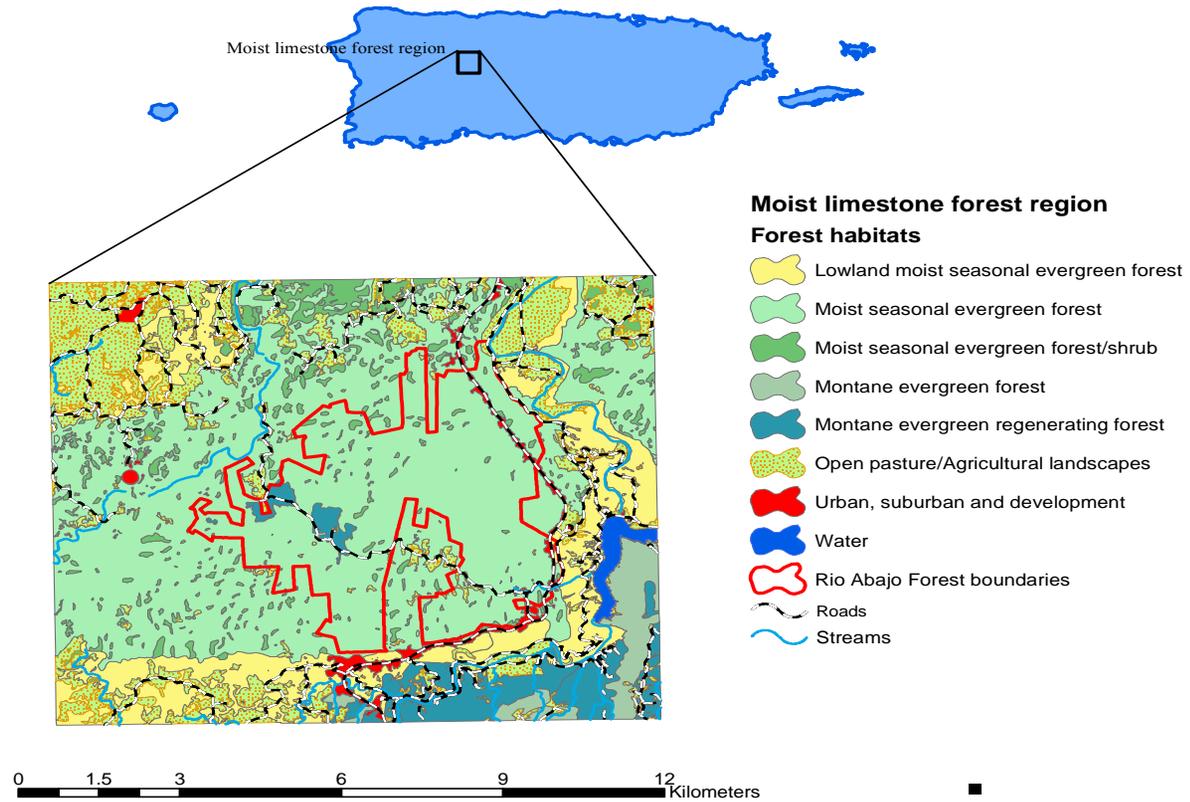
Ley del programa de Patrimonio Natural de Puerto Rico – Ley Num. 150 del 4 Agosto 1990

Ley para fomentar la siembra de árboles cuyas frutas o semillas provean alimento a especies de aves silvestres de Puerto Rico – Ley Num. 97 del 25 Junio 1998

Ley de vida Silvestre del Estado Libre Asociado de Puerto Rico – Ley Num. 241 del 15 Agosto 1999

Ley para la protección y conservación de la fisiografía cársica de Puerto Rico – Ley Num. 292 del 21 Agosto 1999

**APPENDIX I** Map of Puerto Rico showing the location of the Río Abajo Forest.



Llerandi-Román, 2005

## **APPENDIX II: STANDARD OPERATIONS PROTOCOLS**

### **A. BANDING**

- I. Area of Applicability: Caribbean National Forest (CNF)
- II. Background: Banding has been an efficient technique throughout the history of this project. This allows us to identify chicks in the wild after fledglings. Chicks are color banded when they reach a certain weight. The chick left band identifies the nest and the right band the year it was born.
- III. Resources Required:
  - A. Personnel
    1. Biological Science Technician,
    2. Wildlife Biologists and/or Volunteer (2)
  - B. Equipment/Materials
    1. Hand Sanitizing Solution and/or Latex Glove
    2. Round, 8" diameter minimum, container with safety top or Clothes Bags
    3. Notebook
    4. Color Leg Bands
    5. Safety Equipment
- IV. Procedure:
  1. Chicks must be marked when they weigh approximately 100 g using a close color band. To perform this procedure at least two people are needed.
  2. Chicks should be marked when the pair leave the nest, preferable early in the morning (i.e., first or second time after leaving the area).
  3. Before handling the chicks, hands should be cleaned with sanitizing solution or using latex gloves.
  4. One person must climb the nest using the safety climbing equipment. The other must stay near the tree making sure that the pair do not arrive or is near the nest.
  5. Chicks will be marked with one color band in each leg. The left band identifies the nest where chicks were born. All chicks born from the same nest, regarding the year will have the same color band. The right band indicates the year. Every chick in the field, born in the same year, will have the same color band. Consequently, every cohort born in different year will have another color scheme.

6. The color scheme for nests in the wild are the following:

<b>Nest</b>	<b>Color scheme</b>
South Fork 2A	Blue
South Fork 2B	Yellow
Libertad	Purple
South Fork 1T	Green
Quebrada Grande	Orange

7. After chicks are banded, one person must stay in the blind to verify that the pair behavior seems normal (e.g., feeding hatchling soon after arriving to the nest).
8. When performing nest inspection, bands should be checked. Improper banding procedure may cause bands to fall or leg problems.
- V. Reports: Banding procedure will be reported in the blind observation notebook.
- VI. Review Period: Annually
- VII. Authors: Wilfredo Abreu, Marisel López-Flores and Pablo Torres-Báez
- VIII. Approval: Scientific Advisor Team

## **B WILD NEST MONITORING**

- I. Area of Applicability: Caribbean National Forest (CNF)
- II. Background: To increase the wild population in the CNF, we need to assure that wild pairs using the nest cavities are successful in the breeding season. A successful nest implies that at least one chick fledge from every active wild nest. This may increase the probabilities of wild pairs re-nesting in the same cavity. To increase the nest success, field personnel need to monitor regularly the nests using observational blinds. Normally, a person is assigned to a blind for half days. However, nests are watched full-time when chicks are about to fledge.
- III. Resources Required:
  - A. Personnel
    1. Biological Science Technician, Wildlife Biologist or/and volunteers with training in nest monitoring.
  - B. Equipment/Materials
    1. Blind (permanent or temporary)
    2. Portable Radio
    3. Data Notebook
    4. Listening Device System
    5. Monitoring Camera System
    6. Climbing Equipment
    7. Eggs or Chicks transference equipment
    8. First Aid kit
    9. Binoculars
- IV. Procedure:
  1. Normally the nests are monitored 3 half days for a week. However, if the nest presents problems the period time of monitoring and the numbers of day may change.
  2. Under normal conditions, the observer should enter the blind before dawn. If observer arrives after sunset, entering the blind should be done slowly and quiet. It is critical that the breeding pair is not in the vine and/or close to the blind..
  3. While in the blind, sudden movements or noises must be avoided to prevent parrots detecting the presence of the observer.
  4. As soon as observer arrives to the blind, listening device and camera system must be turn-on. If no noise is listened, check the 9-volt battery and 1.5-volt and replace if necessary for listen device. For the camera system, check the

12-volt battery. If the listening device or the cameras are not working properly, do not leave the blind to check any component (e.g., cables, camera inside the nest).

5. Inside the blind, the observer must remain completely alert while observing the nest and its surroundings.
6. If any situation or emergency occurs, especially if the observer is alone in the blind, a radio call must be performed before and after inspecting the nest to the nearest personnel in the field.
7. Before leaving the blind, the observer must fill the data sheet inside the blind. Original copy should remain in the blind and the carbon copy must be taken to the Field Operation Coordinator.
8. When departing the blind turn-off the listening device and camera system.
9. Do not leave the blind if the pair is at the vine or near the nest and/or blind.
10. In any circumstances, unauthorized persons should not enter the blind unless, previous arrangements have been made with the Field Supervisor or Field Operation Coordinator. It is recommended to have no more than two persons in the blind, unless an emergency occurs.
11. During the fledging period, observation time will be from dawn to dusk.

V. Reports: Data will be reported in blind observation notebook.

VI. Review Period: Annually

VII. Authors: Wilfredo Abreu, Marisel López-Flores, Pablo Torres-Báez

VIII. Approval: Scientific Advisor Team

## **C TRANSFERRING EGG(S) AND/OR CHICK(S) FROM FIELD TO AVIARY OR VICE VERSA**

- I. Area of Applicability: Caribbean National Forest (CNF)
- II. Background: For a number of reasons, eggs and/or chicks are transferred among the field and aviary. This protocol assures a safe and rapid transportation of eggs or chicks with minimal mortality.
- III. Resources Required
  - A. Personnel
    - Field personnel and/or Veterinarian
  - B. Equipment/Materials
    - Round, 8" diameter minimum, container with safety top
    - Avian heat brooder
    - Small seeds
    - Paper towels
    - Disposable hand warmers
    - Clothes bag
- IV. Procedure
  1. If removal of eggs or chicks is necessary, contacting aviary personnel beforehand is mandatory. This will give the personnel time before delivery to prepare the aviary.
  2. Do not feed the chick before removing from nest; excessive movement while transferring, may cause chick to aspirate.
  3. Before handling the eggs or chicks, clean your hand with sanitizing solution or use latex glove.
  4. Place eggs into a lined container with small seeds and hand warmers. This will prevent movement and possible breakage of the egg. Seeds should cover at least half the egg.
  5. Chicks with few or no feathers would need additional heat source, especially if outdoor temperature is less than 80F°. Use good reasoning regarding additional heat source (e.g., hand warmer) when transferring chicks. One or two hand warmers should be added. Make sure warmers are under and wrapped by small seeds. Direct contact with chicks can cause serious burns. If chick is feathered and temperature outside is warm, heat source may not be necessary.
  6. Place container into clothes bag and proceed directly and rapidly to destination.

7. If eggs or chicks are place in a wild nest, the foster parent behavior should be monitored thoroughly. This should be done within the first 24 hours after fostering the egg or chick. Use listening device and/or cameras to monitor.
  8. If an aviary chick is placed in a wild nest, be sure to prepare food and feed the chick before placing it in the nest. Use discretion because stressed chick may need a few hours to settle down before feeding is attempted.
  9. Eggs and/or chicks must be transported only by trained personnel, except in emergency cases.
  10. Transfer eggs or chicks from aviary to field early in the morning after sunrise.
- 
- V. Reports: Transferring eggs and/or chicks will be reported in the blind observation notebook and aviary logbook.
  - VI. Review Period: Annually
  - VII. Authors: Wilfredo Abreu, Pablo Torres-Báez, Jafet Vélez
  - VIII. Approval: Scientific Advisor Team

## D. **WILD NEST INSPECTION**

I. Area of Applicability: Caribbean National Forest (CNF)

II. Background: The goal of the Puerto Rican Parrot Recovery Program is to produce successful nests (i.e., at least one chick fledged) every year. To assure the best conditions for Puerto Rican Parrots in the wild, it is critical to have dry, clean, free of parasites and safe (e.g., predators and competitors) nests. This may increase the likelihood of wild pairs re-nesting in the same cavity. The main objective of nest inspections is to increase the probabilities of wild pairs using the improved natural nests or the artificial PVC nest cavities

III. Resources Required:

### A. Personnel

1. Biological Science Technician and/or Wildlife Biologist (2)
2. Veterinarian (Blood Drawing)

### B. Equipment/Materials

1. Portable Radios (2)
2. Nest Material made from Palo Colorado (*Cyrilla racemiflora*) and/or Mahogany (*Swietenia* sp.)
3. Hand Sanitizing Solution and/or Latex Glove
4. Scales
5. Plastic Bags and Clothes Bags
6. Data Notebook
7. Leg Bands
8. Safety Equipment
9. Small Flashlight

IV. Procedure:

Quick inspection = quickly check nest material, eggs(s) and chick(s) condition.

Full inspection = replace nest material, verify chick(s) health condition (weight and physical exam), blood sampling, and banding if is necessary.

A. Early in the breeding season, before nest becomes active, cavities should be checked to make sure that nest material is dry, also if the vine is properly placed and in good condition. Equipment such as the listening device and camera should be tested.

B. Once the nest is active:

- a. **Egg incubation stage:** Check the egg(s) fertility during the 12-15 days after laid. During this period a weekly inspection will be conducted

to check nest material status, unless the nest does not have a video camera system.

- b. **First 1-4 days after hatching:** During this time a quick inspection should be conducted to verify the condition of chicks. If nest material is dirty, humid and contains parasites, it should be change.
- c. **5-15 days:** Replace nest material and add Sevin dust to the new material. Weigh the chick twice and remove the un-hatched egg(s). During this period, at least two full inspection and all necessary quick inspections should be conducted.
- d. **16-30 days:** During this period a weekly full inspection should be done. In every inspection new nest material and Sevin dust must be added. A minimum of two full inspection and all necessary quick inspections should be done.
- e. **31- 45 days:** One full inspection per week. In every inspection nest material should be change with new material without Sevin dust. Chicks will be banded and blood sample must be drawn approximately 45 days after hatched. A minimum of two full inspection and two quick inspections (day after banded and blood samples) should be conducted.
- f. **46 - 60 days:** One full inspection must be done. Nest material should be changed with new material without Sevin dust. Chicks must be radio-marked approximately 45-50 days after hatched. A quick inspection should be conducted the day after radio-marking the chicks.

C. Inspection time: Nest inspections must be done soon after the female leaves the nest for the first time. Disturbing the female inside the nest should not be done, unless is strictly necessary.

If any situation or emergency occurs, especially if the observer is along in the blind, a radio called must be performed before and after inspecting the nest to the nearest personnel in the field.

Before handling the eggs or chicks, clean hands with sanitizing solution or use latex gloves.

- V. Reports: Inspections will be reported in the blind observation notebook.
- VI. Review Period: Annually

- VII. Authors: Hernán Abreu, Wilfredo Abreu, Pablo Torres, Jafet Vélez, Thomas White, Gilberto Ortiz and Miguel Toledo.
- VIII. Approval: Scientific Advisor Team

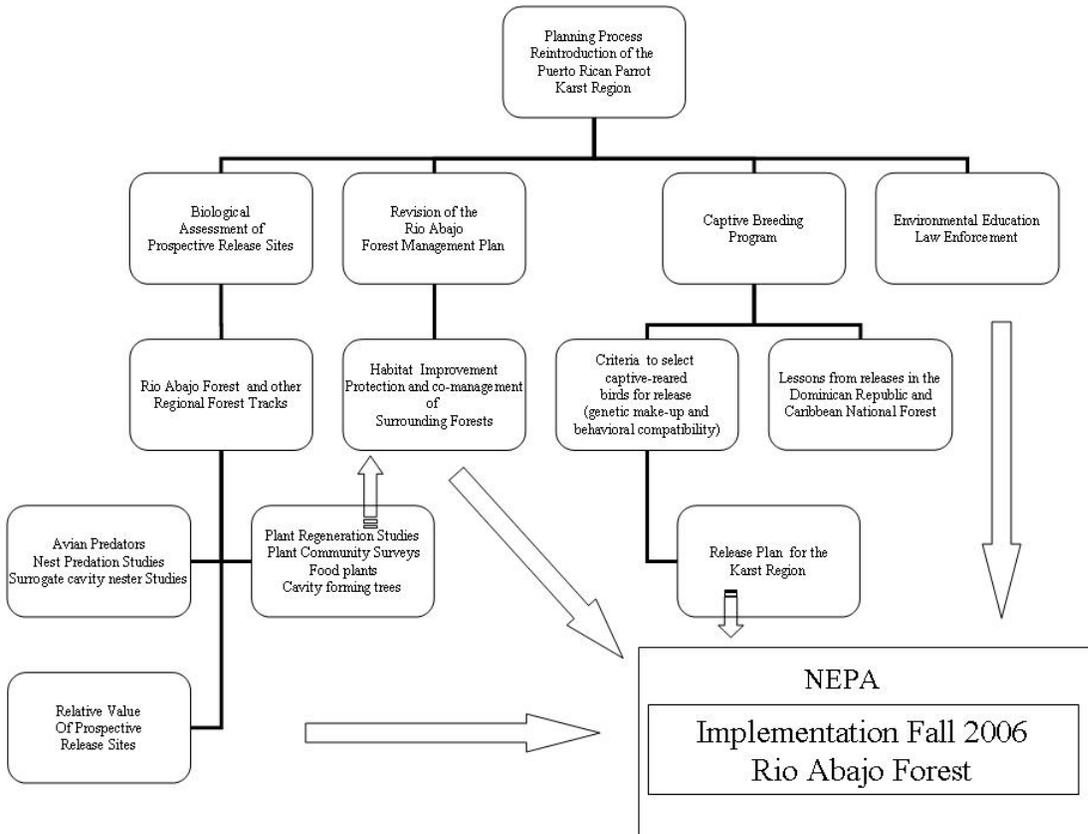
**APPENDIX III:** Typical haystack hill formations characteristic of the Puerto Rican northern karst region



**APPENDIX IV:** Federally endangered and threatened species present in the Northern Karst Region of Puerto Rico

<b>Birds (6)</b>	Common name	Scientific name
	Broad-Winged Hawk	<i>Buteo platypterus</i>
	Sharp-Shinned Hawk	<i>Accipiter striatus</i>
	Yellow-Shouldered Blackbird	<i>Agelaius xanthomus</i>
	Plain Pigeon	<i>Columba inornata wetmorei</i>
<b>Reptiles (1)</b>		
	Puerto Rican Boa	<i>Epicrates inornatus</i>
<b>Plants (21)</b>		
	Palo de Rosa	<i>Ottoschulzia rhodoxylon</i>
	Beautiful Goetzea	<i>Goetzea elegans</i>
	Cóbana Negra	<i>Stahlia monosperma</i>
	Bariaco	<i>Trichilia triacantha</i>
	Vahl's Boxwood	<i>Buxus vahl</i>
	Chupacallos	<i>Pleodendron macranthum</i>
	Palo de Ramón	<i>Pleodendron macranthum</i>
	Palma de Manaca	<i>Banara vanderbiltii</i>
	No common name	<i>Calyptronoma rivalis</i>
	No common name	<i>Ottoschulzia rhodoxylon</i>
	No common name	<i>Myrcia paganii</i>
	No common name	<i>Auerodendron pauciflorum</i>
	No common name	<i>Schoepfia arenaria</i>
	No common name	<i>Daphnopsis hellerana</i>
	Palo de Niqua	<i>Cornutia obovata</i>
	No common name	<i>Solanum drymophilum</i>
	No common name	<i>Cordia bellonis</i>
	No common name	<i>Peperomia wheeleri</i>
	No common name	<i>Adiatum vivesii</i>
	No common name	<i>Tectaria estremerana</i>
	No common name	<i>Thelypteris verecunda</i>
	St. Thomas Prickly Ash	<i>Zanthoxylum thomasianum</i>
	No common name	<i>Chamaecrista glandulosa var. mirabilis</i>

**APPENDIX V:** Flow chart listing the various studies and sources of information used to evaluate potential release sites, including the Río Abajo Forest Reserve, and to develop a reintroduction plan to establish the second wild population of Puerto Rican parrots in the island. The Río Abajo Forest (2340 ha), and surrounding forests, ranked 1 among 3 potential release sites (protected areas) in the northwestern karst (limestone) region of Puerto Rico.



**APPENDIX VI:** Environmental assessment and biological evaluation of non-native exotic species management to protect wild Puerto Rican parrots and their nests for the Caribbean National Forest prepared by the U.S. Forest Service.



**FINAL ENVIRONMENTAL ASSESSMENT**

**EXOTIC SPECIES MANAGEMENT ON THE  
CARIBBEAN NATIONAL FOREST**

**DEPARTMENT OF AGRICULTURE  
U.S. FOREST SERVICE  
SOUTHERN REGION  
CARIBBEAN NATIONAL FOREST**

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## **I. INTRODUCTION**

The purpose of this document is to evaluate the short and long-term environmental consequences of sustained management of non-native rats (*Rattus species*), non-native West Indian mongooses (*Herpestes auro-punctatus*), non-native domestic cats (*Felis catus*) and dogs (*Canis familiaris*), and non-native iguanas (*Iguana iguana*) in the Caribbean National Forest (CNF). This assessment relies predominately on existing federal and state agency publications, information contained in scientific literature, and communications with other wildlife professionals.

The United States Department of Agriculture (USDA) is directed by law to protect American agriculture and other natural resources from damage associated with wildlife. Present USDA Forest Service guidelines and codes are based in compliance with the National Environmental Policy Act (NEPA) and other relevant laws, regulation policies, orders, and procedures. This environmental assessment reviews the actions that would be taken to prevent and/or mitigate any adverse effects from the proposed action and the potential impacts of these actions. Presently, there is a pest management program on the CNF where live cage traps are dispersed after reports of disturbances or incidences. The proposed integrated exotic species damage management plan will have the options of using low-potency rodenticides, and mechanical traps to reduce impacts of exotic species and provide more opportunities in exotic species studies, and a structured public & Forest employee educational programs.

For definitive purposes wildlife damage management, or control, is defined as the alleviation of damage or other problems caused by, or related to the presence of wildlife (Leopold 1933, The Wildlife Society 1990).

### **Purpose and Need**

The purpose of the proposed action is to undertake a sustained reduction of non-native rats, cats, dogs, mongooses and iguanas (designated as the target species), from certain sensitive areas in the CNF. By reducing their populations within and around the approximate areas of recreational sites, administrative zones and endangered species critical habitat, we expect that adverse impacts to visitors, residents, and natural/cultural resources would decrease. The reduction of the target species' populations to levels where they produce minimal or less damage to Forest resources or threats to visitors or employee safety is the prime objective. The program is therefore, termed a "sustained reduction", because once the target species populations are reduced to acceptable levels, the smaller numbers would be maintained at that level or below. Collectively, the target species populations

pose a very large threat to the native natural resources, other resource management programs of the CNF, and visitor/employee health and safety.

People have accidentally or intentionally introduced hundreds of non-native species into natural communities worldwide, and while many die out, some persist and become pests (Stone and Loope 1996). It is now widely accepted that the current rates of species extinctions are dramatically higher than background rates; most current extinctions can be directly attributed to human activity; and for ethical, cultural, aesthetic and economic reasons, the current extinction rate worldwide is cause for considerable concern.

Human-caused extinctions can be roughly divided into four broad categories: non-sustainable use of resources, habitat destruction, pollution, and introduced non-native species (Soule 1990). Results of the first three categories are often acute and can directly affect human and native wildlife welfare on an observable time scale. The human related impacts have made them the focus of public environmental concern. The introduction of non-native species has received less publicity and professional attention; however, introduced species are responsible for 39% of all recorded animal extinctions since 1600 for which a cause could be attributed (Treshy and Croll 1994). Thus, some impacts of introduced species are irreversible and at least as devastating as the other categories. Once established, introduced species often become permanent in ecological time unless intentionally removed (Treshy and Croll 1994).

Native wildlife in island ecosystems are particularly vulnerable to the first three categories as well as the impacts of introduced species. Islands are important for the conservation of biodiversity for three reasons:

- 1) A large percentage of their biota are endemic species and subspecies;
- 2) They are important breeding areas for seabirds, pinnipeds, and sea turtles, which forage over thousands of square kilometers of ocean but are dependent on relatively small amounts of protected land on islands for breeding and nesting;
- 3) The species and ecological communities on islands have evolved in natural fragments, making them more susceptible than continental species to the problems of habitat fragmentation caused by small reserve size. In summary, by restoring and protecting islands, functioning unmanaged ecosystems can be maintained without large expenditures or significant conflict with local human populations (Treshy and Croll 1994).

For these forementioned reasons, active management is required to control limiting factors, which have been detrimental to native endemic species. Exotic species control has been conducted in other islands with the same problems now facing Puerto Rico; the CNF intends to follow their successful examples.

In relation to cats and dogs wildlife professionals and layperson often disagree as to what constitutes a feral animal. Van't Woudt (1990) uses three categories to classify the status of a domesticated animal observed in the wild:

- a) an animal that stays in close proximity to its home or owner (tame);
- b) an animal that may or may not have a home or owner but is reliant on humans for shelter and food (free-ranging); and
- c) an animal that breeds and lives without human interactions (feral).

For the purpose and scope of this EA, the CNF will adopt Van't Woodt's (1990) definitions of tame, free-ranging, and feral domesticated animals, as described above.

In relation to mongooses, rats, and iguanas that establish breeding populations after being introduced by humans, they are termed exotic. Exotics are generally more frightened of humans, while feral animals can be very friendly to people. For simplicity purposes, all target species that establish breeding populations in the Forest will be identified as "exotics". All of these species disrupt complex native ecological communities, jeopardize endangered and native plants and animals, and degrade natural habitats.

In summary, with the exception of bats, the CNF is presently inhabited by numerous species of non-native mammals that have produced severe impacts on many indigenous species of plants and animals and threatens visitor and employee's safety. Even though this EA only addresses 4 mammalian and 1 reptilian species other introduced species of birds, amphibians, reptiles, insects and plants are impacting the entire Puerto Rican environment in different degrees.

### Rats

Introduced by European explorers since Christopher Columbus' landing, rats (*Rattus rattus* and *Rattus norvegicus*) on Puerto Rico are widespread ranging from living near humans to remote critical areas for endangered species. Except for an occasional predation by red-tailed hawks or Puerto Rican Boas, rat populations on the CNF have infested the majority of the Forest with relative ease. Rats are omnivorous; they eat nearly every kind of grain, fruit, fish, fowl, carrion, milk products, and vegetables. Both rat species are adaptive, have high reproduction rates and can survive in a variety of habitats. These traits make them ideally suited to survive on a variety of predator free islands. Even if extinctions do not occur, rats can have ecosystem-wide effects on the distribution and abundance of native species through direct and indirect effects. For example, comparisons of rat-infested and rat-free islands, or pre and post rat eradication experiments, have shown that rats depressed the population size and recruitment of birds, reptiles, plants and terrestrial invertebrates. The introduction of new *Rattus* species should be avoided, even to islands that already have introduced rats.

### Mongoose

In the 1880's, European planters introduced the West Indian Mongoose (*Herpestes auropunctatus*) to the Caribbean as a biological control to suppress the rat populations that decimated sugar cane fields (Nellis and Everard, 1983). At first, the results indicated that a very large decline in the rat population had occurred and the decline was attributed to mongoose predation. As a result, in the next 30 years (1872 to 1900), even more mongooses were distributed throughout the Caribbean as a biological control.

Soon it was discovered that rats sought out their meals at night, which didn't cross paths with the daytime foraging mongooses. The rats were safe in their shelters during the day, unhampered from the mongooses. Problems compounded as the rats continued to enjoy sugar cane and mongooses feasted instead on bird and sea turtle eggs, as well as insects, papaya and guava. Public health concerns increased when the mongoose was discovered to be a carrier of rabies. Since mongooses have no natural predators in Puerto Rico, the checks and balances of natural population control were missing. Non-native mongooses have devastated reptile populations, some bird populations and continue to depredate the nests of the endangered Hawksbill Sea turtle (Coblentz, 1983).

### Cats

Domestic cats originated from an ancestral wild species, the European and African wild cat (*Felis silvestris*). Since then, the introduced domesticated cat have continued to threaten populations of reptiles, ground and shrub nesting birds as well as providing vectors for transmission of parasites and diseases to humans. Cats hunt for both fun and food. Unlike wild predators, domestic cats hunt whether they are hungry or not. These cats are called "subsidized predators" because they sometimes receive a steady supply of food at home.

### Dogs

In the literature, documentation about dogs harassing wildlife dates back to the early 1950's. These early references were solely related to white-tailed deer. Predation by free-ranging dogs was believed responsible for the perceived slow growth rate of existing and translocated populations. Most dogs are found in or around private inholdings in the CNF. At times one can see these dogs chasing cars or following walkers on Highway PR 191.

Some recreationists maintain control of their dogs through leash restraints while others consider voice command a form of control. Still others make little attempt to maintain control of their dogs, allowing them to travel out of sight and/or hearing distance (Sime, 1999). The surrounding municipalities of the Forest are all experiencing a home developmental increase, which it is conceivable that unrestrained dogs could become a future issue of biological significance.

### Iguana

In the last few years the common iguana (*Iguana iguana*) has shown up in a number of places in Puerto Rico. The first specimens were undoubtedly escaped pets since pet shops frequently import young specimens of this species (Rivero, 1998). Today there is a large colony of this species living on the island of Culebra, but it seems to be reproducing in several coastal areas on the island of Puerto Rico.

The concern with these exotic reptiles on the CNF is the unknown effects through competition with Endangered, Threatened, and Sensitive species.

### Summary

Because native reptiles, amphibians and invertebrates, are small, often slow and readily available on Puerto Rico, they are particularly susceptible to extirpation caused by non-native rats, cats, & mongooses. Of particular concern are the varied native reptile and amphibian populations in the Caribbean National Forest and their links to the ecological web of the island. The Puerto Rican parrots, being one of the 10 most endangered birds in the world experience occasional loss due to predation by rats & mongooses. Great numbers of wildlife, therefore, are lost directly each year to relatively agile exotic species and indirectly to iguanas. The cumulative impacts associated with these increasing wildlife losses are considerable to the islands wild populations.

### **Decision to be made**

Based on agency relationships, Memorandum of Understandings and legislative authorities, The CNF is the lead agency for this EA and therefore, is responsible for the scope, content, and decisions made. A list of public participants and representatives of government agencies provided important inputs in the scoping process from which the CNF interdisciplinary team generated issues and alternatives to the proposed action.

Based on the scope of this EA, the decisions to be made are:

- Should human health and safety shortfalls be allowed to continue without a proactive exotic species management plan?
- Should native indigenous species extirpation be allowed to continue without a proactive exotic species management plan?
- Would the proposed action have significant impacts on the target species to reduce their negative effects?
- Would the proposed action have significant negative impacts on the native species?

- What are the expected outcomes to the aesthetic, cultural and socioeconomic values of the Forest?

### **Scope of this Environmental Assessment**

**Actions Analyzed.** This EA evaluates planned non-native exotic species management to protect native wildlife, human health and safety, and alleviate nuisance issues in the CNF. Additional NEPA documentation would be required to conduct wildlife damage management that is outside the scope of this EA, should the need arise.

**Period for which this EA is valid.** This EA would remain valid until the CNF and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time this analysis and document would be supplemented pursuant to NEPA

**Site Specificity.** This EA addresses all present lands under the management of the CNF as designated in the Revised Land and Resources Management Plan (1997). Because the proposed action is to reduce the target species damage, within available funding and workforce, it is conceivable that additional wildlife damage management efforts could occur. Thus this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

### **Proposed Action**

The Caribbean National Forest in cooperation with the U.S. Department of Agriculture's Animal Plant Health Inspection Service (APHIS), Wildlife Services proposes to conduct a site-specific non-native rat, mongoose, cat and dog, and iguana population reduction program using a combination of live cage trapping, padded leg hold traps and low-potent rodenticide applications in species specific bait stations and a structured educational approach for employees and visitors, and improve future study opportunities within the CNF.

In general, the non-native target species populations are larger in or near areas of human recreation, in part because of the availability of food.

Key steps for this proposed action include:

- 1) Establish current and acceptable population estimates;
- 2) Identify food sources and methods to reduce available food and habitat;
- 3) Develop more efficient tactics for population reduction;
- 4) Public and Forest employee education;
- 5) Long-term monitoring

A recent multiple season home-range study of mongooses in the CNF conducted by the University of California at Davis has been completed and is in the process of being published as an official report. Preliminary data has provided information on this species behavior, which help develop future strategies (Quinn, 2003). The anticoagulant rodenticide Ditrac is commercial diphacinone bait that comes in a blue-green block with a grain odor and is not soluble in water (Ditrac, 2000). Ditrac is the intended low-potent poison chosen for this project due to the following:

- Requires multiple feedings to kill target species (avoids bait shyness),
- Low secondary poisoning to birds
- Breakdowns immediately in sunlight
- Not acutely toxic to fishes
- Comes in blocks that accommodates use in bait stations,

Diphacinone has also been successfully used to control predators of endangered species as the on other islands such as Hawaii.

Current labels for rat and mouse baits used outdoors require that baits be applied in protective bait stations or placed in areas inaccessible to nontarget wildlife (e.g., in burrows) (EPA, 1998). In contrast to other commercial poisons diphacinone and chlorophacinone tend to be less toxic to birds, less persistent in animal tissues of primary consumers, and must be eaten over a period of several days to cause mortality. Therefore, a predator feeding only once on a poisoned carcass may not die if the rodent was poisoned with either Diphacinone or Chlorophacinone (EPA, 1998). For more detailed MSDS information see Appendix B.

### **Authority and Compliance Environmental Laws and Plans**

#### **1997 Revised Land and Resource Management Plan for the Caribbean National Forest**

A very important goal is to develop and implement an Integrated Pest Management (IPM) plan to regulate non-native exotic pests to levels that are economically, environmentally and aesthetically acceptable. The IPM is the planned and systematic use of detection, evaluation, and monitoring techniques. It employs all appropriate biological, chemical, genetic and mechanical tactics.

The selection of pest control and abatement methods, whether manual, mechanical, biological or chemical, is on the basis of their effectiveness and minimal environment risk (USDA Forest Service, 1997).

Titles 36 CFR 261.14j & k/ 36 CFR 262.11

Prohibitions in developed recreation or swimming sites on National Forests are specific in stating that all animals brought into the Forest, other than seeing eye dogs, must be crated, caged, or upon a leash not longer than six feet, or otherwise under physical restrictive control.

Forest law enforcement officers through their support activities have been given the power to impound dogs found running at large in any part of the National Forests.

Wildlife Services Legislative Mandate –Act of 1931

The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), as amended in the fiscal year 2001 Agriculture Appropriations Bill, which provides that:

“The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all wildlife services authorities in effect on the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001.”

National Environmental Policy Act (NEPA)

Environmental documents pursuant to NEPA must be completed before work plans consistent with the NEPA decision can be implemented. This EA qualifies as a legitimate work plan for NEPA requirements.

Endangered Species Act (ESA)

It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act.

The Endangered Species Act (ESA) requires that actions authorized, funded or carried out by Federal agencies not jeopardize the continued existence of listed species. Under section 7(a)(2) of the ESA (16 USC section 1536), Federal

agencies are required to consult with the U.S. Fish and Wildlife Service (USFWS) on actions which may affect listed species or critical habitat.

Migratory Bird Treaty Act (MBTA)

The MBTA provides the U.S. Fish Wildlife Services with regulatory authority to protect bird species that migrate outside the United States. The law prohibits any “take” of the species, except as permitted by the USFWS or by federal agencies within the scope of their authority; therefore the USFWS issues permits for managing wildlife damage situations caused by migratory birds.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The U.S. Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. After speaking with the U.S. Fish and Wildlife Service in Hawaii and received information that the EPA will be giving a nationwide permit for the use of Diphacinone for pest (mongoose) control.

Environmental Justice and Executive Order 12898

Environmental Justice has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Executive Order 12898 requires Federal agencies to make Environmental Justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effect of Federal programs, policies and activities on minorities and low-income persons or populations.

To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.

National Historic Preservation Act (NHPA) of 1966 As amended

The National Historic Preservation Act of 1966 (NHPA) and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute “undertakings” that can result in changes in the character or use of historic properties and 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources.

The proposed plans do not cause ground disturbances nor do they otherwise have the potential to significantly affect visual, audible, or atmospheric elements of historic properties and are thus not undertakings as defined by the NHPA.

Executive Order 13045 – “Protection of Children from environmental Health and Safety Risks”

A growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks. Diseases and their vectors must be controlled for the health of all children.

#### Commonwealth of Puerto Rico Laws

Law 67 – This Act shall be known as the Animal Protection Act

The protection of domestic animals in captivity under the control of any person will be done in a humane manner. This means any equine, bovine animals, sheep, goat, swine, dog, cat or any other domestic animal or bird of any animal in captivity under the control of any person shall not be mistreated.

All feral pets when captured shall be taken to the nearest regional animal shelter facility and would not be released into the wild. If there is an ID on a captured animal, the shelter would contact the owner of the captured animal, otherwise, the captured animal would be disposed of according to the shelter facility regulations.

## **II. AFFECTED ENVIRONMENT AND ISSUES**

This section of the EA describes the current status of baseline information from agency expertise, monitoring and research projects. The description of the affected environment is not meant to be a complete account of the program area. Rather, it is intended to portray the significant conditions and trends of the resources that may be affected by the proposed program or its alternatives.

Issues addressed in detail:

- I. Effects of target species (non-native species) on human health and safety
- II. Effects of target species on native wildlife, this includes Proposed Threatened & Endangered species impacts.
- III. Effects on aesthetic, cultural and socioeconomic values of the Forest

Issues addressed in concern to the proposed action:

- IV. Effects of control methods on target species populations
- V. Effects of control methods on non-target species

Now, the affected environment is described in two components of the Natural Resources section. These two components, physical and native animals, presents unique properties of the CNF worthy of protection and proper stewardship.

Natural Resources:

**Physical Setting**

Puerto Rico is located between 17 degrees 55' and 18 degrees 31' North latitude ad 65 degrees 39' and 67 degrees 15' West longitude, or about 1,000 miles southeast of Miami, Florida. Lying between the Atlantic Ocean and the Caribbean Sea, it is the easternmost island of the Greater Antilles. Total land area is 3,421 square miles (USDA Forest Service, 1997).

The Forest is located in the rugged Sierra of Luquillo Mountains, 25 miles southeast of San Juan, Puerto Rico. It is the only tropical forest administered by the USDA Forest Service. The tropics are frost-free areas lying between the latitudes of Cancer and Capricorn (USDA Forest Service, 1997).

The Forest contains 27, 890 acres. Elevation ranges from 100 to 3,533 feet above sea level. The climate is tropical. Average annual rainfall over the Forest is 120 inches per year. Topography is rugged, with 24% of the Forest exhibiting 60% slope or steeper (USDA Forest Service, 1997).

Most nutrients necessary for plant growth are in the top 10-centimeter of the Forest's soils, as is typical of wet tropical forest. Most Forest soils are comprised of high percentages of clay (45-80%). Sandy textured soils are associated with the area of quartz diorite parent rock on the Forest's south side. Intense rains and steep slopes make the Forest's soils highly erodible when vegetative cover is removed. The sandy diorite-derived soils lack cohesion, so they are particularly susceptible to erosion.

Montane wetlands occur on slopes where soils are shallow and poorly drained. Rainfall is high and can be supplemented by cloud water interception (Weaver

1971). Evapotranspiration is low, and water does not drain rapidly. As a result, soils above 2,000 feet are generally saturated with water, even on exposed slopes.

Landslides occur commonly, constantly reshaping the dynamic topography of the Forest. Landslides usually occur during periods of high rainfall (Larson & Torres-Sanchez, 1990). The largest recent landslides on the Forest are located in the Icacos Valley on the south side of the Forest, along Highway 191 (Guariguata and Larsen, 1991).

Water flowing from the Forest is abundant and of high quality, and provides many benefits. The Forest furnishes water for municipal and domestic uses, electrical power generation, and recreation. Water provides fish and wildlife habitat, and supports a lush tropical forest. Water leaves the Forest as surface water in streams, and as subsurface groundwater. There is almost all current use of surface water off the Forest (USDA Forest Service, 1997).

The Forest is headwaters for 8 watersheds, which produce an estimated 226,000 acre-feet (73.5 billion gallons) of water per year. Monthly flows fluctuate from about 3,400 acre-feet to 30,000 acre-feet. Low flows occur in February and March and high flows occur in September and October.

The climate of northeastern Puerto Rico is wet-tropical. As a result, the Forest is the wettest place on the island. Mean annual rainfall ranges from 96 inches at lower elevations to 157 inches at higher elevations, averaging about 120 inches (Brown and others, 1983). Mean annual temperatures range from 80 degrees Fahrenheit at lower elevations to 64 degrees Fahrenheit at the higher elevations. Hurricanes occur annually in the West Indies. Major hurricanes affect Puerto Rico on the average every 20-30 years, usually during the months of July through September.

The Forest contains 4 major forest types: Tabonuco, Palo Colorado, Sierra Palm, and elfin woodlands. The tabonuco forest type is associated with sub-tropical wet and sub-tropical rain forest life zones, which occurs on foothills and slopes below 2,000 feet elevation. Tabonuco is the most extensive type, covering about 13,800 acres or 49% of the Forest. It also has the richest flora, containing at least 175 tree species; 115 of these species occur less commonly than one tree per hectare. Significant human impact, such as farming and pasturing, has occurred on probably 80% of this type, leading to a variety of successional stages.

The Palo Colorado forest type, associated with the lower montane wet life zone, occurs above 2,000 feet on gentle slopes and in valleys. This type borders the tabonuco forest with an overlapping vegetative transition. The Colorado type provides nesting habitat for the endangered Puerto Rican Parrot. The abundant

moisture in this type supports a host of herbaceous plants, including epiphytes representing many plant families. Over 50 tree species occur in the Colorado type, with 15 species occurring less commonly than one tree per hectare. The type covers 8,200 acres or about 30% of the Forest. At least 80% of it is essentially unmodified by human activities.

The Sierra Palm forest type is associated with all five life zones occurring on the Forest. Palm forest occurs chiefly on steep slopes and streambeds above 1,500 feet. This type indicates unstable soils. The palm type covers about 4,800 acres or 17% of the Forest. It is essentially unmodified by human activities, with exception of small areas in recreation sites.

The elfin woodland is associated with the lower montane rain forest life zone. This type occurs only on higher peaks and ridges above 2,500 feet that are subject to extreme exposure. Trees here are stunted and twisted. The largest trees are about 15 feet tall and 12 inches in diameter. Average diameter is about 2-4 inches. Its exposed environment supports a smaller number of species per unit area than the other types. However, a higher percentage of these species are endemic to Puerto Rico. Some species are confined to just the Forest. Elfin woodlands covers only about 1,000 acres or 4% of the Forest. Most of this type is unmodified by human activities, apart from areas on the peaks, which have been developed for electronic sites and their access roads.

### **Native Animals**

Tropical forests are usually characterized by their rich diversities of wildlife species. This is true on the CNF and in Puerto Rico in general. A total of 127 species of terrestrial vertebrate species are known to occur on the Forest; 77 species of birds, 19 species of reptiles, 15 species of amphibians, 7 species of fish, 10 species of shrimps and crabs and 11 species of bats (USDA Forest Service, 1997).

Neotropical migrant birds (NTMB) are those species which breed in North America and migrate south for the winter. Approximately 35 species of NTMB either winter or pass through the Forest. They contribute significantly to the bird and total animal diversity of the Forest. Major causes of recent declines in the populations of many of these species are believed to be the fragmentation of North American breeding habitat and the loss of wintering habitats in Mexico, Central and South America, and the Caribbean.

The Caribbean National Forest has a wide variety of reptiles and amphibians; 19 and 15 species respectively. Most species of reptiles are well represented with the lizards of the Forest, ranging from ground dwellers to the great selection of the

Anolis species. The endangered Puerto Rican Boa also calls most of the lower elevation of the Forest home and can be observed in the evenings in certain times of the year. The amphibians on the Forest are dominated by the Coqui species, which can be heard in a deafening serenade every night. Most coquis that one will find on the Forest is the Common Coqui but each species depending on the habitat has its niche and unique calling repertoire.

Caribbean freshwater fish dominate the lower river systems, although some occur in steep mountain streams. Some of the species mature and reproduce in the rivers, but the larvae move downstream to estuarine or marine waters, requiring juveniles to migrate back upstream.

The freshwater aquafauna include predators, omnivores, and herbivores. Most of the large predatory fish have limited abilities to move up steep streams, but are abundant in pools at lower elevations. Species such as the American eel (*Anguilla rostrata*), mountain mullet (*Agonostomous monticola*), river goby (*Awaous tajasica*), sirajo goby (*Sicyduim plumieri*), shrimps (*Macrobrachium spp.*), and crabs (*Epilobosera sinitufrons*) characterize the aquafauna for the CNF.

Of all the mammalian species on the Forest, the bat is definitely the only present native mammal on the Forest. The most abundant species of bats of the Forest is the Jamaican Fruit bat (*Artibeus jamaicensis*), this species is known to have some some documented cave roosts and shares the Forest with 10 other bat species

For administration purposes the CNF have different species in a category termed management indicator species to monitor their populations annually or every other year to know the population trends.

The following is a list of the CNF Management Indicator Species:

Birds:

- Puerto Rican Parrot (*Amazona vittata*)
- Sharp-shinned Hawk (*Accipiter striatus venator*)
- Broad-winged Hawk (*Buteo platypterus brunnescens*)
- Elfin Woods Warbler (*Dendroica angelae*)
- Black-throated Warbler (*Dendroica caerulescens*)

Amphibians:

- Tree-hole Coqui (*Eleutherodactylus hedricki*)
- Warty Coqui (*E. locustus*)
- Burrow Coqui (*E. unicolor*)

Reptiles:

- Yellow-bearded Anole (*Anolis gunlachi*)

Fish:

Goby (*Sicydium plumieri*)

Mountain mullet (*Agonostomus monticola*)

Crustacean:

Crayfish (*Macrobrachium carcinus*)

Refer to Appendix A.

According to NEPA all proposed actions and alternatives must take into consideration the Proposed Endangered & Threatened & Sensitive (PETS) Species:

The following species were covered in the Biological Evaluation for the use of Rodenticide in the critical area of the P.R. Parrot.

Puerto Rican Parrot (*Amazona vittata*)

Puerto Rican Boa (*Epicratus inornatus*)

Puerto Rican Sharp-shinned Hawk (*Accipiter striatus venator*)

Puerto Rican Broad-winged Hawk (*Buteo playpterus brunnescens*)

White-necked Crow (*Corvus leucognaphalus*)

Threats to all these native species from exotic species are complex due to length of time for ecological processes on the CNF. Unfortunately some results of introduced species in the Forest can be observed immediately. The following brings forth the most relevant risks to the CNF.

### **Garbage Disposal**

There has historically been an avid garbage collection schedule on the CNF in the recreational sites and some highly visited trails. Through the senior program on the Forest, Trash cans are emptied on a daily basis at the recreational areas and most times given new trash bags. Even though good stewardship on trash is maintained, the trashcans themselves have been in commission for over 5 years and do show heavy rusting that have become holes. There has been reason to believe that the bins do indirectly attract many of these non-native species. The worst of these trashcans have been scheduled for replacement. The new trash cans were recommended by the Forest Biologist to be designed after the same types as the Virgin Islands National Park, which have been successful in keeping odors in and resistant to the harsh environment.

### **Cultural Resources**

Cultural resources are buildings, artifacts, or archeological sites that remain from human activity that occurred in the past. They are physical evidence of over 6000

years of human activity on the island of Puerto Rico. Heritage resources may be very prominent and visible, or they may be intangible, or buried under the present land surface. Heritage resources may have archeological, historical and/or architectural values, and each is unique and irreplaceable.

The Forest contains a variety of cultural resources spanning pre-Columbian, Spanish colonial, and through the early twentieth century. Since 1983, approximately 8,400 acres of cultural resource surface inventories have been done on the Forest, resulting in the discovery of over sixty historic and pre-Columbian sites. Seven sites have been evaluated for inclusion in the National Register of Historic Places (USDA Forest Service, 1997).

Due to the nature of the proposed action there will be no soil movement or historic building modification. Thus no need of further study of negative effects to cultural resources is needed.

### **III. ALTERNATIVES**

The National Environmental Policy Act (NEPA) requires that a reasonable range of alternatives be developed to provide decision-makers and the public with a clear basis for choice (40 CFR 1502.14). Case law has determined that reasonable alternatives include those that are technically and economically practicable and feasible, using common sense, rather than those that are simply desirable (46 CFR 18027).

The following alternatives all require the mandatory minimum activity of the use of live cage traps by a trained APHIS, Wildlife Services technician or representative. This APHIS technician would also be responsible for conducting field operations outlined in the Alternatives section, under administration of the Ecosystem Team of the CNF.

The alternatives detailed below were developed to focus on issues identified by CNF resource specialists, exotic species reduction experts and other control experts, government regulatory agencies, and the general public.

All alternatives are derived from the proposed alternative with some supplemental components.

Alternative 1: No Action, Continue Current Level of Management

Alternative 2: Continue Research into exotic species, Public and Forest Employee education / cooperation and Nonlethal Control Only

Alternative 3: No pets allowed in the Forest and Lethal Control only

Alternative 4: Integrated Wildlife Damage Management (Proposed Action)

Alternative 1: No Action, Continue Current Level of Management

Under the No Action, continue current level of management alternative, the stated mandatory minimum of using cage traps to capture problem animals will be kept as the norm. Little or no work in developing further study opportunities. No optional method to deal with challenges. Public and Forest employee education will be only cursory. Gauging to other alternatives most target species in this alternative will not be significantly affected.

Alternative #2: Continue Research into exotic species, Public and Forest Employee education / cooperation and Nonlethal Control Only

This alternative removes all lethal hands-on approach of dealing with the reduction of non-native species. The nonlethal control would consist of the increased dispersion of cage traps and the use of padded leg-hold traps. This alternative focuses on accumulating more scientific information on the target species through collaborative work with institutions, and addressing some primary sources of the occurrence of non-native species. When available, the CNF shall designate resources to specifically conduct studies in new control methods or the further study of the biology of exotic species. Leg hold traps would be used, but only for the capture of iguanas, which are extremely hard to capture

Public and Forest Employee education

A cooperative effort between environmental groups shall be initiated to explore methods of obtaining educational materials to help young people and private landowners in responsible stewardship of the area's scarce resources.

Exploration with other environmental groups will help find ways to offer adoptive alternatives for feral pets caught on the Forest. Every three months during the employee meetings, forest employees will be reminded of the importance of eliminating and preventing anything that would attract exotic species. This message would also be conveyed to tourist groups and permittees.

**Alternative #3: Pets not allowed in the Forest and Lethal Control only**

The main method for controlling black rats in this alternative would be to establish, along with the mandatory cage trapping, poison bait stations. Snap traps and cage traps with euthanasia, and would be used for black roof rats and other exotic species. Visual announcements and press releases describing the banning of all pets for the sake of the health of the Forest would be posted to enhance public awareness.

**Alternative #4: Integrated Wildlife Damage Management (Proposed Action)**

The proposed action is designed to allow the CNF the flexibility to deal with any future non-native exotic pests and still be within the parameters of responsible ecosystem management.

**1 Public and Forest Employee education**

A cooperative effort between environmental groups will be initiated to do the following:

- Provide materials to groups already in the process of educating the regional youth in responsible stewardship of the area's scarce resources. This may also be helpful in informing private homeowners within the Forest of their responsibilities.
- Initiate communications with an animal welfare group in the region to provide an adoptive alternative for feral pets caught on the Forest prior to the last resort of euthanization.
- Every three months during the family meetings reiteration and training of Forest employees on the importance of how not to attract exotic species, thus conveying the intention to tourist groups and permittees.

**2 Continue Research on exotic species biology when Opportunities arise.**

**3 Non lethal control methods (one regimen for recreation and administrative areas another for endangered species critical habitat)**

- Live cage trap baiting
- Padded leg-hold traps

**4 Lethal control methods (one regimen for recreation and administrative areas another for endangered species critical habitat)**

- Low potent poison baiting in species-specific bait stations for emergencies

**IV. ENVIRONMENTAL CONSEQUENCES**

This section analyses the environmental consequences of each alternative in relation to the issues identified for detailed analysis. Analysis of each alternative will be made in comparison with the No Action Alternative to determine if the real or potential impacts would be greater, lesser, or the same. The analysis also takes into consideration USDA Forest Service mandates, directives, and procedures used in Forest Service decision process.

The following resource values within the CNF are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources and timber.

A quantitative method to completely measure changes cannot be devised for the scope of this EA, but in specific sites with defined parameters can be assumed. In essence the proposal is trying to reduce the fecundity, which is the number of young produced per female over a given time period (Caughley, 1996). For simplification this EA will use one formula to help visualize the results from each alternative. The formula is:  $Fecundity = \frac{\text{young produced}}{\text{adult female}}$ . For example usually one year is the time period considered, but for smaller animals, especially those that may breed several times a year, a shorter time period may be selected. Thus, if a population of 100 female rats produced 20 young in a year, the birth rate, or fecundity, would be  $\frac{20}{100} = 0.2$ . If we continue with active management we can lower the number female (also males) and with the same number of young produced come out with a higher percentage  $\frac{20 \text{ (young)}}{80 \text{ (females)}} = .25$ . This means more adult females are being taken out of productivity. Ideally in this ratio, one would like to reach to the whole number one signifying 20 young born out 20 females in the population, but that is generally improbable and impossible for the CNF.

Issues	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Human health & Safety	Status quo existing state	Status quo existing state	Improved	Improved
Native Species & (TES) pop.	Negative Allows predation by exotics	Status quo Existing state	Status quo existing state	Improved
Aesthetic, Cultural & Socioeconomic Values	Negative Does not control possible growth of exotics	Negative Does not reduce possible growth of exotics	Improved	Improved
Effects to Target species	Fec: 0.2 20/100	Fec: 0.2 20/100	Fec: 0.25 20/80	Fec: 0.33 20/60

After each alternative, refer to appendix A to review effects to Management Indicator Species.

**I. Effects of target species (exotic species) on human health and safety.**

Alternative 1. No Action

Direct and Indirect effects:

In cooperation with APHIS Wildlife Services, the CNF would continue the present level of live trapping for mongoose in recreations areas. Under this alternative, there are three major trends in the expected results: 1) The mongoose and rat population will be allowed to fluctuate according to different times of the year (i.e. breeding and brooding seasons). 2) Human-target species interactions will rise and fall in accordance to these activity shifts. And 3) an increase in the spread of diseases will be left unimpeded and reach to humans in the surrounding areas. The no-action alternative is necessary according to Forest Service policy and in the following examination dire consequences are expected for employees and the visiting public of the Forest.

The most dangerous threat from rats, is their ability to pass communicable diseases, the most formidable is Leptospirosis. Leptospirosis-may be contracted through contact with water or ingestion of food contaminated with urine of infected rats. Leptospirosis may be the most common disease that rats carry and transmit to humans in the United States. Leptospirosis is a bacterial flu-like illness with symptoms of aches, pain, and fever. It is often self-limiting, but may sometimes require antibiotic treatment. But 1 in 10 leptospirosis patients develop a more serious form of the disease called Weil's syndrome.

The appealing nature of Mongoose and feral dogs are wellsprings for human affection, but in the past have proved to be extremely hazardous once they become infected with the rabies virus

Transmission of the rabies virus usually begins when infected saliva of a host is passed to an uninfected animal. Various routes of transmission have been documented and include contamination of mucous membranes (i.e., eyes, nose, mouth), aerosol transmission, and corneal transplantations. The most common mode of rabies virus transmission is through the bite and virus-containing saliva of an infected host.

Feral cats have been found to be reservoirs to many diseases and the only species known to allow for the completion of the life cycle for the protozoan parasite *Toxoplasma gondii* (dubey 1973; Teutsch et al. 1979). The domestic cat has been

found to transmit *T. gondii* to both domestic and wild animal species. This protozoan infects both stray and domiciled cats, but this infection is more common in stray cats. Stagno et al. (1980) found that school-aged children, in an Alabama outbreak of *Toxoplasmosis*, were more likely to be infected than other age groups. Ingestion of oocysts deposited in cat feces was the means by which these children contracted the infection. Children with a history of geophagia had a greater chance of contracting this infection than children not exhibiting this behavior.

Another study determined that stray cats serve as major reservoirs for the bacterium *Bartonella spp.* and *B. clarridgeiae*. Consequently, stray cats and their fleas (*Ctenocephalides felis*) are the only known vectors for infecting house bound cats and humans with this bacterium. Humans are not infected via the flea, but fleabites often infect pet cats. Human infections that may result from exposure of this bacterium via stray cats include cat scratch disease in immunocompetent patients, bacillary aniomatosis, hepatic peliosis in immunocompromised patients, endocarditis, bacteremia, osteolytic lesion, pulmonary nodules, neuroretinitis, and neurological diseases (Heller et al. 1997).

Other diseases that may be communicable from feral cats to pet cats include feline panleukopenia (FPL) infection, feline clicivirus (FCV) infection, feline reovirus (FRV) infection and feline sycytium-forming virus (FSV) infection (Gillespe and Scott 1973).

No diseases communicable to humans from iguanas have been found warranting caution. Although in past experience, several occasions of aggressive behavior have been documented against visitors. During these encounters the CNF had to have assistance from APHIS, wildlife services to handle the hazardous lizard.

As mentioned before, this alternative does not prevent future attacks and is a temporary solution. Most mammals have a breeding season in certain times of the year and in their native natural settings these breeding seasons are limited. In the CNF those constraints either are non existent or too minor to affect a population. The mongoose and rat population will breed according to the different seasons of the year without any natural predators and make their presences be known, especially around human occupied sites.

**Cumulative effects:**

In cooperation with APHIS Wildlife Services, the CNF would continue the present level of live cage trapping for mongooses in recreations areas. Cumulatively threats to human health and safety from the target species would continue seasonally and increase to higher levels in sites where mongoose and rats populations are known to exist. Observing APHIS Wildlife Services records, the

winter (December-February) and summer (May-August) months held the most trappings and showed a direct relationship with the reports of human-target species encounters.

**Alternative 2. Continue Research into exotic species, Public and Forest Employee education / cooperation and Nonlethal Control Only:**

In this alternative the emphasis is focused on education along with the mandatory live trapping regime for the Forest. Using the same management actions over time, it has been observed that there will be two results; 1) there will be a slight drop in the number of reported target species-human encounters with new information from research. And 2) the oscillating population trends will continue.

**Direct and Indirect effects:**

With only one method to control target populations (live cage trapping), the local population will not experience a reduction in number. Human-target species will continue at around 6 encounters per year. After each attack the APHIS technician will deploy traps and perhaps capture the culprit. Research into biological aspects of the target species will take time to organize and execute, so no immediate outcomes can be predicted. Education will enable future human-target species encounters to decrease and possibly reduce the chance occurrence of disease transfer from exotic species to humans. Cooperation will be helpful with the capturing of feral pets with the processing of the animal in shelters to provide an alternative home. Nonlethal control will be used primarily to capture iguanas and with this option the number of iguanas can be immediately controlled.

**Cumulative effects:**

Non-native rats and mongoose would continue to adversely impact visitor services and experience at future food concessions throughout the Forest. There would be no use of rodenticide application, so populations will stay in a potential position for further growth. The use of padded leg holds allows the more efficient capture of illusive iguanas once they have been identified in certain areas. A more structured educational outline will enhance employees and visitors awareness in preventing the attraction and avoidance of target species.

**Alternative 3 No pets allowed in the Forest and Lethal Control only**

**Direct and Indirect effects:**

In this alternative the use of only certified low-potent poison along with mandatory live cage baiting; poison will be used in species specific bait traps as the main method of control and a pet rule exclusion initiated only by the Forest

Supervisor on the Forest. There are two immediate results expected from this alternative; 1) the local rats and mongoose populations will be immediately reduced, thus a reduction in the number of encounters, and human experiences may be more positive due to this reduction and appreciate the native local fauna that occur naturally in the Forest; and 2) the feral pets found on the Forest would go down slightly at first and will keep feral animals occurrences low. The number of feral animals chasing visitors and their vehicles will drop with the frequency of capture by the APHIS technician.

**Cumulative effects:**

Over the long-term only using these methods and not opening to new research may give the target species a new advantage we haven't considered. The target species are known to have an adept ability to acclimate to their surroundings, so relying only on this alternative in the long-term may not be able to handle changes in behavior. However human health and safety may be kept to an acceptable level with little encounters with target species.

**Alternative 4 Integrated Wildlife Damage Management (Proposed Action)**

In this alternative a multiple use approach depending on the situation would immediately and for the long-term reduce the number of encounters in the recreational, administration zones, and critical areas for TES.

**Direct and Indirect effects:**

Controlled target species populations will reduce harassments of visitors and employees. Better-informed visitors will improve awareness of the potential threats from target species. Educated employees will provide better service and resources for reporting target species activities. Possible assistance with public groups will enhance understanding to surrounding communities and show the CNF as being progressive in the field of ecosystem management.

**Cumulative effects:**

Over the long-term the numbers of local populations will be reduced and with research into new methods will allow the program to change with the uncertainty of future occurrences in either behavior or abiotic factors. Human health and safety can be kept at a sustainable level and possibly make recreation sites one of the safest areas due to vigilant management activities.

**II. Effects of target species on native wildlife & control methods on target and non-target species populations.**

**Alternative 1. No Action**

**Direct and Indirect effects:**

Non-target (native) species shall continue to experience negative effects of predation and possible exposures to diseases. Native bats can be susceptible to the rabies virus from the exotic mammalian species and become a vector of the virus to other areas of Puerto Rico. Local populations of wildlife such as lizards, coquies, arthropods will bear the brunt of no action by the ongoing consumption by rats, mongooses and cats. Impacts of the iguana would be indirect through competition due to its predominantly vegetarian (although it may eat eggs, young birds and carrion). The iguana potential population growth may of concern as in Venezuela where it causes considerable damage to fruit plantations (Rivero 1998).

The domestic cat has been one of the most important biological factors (not including humans) causing the depletion or extinct of both island and mainland bird species. In a survey of the impact of biological invasions on six island reserves, feral cats were identified in all six of the islands surveyed. On these islands, cats had a varying degree of impact depending on the environment and vulnerable species present (Brockie et al. 1988). Jackson (1978) reports cats as the most significant factor, next to habitat destruction, contributing to the extinction of bird species. Jackson (1978) reports that at least 33 species (forms) have become extinct as a result of cat predation.

The diet of feral and free-ranging cats varies depending on availability, abundance, and geographic location. Fitzgerald (1990) concluded that prey selection of feral and free-ranging cats is dependent on availability. The author found that cats on mainland situations fed most heavily on mammals; where as cats on islands fed almost exclusively on bird. Feral and free-ranging cats are known to prey on birds as large as mallard ducks (Figley and VanDruff 1982) and young brown pelicans (Anderson et al. 1989) and mammals as large as hares and rabbits. Many of these cat populations rely heavily on humans, either for handouts and/or garbage

**Cumulative effects:**

Non-native rats would continue to flourish essentially unabated throughout the CNF. The terrestrial habitat would continue to decline under their foraging and predatory activities. Species protected under the Endangered Species Act would continue to be adversely affected, as rats and mongoose would also continue to depredate endangered Puerto Rican Parrots.

Examples from other island ecosystems have portrayed that the minimum amount of exotic predator control has thrown local populations of native birds into a decline. Hence the fecundity of non-natives will remain the same or worse, experience an increase due to a population boom.

**Alternative 2 Continue Research into exotic species, Public and Forest Employee education / cooperation and Nonlethal Control Only**

Under this alternative the CNF and APHIS Wildlife Services would implement and recommend nonlethal control methods as the main method to control target populations. Continued research opportunities would be requested and a more structured educational drive would be followed.

**Direct and Indirect effects:**

There are two outcomes expected; 1) the local target species populations would continue to rise and fall even with the active live cage trapping and numbers of iguanas caught with padded leg holds would increase; and 2) the native species in those areas where management is intensive would not be adversely effected and would not be likely to be caught in the referred traps.

**Cumulative effects:**

It is not likely that local populations of target species would grow with an active trapping schedule. At least once a week with live bait traps and the occasional padded leg holds for trouble iguanas would lessen the pressures of target species off balanced and keep from resident exotics from establishing in the site. Native species would also experience at the minimum a somewhat more hospitable area. However, non-target species numbers would not be likely to accumulate because the target species ability to replenish numbers. In all methods in this alternative, certain individuals will become weary or trap-shy and avoid the traps altogether.

**Alternative 3 No pets allowed in the Forest and Lethal Control only**

**Direct and Indirect effects:**

Under this alternative, the CNF and APHIS Wildlife Services would only implement lethal control methods without considering nonlethal methods. There shall also be announced a no pets policy. Some local reduction in rat and mongoose populations will occur immediately by lethal methods. The occurrences of feral dogs and cats would be significantly reduced.

**Cumulative effects:**

Species-specific bait stations would not adversely affect native species due to design, but rat and mongoose species may become accustomed to avoid stations. The ability for the rat and mongoose species to learn about the acceptance of such stations has not been studied.

**Alternative 4 Integrated Wildlife Damage Management (Proposed Action)**

**Direct and Indirect effects:**

Non-target species shall undergo an immediate change especially in the recreational areas and critical areas. Most if not all native species that are predated by the target species will not have to contend with these advanced hunters. The proposal allows the use of multiple control methods to use against the target species to curtail the amount of activity in the specific area.

**Cumulative effects:**

The poison's instability is important in not harming the non-target species and ecosystem altogether. Non-target species populations will exhibit a steady growth pattern in the effected sites.

**III. Effects to the Aesthetic, Cultural and Socioeconomic values of the Forest**

Alternative 1. No Action

& Alternative 2: Continue Research into exotic species, Public and Forest Employee education / cooperation and Nonlethal Control Only

The effects in this issue on these two alternatives can be combined.

Infestation by both rats and mongoose will reduce appeal to visitors and droppings in hard to reach areas will be odorous. This could lead to loss of revenue and visitor enjoyment over the long-term. The future plans of allowing food to be served in the Palma de Sierra area will be hampered with the growing pressures of all target species.

Alternative 3 No pets allowed in the Forest and Lethal Control only and

Alternative 4 Integrated Wildlife Damage Management (Proposed Action)

These two alternatives utilize a very active approach and according to the issues two outcomes are expected; 1) visual appearances will be kept in an adequate condition and 2) the site would be acceptable to accommodate recreational visitors. With more management in non-native species control, cultural resources will be better conserved and tend to last longer for future generation.

**V. Mitigations**

The following list is the mitigation measures specific to the issues for the use of those new methods mentioned in the proposed action.

- Species-specific bait stations will only be used for poison deployment,
- Poison Bait stations will not be placed within 25 meters of a perennial stream,

- Future studies will provide relevant information to guide management actions.

The Interdisciplinary team for this project is the following:

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36 Code Federal Regulations 262.11

36 Code Federal Regulations 800

16 United States Code section 1536

## **VI. APPENDICES**

**APPENDIX A**

Management Indicator Species	Present population information	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Puerto Rican Parrot	Populations are stable at 32 since the last post-breeding count in June 03	No action in the past has been negative due to rat & mongoose predation	Negative	Positive due to the reduction of rats, mongoose, and cat reduction	Positive due to the reduction of rats, mongoose, and cat reduction
Sharp-shinned Hawk	None documented in FY03	No negative effects	No negative effects	No negative effects	No negative effects
Broad-winged Hawk	Migratory bird counts FY03 show 2 identified in western sections	No negative effects	No negative effects	No negative effects	No negative effects
Elfin Woods Warbler	Christmas bird counts show 1 EWA in the cloud forest	Possible predation by arboreal rats or cats	Possible predation by arboreal rats or cats	Positive due to reduction of non-native exotic predators	Positive due to reduction of non-native exotic predators
Black-throated Blue Warbler	2 Warblers have been documented in Christmas counts in low elevations..	Possible predation by arboreal rats or cats	Possible predation by arboreal rats or cats	Positive due to reduction of non-native exotic predators	Positive due to reduction of non-native exotic predators
Tree-hole coqui	Coqui counts in FY03 show occurrences are stable	Possible predation by arboreal rats or cats	Possible predation by arboreal rats or cats	Positive due to reduction of non-native exotic predators	Positive due to reduction of non-native exotic predators

Management Indicator Species	Present population information	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Warty Coqui	Coqui counts in FY03 show less occurrences.	Possible predation by arboreal rats or cats	Possible predation by arboreal rats or cats	Positive due to reduction of non-native exotic predators	Positive due to reduction of non-native exotic predators
Burrow Coqui	Coqui counts in FY03 show less occurrences.	Possible predation by arboreal rats or cats	Possible predation by arboreal rats or cats	Positive due to reduction of non-native exotic predators	Positive due to reduction of non-native exotic predators
Yellow-bearded Anole	Less is reported from technicians in all areas of CNF.	Possible predation by mongoose or cats	Possible predation by mongoose or cats	Positive due to reduction of non-native exotic predators	Positive due to reduction of non-native exotic predators
Sicydium plumieri	Population is stable in northern watersheds.	No effects	No effects	No effects	No effects
Agonostomus monticola	Population is stable in northern watersheds.	No effects	No effects	No effects	No effects
Macrobrachium carcinus	Population is stable in northern watersheds.	No effects	No effects	No effects	No effects

**Decision Notice**  
**Finding of No Significant Impact**

Exotic Species Management on the Caribbean National Forest

USDA Forest Service  
Southern Region  
Caribbean National Forest  
Municipalities of Rio Grande, Luquillo, & Naguabo  
Puerto Rico

**Decision and rationale for the decision**

**Background**

I have reviewed the Environmental Assessment (EA), which discloses the environmental effects of implementing four alternatives for the sustained reduction of exotic species on the Caribbean National Forest (CNF). The EA was prepared utilizing input from an interdisciplinary team and comments from the public. The EA is available for public review or a copy can be obtained through the mail by contacting the Caribbean National Forest, P.O. Box 490, Palmer, PR 00721 or by viewing the Forest website at [www.southernregion.fs.fed.us/caribbean](http://www.southernregion.fs.fed.us/caribbean).

The CNF began the National Environmental Policy Act (NEPA) process in March 2003 to improve its overall management program for exotic species on recreational sites, administration zones, and critical area for endangered species.

People have accidentally or intentionally introduced hundreds of non-native species into natural communities worldwide, and while many die out, some persist and become pests. Human-caused extinctions can be roughly divided into four broad categories: non-sustainable use of resources, habitat destruction, pollution, and introduced exotic species. It is now widely accepted that through introduced species the current rates of species extinctions are dramatically higher than background rates; most current extinctions can be directly attributed to this human activity. For ethical, cultural, aesthetic and economic reasons, the current extinction rate is cause for considerable concern.

With the exception of bats, the CNF is presently inhabited by numerous species of exotic mammals that have produced severe impacts on many indigenous species of plants and animals and threatens visitor safety. Feral or wild mammals include the small Indian mongoose, Norway rat, black rat, domestic cat, domestic dog. Also the iguana is considered an exotic lizard that was initially brought to Puerto Rico as pets. Some of these species also pose a danger to Forest Service employee's safety. Allowing the exotic species populations to grow is seriously affecting native fauna and flora species.

## Decision Notice and FONSI for exotic species management

### Present program

Under the cooperative agreement between the USDA Forest Service, Caribbean National Forest and the USDA Animal Plant Health and Inspection Service (APHIS), Wildlife Services, the two agencies collaborate to deal with issues related with exotic species on the Forest. The parameters to the present activities are specific in the only allowing the use of live trap cages for mammal species and following a general reactionary trap deployment schedule to capture exotic species. An APHIS technician has been responsible in the implementation of the trapping and has acted as a liaison with the health department of the commonwealth of Puerto Rico.

### New proposal

The new approach shall consist of the expansion of the use of live trap cages with the additional use of low-potent poisons and padded leg traps. The program will be supplemented with a structured employee and public educational effort, along with a more focused approach at relevant biological research on exotic species. The general trapping schedule on recreation areas will still be followed and through continued monitoring, data will be collected for analysis. Captured feral animals will continue to be sent to regional pounds for the possibility of adoption. The APHIS technician will still be involved with the major part of the new proposals but other alternatives will be looked into if needed.

### Public involvement

Implementation of this EA could affect Forest visitors, commercial operators, island residents, the integrity of natural and cultural resources, and the status of listed threatened and endangered species. Therefore, public participation has been a critical element in its preparation. The public involvement process for the EA provided two distinct phases of public information on and review of plan elements: 1) 30-day public scoping phase of goals to be analyzed in detail in the EA ; 2) The 30-day public review with a press briefing of the draft EA. With this final phase of the NEPA process the public has a 45-day period to appeal the Final EA.

### Alternatives Analyzed

Four alternatives were analyzed in detail in the EA.

Alternative 1: No Action, Continue Current Level of Management

Alternative 2: Continue Research into exotic species, Public and Forest

Employee education / cooperation and Nonlethal Control Only

Alternative 3: No pets allowed in the Forest and Lethal Control only

Alternative 4: Integrated Wildlife Damage Management (*Proposed Action*)

These alternatives were developed based on issues raised in scoping, public comment, and interdisciplinary team meetings. The EA discloses the potential environmental consequences that may result from implementation of various alternative management strategies. Comments received during public review of the draft EA were considered in preparation of a Final EA and this DN/FONSI.

## Decision Notice and FONSI for exotic species management

### Environmental Consequences (summarized from EA)

#### Alternative 1: No Action, Continue Current Level of Management:

Continuing current level of management with minimal effects to exotic species occurrence in recreational, administrative and endangered species critical habitat. Little or no work in developing further study opportunities. No optional method to deal with challenges. Public and Forest employee education will only be cursory.

#### Alternative 2: Continue Research into exotic species, Public and Forest Employee education / cooperation and Nonlethal Control Only:

This alternative removes all lethal hands-on approach of dealing with the reduction of non-native species. The nonlethal control would consist of the increased dispersion of cage traps and the use of padded leg-hold traps. Target species would be studied through collaborative work with scientific institutions. A cooperative effort between environmental groups shall be initiated to explore methods of obtaining educational materials in responsible stewardship of the area's natural resources.

#### Alternative 3: No pets allowed in the Forest and Lethal Control only:

Along with the mandatory live cage trapping, poison bait stations. Placement of visual announcements would be dispersed and press releases describing the banning of all pets combined with the controlling would reduce exotic species in all locations. Over time, possible bait aversion developed by target species and without further biological study this method alone may prove ineffective.

#### Alternative 4: Integrated Wildlife Damage Management (*Proposed Action*)

In this multiple use approach depending on the situation would immediately and for the long-term reduce the number of encounters in the recreational, administration zones, and critical areas for endangered species. Controlled target species will reduce harassments of visitors and employees. Better-informed visitors will improve awareness of the potential threats from target species. Educated employees will provide better service and resources for reporting target species activities. Assistance with public groups will enhance understanding to surrounding communities and show the CNF as being progressive in the field of ecosystem management.

### **The Decision**

Based upon my review of the EA and all alternatives, I have decided to implement Alternative 4, which includes the necessary features to have a significant effect to the local populations of exotic species.

My selection of Alternative 4 is also based on a careful review of proposed, endangered, threatened, and sensitive species Biological Evaluation.

## Decision Notice and FONSI for exotic species management

The Forest Plan and Forest Service handbooks and manuals support the proposed actions of this pro-active management plan.

### **FONSI – Finding of No Significant Impact**

After thorough consideration of the EA, Appendices, the Forest Plan, and comments received, I have determined that these actions will not have a significant effect on the quality of the human environment considering the context and intensity of impacts (40 CFR 1508.27). Thus, an Environmental Impact Statement (EIS) will not be prepared. I base my determination on the following:

1. The action will not adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species act of 1973, because of the type of activities proposed for exotic species management (see EA page 8). There will also be no manipulation of the forest habitat. The listed species documented in the area are also protected by the beneficial effects by the proposed actions.
2. The action will not cause loss or destruction of significant scientific, cultural, or historical resources. An effect of controlling exotic pests is keeping the restored status of historical buildings intact (see EA pages 28).
3. The action will not violate Federal, State, and local laws or requirements for the protection of the environment. Applicable laws and regulations were considered in the EA (see EA page 9). The action is consistent with the Caribbean National Forest Land and Resource Management Plan. Benefits are expected in the following issues:
  - Improved human health & safety for all who visits or works on the Forest
  - Providing removal methods of harmful exotic species, which does not damage populations of native species. Predation pressures from exotics will be reduced and allow local native species populations to thrive in the project areas.
  - The sites of the proposed action shall occur in recreational, administrative zones and critical areas identified by the revised

land and resources management plan for the Caribbean National Forest.

4. There will be no significant effects on public health and safety, because of the importance of public relations and scientific inquiries on the site. Exotic species management shall be cautious to the natural and archeological resources on the site and not endanger any public interest. The Forest Biologist and any participating partner shall follow mitigations accordingly to ensure the protection of the resources and the public. (see EA page 28).
5. There will be no significant effects on unique characteristics of the area, because an analysis on unique characteristics or ecologically critical areas such as historic or cultural resources, or rare habitats will not be negatively effected.
6. The action is not likely to establish a precedent for future actions with significant effects, because research projects at the site shall be according to the Forest Plan, which does not allow environmentally detrimental projects to occur. The CNF Forest Biologist and Special Uses manager shall review the mandatory annual reports of the types of present and proposed projects for the site.
7. We have considerable experience with the types of activities to be implemented. The effects analysis shows the effects are not uncertain, and do not involve unique or unknown risk (see Biological Evaluation).
8. The cumulative impacts are not significant (see EA pages 21-28).
9. My finding of no significant environmental effects is not biased by the beneficial effects of the action.

#### **Implementation Date**

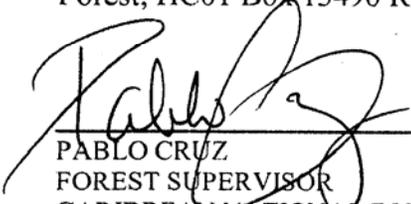
The majority of the proposed project will be implemented on or after September 15, 2004 or after the 45-day appeal period as soon as public notification is given.

**Administrative Review or Appeal Opportunities**

This decision is subject to appeal in accordance with 36 CFR 215.7. A notice of appeal must be in writing and clearly state that it is a Notice of Appeal being filed in pursuant to 36 CFR 215.7. Appeals must be filed, within 45 days of the date of legal notice of this decision. A notice of appeal should be sent to USDA, Forest Service, Southern Region, ATTN: Appeals deciding Officer, 1720 Peachtree Rd NW, Suite 876S, Atlanta, GA 30367-9120

**Contact**

For additional information concerning this decision or the Forest Service appeal process, contact Felipe Cano, Forest Biologist, Caribbean National Forest, HC01 Box 13490 Rio Grande, P.R. 00745-9625, or (787) 888-1810.

  
\_\_\_\_\_  
PABLO CRUZ  
FOREST SUPERVISOR  
CARIBBEAN NATIONAL FOREST

8/3/04  
Date

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United States  
Department of  
Agriculture

Forest  
Service

Caribbean  
National  
Forest

HC01, Box 13490  
Rio Grande, PR 00745-9625  
Tel: (787) 888-1810/1880

File Code: 2600/3400

Date: April 27, 2004

U.S. Fish and Wildlife Service  
Mr. Edwin Muñiz  
Field Office Supervisor  
Boquerón Field Office  
PO Box 491  
Boqueron, PR 00622

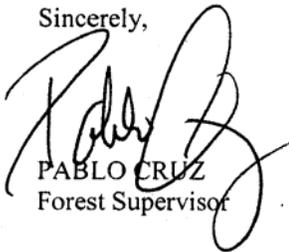
Dear Mr. Muñiz:

The Caribbean National Forest (CNF) has completed a Biological Evaluation (BE for the Environmental Assessment of the management of exotic non-native species on the Forest. The goal of the CNF in controlling the non-native exotic pests is to reduce the exotic pest population in both recreational areas and habitats for Proposed, Endangered and Threatened species.

I am requesting a section 7 consultation on the BE for these proposed actions

If you have any questions please contact Felipe Cano, Forest Biologist, at (787) 888-1810.

Sincerely,



PABLO CRUZ  
Forest Supervisor



Caring for the Land and Serving People

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**BIOLOGICAL EVALUATION OF THE PROPOSED NON-NATIVE  
EXOTIC SPECIES MANAGEMENT  
ENVIRONMENTAL ASSESSMENT FOR THE  
CARIBBEAN NATIONAL FOREST**

USDA FOREST SERVICE  
SOUTHERN REGION  
CARIBBEAN NATIONAL FOREST  
MUNICIPIO DE RIO GRANDE, LUQUILLO & NAGUABO  
PUERTO RICO

CONTACT PERSON:  
FELIPE CANO  
FOREST BIOLOGIST  
HC01 BOX 13490, RIO GRANDE, P.R. 00745-9625  
(787) 888-5640

April 23, 2004

## I. INTRODUCTION

The purpose of this Biological Evaluation (BE) is to document the impacts on Proposed, Endangered, Threatened and Sensitive (PETS) species from the proposed use of low toxic rodenticides in species-specific boxes, padded leg traps and live-traps in the Caribbean National Forest (CNF). The intended sites of the proposed actions on the CNF, (also known as El Yunque), are the recreational areas and critical habitats of the Puerto Rican Parrot (PRP). In cooperation with the USDA Animal and Plant Health Inspection Service (APHIS), the CNF will implement the anticipated actions in addressing non-native exotic species.

The managing agencies efforts to provide a safe and secure nesting area for the PRP has been hampered by the presence of exotic species; most prevalent of these pests is the black rat (*Rattus rattus*) (USFS, 1997). Due to the detrimental effects of the rat's activities to nesting PRP the managing agencies have reinstalled rat control through the use of a rodenticides. Other new alternatives include the uses of live traps for cats and mongoose.

The CNF is one of the most accessible tropical forests in the world, which draws approximately one million visitors each year. Recently the number of non-native exotic species encounters with humans has increased to a level that calls for an action plan. Most occurrences of these interactions have been due to the exotic species being infected with the rabies virus. The transmitting of diseases is of profound importance and these projected techniques allow for the control of exotic species and at the same time pose no great threat to the fauna and flora of the CNF. Leg traps will be used only to capture the illusive iguana once one has been detected; the tools will be used immediately and not be left unsupervised.

Through the BE process, the proposed activities are reviewed and their potential effects on any proposed, endangered or threatened species protected under the Endangered Species Act (ESA) of 1973, or designated by the Forest Service as sensitive are evaluated.

The objective of this BE are as follows from Forest Service Manual 2672.41:

- To provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process.
- To comply with the requirements of the endangered species act that action of Federal agencies not jeopardize or adversely modify critical habitat for the recovery of Federally listed species without a thorough analysis of the significance of such impacts.

- To ensure that Forest Service actions do not contribute to the loss of viability of any native or desired non-native plant or animal species or contribute to trends towards federal listing.

## II. CONSULTATION HISTORY

Under Section 7 of the Endangered Species Act (1973) this BE made use of internal expertise, collected literature and informal consultation with other responsible agencies. On February 11 and 13, 2002 unofficial phone conversations between the CNF Biologist, Felipe Cano, and the Supervisor of the USFWS Rio Grande Office, Fernando Nunez, was conducted to address the potential re-establishment of the use of a rodenticide in the PRP protocols. On February 20, 2002 an unofficial phone conversation between the CNF Biologist and Felix Lopez, Contaminants personnel, of the USFWS Boqueron Office took place to discuss the potential effects of specific rodenticides to the surrounding areas and non-target species.

On February 22, 2002 Bernice Constantin of the USDA APHIS/Wildlife Services discussed information regarding the use diphacinone as the safest rodenticide to use without harming the Puerto Rican Boa. Rodent control efforts in Hawaii also have opted to use diphacinone due to the lower potential of secondary poisonings.

On March 1, 2002 US Fish and Wildlife Service signed a section 7 consultation of the rodenticide use for rat abatement in the Puerto Rican Parrot critical habitat on the CNF.

On March 7, 2003 an Environmental Assessment commenced with the intention of using more options of non-native exotic species control after the initiation of a pests study by the University of California at Berkeley. Presently it is in the final draft phase and expected to be signed by late April 2004.

This BE is tiering, as defined through the Council on Environmental Quality regulations (CEQ, 1992), to the Final Environmental Impact Statement of the National Animal Damage Control Program of USDA APHIS. This document provides a National Environmental Policy Act (NEPA) foundation to the proposed rat abatement. The proper use of an anticoagulant for animal control was examined for the entire United States and its territories (USDA, 1997).

The Memorandum of Understanding (MOU) between the USDA APHIS Wildlife Services and the Caribbean National Forest of 2001 defines the cooperative quality of the Integrated Pest Management strategies (USFS, 2001).

The MOU between the US Fish Wildlife Service and Caribbean National Forest of 1999 also defines the leadership and the responsibilities of each agency for protective measures for the PRP recovery effort (USFS, 1999).

**III. PROPOSED ACTIONS**

The proposed action consists of placing covered bait boxes, accessible only to rat species, containing the rodenticide, Diphacinone, into the recreational areas on PR road 191. In addition, an increase of number of live traps (have-a-heart traps) and supervised use of padded leg traps will be deployed in these known areas of infestation.

Diphacinone is an anticoagulant poison chosen because 1) it is effective in very low concentrations, 2) there is an antidote (vitamin K) to accidental poisoning, and 3) secondary hazards are lower than more acute toxicants (Witmer, 1998). Diphacinone has been used extensively for rodent control since the 1960's and for several years in other island situations. There have been no reported cases of secondary poisoning for raptors and only a few cases of poisonings in mammals (Hillis-Starr, 1999). The product will not be applied directly to water or where surface water is present or to intertidal areas as suggested in the environmental hazards statement on the packet.

Employees of the CNF will only assist if the USDA APHIS, Wildlife Services requests help in the distribution of the rat poison.

**III. CONSIDERED AND EVALUATED SPECIES**

Below is an updated chart listing all Proposed, Endangered, Threatened and Sensitive (PETS) species known to occur on the Caribbean National Forest. This chart indicates the status of each species within the proposed project area based on known scientific information and surveys.

After the collection of known data, there is two Endangered species documented to occur within the proposed project area. Those species with an "X" in the potential column will be evaluated in this BE due to the occurrence of potentially suitable habitat within the proposed project area. The remainders of the species on the list were not included because of the lack of any potential habitat present in the area that those species prefer or require (See comment column).

My determination is based on habitat relationships for these species, species range distribution information, and known locations of these species from field surveys or observations.

**Proposed, Endangered, Threatened, and Forest Service Sensitive Species List  
of the Caribbean National Forest  
As of April 2004**

Scientific Name	Common Name	Documented within project area	Potentially within project area	Not likely to occur	Comments
<i>Amazona vittata</i> <b>Endangered</b>	Puerto Rican Parrot	X			

PROPOSED EXOTIC SPECIES MANAGEMENT BE

Scientific Name	Common Name	Documented within project area	Potentially within project area	Not likely to occur	Comments
<i>Corvus leucognaphalus</i> <b>Extirpated</b>	White-necked Crow			X	No longer found in Puerto Rico. No Commonwealth status.
<i>Accipiter striatus venator</i> <b>Endangered</b>	Puerto Rican Sharp-Shinned Hawk		X		
<i>Buteo platypterus brunnescens</i> <b>Endangered</b>	Puerto Rican Broad-Winged Hawk		X		
<i>Epicrater inornatus</i> <b>Endangered</b>	Puerto Rican Boa	X			
<i>Dendroica angelae</i> <b>Proposed</b>	Elfin Woods Warbler			X	Known only to occur in the Elfin woods of El Yunque.
<i>Stenoderma rufum</i> <b>Sensitive</b>	Desmarest's fig-eating Bat			X	Prefers El Yunque's riparian zones, where fruit trees grows with low-disturbance.
<i>Eleutherodactylus eneidae</i> <b>Sensitive</b>	Mottled Coqui			X	Occurs in mud-banks along trails and roads. Collected in Toro Negro and El Yunque
<i>Eleutherodactylus gryllus</i> <b>Sensitive</b>	A Coqui	X			Prefers openings & along forest margins along roads & trails. Not collected below 900 ft elevation.
<i>Eleutherodactylus hedricki</i> <b>Sensitive</b>	A Coqui	X			An arboreal spp. Often as high as 20 ft off the ground. Not been heard below 1,000ft. elevation.
<i>Eleutherodactylus karlschmidti</i> <b>Sensitive</b>	Web-Footed Coqui		X		Prefer boulder habitats and known to lay eggs near streams.
<i>Eleutherodactylus unicolor</i> <b>Sensitive</b>	Burrow Coqui	X			Recorded around 2,000ft. & common under moss, rocks, & roots.
<i>Eleutherodactylus locustus</i> <b>Sensitive</b>	Martillito Coqui	X			Calls from low bushes, grasses or ferns. Never been collected below 900ft. in elevation.
<i>Eleutherodactylus richmondi</i> <b>Sensitive</b>	Caoba Coqui		X		Terrestrial spp. Common under rocks & logs. Never been collected below 600ft.

PROPOSED EXOTIC SPECIES MANAGEMENT BE

Scientific Name	Common Name	Documented within project area	Potentially within project area	Not likely to occur	Comments
<i>Callicarpa ampla</i> <b>Endangered</b>	Capa Rosa			X	No local populations are located in sites. Nature of proposed project will not affect species.
<i>Cornutia obovata</i> <b>Endangered</b>	Palo de nigua			X	No local populations are located in sites. Nature of proposed project will not affect species.
<i>Eugenia haematocarpa</i> <b>Endangered</b>	Uvillo			X	No local populations are located in sites. Nature of proposed project will not affect species.
<i>Ilex sintensis</i> <b>Endangered</b>	Cuero de Sapo			X	No local populations are located in sites. Nature of proposed project will not affect species.
<i>Lepanthes eltorensis</i> <b>Endangered</b>	An Orchid			X	No local populations are located in sites. Nature of proposed project will not affect species.
<i>Pleodendron macranthum</i> <b>Endangered</b>	Palo de rosa			X	No local populations are located in sites. Nature of proposed project will not affect species.
<i>Styrax potoricensis</i> <b>Endangered</b>	Palo de Jazmin			X	No local populations are located in sites. Nature of proposed project will not affect species.
<i>Ternstroemia luquillensis</i> <b>Endangered</b>	Palo Colorado			X	No local populations are located in sites. Nature of proposed project will not affect species.
<i>Brachionidium ciliolatum</i> <b>Sensitive</b>	Hairycup orchid			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Brunfelsia portoricensis</i> <b>Sensitive</b>	Puerto Rico raintree			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Calyptranthes luquillensis</i> <b>Sensitive</b>	Luquillo forest lidflower			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Calyptranthes woodburyi</i> <b>Sensitive</b>	Woodbury's lidflower			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Conostegia refescens</i> <b>Sensitive</b>	Luquillo Mountain snailwood			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Cordia wagneriorum</i> <b>Sensitive</b>	Luquillo Mountain manjack			X	Nature of the proposed project will not affect any forest vegetation/flowers.

PROPOSED EXOTIC SPECIES MANAGEMENT BE

Scientific Name	Common Name	Documented within project area	Potentially within project area	Not likely to occur	Comments
<i>Eugenia eggersii</i> <b>Sensitive</b>	Guasabara			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Laplacea portoricensis</i> <b>Sensitive</b>	Nino de cota			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Lepanthes dodiana</i> <b>Sensitive</b>	Island babyfoot orchid			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Lindsaea stricta</i> var. <i>jamesoniiformis</i> <b>Sensitive</b>	Smallstalk necklace fern			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Marlierea sintenisii</i> <b>Sensitive</b>	Beruquillo			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Marsdenia elliptica</i> <b>Sensitive</b>	Jungle netvine			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Maytenus elongata</i> <b>Sensitive</b>	Puerto Rico mayten			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Miconia foveolata</i> <b>Sensitive</b>	Puerto Rico Johnnyberry			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Miconia pycnoneura</i> <b>Sensitive</b>	Ridge johnnyberry			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Myrica hodridgeana</i> <b>Sensitive</b>	Palo de cera			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Pilea multicaulis</i> <b>Sensitive</b>	Luquillo Mountain clearweed			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Pilea yunquensis</i> <b>Sensitive</b>	Mountain clearweed			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Psidium sintenisii</i> <b>Sensitive</b>	Sintenis' guava			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Ravenia urbanii</i> <b>Sensitive</b>	Tortugo prieto			X	Nature of the proposed project will not affect any forest vegetation/flowers.

Scientific Name	Common Name	Documented within project area	Potentially within project area	Not likely to occur	Comments
<i>Solanum woodburyi</i> <b>Sensitive</b>	Woodbury's nightshade			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Ternstroemia heptasepala</i> <b>Sensitive</b>	Saintedwood			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Urera chlorocarpa</i> <b>Sensitive</b>	Ortiga colorada			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Xylosma schwaneckeana</i> <b>Sensitive</b>	Schwaneck's logwood			X	Nature of the proposed project will not affect any forest vegetation/flowers.

#### IV. ENVIRONMENTAL BASELINE & SURVEY INFORMATION FOR EVALUATED SPECIES

##### 1. Puerto Rican Parrot (*Amazona vittata*). **Endangered**

The Puerto Rican Parrot (PRP) is a large green parrot with a red forehead and white-eye ring. In flight, the flight feathers flash a brilliant blue color. Its diet consists of fruits, bark, or leaves of over 60 plant species. Formerly found throughout all forest habitats in Puerto Rico, Vieques, and Culebra, the PRP once numbering one million birds has become one of the most rare birds in the world. The decline of the PRP can be linked primarily from increasing numbers of people (Snyder et al., 1987), initiating a transformation of the Puerto Rican habitat. PRP were routinely shot by farmers because of their threat to agriculture (Raffaele, 1989).

The wild population declined to a documented 13 birds in 1975, and the species is now on the federal endangered list (Oberle, 2000). The wild population has increased since the mid-1970's with the help of interagency coordination in Puerto Rico to develop long-term protocols and goals. The population recovered to 45-47 birds, but then dropped to 21-23 birds after Hurricane Hugo in 1989 (Oberle, 2000). Annual wild population surveys on the Caribbean National Forest have been conducted continually in a combined effort with the count estimated around 30-32. Two aviaries on the island contribute with new parrots that are raised and released with the help of the USFWS and Puerto Rican Department of Natural Resources (PRDNR).

##### 2. Puerto Rican Sharp-Shinned Hawk (*Accipiter striatus venator*). **Endangered**

A small forest hawk with dark blue-gray plumage above, with barred rufous markings on the breast. It inhabits heavily forested montane areas principally in the Luquillo Mountains. The hawk feeds primarily on small birds ranging in size from a tanager down to a hummingbird in dense vegetation (Oberle, 2000).

The subspecies experienced a 40% decline in population from 1985 to 1992. Estimates for the population in 1992 total to 154 birds.

3. Puerto Rican Broad-Winged Hawk (*Buteo platypterus brunnescens*). **Endangered**

In adults, the tail, broadly banded with black and white, and the rufous breast are characteristic of this subspecies. It is confined to forested areas on El Yunque and around the Rio Abajo State Forest. It prefers to hunt from a perch under the forest canopy that offers a clear view of a forest clearing, trail, or road (Oberle, 2000).

In the Caribbean National Forest, the hawk declined by 50% from 1984 to 1992. A population estimation of 124 individuals was generated for the Caribbean NF (Delannoy, 1992).

4. Puerto Rican Boa (*Epicrates inornatus*) **Endangered**

The Puerto Rican boa is the largest native species of snake and one of only three Boidae represented in the island. It grows to a length of 6 or 7 feet, although some people claim to have seen specimens of at least 12 feet (Rivero, 1998). The boa may be found on the ground or in trees. It feeds on rats, mice and bats but when young its regime is limited to small lizards, insects and other invertebrates. This species exists only in Puerto Rico. Although no population estimates are available, a series of casual observations were made during the period of 1972 to 1977. Perez-Rivera and Velez, Jr. (1978) observed 75 boas at 18 different localities. A considerable area judged to be potential habitat was not covered by their observations. *Epicrates* seems to be distributed throughout the Island, but is more abundant in the "haystack" (Karst topography) area, between Aguadilla and Bayamon and considerably less abundant in the dry region of the south (Rivero, 1998).

5. Coqui Species: *Eleutherodactylus gryllus*, *E. hedricki*, *E. karlshmidti*, *E. locustus*, *E. richmondi*, *E. unicolor*. **Sensitive**

All of the coquies mentioned above are categorized into one group due to these tree frogs similarities in biology and needs. Coquies are amphibians that have typically naked skin, which serves both as a respiratory organ and secretory apparatus (Rivero, 1998). This physical character makes the species susceptible to changes in abiotic factors such as temperature and humidity. In August 2003 one Forest-wide coqui survey was conducted to search for occurrences of new species individuals on long-term survey routes. Two of these routes traverse through the intended sites and have shown a presence of four sensitive Coqui species. *E. hedricki*, *E. locustus*, *E. gryllus*, *E. unicolor*, were found in the two routes with numbers averaging 4.8, 5.0, 6.5 and 3.9 per listening site (respectively). *E. Karlshmidti* and *E. unicolor* were not heard, but the habitat is preferable for the occupation by these two species. In fact, *E. Karlshmidti* has not been heard on the CNF

for some time and should be of concern for the USFWS. These Coquis diet consists mostly of insects, vegetation & eggs of other coquies.

#### 6. Endangered Plants:

Due to the nature of the proposed action, which does not involve any soil disturbance or vegetation manipulation. Discussing with the Forest Botanist in April 2004 on known local populations on the Forest, no Endangered plants are in danger from the proposed action.

### V. EFFECTS OF PROPOSED ACTION ON SPECIES

#### **Puerto Rican Parrot:**

Direct, indirect and cumulative effects to the Puerto Rican Parrot are immediate, but beneficial for the wild population. The reduction of rats in the nesting area will diminish the chances of nest or fledgling predation during those respective periods of the year.

#### **Puerto Rican Sharp-shinned hawk and Puerto Rican Broad-winged hawk:**

Direct, indirect and cumulative adverse effects to the Puerto Rican Sharp-shinned hawk and Puerto Rican Broad-winged hawk are not likely to occur. Delannoy (1984) observed that Sharp-shinned hawks do not have rats as part of their diet, mostly small birds. The chance of secondary poisoning is not high.

Puerto Rican Broad-winged hawk, like the other buteos, takes a wide range of prey. During the nesting season in North America small mammals, primarily chipmunks, shrews and voles are common in their diets along with snakes, toads, frogs, lizards, nestling birds, and large insects, notably the caterpillars of the saturnid moths. On the wintering grounds of South America, insects, lizards and frogs seem to make up the majority of their diet (Hawk conservancy website, 2002). It also takes various other arthropods, crustacea and even earthworms. These raptors generally have not been observed to devour carcasses.

#### **Puerto Rican Boa:**

Direct effects to the Puerto Rican Boa is not significant since the poison will not be accessible to the boa for direct consumption. Boas are not known to devour poison bars and prefer their natural prey. Again the poison is physically designed in the bait station for the use only by rats.

Indirect and Cumulative adverse effects will be minute to nonexistence due to the fact that diphacinone requires multiple ingestion for several days, which undoubtedly lessens hazards to most nontarget species (Fagerstone, 1997). Having these bait stations regularly checked by USDA APHIS and CNF employees will also observe any results. Most boas will not scavenge for their food.

**Coqui Species:**

The direct, indirect & cumulative effects to the coqui species are the reduced pressure of predation from exotic species such as the mongoose, rat & cat. Since predation from these predators is known to occur, the reduction of the non-native exotic species local populations will benefit the coquies species. Since the coqui are not attracted to diphacinone, there are no expected results of having coqui mortality connected with the dispersion of the poison boxes. Populations of coquies in these routes are expected to stay stable and perhaps have small increases, as much as the carry capacity for the site allows.

**Endangered Plants:**

There are no direct, indirect & cumulative effects to the endangered plants on the Forest. No soil disturbance, vegetation manipulation or plant management is proposed in this project.

**VI. MITIGATION MEASURES**

The Diphacinone brand poison shall be used as directed on the package. Poison bait stations will not be placed within 25 meters of a perennial stream. Monitoring of the poison sites shall consists of documentation of the poison site locations and recover carcasses of rats to be disposed of by trained employees.

**VII. DETERMINATION OF EFFECTS**

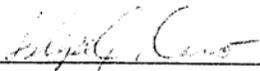
It is my determination that the implementation of the proposed rodenticide use for rat abatement in the PRP nesting area will have:

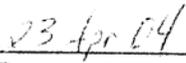
May affect, but beneficial effects for the Puerto Rican Parrot.

May affect, but not likely to adversely affect the Puerto Rican Sharp-Shinned Hawk, Puerto Rican Broad-Winged Hawk and Puerto Rican Boa.

The Forest Service does not anticipate adverse effects on the Coqui Species and sensitive species. Beneficial effects to fish and wildlife resources are anticipated from the planned management activity.

No effects to the Endangered Plants.

  
 \_\_\_\_\_  
 Felipe J. Cano  
 Forest Biologist, Caribbean NF

  
 \_\_\_\_\_  
 Date

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U.S. Department of Agriculture  
Forest Service, Southern Region  
Caribbean National Forest

Categorical Exclusion Review

Background: The Scientific Advisory Committee to the Endangered Puerto Rican Parrot, which is composed of members from the U.S. Forest Service, U.S. Fish and Wildlife Service, and the Puerto Rican Department of Natural Resources have proposed to conduct a disruption of Red-tailed Hawk predation on the last wild parrot flock. The Caribbean National Forest is public land managed by the USDA Forest Service. In order to determine whether an Environmental Analysis or Environment Impact Statement is required an extensive criteria list was reviewed and found that neither one was necessary.

Proposed Action: The action is to conduct the direct taking of Red-tailed Hawks within the delineated boundaries of parrot's nesting and foraging areas on the Forest. The USDA Animal and Plant Health and Inspection Service (APHIS), Wildlife Services agency will provide an employee coupled with an US Fish and Wildlife Service employee for the project. These two employees have recently completed training in firearms and safety protocols to conduct the proposed action. The taking will only occur in two events each year, before the fledgling of young parrots and before the nesting selection period. These two periods are the most vulnerable for the endangered parrots.

The proposed action is consistent with the environmental impact statement of APHIS national animal damage control program (APHIS, 1997).

Decision: The proposed action described above is approved. Implementation is immediate once signature has been completed. Biological Evaluation has endorsed the proposed action along with a formal consultation from the U.S. Fish and Wildlife Service.

Rationale: The proposed action is needed to ensure that the viability of the last wild flock of Puerto Rican Parrots is not detrimentally threatened. There is a rapidly declining trend of the last wild parrot flock that has been documented to limiting factors. The most adverse being predation of juvenile and adult parrots by the Red-tailed Hawk, which has a high number of occurrences in the Forest.

### Exception Criteria Review Checklist

Proposed Action: Reduction in Red-tailed Hawk foraging efficiency  
 Review the proposed action against each of the 10 criteria listed below. To qualify as a Categorical Exclusion the proposed action may not meet any of the criteria. If the criterion does not apply. Indicate "Not Applicable."

Exception Criteria		Comments
1	Have significant adverse effects on public health or safety	None
2	Have adverse effects on unique resources (i.e., parks, recreation, refuge lands, wilderness areas, wild or scenic rivers, etc.)	None
3	Have highly controversial environmental effects	None
4	Have highly uncertain environmental effects or involve unique or unknown environmental risks	None
5	Establish a precedent that could result in significant impacts	None
6	Be directly related to other actions having cumulatively significant effects	None
7	Have adverse effects on cultural or historical resources	None
8	Have adverse effects on species listed or proposed as threatened or endangered or have adverse effect on designated critical habitat for these species.	None, beneficial effects anticipated, see Biological Evaluation.
9	Require compliance with Forest Land and Resource Management Plan	Positive in the Parrot Recovery
10	Threatened to violate Federal, State, Local or Native American law or requirements imposed for the protection of the environment.	None, See US Fish and Wildlife Services Formal letter.

Prepared By: *Juliana J. Cano*  
*I am Peter B. 3/18/03*  
 Approved By: *Peter B.*

Date: *28 March 03*

Date: *3/23/03*

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U.S. Forest Service, March 2003. Biological Evaluation for the disruption of Red-tailed Hawk foraging efficiency in the parrot area on the Caribbean National Forest. Caribbean National Forest, Catalina Service Center.



United States  
Department of  
Agriculture

Forest  
Service

Caribbean  
National  
Forest

P.O. Box 490  
Palmer, PR 00721  
Tel: (787) 888-1810/1880

File Code: 2600

Date: March 10, 2003

James Oland  
US Fish and Wildlife Services  
Boqueron Field Office  
P.O. Box 491  
Boqueron, Puerto Rico 00622

Dear Mr. Oland:

On February 14, 2003 the Scientific Advisory Committee consisting of members from the USDA Forest Service, US Fish and Wildlife Service, and the Puerto Rican Department of Natural Resources, made a unanimous decision to control the threat of the Red tailed Hawk (RTH) on the Puerto Rican Parrot wild flock.

The decision was based on scientific data showing that adult and juvenile parrots are being predated by a select number of resident RTH. The continued predation of the parrot will place the last wild flock in jeopardy and hamper the recovery effort on the forest.

This Biological Evaluation (BE) assesses the effects of the proposed disruption of the RTH foraging efficiency on the Proposed, Endangered and Threatened Species of the Caribbean National Forest.

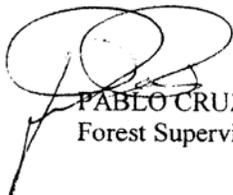
I concur with the findings of the BE:

Not likely to adversely effect to the Puerto Rican Parrot, beneficial effects anticipated.

No effects to the Puerto Rican Sharp-Shinned Hawk, or Puerto Rican Broad-Winged Hawk, Puerto Rican Boa.

I request for your cooperation in providing a response on this proposed action.

Sincerely,

  
PABLO CRUZ  
Forest Supervisor



Caring for the Land and Serving People

Printed on Recycled Paper



**BIOLOGICAL EVALUATION OF THE PROPOSED REDUCTION  
OF THE RED TAILED HAWK FORAGING EFFIECENCY IN THE  
PUERTO RICAN PARROT CRITICAL HABITAT ON THE  
CARIBBEAN NATIONAL FOREST**

USDA FOREST SERVICE  
SOUTHERN REGION  
CARIBBEAN NATIONAL FOREST  
MUNICIPIO DE RIO GRANDE, PUERTO RICO

CONTACT PERSON:  
FELIPE CANO  
FOREST BIOLOGIST  
PO BOX 490, PALMER, P.R. 00721  
(787) 888-5640

March 3, 2003

## I. INTRODUCTION

The purpose of this Biological Evaluation (BE) is to document the impacts on Proposed, Endangered, Threatened and Sensitive (PETS) species from the proposed disruption of red tailed hawks (RTH) foraging on the Puerto Rican Parrot, (PRP), (*Amazona vittata*) in the current breeding habitat area of the Caribbean National Forest (CNF). The USDA Animal and Plant Health and Inspection Service (APHIS), Wildlife Services and U.S. Fish and Wildlife Service (USFWS) will conduct the RTH reduction. The PRP managing agencies are composed of the Caribbean National Forest (also known as El Yunque), U.S. Fish and Wildlife Services (USFWS) and the Puerto Rican Department of Natural Resources (PRDNR).

The managing agencies efforts to provide a safe and secure nesting area for the Puerto Rican Parrot (PRP) has been hampered by the predation of adult and juveniles by red tailed hawks. The population of RTH is very high in the CNF and due to the detrimental effects of the hawk's predation on fledgling and adult PRPs the managing agencies are serious in considering the installation of a RTH foraging control protocol through direct removal.

Data has shown that the recovery effort was setback with the lost of many parrots to RTH predation (USFS, 2002).

Through the BE process, the proposed activities are reviewed and their potential effects on any proposed, endangered or threatened species protected under the Endangered Species Act (ESA) of 1973, or designated by the Forest Service as sensitive are evaluated.

The objective of this BE are as follows from Forest Service Manual 2672.41:

- To provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process.
- To comply with the requirements of the endangered species act that action of Federal agencies not jeopardize or adversely modify critical habitat for the recovery of Federally listed species without a thorough analysis of the significance of such impacts.
- To ensure that Forest Service actions or activities on the Forest do not contribute to the loss of viability of any native or desired non-native plant or animal species or contribute to trends towards federal listing.

## II. CONSULTATION HISTORY

Under Section 7 of the Endangered Species Act (1973) this BE made use of internal expertise, collected literature and informal consultation with other responsible agencies. On February 14, 2003 the Scientific Advisory Committee for the Puerto Rican Parrot met to decide what would be the most efficient way to control the factors that are decimating the adult and juvenile members of the wild flock. After extensive discussion the decision was made to have the USDA APHIS, Wildlife Services conduct the direct foraging reduction of RTH in a very controlled setting with light firearms in the PRP critical habitat area. Along with the APHIS technician, a designated firearms-qualified USFWS employee shall back up the APHIS employee during the procedure. The CNF is only allowed to provide safety support. Also on February 14, 2002 an unofficial phone conversation between the CNF Biologist, Felipe Cano and Wildlife Services director for Florida, Bernice Constantin, developed the protocol to provide training to the two designated workers.

This BE is tiering, as defined through the Council on Environmental Quality regulations (CEQ, 1992), to the Final Environmental Impact Statement of the National Animal Damage Control Program of USDA APHIS. This document provides a National Environmental Policy Act (NEPA) foundation to the proposed RTH reduction.

The Memorandum of Understanding (MOU) between the USDA APHIS Wildlife Services and the Caribbean National Forest of 2000 defines the cooperative quality of the Integrated Pest Management strategies (USFS, 2001).

The MOU between the USFWS and CNF of 1999 also defines the leadership and the responsibilities of each agency for protective measures for the PRP recovery effort (USFS, 1999).

## III. PROPOSED ACTIONS

The proposed action is to allow the USDA APHIS Wildlife Services conduct reconnaissance for the offending RTH and then along with any other participant of the CNF and the identified USFWS employee provide the support for the taking of the predator. The majority of the actions will take place in the western part of the Forest, not crossing east of Puerto Rican Road 191 or Road 10 on top of the mountain. The need is for the current breeding area and areas adjacent to it. The taking of the predator will have a double identification process of the target to ensure recognition of the species from other raptor species. This direct taking procedure will only disrupt and lower the foraging efficiency of the hawk due to the spatial behavior of the species. This disruption will allow the parrot to survive when it is at its most vulnerable.

This procedure will occur only two times per year before the fledgling season and before the nesting season. These two periods requires the most attention to the prevention of predation by RTH.

All participants are experience in identifying flying birds and will follow direct safety procedures specified by APHIS.

**III. CONSIDERED AND EVALUATED SPECIES**

Below is an updated chart listing of all PETS species known to occur on the Caribbean National Forest. This chart indicates the status of each species within the proposed project area based on known scientific information and surveys.

After the collection of known data, there is one Endangered species documented to occur within the proposed project area. Those species with an "X" in the potential column will be evaluated in this BE due to the occurrence of potentially suitable habitat within the proposed project area. The remainders of the species on the list were not included because of the lack of any potential habitat present in the area that those species prefer or require (See comment column).

My determination is based on habitat relationships for these species, species range distribution information, and known locations of these species from field surveys or observations.

**Proposed, Endangered, Threatened, and Sensitive Species List  
of the Caribbean National Forest  
as of November 2002**

Scientific Name	Common Name	Documented within project area	Potentially within project area	Not likely to occur	Comments
<i>Amazona vittata</i>	Puerto Rican Parrot	X			Beneficial outcomes.
<i>Corvus leucognaphalus</i>	White-necked Crow			X	No longer found in Puerto Rico. No Commonwealth status.
<i>Falco peregrinus tundrius</i>	Peregrine Falcon			X	Not documented in PRP critical area, prefer cliff areas on the East side of Forest and wetlands.
<i>Accipiter striatus venator</i>	Puerto Rican Sharp-Shinned Hawk		X		Nature of the proposed project will not affect due to double identification
<i>Buteo platypterus brunnescens</i>	Puerto Rican Broad-Winged Hawk		X		Nature of the proposed project will not affect due to double identification

PROPOSED PREDATION REDUCTION OF PR PARROTS BE

<i>Epicrates inornatus</i>	Puerto Rican Boa		X		Nature of the proposed project will not affect ground dwellers
<i>Dendroica angelae</i>	Elfin Woods Warbler			X	Known only to occur in the Elfin woods of El Yunque.
<i>Stenoderma rufum</i>	Desmarest's fig-eating Bat			X	Prefers El Yunque's riparian zones, where fruit trees grows with low-disturbance.
<i>Eleutherodactylus eneidae</i>	Mottled Coqui			X	Occurs in mud-banks along trails and roads. Collected in Toro Negro and El Yunque
<i>Eleutherodactylus gryllus</i>	A Coqui			X	Prefers openings & along forest margins along roads & trails. Not collected below 900 ft elevation.
<i>Eleutherodactylus hedricki</i>	A Coqui			X	An arboreal spp. Often as high as 20 ft off the ground. Not been heard below 1,000ft. elevation.
<i>Eleutherodactylus karlschmidti</i>	Web-Footed Coqui			X	Prefer boulder habitats and known to lay eggs near streams.
<i>Eleutherodactylus unicolor</i>	Burrow Coqui			X	Recorded around 2,000ft. & common under moss, rocks, & roots.
<i>Eleutherodactylus locustus</i>	Martilitto Coqui			X	Calls from low bushes, grasses or ferns. Never been collected below 900ft. in elevation.
<i>Eleutherodactylus richmondi</i>	Caoba Coqui			X	Terrestrial spp. Common under rocks & logs. Never been collected below 600ft.
<i>Brachionidium ciliolatum</i>	Hairycup orchid			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Brunfelsia portoricensis</i>	Puerto Rico raintree			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Calyptanthes luquillensis</i>	Luquillo forest lidflower			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Calyptanthes woodburyi</i>	Woodbury's lidflower			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Conostegia refescens</i>	Luquillo Mountain snailwood			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Cordia wagneriorum</i>	Luquillo Mountain manjack			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Eugenia eggersii</i>	Guasabara			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Laplacea portoricensis</i>	Nino de cota			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Lepanthes dodiana</i>	Island babyfoot orchid			X	Nature of the proposed project will not affect any forest vegetation/flowers.

					forest vegetation/flowers.
<i>Lindsaea stricta</i> var. <i>jamesoniiformis</i>	Smallstalk necklace fern			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Marlierea</i> <i>sintensisii</i>	Beruquillo			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Marsdenia</i> <i>elliptea</i>	Jungle netvine			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Maytenus</i> <i>elongata</i>	Puerto Rico mayten			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Miconia</i> <i>foveolata</i>	Puerto Rico Johnnyberry			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Miconia</i> <i>pycnoneura</i>	Ridge johnnyberry			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Myrica</i> <i>hodridgeana</i>	Palo de cera			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Pilea</i> <i>multicaulis</i>	Luquillo Mountain clearweed			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Pilea</i> <i>yunquensis</i>	Mountain clearweed			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Psidium</i> <i>sintensisii</i>	Sintenis' guava			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Ravenia urbanii</i>	Tortugo prieto			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Solanum</i> <i>woodburyi</i>	Woodbury's nightshade			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Ternstroemia</i> <i>heptasepala</i>	Saintedwood			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Urera</i> <i>chlorocarpa</i>	Ortiga colorada			X	Nature of the proposed project will not affect any forest vegetation/flowers.
<i>Xylosma</i> <i>schwaneckeana</i>	Schwaneck's logwood			X	Nature of the proposed project will not affect any forest vegetation/flowers.

IV. ENVIRONMENTAL BASELINE & SURVEY INFORMATION FOR EVALUATED SPECIES

1. Puerto Rican Parrot (*Amazona vittata*). **Endangered**

The Puerto Rican Parrot (PRP) is a large green parrot with a red forehead and white-eye ring. In flight, the flight feathers flash a brilliant blue color. Its diet consists of fruits,

bark, or leaves of over 60 plant species. Formerly found throughout all forest habitats in Puerto Rico, Vieques, and Culebra, the PRP once numbering one million birds has become one of the most rare birds in the world. The decline of the PRP can be linked primarily from increasing numbers of people (Snyder et al., 1987), initiating a transformation of the Puerto Rican habitat. PRP were routinely shot by farmers because of their threat to agriculture (Raffaele, 1989).

The wild population declined to a documented 13 birds in 1975, and the species is now on the federal endangered list (Oberle, 2000). The wild population has increased since the mid-1970's with the help of interagency coordination in Puerto Rico to develop long-term protocols and goals. The population recovered to 45-47 birds, but then dropped to 21-23 birds after Hurricane Hugo in 1989 (Oberle, 2000). Annual wild population surveys on the Caribbean National Forest have been conducted continually in a combined effort with the count estimated around 30-32. Two aviaries on the island contribute with new parrots that are raised and released with the help of the USFWS and Puerto Rican Department of Natural Resources (PRDNR).

## 2. Puerto Rican Sharp-Shinned Hawk (*Accipiter striatus venator*). **Endangered**

A small forest hawk with dark blue-gray plumage above, with barred rufous markings on the breast. It inhabits heavily forested montane areas principally in the Luquillo Mountains. The hawk feeds primarily on small birds ranging in size from a tanager down to a hummingbird in dense vegetation (Oberle, 2000).

The subspecies experienced a 40% decline in population from 1985 to 1992. Estimates for the population in 1992 total to 154 birds.

## 3. Puerto Rican Broad-Winged Hawk (*Buteo platypterus brunnescens*). **Endangered**

In adults, the tail, broadly banded with black and white, and the rufous breast are characteristic of this subspecies. It is confined to forested areas on El Yunque and around the Rio Abajo State Forest. It prefers to hunt from a perch under the forest canopy that offers a clear view of a forest clearing, trail, or road (Oberle, 2000).

In the Caribbean National Forest, the hawk declined by 50% from 1984 to 1992. A population estimation of 124 individuals was generated for the Caribbean NF (Delannoy, 1992).

## 4. Puerto Rican Boa (*Epicrates inornatus*) **Endangered**

The Puerto Rican boa is the largest native species of snake and one of only three Boidae represented in the island. It grows to a length of 6 or 7 feet, although some people claim to have seen specimens of at least 12 feet (Rivero, 1998). The boa may be found on the

ground or in trees. It feeds on rats, mice and bats but when young its regime is limited to small lizards, insects and other invertebrates. This species exists only in Puerto Rico. Although no population estimates are available, a series of casual observations were made during the period of 1972 to 1977. Perez-Rivera and Velez, Jr. (1978) observed 75 boas at 18 different localities. A considerable area judged to be potential habitat was not covered by their observations. Epicrates seems to be distributed throughout the Island, but is more abundant in the "haystack" (Karst topography) area, between Aguadilla and Bayamon and considerably less abundant in the dry region of the south (Rivero, 1998).

#### V. EFFECTS OF PROPOSED MANAGEMENT ACTION ON SPECIES

##### Puerto Rican Parrot:

**Direct, indirect and cumulative effects** of the reduction of the RTH to the Puerto Rican Parrot are immediately beneficial and hold long-term beneficial conditions for the wild population. The reduction of the foraging efficiency of RTH in the nesting area will diminish the chances of fledgling or adult predation during the most sensitive periods of the year.

##### Broad-winged and Sharp-shinned Hawk, Puerto Rican Boa:

**Direct, indirect and cumulative effects** to the Puerto Rican Broad-winged hawk, Puerto Rican Sharp-shinned hawk, and the Puerto Rican Boa are not significant. This is fact that participants all have extensive experience identifying birds in flight. The double identification process ensures that the RTH is unquestionably acknowledged.

#### VI. MITIGATION MEASURES

None needed for the proposed action.

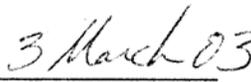
#### VII. DETERMINATION OF EFFECTS

It is my determination that the implementation of the proposed reduction in red-tailed hawk forage efficiency in the PRP area will have:

Not likely to adversely effect to the Puerto Rican Parrot, beneficial effects anticipated.

No effects to the Puerto Rican Sharp-Shinned Hawk, or Puerto Rican Broad-Winged Hawk, Puerto Rican Boa.

  
 Felipe J. Cano  
 Forest Biologist,  
 Caribbean National Forest

  
 Date

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United States  
Department of  
Agriculture

Forest  
Service

Caribbean  
National  
Forest

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Tel: (787) 888-1810/1880

File Code: 2600/3400

Date: July 29, 2004

RE: Decision notice for the exotic species management

Dear Interested Parties:

The Caribbean National Forest (CNF) has completed a decision notice and finding of no significant impact (FONSI) for the Environmental Assessment for the management of exotic species on the Forest.

The interdisciplinary team under direction from the Revised Land and Resources Management Plan for the CNF has completed the process of identifying issues, as well as compliance with multiple natural resource legislation authorities.

If you do not agree with the findings please respond verbally or in writing by September 15, 2004. To reduce wasteful paper production the Decision Notice/FONSI and Environmental Assessment is available at <http://www.southernregion.fs.fed.us/caribbean> for your review.

If you are unable to view the document on the internet, please contact our office, mentioned below, to request a copy.

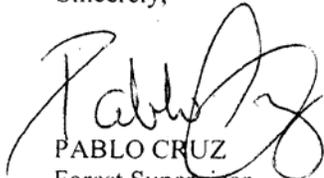
Appeals to this decision should be made to:

Felipe Cano  
Forest Biologist  
Caribbean National Forest  
P.O. Box 490  
Palmer, PR 00721

Phone: (787) 888-1810, Fax: (787) 888-5685, E-mail: [fcano@fs.fed.us](mailto:fcano@fs.fed.us)

I value your interest in the management of the Caribbean National Forest. I wish to work with you in providing management that reflects the scientific validity in land management and provides protection to the environment.

Sincerely,

  
PABLO CRUZ  
Forest Supervisor



Caring for the Land and Serving People

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