# Terrestrial Bird Studies on St. Martin: Winter of 2003

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## ***Introduction***

During the winter months of January, February, and March 2003, Environmental Protection In the Caribbean (EPIC) banded passerines in three habitats on the Caribbean island of St. Martin. The three habitats were defined as Secondary Dry Forest, Thorn Scrub Forest, and Scrub Mangrove Forest. This was the second year banding in the Secondary Dry Forest. Additionally, area sueveys were done to detect birds which were not captured for banding.

There is little known regarding passerine overwintering requirements in the Lesser Antillean region of the Caribbean. Much has been studied on overwintering passerines in the Greater Antillean islands to the north of the Lesser Antilles, including the islands of Hispaniola, Puerto Rico, and Jamaica (Arendt and Faaborg 1989; Confer and Holmes 1993; Ewert and Askins 1991; Marra *et al.* 1993; Parrish and Sherry 1994; Wallace *et al.* 1996; Wunderle and Wade 1993). Habitat and diet requirements must be known in order to better conserve and protect the birds which overwinter in the Lesser Antilles. Many species are only found in single dominant habitat types in their overwintering range. For instance, Prothonotary Warbler (*Protonotaria citrea*) and Northern Waterthrush (*Seiurus noveboracensis*) are primarily found in mangrove dominated habitat. Such data on specific habitat requirements must be found in order to protect both the species and the habitat type.

## ***Objectives***

- Band both overwintering migrant birds and resident birds.
- Do area surveys for birds not accounted for while banding.
- Assess how many birds and which species of birds are using each habitat type: Secondary Dry Forest, Thorn Scrub Forest, and Scrub Mangrove Forest.
- For overwintering migrants: Assess length of stay in overwintering habitat.
- For overwintering migrants: Assess general health during overwintering period.
- For resident species: Assess general health over a three-month period as well as inter-annually.

## ***Methods***

*Mist-netting:* The goal of mist-netting was to collect information on the bird's age, sex, fat stores, molt, and plumage characteristics. Capture/re-capture analysis will give us additional insight into population estimates. Nets were placed within three separate habitats: Secondary Dry Forest, Thorn Scrub Forest, and Scrub Mangrove Forest. Ten nets were used at each site and arranged at a distance of 3 nets per 2-hectare area. This distance assured biologists of covering all nets within a 15-minute time span. An eleventh net was added to the Secondary Dry Forest site for the second and third period. All nets used were 12-m-long, 30-mm-mesh, 4-tier, tethered, nylon mist nets. Nets were open during the hours of the most bird activity beginning at sunrise and

continuing for 6 hours. Nets were placed in areas of high avian traffic, including shrub areas and within canopy areas of larger trees. This assured us of high capture/re-capture rates. Finally, all birds were banded with uniquely numbered bands. Starting January 5th, each station was run for 5 consecutive days. Each of the three sites were run consecutively to each other. The total netting cycle was a 15-day period. Three 15-day periods were run over a three-month time span starting in January and ending in March. Dates included:

Period One:
- Secondary Fry Forest: January 5-9
- Thorn Scrub Forest: January 10-14
- Scrub Mangrove Forest: January 15-19

Period Two:
- Secondary Dry Forest: January 31-February 4
- Thorn Scrub Forest: February 9-13
- Scrub Mangrove Forest: February 16-20

Period Three:
- Secondary Dry Forest: March 1-5
- Thorn Scrub Forest: March 1-5
- Scrub Mangrove Forest: March 7-11

*Area Surveys:* Area surveys were run concurrently with mist-net sites during the second and third periods. Surveys were done in all three major habitats on the island: 1) Secondary Dry Forest, 2) Thorn Scrub Forest, and 3) Scrub Mangrove Forests. Each transect was done along pre-existing trails in each habitat. These trails are the only "breaks" in otherwise unbroken tracts of habitat, none of which border habitat edges. 1) In the Secondary Dry Forest habitat, these trails cross both riparian corridors as well as steep forested hillside. 2) In the Thorn Scrub Habitat, these trails cross from acacia thorn scrub hillsides into semi-riparian thorn scrub drainages. 3) In the Scrub Mangrove Forests, the trails cross from pure red mangrove stands into drier Buttonwood stands in the mangrove scrub areas. Area surveys were completed beginning at sunrise and ran until the survey was completed. Ten points were located along each transect. Points were located approximately 250 meters apart from each other, avoiding recording birds previously recorded at another sampling station as more than 95% of individuals are detected within 125 meters of the observer (Ralph and Scott 1981). Five minutes were spent at each point. Data collected included all individuals seen or heard during the first three minutes and those individuals heard during the remaining two minutes. Counts only took place during stable weather conditions, not during rainy or exceptionally windy conditions. A single observer completed all surveys to reduce observer bias. During data collection, birds flying over the site were recorded separately from individuals detected in vegetation, as these birds may not have been associated with the habitat surrounding the station. A. Brown ran all area surveys.

## ***Results***

We mist-netted for a total of 2,604 hours at all three sites including 954 hours at Secondary Dry Forest, 900 at Thorn Scrub Forest, and 750 at Scrub Mangrove Forest. The higher hours at the Secondary Dry Forest site indicate the addition of an eleventh net for periods two and three. The low hours at the Scrub Mangrove Forest site are an indication of fewer hours mist-netting per day due to the mid-day heat at that site.

We captured a total of 1,088 bird at all three sites this year. We banded a total of 812 birds, recaptured 245 birds, and released, unbanded, 31 birds. We banded a total of 29 species including 14 species of overwintering migrant and 15 species of resident birds (a full list can be found in Appendix A). During area searches of the three study sites, we detected five additional migrant species in addition to the 14 species of over-wintering migrant that were banded (a list of Birds Detected at each site see Appendix B). All resident songbird species that were detected

were banded. Direct comparisons to the 2002 banding season can be found in the *Secondary Dry Forest* section in *Results*.

*Secondary Dry Forest*

The Secondary Dry Forest (called the "forest" site) site was located on Lotterie Farm on the northeast side of French St. Martin. The site was located at the 1,000 meter level above sea-level on Pic Paradis. We banded at this site previously during the winter of 2002. Ten nets were set up in the same areas as last year. An additional net (net#11) was added after we observed an additional area of high avian traffic. Net # 11 was added for the second and third banding periods.

We captured 151 birds of 17 species at the forest site this year; Banding 122 birds, recapturing 18 birds, and releasing unbanded 11 birds. Of the 17 species, nine species were over-wintering migrants and eight species were resident species. Both the first and third banding periods had 43 total birds banded, while the second had 36. Twenty-four overwintering migrants were banded during the first banding period. Of the 24 overwintering migrants banded during the first period, we recaptured eight of these individuals during the following two banding periods, including two of the three Black-throated Blue Warblers (*Dendroica caerulescens*). Interestingly, we captured a 9$^{th}$ individual, an adult male Northern Parula (*Parula americana*), in our Thorn Scrub Forest habitat at the foot of the mountain on which our Secondary Dry Forest is located, approximately a kilometer distant and 750m down in elevation.

Overall, our capture rate in this habitat was below that of the other two sites. However, we captured more overwintering migrants in this habitat than in the other two, 43 in Secondary Dry Forest versus 14 in Thorn Scrub Forest and 16 in Scrub Mangrove Forest. Thirty-five percent of the new birds ("new birds" being defined as non-recaptured birds) captured in the forest were overwintering migrants.

Within the Secondary Dry Forest we trapped or observed nine overwintering species not observed in the other two habitats: Chuck-will's Widow (*Caprimulgus carolinensis*), Yellow-throated Vireo (*Vireo flavifrons*), Black-throated Blue Warbler, American Redstart (*Setophaga ruticilla*), Black-and-White Warbler (*Mniotilta varia*), Ovenbird (*Seirus aurocapillus*), Magnolia Warbler (*Dendroica magnolia*), Kentucky Warbler (*Oporonis formosus*), and Worm-eating Warbler (*Helmitheros vermivorus*). Additionally, within this habitat, we trapped ten Scaly-breasted Thrashers (*Margarops fuscus*), of the total 12 caught from all three sites. The Scaly-breasted Thrasher was previously unrecorded as a resident from St. Martin, and thought to be diminishing within its range on the islands south of St. Martin. Finally, seven Antillean-crested Hummingbirds (*Orthorhyncus cristatus*) were trapped in the forest site, the only habitat in which it was observed.

In direct comparison to the same periods during 2002, where we banded during two periods (February and March) not three as in 2003, our capture rates were down. There was a total of 213 new birds captured in 2002 compared to 87 new birds captured during 2003. Interestingly, we captured only a total of 133 new birds in the forest site during *three* banding periods in 2003, down from a total of 213 trapped during *two* banding periods in 2002. These rates were considerably decreased due to low numbers of residents banded during 2003 (total numbers from *all banding periods*): Bananaquits (*Coereba flaveola*) went from 104 banded in 2002 down to 47 banded in 2003, Pearly-eyed Thrashers (*Margarops fuscatus*) went from 13 banded in 2002 down to 3 banded in 2003, and Black-faced Grassquits (*Tiaris bicolor*) went from 21 banded in 2002 down to 4 banded in 2003.

Notable decreases in overwintering bird numbers occurred with American Redstart, whose numbers dropped from 22 banded in 2002 down to 15 banded in 2003 and Hooded Warbler (*Wilsonia citrina*), 7 in 2002 down to 5 in 2003. Notable increases in birds banded during 2002 occurred with Black-and-white Warbler whose numbers went from one bird banded in 2002 to nine banded in 2003. Additionally, we banded and/or observed the presence of six species not

recorded in 2002: Yellow-billed Cuckoo (*Coccyzus americanus*) (2 observed), Yellow-throated Vireo, (1 observed), Magnolia Warbler (three observed/one banded), Kentucky Warbler (four observed/three banded), Myrtle Warbler (*Dendroica coronata*) (two observed), and Worm-eating Warbler (one observed). Birds banded/observed during 2002 and not found during 2003 were Louisiana Waterthrush (*Seiurus motocilla*) and Chestnut-sided Warbler (*Dendroica pensylvanica*).

Two Pearly-eyed Thrashers were recaptured with bands from 2002. No other birds were recaptured in the forest site with year 2002 bands.

During area searches of this site we recorded 25 species including 13 migrant species and 12 resident species. Of the 25 species recorded 19 were high counts for all three sites. Of the 13 migrant species, 12 were high counts for all three sites. Notable one-day high counts for migrants included (high counts in parenthesis): Chuck-will's Widow (1), Northern Parula (6), Magnolia Warbler (1), Black-throated Blue Warbler (5), Prairie Warbler (*Dendroica discolor*) (3, shared with scrub site), Black-and-white Warbler (6), American Redstarts (18), Worm-eating Warbler (1), Ovenbird (1), Kentucky Warbler (1), and Hooded Warbler (2).

*Thorn-Scrub Forest*

The Thorn Scrub Forest site (called the "scrub" site) was located on Lotterie Farm on the northeast portion of French St. Martin. The site was located at the base of Pic Paradis at about 300 meters elevation above sea-level. This was the first year we banded at this site. Ten nets were used at this site and all ten were run for all three banding periods.

We captured a total of 651 birds of 17 species at this site; Banding 500 birds, releasing unbanded 18 birds, and recapturing 133 birds. Additionally, due to very high capture rates of Bananaquits during the second period, all unbanded Bananaquits captured during the *third* banding period were immediately released without any banding done or measurements taken. Of the 17 species captured, five were overwintering migrant species and 12 were resident species. We banded 153 species during the first period, 296 during the second period, and 51 during the third period. The high capture rate numbers during the second period was due to a spike in Bananaquit captures where we banded 250 Bananaquits, 84% of the total birds banded for that period.

A total of 14 overwintering migrants of five species were banded at the scrub site. None of the14 overwintering migrants banded at the scrub site were recaptured. However, an adult male Northern Parula banded previously at the forest site was recaptured in the scrub site. The scrub site had the highest capture rates for Prairie Warbler of the three habitats, 5 banded. Additionally, we had similar capture rates of the Northern Parula, in comparison with the forest site (4 in scrub and 6 in forest). Within the scrub site we trapped or observed four species not observed at the other two habitats: Merlin (*Falco columbaris*) (1 banded), Mangrove Cuckoo (*Coccyzus minor*) (5 observed/1 banded), Common Yellowthroat (*Geothlypis trichas*) (1 observed), and Indigo Bunting (*Passerina cyanea*) (1 banded).

Of the 486 resident birds banded in the scrub site, 329 were Bananaquits, the highest capture rate for any species at all three sites. High banding counts were also recorded for Black-whiskered Vireo (*Vireo altiloquus*)(5 observed/3 banded), Pearly-eyed Thrasher (22 banded), Green-throated Carib (*Eulampis holosericeus*) (4 captured), Black-faced Grassquit (93 banded), and Lesser Antillean Bullfinch (*Loxigilla noctis*)(15 banded). Caribbean Elaenia (*Elaenia martinica*) counts at the scrub site were second only to the mangrove site count (12 banded in scrub compared to 14 birds in the mangroves). We had high recapture rates for Bananaquits as well, recapturing 91 of the 329 birds banded. We also had good recapture rates of Black-faced Grassquit (20 recaptures) and Caribbean Elaenia (4 recaptures).

Interestingly, we recaptured eight Bananaquits that were banded in the forest site during 2002. These were the only birds recaptured at this site from 2002. Of further interest, there were no recaptures of Bananaquits from 2002 in the forest site during 2003.

During area searches of this site we recorded 16 species including five migrant species and 11 resident species. Of the 16 species recorded seven were high counts for all three sites. Of the five migrant species, two were high counts for all three sites. Notable one-day high counts for migrants included (high counts in parenthesis): Prairie Warbler (3, shared with forest site) and Common Yellowthroat (1).

*Scrub-Mangrove Forest*

The Scrub-Mangrove Forest site (called the "mangrove site"), was located in the Etang Poisson and along its margins in eastern French St. Martin. Ten nets were used at this site and all ten were run for all three banding periods. Five of the net sites were located in the mangroves over water while the other five were located in mangroves over land. This was the first year banding at this site.

We captured a total of 294 birds of 13 species at this site; Banding 194 birds, releasing unbanded 6 birds, and recapturing 94 birds. Of the 13 species banded, five were overwintering migrants and nine were resident species. We banded 130 birds during the first period, 46 during the second, and 18 during the third period.

A total of 16 overwintering migrants were banded at this site. Of the 16 overwintering birds captured, four individual birds were recaptured, including all three of the Prothonotary Warblers banded and a single Prairie Warbler. A single Prothonotary Warbler and the Prairie Warbler were both banded during the first period and recaptured during the third period.

Within the mangrove site we observed/trapped three species not observed at the other sites: Belted Kingfisher (*Ceryle alcyon*) (1 banded), Prothonotary Warbler (3 banded), and Northern Waterthrush (9 banded). Additionally, the only Gray Kingbirds (*Tyrannus dominicensis*) (8 banded) and Myrtle Warbler (1 banded) were banded at this site. Prairie Warbler banding numbers were similar to those at the scrub site (4 at mangroves and 6 at scrub site) compared to only one at the forest site.

Of the 184 resident birds captured, high banding counts were recorded for Belted Kingfisher (1 banded), Caribbean Elaenia (14 banded), Common Ground Dove (*Columbina passerine*) (20 banded), and Golden Yellow Warbler (*Dendroica petechia*) (22 banded). We recorded 22 recaptures of Golden Yellow Warbler, recapturing 20 of the 22 individuals banded at this site during 2003. We also recorded high numbers of recaptures for Bananaquits (90 banded/50 recaptured), Common Ground Dove (20 banded/8 recaptured), and Black-faced Grassquit (21 banded/6 recaptured).

During area searches of this site we recorded 13 species including 4 migrant species and 9 resident species. Of the 13 species recorded 10 were high counts for all three sites. Of the 4 migrant species, 3 were high counts for all three sites. Notable one-day high counts for migrants included (high counts in parenthesis): Myrtle Warbler (4), Prothonotary Warbler (1), and Northern Waterthrush (5).

## ***Discussion***

Banding at three distinct habitat types during the winter of 2003, helped us distinguish which locations landbirds of St. Martin require during the winter months. We were able to identify species which rely on a single habitat type during their overwintering stay on St. Martin.

Additionally, we were able to identify habitats where majorities of certain overwintering species are located. Finally, we were able to monitor populations of resident species in multiple habitats.

The Secondary Dry Forest is a required habitat for overwintering landbirds on St. Martin. Within this habitat we banded 60% of all overwintering landbirds banded on St. Martin. Thirteen of the 16 overwintering species observed/banded on St. Martin in 2003, were banded in the forest site. Nine of these 16 overwintering species were observed only within the secondary dry forest. The American Redstarts, the most abundant overwintering landbird on St. Martin based on observations of 22 individuals during area searches in 2003, were only observed in the Secondary Dry Forest. Scaly-breasted Thrashers, whose populations are diminishing throughout its range and who was once thought a rare visitor to St. Martin, are found almost exclusively in this forest habitat. Eighty-three percent of the Scaly-breasted Thrashers banded on St. Martin in 2003 were banded in the forest habitat.

Scrub-Mangrove Forest is a required habitat for fewer overwintering species than the Secondary Dry Forest, but is critical habitat for both Prothonotary Warbler and Northern Waterthrush. Both of these species are found in no other habitat on St. Martin. Additionally, this habitat is home to the Golden Yellow Warbler. Seventy-four percent of the Golden Yellow Warblers banded on St. Martin were banded at the mangrove site. Additionally, the only Gray Kingbirds banded on the island were within this habitat. Additional Gray Kingbirds were observed in other habitats on the island. However, the majority of the Gray Kingbirds caught were observed to have developed brood patches, indicating active incubation within this habitat. The mangrove habitat is a possible required breeding grounds for this species on St. Martin. Additionally, this habitat had high numbers of most terrestrial species on the island, including island high banding counts for five species.

Thorn Scrub Forest is the stronghold for many island resident species. Bananaquits, the most banded and commonly observed bird on St. Martin, were found most commonly in scrub habitat. Other resident species such as Caribbean Elaenia, Black-whiskered Vireo, Pearly-eyed Thrasher, Green-throated Carib, Black-faced Grassquit, and Lesser Antillean Bullfinch, had high counts within the scrub habitat. Black-faced Grassquits and Lesser Antillean Bullfinches, both birds who forage on the ground, recorded island high banding counts within this habitat. Along with Bananaquits, Black-faced Grassquits and Lesser Antillean Bullfinches are the three most common birds casually found on St. Martin, and the scrub habitat contained the largest populations of all three species within all habitats.

All three habitat areas share common threats: habitat loss due to development, hunting of species by humans for food, and mongoose predation. Secondary Dry Forest habitat is waning quickly as developments quickly encroach up the forested hillsides of the island. Scrub Mangrove Forests are dwindling due to the need for seaside resorts. These mangrove forests lie in untouched bays and ponds adjacent to the shoreline of the island. This habitat is much sought after by developers in the region. The Thorn Scrub Forest habitat is the most widespread habitat on the island. Many of the resident birds of the island are fortunate to use these areas as their primary habitat. Predation by mongoose on landbirds is a serious threat (Seaman and Randall 1962). We witnessed mongoose predation on landbirds in our mist nets on multiple occasions. Mongoose have been commonly observed in all three habitats on the island. Many of these threats can be controlled by proper management and development of the island. Careful consideration of habitat and perhaps species loss due to development should be a major consideration to developers as St. Martin continues to be built up. Hunting on St. Martin should be regulated and bans should be put on threatened and endangered resident and migrant species. These hunting bans should, if possible, be enforced by land management officers. Control of the mongoose problem should be taken up. Trapping and removal of this invasive species should become a priority for both public and private land managers. St. Martin is an important area for migrating and overwintering birds. The habitats of the island should be protected for both the use of these birds as well as the use of resident birds on St. Martin.

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Table 1. Overwintering bird totals for new birds trapped (non-recaptures) for all three banding sites during winter 2003 on St. Martin

| Overwintering Migrant Birds | | | |
|---|---|---|---|
| | *forest* | *scrub* | mangrove |
| **Merlin** | 0 | 1 | 0 |
| **Northern Parula** | 6 | 4 | 0 |
| **Chestnut-sided Warbler** | 0 | 0 | 0 |
| **Magnolia Warbler** | 1 | 0 | 0 |
| **Black-throated Blue Warbler** | 3 | 0 | 0 |
| **Myrtle Warbler** | 0 | 0 | 1 |
| **Prairie Warbler** | 1 | 5 | 3 |
| **Black-and-white Warbler** | 9 | 0 | 0 |
| **American Redstart** | 16 | 0 | 0 |
| **Prothonotary Warbler** | 0 | 0 | 3 |
| **Ovenbird** | 2 | 0 | 0 |
| **Northern Waterthrush** | 0 | 0 | 9 |
| **Louisiana Waterthrush** | 0 | 0 | 0 |
| **Kentucky Warbler** | 3 | 0 | 0 |
| **Hooded Warbler** | 5 | 3 | 0 |
| **Indigo Bunting** | 0 | 1 | 0 |

Table 2. Resident bird totals for new birds trapped (non-recaptures) for all three banding sites during winter 2003 on St. Martin.

| Resident Birds | | | |
|---|---|---|---|
| | *forest* | *scrub* | mangrove |
| **Zenaida Dove** | 1 | 4 | 0 |
| **Common Ground Dove** | 0 | 9 | 20 |
| **Mangrove Cuckoo** | 0 | 1 | 0 |
| **Green-throated Carib** | 0 | 4 | 0 |
| **Antillean-crested Hummingbird** | 4 | 0 | 0 |
| **Belted Kingfisher** | 0 | 0 | 1 |
| **Caribbean Elaenia** | 2 | 12 | 14 |
| **Gray Kingbirds** | 0 | 0 | 8 |
| **Scaly-breasted Thrasher** | 10 | 2 | 0 |
| **Pearly-eyed Thrasher** | 6 | 22 | 1 |
| **Black-whiskered Vireo** | 0 | 3 | 0 |
| **Golden Yellow Warbler** | 0 | 8 | 23 |
| **Bananaquit** | 51 | 331 | 90 |
| **Black-faced Grassquit** | 5 | 93 | 21 |
| **Lesser Antillean Bullfinch** | 8 | 15 | 6 |

Table 3. Comparison of total overwintering new birds trapped in the Secondary Dry Forest during 2002 and 2003.

| Overwintering Migrant Birds | | |
|---|---|---|
| | 2002 | 2003 |
| Northern Parula | 4 | 6 |
| Chestnut-sided Warbler | 1 | 0 |
| Magnolia Warbler | 0 | 1 |
| Black-throated Blue Warbler | 2 | 3 |
| Prairie Warbler | 1 | 1 |
| Black-and-white Warbler | 1 | 9 |
| American Redstart | 23 | 16 |
| Ovenbird | 1 | 2 |
| Louisiana Waterthrush | 1 | 0 |
| Kentucky Warbler | 0 | 3 |
| Hooded Warbler | 7 | 5 |

Table 4. Comparison of total resident new birds trapped in the Secondary Dry Forest during 2002 and 2003.

| Resident Birds | | |
|---|---|---|
| | 2002 | 2003 |
| Zenaida Dove | 2 | 1 |
| Common Ground Dove | 2 | 0 |
| Antillean-crested Hummingbird | 3 | 4 |
| Caribbean Elaenia | 0 | 2 |
| Scaly-breasted Thrasher | 5 | 10 |
| Pearly-eyed Thrasher | 16 | 6 |
| Bananaquit | 112 | 51 |
| Black-faced Grassquit | 23 | 5 |
| Lesser Antillean Bullfinch | 12 | 8 |

Table 5. Comparisons of totals for periods two and three of overwintering new birds trapped in the Secondary Dry Forest during 2002 and 2003.

| Overwintering Migrant Birds | | |
|---|---|---|
| | 2002 | 2003 |
| Northern Parula | 4 | 3 |
| Chestnut-sided Warbler | 1 | 0 |
| Magnolia Warbler | 0 | 1 |
| Black-throated Blue Warbler | 2 | 0 |
| Prairie Warbler | 1 | 1 |
| Black-and-white Warbler | 1 | 4 |
| American Redstart | 23 | 6 |
| Ovenbird | 1 | 1 |
| Louisiana Waterthrush | 1 | 0 |
| Kentucky Warbler | 0 | 2 |
| Hooded Warbler | 7 | 3 |

Table 6. Comparisons of totals for periods two and three of resident new birds trapped in the Secondary Dry Forest during 2002 and 2003.

| Resident Birds | | |
|---|---|---|
| | 2002 | 2003 |
| Zenaida Dove | 2 | 1 |
| Common Ground Dove | 2 | 0 |
| Mangrove Cuckoo | 0 | 0 |
| Green-throated Carib | 0 | 0 |
| Antillean-crested Hummingbird | 3 | 4 |
| Belted Kingfisher | 0 | 0 |
| Caribbean Elaenia | 0 | 2 |
| Gray Kingbirds | 0 | 0 |
| Scaly-breasted Thrasher | 5 | 5 |
| Pearly-eyed Thrasher | 16 | 5 |
| Black-whiskered Vireo | 0 | 0 |
| Golden Yellow Warbler | 0 | 0 |
| Bananaquit | 112 | 37 |
| Black-faced Grassquit | 23 | 4 |
| Lesser Antillean Bullfinch | 12 | 8 |

Table 7. High counts for overwintering species encountered during area surveys of all three study sites during winter of 2003.

| Overwintering Migrant Species | | | |
|---|---|---|---|
| | FOREST | SCRUB | MANGROVES |
| Yellow-billed Cuckoo | 1 | 2 | |
| Chuck-will's-widow | 1 | | |
| Northern Parula | 6 | 4 | |
| Magnolia Warbler | 1 | | |
| Black-throated Blue Warbler | 6 | | |
| Myrtle Warbler | 1 | | 4 |
| Prairie Warbler | 3 | 3 | 2 |
| Black-and-white Warbler | 6 | | |
| American Redstart | 18 | 2 | |
| Prothonotary Warbler | | | 1 |
| Worm-eating Warbler | 1 | | |
| Ovenbird | 1 | | |
| Northern Waterthrush | | | 5 |
| Kentucky Warbler | 1 | | |
| Common Yellowthroat | | 1 | |
| Hooded Warbler | 2 | | |

Table 8. High counts for resident species encountered during area surveys of all three study sites during the winter of 2003.

| Resident Species | | | |
|---|---|---|---|
| | FOREST | SCRUB | MANGROVES |
| Osprey | 1 | 1 | |
| American Kestrel | 2 | | |
| Zenaida Dove | 2 | 1 | |
| Common Ground Dove | | 1 | 8 |
| Mangrove Cuckoo | | 1 | |
| Green-throated Carib | 1 | | |
| Antillean Crested Hummingbird | 1 | | |
| Belted Kingfisher | | | 3 |
| Caribbean Elaenia | 5 | 3 | 4 |
| Gray Kingbird | 3 | | 5 |
| Scaly-breasted Thrasher | 12 | 1 | |
| Pearly-eyed Thrasher | 23 | 22 | |
| Black-whiskered Vireo | | 1 | 2 |
| Yellow Warbler | | 8 | 28 |
| Bananaquit | 22 | 46 | 52 |
| Black-faced Grassquit | 7 | 14 | 11 |
| Lesser Antillean Bullfinch | 4 | | 5 |