

**Distribution, Habitat Use and Conservation of Bicknell's Thrush  
and other Montane Forest Birds in the Dominican Republic**

**PROGRESS REPORT  
1994-1997**



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Following a preliminary field investigation in 1994, we initiated long-term studies of Bicknell's Thrush in the Dominican Republic during November and December of 1995. These studies were continued during the winter of 1996-97. The primary purposes of this research were to: 1) visit areas of known historic occurrence of Bicknell's Thrush to determine current presence/absence and habitat condition; 2) establish study sites in Parque Nacional Sierra de Baoruco to initiate a long-term monitoring program and to collect demographic and population density data; 3) survey forested areas throughout the country to document wintering distribution and habitat use; and 4) enlist the cooperation of Dominican wildlife agencies and other conservation organizations in determining the winter range of Bicknell's Thrush and collaborating in future studies.

We were accompanied in the field by Dominican wildlife biologists, national park guards and local guides. We trained them in the various field methods (e.g., censusing, mist-netting and banding, field record-keeping) used during this study. Informally, but often in considerable detail and at considerable length, we discussed conservation issues and land use practices with Dominican natural resource officials, park guards, and guides who assisted us, as well many local citizens we met. Although the effects of such discussions are difficult to evaluate, we believe this is an important and highly effective method to raise consciousness about bird conservation at the grassroots level.

In June and July of 1997 we sponsored a visit by Jesús Almonte of Grupo Jaragua to join our Bicknell's Thrush research project in Vermont for additional intensive training in field research methods during the breeding season. The exchange, both culturally and scientifically enriching, served to further cement a bond between our two organizations.

## Methods

*Distribution Surveys.* Presence/absence field surveys were conducted at 18 sites in the Dominican Republic during the winter of 1995-1996 (Table 1) and at 25 sites during the winter of 1996-97 (Table 2). Additionally, we enlisted colleagues and volunteer birders to conduct additional surveys in the Dominican Republic, Puerto Rico, Jamaica, and Dominica (Table 3). Tape recorded playbacks and passive listening were used to determine the presence or presumed absence of Bicknell's Thrushes at each site. Tapes were generally broadcast at 100m intervals along survey routes.

Unless a species is 100% detectable when present, multiple visits to a site are required to be statistically confident that the species is absent (Reed 1996). Bicknell's Thrush is secretive on its wintering grounds and vocalizes for very short periods at dawn and dusk (Fig. 1 and 2). Assuming a medium level of detectability (probability of detection = 0.4) for Bicknell's Thrush, using tape recorded playbacks at dawn and dusk, a statistically valid assumption of species absence ( $p \leq 0.05$ ) requires that each site be visited a minimum of 6 times (Reed 1996). Presumed absences in habitats that appear to be suitable should be viewed with caution when the number of visits was low. In most cases, the benefits of repeat visits to particular sites must be weighed against the costs of covering larger areas of the country.

*Intensive Demographic Study Sites.* In 1995 we established 2 long-term study sites in Parque Nacional Sierra de Baoruco. Loma del Toro (LOTO) was situated on the Haitian border between El Aguacate military post and Loma del Toro park guard station on the International Road at 1,600 - 1,820m elevation on a northeast facing slope. The habitat consisted of small patches of moist broad-leaf forest surrounded by areas of predominantly tall pines, with dense broad-leaf understory, or open to semi-open pine savanna. The Pueblo Viejo (PUVI) study site was established near the historic town of Pueblo Viejo and its current park guard station. An 11.8 ha plot was placed on the long ( $\pm 10$ km), narrow east slope of a ridgeline. The habitat consisted of moist broad-leaf forest, which Fisher-Meerow and Judd (1989) classified as premontane wet forest. Apparently, this tract escaped human modification during 1950s and 1960s sawmill operations in the more extensive adjacent pine forests (Park personnel, pers. comm.). In 1996 we established a third site approximately 3.8 km to the north by road from Pueblo Viejo in an area

**Abstract:** To clarify the status of Bicknell's Thrush (*Catharus bicknelli*) on its wintering grounds and to complement breeding ecology studies begun in 1992, the Vermont Institute of Natural Science (VINS) initiated preliminary field investigations in the Dominican Republic in 1994 and 1995. Efforts focused on establishing a network of local collaborators and identifying areas of known concentration of Bicknell's Thrush for further study. VINS significantly expanded the scope of this project during the 1996/97 winter, with an overall goal of investigating the distribution, habitat selection, population ecology, and conservation status of this species on Hispaniola. Our longer-term aim is to develop a conservation strategy for Bicknell's Thrush and its preferred winter habitats.

One of our most exciting early findings was the 2 December 1995 recapture of a Bicknell's Thrush in the Sierra de Baoruco, Dominican Republic. This thrush, originally banded by VINS researchers on 16 June 1995 on its breeding territory on Mt. Mansfield, Vermont, USA, established a direct biological link between the mountains of Vermont and the Dominican Republic.

Intensive demographic studies at several sites in the Sierra de Baoruco in 1995 and 1996/97 have laid a foundation for long-term studies and yielded valuable preliminary data. Spot mapping on a 12 ha plot at Pueblo Viejo (PUVI) and a strip transect at Loma del Toro (LOMA) indicated an apparent decline in territories (PUVI = 77 territories/40 ha in December of 1995, 60 territories/40 ha in December 1996, 50 territories/40 ha in March 1997; LOMA = 40 territories/40 ha in 1995 and 18 territories/40 ha in 1996). Banding captures at PUVI have also declined from 9 individuals in December 1995, 4 in December 1996 to 3 in March 1997. We suspect decreases in density estimates and capture rates may have resulted from reduced calling and activity near plot reference points and net locations from intensive research activity. In November 1997 we plan to complete censusing before mist netting is initiated and to examine whether thrush activity is greater in November, just after the presumed arrival period on the wintering grounds. We have recaptured 5 Bicknell's Thrushes between years. The average distance between capture points was 45.4 m (SD 43.0 m, range 0 - 92 m), providing strong evidence of winter site fidelity.

Constant-netting operations during December 1996 and March 1997 at three sites (LOTO in December only, PUVI in December and March, PALO in March only) yielded combined totals (all species) of 109 captures in December and 140 in March. The five most abundant species captured were Green-tailed Warbler (See appendix for scientific names;  $n = 44$  captures), Ovenbird ( $n = 25$ ), Black-faced Grassquit ( $n = 22$ ), Chat Tanager ( $n = 21$ ), and Rufous-throated Solitaire ( $n = 18$ ) (Table 9). Several between-year (1995/96 to 1996/97) and within-year (December to March) recaptures were obtained.

To date, we have compiled fewer than 20 historic (pre-1994) records of Bicknell's Thrush for the Dominican Republic and only 14 for the remainder of the Caribbean. We found thrushes at 7 of 13 (54%) historic sites visited from 1994-1996/97. An important preliminary finding of distributional surveys was that Bicknell's Thrush appears not to be restricted solely to montane forests. However, it does seem to be restricted to mature, moist to wet forest habitats which have and continue to disappear at an alarming rate throughout the island. Even national parks and reserves are experiencing habitat loss and degradation, underscoring the pressing need for research-directed conservation efforts.

## Introduction

The wintering area of the Bicknell's Thrush (*Catharus bicknelli*) was completely unknown until 1921, when specimens of Gray-checked Thrush (*Catharus minimus*) from the island of Hispaniola were examined and determined to be *bicknelli* (Wetmore and Swales 1931, Wallace 1939). In addition to these and other more recent specimens from Haiti and the Dominican Republic, documented winter records of Gray-checked Thrush, probably representing *bicknelli*, have been obtained in Jamaica, Mona Island, and Puerto Rico (Arendt et al. 1992). However, the precise distribution and wintering ecology of Bicknell's Thrush remain poorly documented. Preliminary data suggest that the species may be limited to primary tropical forest at both high and low elevations. These forests have been heavily clear-cut, burned and converted to other uses throughout the Caribbean as a result of burgeoning human population pressures (Arendt et al. 1992). Forest inventories in the 1980's indicated that only 14% of the Dominican Republic remained covered with moist, broad-leafed forests (Ottenwalder 1989, Anonymous 1995). The consequences of such deforestation on wintering Bicknell's Thrush populations are unknown, but could be significant.

locally known as Palo de Agua (PALO). This area also consists of a large tract of premontane wet forest surrounded by pine forest. Most adjacent pine forests have been subject to intense forest fires within the last 5 years (Park personnel, pers. comm.).

*Color Banding.* On 3 study plots (LOTO, PUVI, and PALO) we used strategically placed 6 and 12 m mist nets in combination with tape recorded playbacks of Bicknell's Thrush vocalizations and a life-like wooden decoy to attempt to capture and uniquely color band Bicknell's Thrushes. Up to 30 mist nets were used simultaneously to passively capture thrushes as a complement to the use of vocal and visual lures. Detailed mensural (e.g., wing chord, weight, tarsus, culmen) and body condition (e.g., subcutaneous fat, molt, feather wear) data were recorded for all captured birds. Age was determined using skull ossification, presence of terminal buffy shaft streaks or spots on greater coverts and outer rectrix shape (Pyle et al. 1987, Collier and Wallace 1989). Sightings and captures of color banded individuals were mapped to determine site fidelity, movement distances and patterns, and to attempt to match each territory with a known identity bird.

*Constant Effort Mist Netting.* We operated constant effort mist netting stations at 3 sites (LOTO, PUVI, and PALO), during the winter of 1996-97. We operated 13-25 nylon mist nets (ATX, 12 x 2.6 m, 4 panels, 36 mm extended mesh) at fixed locations at 2 sites in December 1996 (LOTO 13 nets and PUVI 25 nets) and at 2 sites in March 1997 (PALO 25 nets and PUVI 24 nets) (Table 8). Nets were opened before sunrise and closed after sunset. All nets were closed under adverse weather conditions. Each captured bird was banded with a USFWS metal band and/or a unique combination of plastic color bands. Detailed mensural, body condition, sex and age (if possible) data were recorded for all captured birds. Opening and closing times and weather conditions were also recorded.

*Density Estimates.* Territory densities of Bicknell's Thrush were estimated by spot mapping vocalizing thrushes along single strip transects with marked points every 25m ( $n = 5$  transects) or within irregularly shaped plots ( $n = 2$  plots) with transects marked every 25m within the plot boundaries for reference (Table 4). Strip transects were used as a quick, although less sophisticated, method of obtaining relative density estimates in a variety of sites and habitat types while conducting presence/absence surveys. Intensive spot mapping plots were considered to provide more accurate data, suitable for long-term monitoring. We recorded all birds within 50m on each side of strip transects to obtain density estimates. No point on a census plot was farther than 50m from any transect reference point. For each thrush seen or heard a compass bearing and distance estimate were recorded from marked reference points. Data were plotted on a base map of each study area. Simultaneous registration of 2 or more vocalizing birds and tight clusters of 3 or more registrations in one area were used as the primary means of discriminating territories (Robbins 1970). We calculated the number of territories on each study area using the international spot mapping standards (Robbins 1970), where each territory that is at least 50% within the plot boundaries is counted as a full territory on the plot. To the extent possible, we used the same observers between years on each study site (Table 4). One data analyst determined densities for all areas in all years. For a complete discussion of observer and analyst variability, see Verner and Milne (1990).

## Results and Discussion

*Review of historic records.* We conducted an exhaustive review of published and unpublished historic (pre-1994) records of Bicknell's Thrush throughout the Caribbean Basin and established a detailed database of these records. This process is ongoing. To date, we have compiled fewer than 20 independent records for the Dominican Republic and only 14 for the remainder of the Caribbean (Tables 5 and 6). The paucity of such records underscores the need for comprehensive surveys of the Greater and Lesser Antilles.

*Distributional surveys.* During the winters of 1995-96 and 1996-97 we conducted broad-scale distributional surveys in forested habitats of the Dominican Republic on the Samaná Peninsula, Los Haitises, southeastern region, eastern and northern sections of the Cordillera Central, Sierra de Baorucos, and Sierra de Neiba. We confirmed the presence of Bicknell's Thrush at 15 of the 25 (60%) sites surveyed. All sites with confirmed presence consisted of primary or mature secondary broad-leaved forest or pine forest with a predominantly dense, broad-leaved understory (Tables 1 and 2). Most surveyed sites where Bicknell's Thrush was not documented had a recent history of impact by agriculture, grazing or fire. We found thrushes at 7 of the 13 (54%) historic sites we surveyed (Table 5). Many of these areas have been and continue to be heavily impacted through cutting, fire, grazing, and agriculture. We were unable to pinpoint the exact location of several historic sites due to their inadequate documentation or because radical changes in the surrounding landscape had made them unrecognizable.

The Loma Atravesada site on the Samaná Peninsula typifies the large scale landscape changes that have greatly impacted some sites of historical Bicknell's Thrush occurrences. Virtually all of the Samaná Peninsula is dedicated to subsistence agriculture and plantations of cocoa and palm oil. In 1997, we located one of the last remaining tracts of forest larger than a few hectares on the entire Peninsula. This remnant patch ( $\pm 25$  ha) of wet broad-leaved forest is currently in private ownership but is wholly unprotected from selective cutting of large trees for charcoal and lumber, and from agricultural clearing on its periphery. Despite these serious incursions, we found a relatively high density of Bicknell's Thrush in this forest fragment. The apparently high density of thrushes may have been inflated by immigration from recently impacted surrounding areas. We failed to detect any thrushes in a much smaller ( $\pm 4$  ha), isolated parcel of forest on the Peninsula between the towns of Sanchez and Naranjitos.

Field studies revealed that Sierra de Neiba was an area that was losing forest cover from harvesting and fire at an exceedingly rapid rate despite being declared a national park in 1995. Of the two Neiba localities we visited in 1997, the western section above "Vuelta de Quince" on the road to Hondo Valle showed fewer signs of conversion, with only selective removal of very large pine and hardwoods for lumber and some clearing for agriculture. In contrast, the eastern section above Apolinario centered on Monte Bonito had been extensively cleared for agriculture. In 1995, cleared areas and agricultural plots within this section of the park were estimated to occupy 30-40% of the land (A. Schubert, pers. comm.). In early 1997, we estimated this figure to be 70-80%, with very little forest remaining within park boundaries and none outside. We estimate complete loss of forest in this area within 2-3 years, although increasing fragmentation may render many forest patches too small to support forest-dwelling birds even earlier.

Boca de Yuma in southeastern Dominican Republic illustrates the difficulties we have encountered with historic records. Bicknell's Thrush was found by two independent observers in the 1970's through banding captures and tape recorded playbacks (Table 5). Six thrushes were captured during 3 days of banding (8-11 April 1974) near Boca de Yuma (J. Faaborg, unpub. data), although no thrushes were captured when netting was again conducted at that site on 7-9 January 1975. The site was said to be located "3.5 miles west of the Club Nautico entrance". A single recording of a thrush was also obtained on 9 March 1979 at an unspecified location in the Boca de Yuma area (G. Reynard, unpub. data). We visited the area on 11-12 December 1995. After questioning local citizens we were able to locate the former entrance for Club Nautico. The original directions to the banding site, written as "3.5 miles", left us with uncertainty as to whether we should travel 3.5 miles or kilometers because vehicle odometers are metric in the Dominican Republic. We traveled 3.5 miles and found large agricultural fields and no forest. At 3.5 km we found forest on one side of the road and recently cut forest (stumps still visible) converted to pasture on the other side of the road. A dusk census at this latter site failed to detect any thrushes. We also censused areas within Parque Del Este 1.5 miles west of Boca de Yuma and failed to detect any thrushes. The forest immediately outside of the park was heavily impacted or removed. The historic presence of Bicknell's Thrush in this area remains uncertain. We plan to revisit this area in 1997-98 and survey the gallery forest along the Yuma river, where humid forest currently appears to be intact.

*Intensive Demographic Studies.* We expanded our research on Bicknell's Thrush ecology and demography in the Sierra de Baoruco, with intensive visits to study sites in December 1995, December 1996 and March 1997. PUVI spot mapping data indicate an apparent decline in Bicknell's Thrush territories, from 77 territories/40 ha in December 1995, to 60 territories/40 ha in December 1996, to 50 territories/40 ha in March 1997 (Table 4). December density estimates at our LOTO site also declined from 40 territories/40 ha in 1995 to only 18 territories/40 ha in 1996. We suspect that the decrease in density estimates at PUVI between December 1996 and March 1997 may have been an artifact of reduced calling by thrushes between the two time periods (Fig. 1 and 2). To date, intensive mist netting and censusing have been conducted simultaneously on all plots. This intensive level of activity may have caused some individuals to shift territory locations, to adjust daily movements within established territories away from spot mapping reference points and net sites, or to reduce vocal behavior. In November 1997, we plan to complete censusing before mist netting is initiated and examine whether territorial and vocal activity is greater in early November, just after presumed arrival of thrushes on the wintering grounds. Despite these constraints, the drop in numbers from 1995 to 1996/97 at both sites is puzzling and requires more study. We hope to develop protocols for optimal timing and methods of censusing. Despite the uncertain effects of our previous activities on census results, we believe that the drop in density estimates from 1995 to 1996/97 at both sites warrants additional, careful study.

The number of Bicknell's Thrush banded at PUVI has also declined since 1995. We banded 9 individuals in December 1995, 4 in December 1996 and 3 in March 1997 (Table 7). This decline parallels the census data above and reinforces the need for further study. However, it should be noted that individual thrushes appeared to become wary of mist nets and tape recorded playbacks on many territories in 1996 and 1997, so that we were unable to identify many of the individuals on spot mapped territories.

We have recaptured 5 Bicknell's Thrushes between years at PUVI and PALO (Table 7). No individuals have been recaptured at LOTO with limited mist netting. The distance between capture points among these 5 individuals averaged 45.4 m (SD 43.0 m, range 0 - 92 m), providing strong evidence of winter site fidelity. Of the 4 birds at PUVI, 2 ASY (>2 years old) thrushes were captured in the same net site in both years, while 2 HY/SY birds (< 1 year old) were caught 60 and 92 m from their original capture sites. It appears that ASY individuals may have especially strong fidelity to specific territories. We recaptured 3 HY/SY individuals within the same banding period at PUVI (Table 7). These birds moved an average of 56 m (SD 42.6 m), ranging from 15-100 m. This extremely small sample limits meaningful inferences, but it suggests that Bicknell's Thrushes may adopt a more mobile, "floating" strategy in their first winter. Additional data collection, including the use of radio telemetry, will be necessary to refine our density estimates, determine individual territory sizes and locations, and confirm the existence of "floaters".

On 2 December 1995 we experienced a remarkable encounter with a previously banded Bicknell's Thrush (band number 1231-40012) in a mist net at PUVI. This individual was originally captured as a second year male by VINS staff on 16 June 1995 during breeding studies in the Ranch Brook watershed on Mt. Mansfield, Vermont, USA. Although we were unable to confirm the presence of this bird at PUVI during the 1996/97 winter, an individual of unknown identity occupied the same territory held by #1231-40012 in 1995. Repeated attempts to observe color bands or capture this bird were unsuccessful. We estimate the direct migration distance between the two capture points to be approximately 3,220 Km. This recapture provides direct evidence for a biological link between the Green Mountains of Vermont and the Dominican Republic. It also represents one of a very few documented cases of a long-distance migrant whose exact breeding and wintering locations have been identified.

Constant-netting operations during December 1996 and March 1997 at 3 sites (LOTO in December only, PUVI in December and March, PALO in March only) yielded combined totals (all species) of 109 captures in December and 140 in March (Table 8). The 5 most abundant species handled were Green-tailed Warbler ( $n = 44$  captures), Ovenbird ( $n = 25$ ), Black-faced Grassquit ( $n = 22$ ), Chat Tanager ( $n = 21$ ), and Rufous-throated Solitaire ( $n = 18$ ) (Table 9). Several between-year (1995/96 to 1996/97) and within-year (December to March) recaptures were obtained (Table 10).

Beginning in 1995 at PUVI, we banded all neotropical migrants captured while banding thrushes. Preliminary data show strong site fidelity of Ovenbirds ( $n = 3$  between year recaptures,  $x = 16.7\text{m}$  moved,  $SD = 14.4$ , range = 0-25). Adult Green-tailed Warblers recaptured at PUVI in March 1997 among individuals banded during December 1996 ( $n = 6$ ) moved further than neotropical migrants ( $x = 85.5\text{m}$ ,  $SD = 78.3\text{m}$ , range = 0-225m). One Green-tailed Warbler was recaptured 192m from its site of initial capture. We frequently observed both Green-tailed and White-winged warblers and in mixed-species foraging flocks that may cover a 250m<sup>2</sup> area. Our banding and resighting data promise to yield future valuable insights on survivorship, site fidelity, activity patterns, and ecology of both migrant and resident species of little studied montane forests.

### **Proposed Activities for 1997/98**

- completing compilation of computerized database of historic Bicknell's Thrush records in the Caribbean Basin.
- expansion of distributional and habitat use surveys in the Dominican Republic. Efforts during the winter 1997/98 field season will focus on expanding geographic coverage of mature forest habitat types in the country, visiting known historic sites not covered in 1996/97, and revisiting selected 1996/97 survey sites of known Bicknell's Thrush occurrence to document the continued presence or possible local extirpation of this species and habitat stability or loss.
- continuation of intensive demographic studies on long-term Sierra de Baoruco study plots, investigation of other sites for replicate studies.
- initiation of distributional and habitat use surveys in southeastern Haiti, the Blue and John Crow mountains of Jamaica, several Lesser Antilles islands, and, possibly, eastern Cuba. Each of these proposed survey efforts will be collaborative efforts with other research groups (e.g., Univ. of Florida in Haiti, Gosse Bird Club in Jamaica, Caribbean Society of Ornithology in Lesser Antilles, Canadian Wildlife Service in Cuba) and will be contingent on funding received.
- continued planning and coordination of a national avian conservation conference scheduled for March 1998 in Santo Domingo.
- exploration of possible funding sources to help manage and protect parks and reserves that contain Bicknell's Thrush, but that currently receive little or no actual protection.
- obtain GIS vegetation coverages from 1992 aerial photographs presently being completed by Direccion de Recursos Naturales (DIRENA) to develop a GIS based distribution and habitat map of the Dominican Republic.
- based on distributional data and documentation of preferred habitat types, determination of available habitat and its current protected status using GIS. Application of a stepwise logistic regression to presence-absence data and physical and spatial habitat data to determine important factors for predicting the presence of thrushes in habitat patches of different size, configuration, degree of isolation and fragmentation and cover type (e.g., Atwood et. al 1996).
- recommendation of specific areas targeted for protection based on our field work and GIS analysis.
- exploration of cooperative strategies to protect critical areas threatened by immediate habitat loss.

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Appendix. English and Spanish common names and scientific names mentioned in this report (Dod 1981).

English Common Name	Spanish Common Name	Scientific Name
Bananaquit	Ciguita comun	<i>Coereba flaveola</i>
Greater Antillean Bullfinch	Gallito prieto	<i>Loxigilla violacea</i>
Common Yellowthroat	Ciguita enmascarada	<i>Geothlypis trichas</i>
Red-naped Pigeon	Paloma Turca	<i>Columba squamosa</i>
Grey-Headed Quail Dove	Perdiz coquito blanco	<i>Geotrygon caniceps</i>
Ruddy Quail Dove	Perdiz colorada	<i>Geotrygon montana</i>
Greater Antillean Elaenia	Maroita canosa	<i>Elaenia fallax</i>
Hispaniolan Emerald	Zumbador mediano	<i>Chlorostilbon swainsonii</i>
Black-faced Grassquit	Juan maruca	<i>Tiaris bicolor</i>
Sharp-shinned Hawk	Guaraguaito de sierra	<i>Accipiter striatus</i>
Hispaniolan Trogon	Papagayo	<i>Temnotrogon roseigaster</i>
Ovenbird	Ciguita salterina	<i>Seiurus aurocapillus</i>
Greater Antillean Pewee	Mariota	<i>Contopus caribaeus</i>
Antillean Piculet	Carpintero de sierra	<i>Nesocittes micromegas</i>
American Redstart	Candelita	<i>Setophaga ruticilla</i>
Rufous-Throated Solitaire	Jilguero	<i>Myadestes genibarbis</i>
Black-Crowned Palm Tanager	Cuatro ojos	<i>Phaenicophilus palmarum</i>
Chat Tanager	Patico chirri	<i>Calyptophilus frugivorus</i>
Stripe-Headed Tanager	Cigua amarilla	<i>Spindalis zena</i>
Bicknell's Thrush	Zorzal migratorio	<i>Catharus bicknelli</i>
La Selle's Thrush	Zorzal de La Selle	<i>Turdus swalesi</i>
Red-legged Thrush	Chua-chua	<i>Mimocichla plumbea</i>
Narrow Billed Tody	Chi-cui	<i>Todus angustirostris</i>
Black and White Warbler	Pegapalo	<i>Mniotilta varia</i>
Black-throated Blue Warbler	Ciguita azul	<i>Dendroica caerulescens</i>
Green-tailed Warbler	Ciguita coliverde	<i>Microligea palustris</i>
White-Winged Warbler	Ciguita aliblanca	<i>Xenoligea montana</i>
Hispaniolan Woodpecker	Carpintero	<i>Melanerpes striatus</i>

Table 1. Summary of 1995-96 Bicknell's Thrush distribution surveys in the Dominican Republic.

Geographic Area	Site	Survey Location	Date	# of BITH	Elev. (m)	Habitat Type	Habitat Notes	Use	Risk of loss
Cordillera Oriental	Pedro Sanchez	unknown. Misc. report- Vida Silvestre Office	1995	1	unknown	unknown	unknown	unknown	unknown
Cordillera Central	Ebano Verde Sci. Reserve	Caseta Casabito	10Dec	4	1400	wet montane broadleaf	recovering from disturbance	scientific reserve	low
Cordillera Central	Outside E. V. Sci. Reserve	± 15 km east along road	10Dec	0	1000 - 1400	wet montane broadleaf, open areas	patchy forest with large areas cleared		high
Cordillera Central	Jarabacoa	± 1km west of town	29,30 Jan	1	700	moist montane pine	burning for grazing	unprotected	high
Cordillera Central	Parque Nacional A. Bermudez	2 km radius of ranger station	18Jan	2	1080-1160	moist broadleaf and moist montane pine	broadleaf forest recovering from disturbance >70 yrs old growth	park	low
Cordillera Central	Manabao	ridge north of town across river	15Jan	0	990 - 1010	wet montane pine		unprotected	moderate
Cordillera Septentrional	N. of Santiago	unknown. Misc. report- Vida Silvestre Office	1995	1	unknown	unknown	unknown	unknown	unknown
Eastern Peninsula	La Romana	Rio Chavon	13Dec	0	50	dry, riverine forest	grazed, harvested. Many rats.		high
Eastern Peninsula	Parque Del Este	Ridge west of Boca de Yuma Ranger Station	11-12 Dec	0	25-75	dry and semi-dry broadleaf	rocky understory, little leaf litter	park	low
Eastern Peninsula	Boca de Yuma	3.5 km north of town along road	12Dec	0	100	dry and semi-dry broadleaf	agriculture impacts surrounding area		high
Sierra de Bahoruco	El Aguacate	km 20, 27, 29 on International Road	30Nov	1	1,400-1,500	wet montane broadleaf and pine		park	low
Sierra de Bahoruco	Loma del Toro	± 2 km north of park guard station along road	01Dec	± 9	1,600-1,800	wet montane broadleaf and pine	patchy distribution of pine and broadleaf habitats	park	low
Sierra de Bahoruco	Loma del Toro	± 2 km north of park guard station - path to east off road	30Nov	10	1800	wet montane broadleaf and pine	patchy distribution of pine and broadleaf habitats	park	low
Sierra de Bahoruco	Pueblo Viejo	ridge south of ranger station	3-6 Dec	>50	1400	wet montane broadleaf	approx. 10 km long patch	park	low
Sierra de Bahoruco	Puerto Escondido	14 Km on International Road	29Nov	0	500	dry and semi-dry broadleaf	rocky and sparse understory, grazed	park	low
Sierra de Bahoruco	Pedernales	Alcoa Haul Rd. - km 20-25	07Dec	0	700-900	moist to semi-arid broadleaf	grazed and harvested		high
Sierra de Bahoruco	Pedernales	Las Abejas	07Dec	± 10	1200	wet montane broadleaf	agriculture, grazed except in ravine	park	moderate
Santo Domingo	Santo Domingo	National Botanical Gardens	13Dec	0	70	moist, broadleaf, gallery forest	traffic noise and very polluted stream	park	low

Table 2. Summary of 1996-97 Bicknell's Thrush distributional surveys in the Dominican Republic.

Geographic Area	Site	Survey Location	Date	# of BITH	Elev. (m)	Habitat Type	Habitat Notes	Use	Risk of loss
Cordillera Central	East of Jima	SD-135km; 20km from	25Jan97	0	410	pine	90% of pine are >20cm dbh. open understory.	unprotected	high
Cordillera Central	Ebano Verde Scientific Reserve	Caseta La Sal trail to El Bombillo	23Feb97	0	850	pine/broad mix	highly impacted by agriculture and grazing.	scientific reserve	low
Cordillera Central	Ebano Verde Scientific Reserve	main trail	15Dec96	>3	850	pine/broad mix	moderate impact from grazing.	scientific reserve	low
Cordillera Central	Guacara	3km radius of caseta	29Jan97	1	1220	grass/ pine/ broad mix	steep, grassy, xeric hillsides on south faces. ravines and north faces forested. extensive goat grazing until 1994.	park	moderate fire danger
Cordillera Central	Loma del Oro	3km radius of caseta	31Jan97	4	1270	broadleaf ravines	wet ravines	park	
Cordillera Central	Loma el Rodeo	3km radius of caseta	30Jan97	0	1410	pine	steep, grassy, xeric hillsides on south faces. ravines and north faces forested. extensive goat grazing until 1994.	park	moderate fire danger
Cordillera Central	Los Ramones	3km radius of caseta	02Feb97	0	740	broadleaf	dry ravine; abandoned agricultural area outside park. heavy grazing from many goats.	park border	
Cordillera Central	Parque Nacional A. Bermudez	3km radius of caseta	25Jan97	8	1140	moist broadleaf	tree fern, palm broadleaf in ravines and valleys, pines only on ridges	park	low
Cordillera Central	Pico de Gallo	main trail to peak	02Feb97	13	1600	montane broadleaf	primary forest with some high-grade	park	low
Cordillera Central	Rancho en Medio	at peak & main trail to N	28Jan97	5	1500	broadleaf	some remnant mature, but chiefly young secondary forest. many exotic, invasive plants.	park	low
Cordillera Central	Valle Nuevo	main rd., <2km S of military gate	22Feb97	4	2100	montane pine	some grazing, evidence of fire.	scientific reserve	low
Cordillera Septentrional	Loma Quita Espuela	at & near summit	21Jan97	0	800	wet palm forest	palms dominant. many tree ferns, very mossy, wet, steep	no extraction	low
Haitises	Bosque Humedo	Bosque Humedo trail	08Feb97	15	0-50	wet broadleaf	primary wet broadleaf. Renewed human encroachment.	park	moderate
Haitises	Los Naranjos	trail S of caseta to 1.6 km	09Feb97	15	0-50	wet broadleaf	chiefly primary forest	park	moderate

Table 2. Continued.

Geographic Area	Site	Survey Location	Date	# of BITH	Elev. (m)	Habitat Type	Habitat Notes	Use	Risk of loss
Haitises	Trepeda Alta	Monte Bonito; trail 1 km NE of caseta	07Feb97	0	100	broadleaf	chiefly secondary forest. history of extensive agriculture and grazing. Current grazing.	park	moderate to high
Samana Peninsula	Loma Atravesada	remnant forest near peaks	19Jan97	6	580	moist broadleaf	Remnant forest patch approx. 25 Ha. Charcoal, lumber extraction, slash and burn encroachment. few trees larger than 15cm. but	unprotected	suffering heavy losses daily
Samana Peninsula	Naranjitos de Sanchez	only remnant forest >4ha	18Jan97	0	200	broadleaf	Remnant forest patch approx. 4 Ha. Large, Valuable trees removed. Surrounding land 98% cleared.	unprotected	high
Sierra de Baoruco	Loma del Toro	± 2 km north of park guard station - path to	6-8Dec97	4	1,800	wet montane broadleaf	patchy distribution of pine and broadleaf habitats	park	low
Sierra de Baoruco	near Alcoa Road area	on ridgeline west of road	Dec 96	1		transitional moist broadleaf forest	surrounded by second growth and slash and burn agriculture. Pine forest above. Site protected by limestone cliffs. Open understory dominated by old coffee.	park	moderate
Sierra de Baoruco	near Alcoa Road area	on ridgeline west of road	Dec 96	2		transitional dry broadleaf	Many dry forest plant species. Understory dense with thorn-scrub, vine and weed thickets	park	moderate
Sierra de Baoruco	Palo de Agua	3.8 km toward Puesto Escondido from Pueblo Viejo	Mar97	approx 10	1400	montane broadleaf	Dense forest. Many tree ferns. Understory variable- open to very dense. Pig damage. Surrounding pine stands heavily damaged by fire	park	low
Sierra de Baoruco	Pueblo Viejo	ridge south of ranger station	Dec 96 and Mar 97	many	1400	montane broadleaf	approx. 10 km long patch. Dense forest with open gaps of vine tangles. Pig damage.	park	low
Sierra de Neiba - east	Monte Bonito, Apoloniario	ridge	20Feb97	7	1670	wet broadleaf	extensive clearing for agriculture: <50% forrest remains within National Park borders.	park - unprotected	suffers heavy losses daily
Sierra de Neiba - west	Los Pinos	hill S. of Main Rd.	16Feb97	0	420	montane broadleaf	heavy goat grazing - little understory remains	unprotected	
Sierra de Neiba - west	Main road	~4km N of Vuelta de 15;	17Feb97	8	1600	montane broadleaf	thick, wet forest. extensive extraction of large pine, cedar and extensive clearing for agriculture.	park - unprotected	high
Sierra de Neiba - west	Main road	2.2km N of Vuelta de 15;	17Feb97	8	1600	montane broadleaf	thick, wet forest. extensive extraction of large pine, cedar and extensive clearing for agriculture.	park - unprotected	high

Table 3. Summary of 1995-97 Bicknell's Thrush distribution surveys outside of the Dominican Republic.

Country	Geographic Area	Site	Survey Location	Date	# of BITH	Elev. (m)	Habitat Type	Habitat Notes	Use	Risk of loss
Puerto Rico	Rio Grande	El Verde	Parrot Obs. Platform-Sonadora Rd.	16-Nov-96	0 (recording not used)	1500ft	broad leaf forest	canopy ht approx. 15m.	National Forest	low
Puerto Rico	Rio Grande	El Verde	Palo Hueco forest Rd. from entrance to river bridge	14-Dec-95	1	455m	broad leaf forest	20-30 year old forest regeneration from pasture, canopy and understory dense	National Forest	low
Puerto Rico	Rio Grande	El Verde	Palo Hueco trail from road to caucique entrance	15-Dec-95	1	400m	broad leaf forest	same as above	National Forest	low
Jamaica		Hardwar Gap	roadside census 2km north and 2km south of gap	22-Nov-96	2	4000ft	broad leaf forest	high elevation elfin forest. Overstory variable dur to Hurricane Gilbert. Understory lush. Sun coffee covers large acreage in area	Park, unprotected	moderate
Jamaica	Clarendon	Portland Ridge		18, 19 Nov 96; 3, 4, 5 Dec 96	0	150m	broadleaf, dry limestone forest	probably largest remaining tract on island.	Private gun club	low
Jamaica	Manchester	Colyville	Colyville Farms	8-Dec-96	0	915m	shade coffee	coffee 2.5m tall with overstory of <i>Inga vera</i> widely dispersed.	Private farm	unknown
Jamaica		Copse		22-Mar-97	0		broadleaf	primary forest damaged by hurricane	Private	low
Jamaica		Copse		24-Mar-97	0		broadleaf	same as above	Private farm	low
Dominican		oudat	trail to Boiling Lake	20, 21 Feb 96	3 (probable)	1800-2100 ft	broadleaf		Park	low

Table 4. Density estimates of Bicknell's Thrush in the Dominican Republic using intensive spot mapping of plots (SMP) or less intensive 100 m wide transects (SMT). A single data analyst determined densities for all areas all years. See Table 2 and methods for habitat descriptions and notes.

Location	Method	Year	AM Dates	PM Dates	Observers	Person Hours	Total Individual Calls	Calls/Person Hours	Raw Density (Terr/ha)	Adjusted Density (Terr/40 ha)
Pueblo Viejo	SMP	1995	3-6 Dec	2-5 Dec	KPM, CCR, DSN, PW, JFC	102.5	186	1.8	23/12	76.7
Pueblo Viejo	SMP	1996	9-13 Dec	8-13 Dec	KPM, CCR, DSN, PW, JAM, JEG	154.5	129	0.8	18/12	60
Pueblo Viejo	SMP	1997	1-4 Mar 6,8 Mar	28 Feb 1-3 Mar 5,7 Mar	KPM, CCR, DSN, PW, JAM, JEG SDF, MLS	201.75	91	0.5	16/12	54.2
Palo de Agua	SMP	1997	5-7 Mar	1-6 Mar	KPM, CCR, DSN, PW, JAM, JEG SDF, MLS	139	29	0.2	9/15	24
Loma del Toro (path)	SMT	1995	1 Dec	30 Nov	CCR, DSN, PW				9/9	40
Loma del Toro (path)	SMT	1996	7,8 Dec	6,7 Dec	CCR, KPM				4/9	17.8
Loma del Toro (road)	SMT	1995	1 Dec	30 Nov	KPM, JFC, PW				7/23	12.2
Las Abejas	SMT	1995	7 Dec	6 Dec	KPM, CCR, JFC				10/10	40
Ebano Verde	SMT	1995	9 Dec	8 Dec	KPM, JFC				4/25	6.4
Los Naranjos	SMT	1997	11 Feb	10 Feb	JEG, JAM				15/10	60

Table 5. Historic winter records for the Dominican Republic.

Geographic Area	Province	Town	Location	Source	Year	Date	# of BITH	Comments
Capital	Dist. Nacional	Santo Domingo		Wetmore and Swales 1931	1895	01May	1	collected by Cherrie
Capital	Dist. Nacional	Santo Domingo	Forest near airport	Reynard	1979	10Mar	1	recording H161-1
Capital	Dist. Nacional	Santo Domingo	Jardín Botánico	Marshall	1990	17Feb	2	pers. comm.
	San Cristobal	Bayaguana	Lechuza de Pílancon	Marshall	1973	30Mar	1	collection # 73-1503 at Mus. Nac. His. Nat.
Barahona Peninsula	Barahona	Enriquillo	West of town	Reynard	1974	27-28Nov	2	recording H161-2, H161-3
Boca de Yuma	La Romana	Boca de Yuma		Reynard	1979	09Mar	1	recording H161-5
Cordillera Central		Piedra Blanca	cloud forest	Terborgh	1975	26-28Jan	6	pers. comm.
Cordillera Central	La Vega	Jarabacoa	Finca Mota	Reynard	1978	18Nov	1	recording H161-4
Cordillera Oriental	Seibo	Pedro Sanchez	14 miles north of town	Terborgh, Weske	1970	22-24Jan	11	pers. comm.
Cordillera Septentrional	Puerto Plata	Puerto Plata		Wetmore and Swales 1931	1882/83	Dec./Jan	3	collected by Cory
Cordillera Septentrional	Duarte	San Francisco de Macoris	Loma Quita Espuela	Vargas	1988	03Mar	3	pers. comm.
Eastern Peninsula	La Romana	Boca de Yuma (3.5km N)	3.5km north of town	Faaborg	1974	09Apr	6	Pers. comm. 7-9 Jan 1975 had no Bicknell's Thrush captures
Samaná Peninsula	Samaná	Sanchez		Wetmore and Swales 1931	ca. 1895		1	collected by Verrill
Sierra de Bahoruco	Independencia	Zapoten		Reynard, from Schwartz			>1	pers. comm. Third party information
Sierra de Bahoruco	Pedernales	Aguacate		Marshall	1990	15Feb	6	pers. comm.
Sierra de Bahoruco	Pedernales	Aguacate		Wetmore, Swales	1895	22, 25Feb	2	collected by Cherrie
Sierra de Bahoruco	Pedernales	Cabo Rojo	Alcoa Road	Terborgh	1975	14-16Jan	6	pers. comm.
Sierra de Bahoruco	Pedernales		Loma del Toro	Haney	unk.	unk.	>1	pers. comm.
Sierra de Neiba	San Juan	Hondo Valle	Hondo Valle	Foy 1976	1971	date uncertain	1	Originally captured on Island Beach, NJ, USA on 24 May 1970
Sierra de Neiba	Bahoruco			Marshall	1975	23Feb	1	col. # 75-579 at Mus. Nac. His. Nat.



Table 6. Historical winter records of Gray-checked Thrush and Bicknell's Thrush outside of the Dominican Republic in the Caribbean basin. Some records lack sufficient data to confirm identification as Bicknell's Thrush.

Country	Location	Source	Year	Date	Bicknell's?	#Rec	Comments
Bahamas	Cay Sal	Cory 1891	1891	May	yes	1	collected by Winch
Cuba	Jardín Botánico, Habana	Garrido 1968	1965	Oct	yes	1	col. # 1332, Inst Bio, Acad Ciencias, Cuba; col by R. Fleitas
	Jardín Botánico, Habana-Sabana-Camaguey	Garrido 1968	1968	26Oct	yes		
Cuba	Garrido 1973	Garrido 1973	Unrep.	15Oct	?		lighthouse mortalities
Haiti	Wetmore and Swales 1931	Wetmore and Swales 1931	1928	19Jan	yes	1	Reported by Bond. Possibly same collected by Ekman
	Morne Malange	Bennett, Witt, and White 1980	unk	unk	?	1	J. of Wild. Diseases 16(1), 1980
Jamaica		Wunderle and Waide 1993	1984-91		?	1	
Martinique	Colson	Pinchon 1976	1958	26Oct	?	4	
Puerto Rico	Guanica Dry forest	Arcndt and Faaborg 1989	1985	24Jan	?	1	only cap In 17 years of netting
Puerto Rico		Raffaele 1983	unk	unk	?	3	listed as vagrant
Puerto Rico		Wunderle and Waide 1993	1984-91	unk	?	1	
Swan Is.		Paynter 1956	1913	19Apr	?	1	
Turks and Caicos Is.	Providenciales	Aldridge 1987	1984/85	unk	?	1	
Virg Islands	Buccaneer Golf Course	Sladen 1988	1981	19Oct	?	1	

Table 7. Bicknell's Thrushes captured in the Sierras de Baorucos, Dominican Republic, 1994-1997.

Band Number	Age <sup>a</sup>	Sex	Wing (mm)	Weight (g)	Year	Date	Time	Location <sup>b</sup>	Fat <sup>c</sup>	Distance Moved (m)
122180013	AHY		89	29.1	1995	3-Dec	710	PUVI	0	
122180014	ASY		93	27.4	1995	3-Dec	820	PUVI	5	
122180015	HY		85	26.5	1995	5-Dec	720	PUVI	5	
123140012	ASY	male	92	29.1	1995	2-Dec	700	PUVI	5	approx. 3,220 Km <sup>d</sup>
124110943	AHY		93	30.1	1996	10-Dec	820	PUVI	5	
124110952	SY		85.5	24.6	1997	2-Mar	800	PUVI	0	
124110952	SY		85.5	25.5	1997	8-Mar	830	PUVI	5	53
124110957	SY		88.5	25.7	1997	3-Mar	1430	PUVI	5	
124110957	SY		89	25.4	1997	8-Mar	830	PUVI	5	15
124110960	ASY		89.5	26	1997	4-Mar	1730	PALO	5	
124110962	ASY		88	26.9	1997	5-Mar	710	PALO	0	
124110963	SY		89	25.9	1997	5-Mar	1010	PALO	0	
124110968	SY		89		1997	6-Mar	910	PALO	1	
124110969	SY		90.5	26	1997	7-Mar	740	PALO	0	
147147979	HY		86	26	1995	3-Dec	930	PUVI	1	
147147979	SY		88	25	1996	12-Dec	720	PUVI	5	60
148127615	HY		87	27	1995	30-Nov	1740	LOTO	5	
148127616	HY		91	27.2	1995	1-Dec	820	LOTO	0	
148127617	HY		90	28.2	1995	1-Dec	820	LOTO	5	
148127618	ASY		85	24.5	1995	2-Dec	710	PUVI	0	
148127618	ASY		85	25.4	1996	11-Dec	940	PUVI	5	0
148127619	HY		91.5	28.9	1995	4-Dec	710	PUVI	5	
148127619	HY		93	29.3	1995	5-Dec	1000	PUVI	1	100
148127620	HY		88.5	25.5	1995	5-Dec	630	PUVI	5	
148127620	SY		91.5	25.2	1996	11-Dec	750	PUVI	5	92
148127621	ASY		96.5	26.7	1995	6-Dec	630	PALO	0	
148127621	ASY		97	29	1997	4-Mar	1730	PALO	5	75
148127622	HY		90	28.3	1995	7-Dec	720	LAAB	0	
153148001	AHY		89	26.6	1994	10-Dec	730	LOTO	5	
153148002	AHY		91	28.5	1994	10-Dec	1600	PUVI	5	
153148002	ASY		91.5	26.6	1995	2-Dec	820	PUVI	0	0
153148225	AHY		90.5	26.7	1996	7-Dec	1840	LOTO	5	
153148228	AHY		90.5	26.2	1996	8-Dec	910	LOTO	5	
213158964	SY		92	29.1	1997	5-Mar	1920	PALO	5	

a Individuals aged by covert color, retrix shape, and/or absence of skull ossification. HY=hatch year, AHY=after hatch year, SY=second year, ASY=after second year. SY individuals were known age or captured after 1 January.

b Capture locations were: Las Abejas (LAAB), Loma del Toro (LOTO), Palo de Viento (PALO), Pueblo Viejo (PUVI).

c Fat scores in furcula: 0=none, 1=concave sheet covering, 2= full, even sheet, 3= bulging, 5= trace

d Thrush 1231-40012 was originally captured on 16 June 1995. Mt. Mansfield, Vermont, USA.

Table 8. Summary of constant effort mist netting stations in the Sierra de Baoruco, Dominican Republic, 1996-97.

Station Name	Station code	Year	Days of Operation		Total Net Hours	No. of Captures			Total Captures per 100 net-hours			Number of Species (migrants)
			Total	Range		N <sup>1</sup>	R <sup>2</sup>	T <sup>3</sup>	N	R	T	
Pueblo Viejo	PUVI	1996	3	10-12 Dec	900	66	10	76	7.3	1.1	8.4	18 (5)
Pueblo Viejo	PUVI	1997	2.5	2-4 Mar	744	54	13	67	7.3	1.7	9.0	19 (5)
Palo de Agua	PALO	1997	2.5	5-7 Mar	744	71	2	73	9.5	0.3	9.8	18 (4)
Loma del Toro	LOTO	1996	1.5	7-8 Dec	210.5	32	1	33	15.2	0.5	15.7	10 (3)

1 new capture

2 recapture

3 total captures

Table 9. Total number of captures (N = first captures, R = repeat captures) at Loma del Torro (LOTO), Palo de Viento (PALO) and Pueblo Viejo (PUVI) in the Sierras de Baoruco National Park. **Bold** common names are neotropical migrant species. Number of banded birds are not adjusted for net hours (see table 8 for net hours).

Common Name	LOTO		PALO		PUVI				Total	
	1996		1997		1996		1997		N	R
	N	R	N	R	N	R	N	R		
Green-tailed Warbler	1	0	5	0	12	2	18	6	36	8
Black-faced Grassquit	0	0	9	1	5	2	5	0	19	3
Chat Tanager	5	0	8	1	4	0	2	1	19	2
Greater Antillean Bullfinch	6	0	0	0	7	0	4	0	17	0
<b>Ovenbird</b>	3	0	6	0	8	5	0	3	17	8
Rufous-throated Solitaire	3	1	9	0	1	0	4	0	17	1
White-winged Warbler	0	0	10	0	2	0	3	0	15	0
<b>Black-throated Blue Warbler</b>	5	0	2	0	2	1	2	0	11	1
Hispaniolan Emerald	5	0	2	0	2	0	0	0	9	0
Narrow-billed Tody	0	0	3	0	4	0	2	1	9	1
Black-crowned Palm Tanager	0	0	2	0	3	0	3	0	8	0
<b>Bicknell's Thrush</b>	2	0	3	0	1	2	2	0	8	2
Red-legged Thrush	0	0	2	0	4	0	1	0	7	0
Stripe-headed Tanager	0	0	2	0	4	0	1	0	7	0
<b>Black and White Warbler</b>	0	0	0	0	1	0	3	1	4	1
Greater Antillean Pewee	0	0	3	0	0	0	1	0	4	0
Sharp-shinned Hawk	0	0	2	0	0	0	1	0	3	0
Greater Antillean Elaenia	1	0	1	0	0	0	0	0	2	0
Hispaniolan Trogon	0	0	0	0	2	0	0	0	2	0
<b>American Redstart</b>	0	0	1	0	0	0	0	0	1	0
Bananaquit	1	0	0	0	0	0	0	0	1	0
<b>Common Yellowthroat</b>	0	0	0	0	1	0	0	0	1	0
Gray-headed Quail Dove	0	0	0	0	0	0	1	0	1	0
Hispaniolan Woodpecker	0	0	1	0	0	0	0	0	1	0
Ruddy Quail Dove	0	0	0	0	1	0	0	0	1	0
Red-naped Pigeon	0	0	0	0	0	0	1	0	1	0
<b>Grand Total</b>	<b>32</b>	<b>1</b>	<b>71</b>	<b>2</b>	<b>64</b>	<b>12</b>	<b>54</b>	<b>12</b>	<b>221</b>	<b>27</b>

Table 10. Distances (m) between original capture and recapture locations at Pueblo Viejo (PUVI) Dec. 1995 and 1996, Mar. 1997; Loma del Toro (LOTO) Dec. 1996; Palo de Viento (PALO), Dec. 1997. Only neotropical migrants were banded at PUVI during 1995. Shaded records represent recaptures between study periods.

Band	Species	Age	Date	Study Area	Distance Moved (m)
2131-57682	Ovenbird	HY	9 DEC 96	PUVI	
			12 DEC 96	PUVI	21
2131-58640	Ovenbird	HY	10 DEC 96	PUVI	
			12 DEC 96	PUVI	35
		SY	2 MAR 97	PUVI	0
2131-57682	Ovenbird	HY	10 DEC 96	PUVI	
			13 DEC 96	PUVI	268
2131-58521	Ovenbird	HY	12 DEC 96	PUVI	
			13 DEC 96	PUVI	118
2131-58609	Ovenbird	U	4 DEC 95	PUVI	
		AHY	13 DEC 96	PUVI	25
2131-58509	Ovenbird	HY	3 DEC 95	PUVI	
		SY	9 DEC 96	PUVI	25
			12 DEC 96	PUVI	25
2131-58638	Ovenbird	HY	9 DEC 96	PUVI	
			10 DEC 96	PUVI	42
2131-58639	Ovenbird	AHY	10 DEC 96	PUVI	
			12 DEC 96	PUVI	36
			2 MAR 97	PUVI	0
2131-58608	Ovenbird	U	3 DEC 95	PUVI	
		AHY	2 MAR 97	PUVI	0
YO/O	Green-tailed Warbler	AHY	9 DEC 96	PUVI	
			1140		
			9 DEC 96	PUVI	192
			1850		
			10 DEC 96	PUVI	20
LBW/PI	Green-tailed Warbler	HY	11 DEC 96	PUVI	
			12 DEC 96	PUVI	135
RLB/LG	Green-tailed Warbler	AHY	9 DEC 96	PUVI	
			8 MAR 97	PUVI	105
YDB/R	Green-tailed Warbler	AHY	2 MAR 97	PUVI	
			8 MAR 97	PUVI	50
LG/RBK	Green-tailed Warbler	AHY	9 DEC 96	PUVI	
			2 MAR 97	PUVI	69
LB/YDB	Green-tailed Warbler	AHY	10 DEC 96	PUVI	
			2 MAR 97	PUVI	85
LB/OO	Green-tailed Warbler	AHY	9 DEC 96	PUVI	
			3 MAR 97	PUVI	0

Table 10. Continued.

Band	Species	Age	Date	Study Area	Distance Moved (m)
PIDB/Y	Green-tailed Warbler	AHY	10 DEC 96	PUVI	
			4 MAR 97	PUVI	225
LB/YR	Green-tailed Warbler	AHY	2 MAR 97	PUVI	
			4 MAR 97	PUVI	122
O/RLB	Green-tailed Warbler	AHY	12 DEC 96	PUVI	
			3 MAR 97	PUVI	29
2050-83229	Black-throated. Blue Warbler	U, F	4 DEC 95	PUVI	
		AHY	12 DEC 96	PUVI	0
2131-58634	Rufous-throated Solitaire	AHY	7 DEC 96	LOTO	
			8 DEC 96	LOTO	25
1221-80042	Rufous-throated Solitaire	U	1 MAR 97	PUVI	
			3 MAR 97	PUVI	35
			5 MAR 97	PUVI	0
			8 MAR 97	PUVI	0
2131-58524	Rufous-throated Solitaire	U	2 MAR 97	PUVI	
			6 MAR 97	PUVI	0
			8 MAR 97	PUVI	0
R5R6	Narrow-billed Tody	U	6 MAR 97 0900 hrs.	PALO	
			1720 hrs.		
R6L6	Narrow-billed Tody	U	13 DEC 96	PUVI	
			2 MAR 97	PUVI	17
LB/R Y	Black-crowned Palm Tanager	U	6 MAR 97	PALO	
			7 MAR 97	PALO	20
R/YPI	Chat Tanager	U	10 DEC 96	PUVI	
			3 MAR 97	PUVI	195
LB/YPI	Chat Tanager	U	5 MAR 97	PALO	
			7 MAR 97	PALO	30
1750-62032	American Redstart	AHY,F	2 MAR 97	PUVI	
			3 MAR 97	PUVI	27
1750-62034	Black and White Warbler	AHY,F	2 MAR 97	PUVI	
			3 MAR 97	PUVI	87
2050-83493	Black-faced Grassquit	HY	5 MAR 97	PALO	
			7 MAR 97	PALO	40

Figure 1. Total number of vocalizing Bicknell's Thrushes recorded by observers from 0630-1130 on PUVI during 3-6 Dec. 1995, 9-13 Dec 1996, and 1-4, 6, 8 March 1997. Totals are not adjusted for personnel hours.

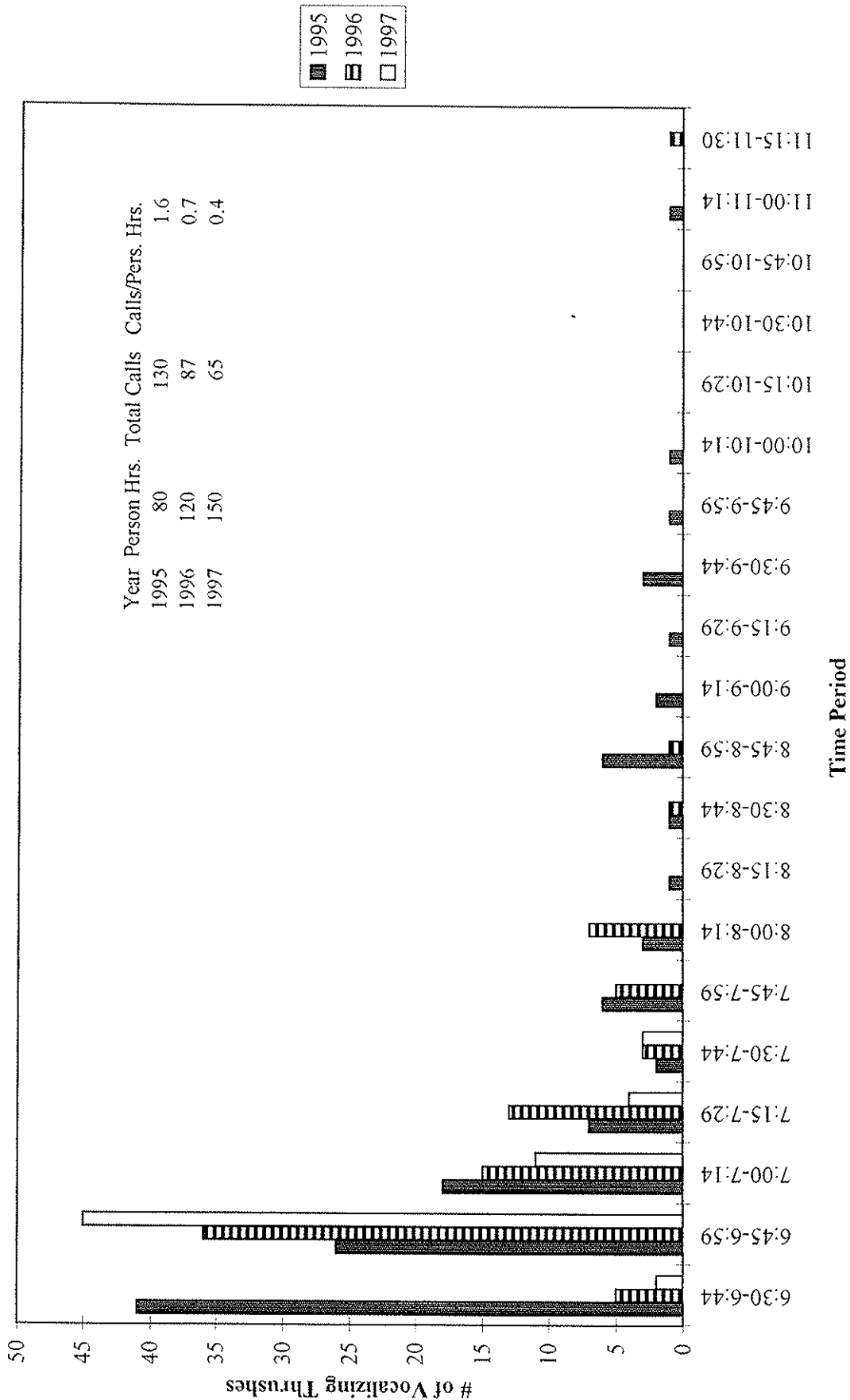


Figure 2. Total number of vocalizing Bicknell's Thrushes recorded by observers from 1700-1914 on PUVI during 3-5 Dec. 1995, 8-13 Dec 1996, and 28 Feb., 1-3, 5, 7 March 1997. Totals are not adjusted for personnel-hours.

