

# **Ecology of winter resident Prothonotary Warblers in Costa Rica 2005/2006 Report**

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for  
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## Ecology of winter resident Prothonotary Warblers in Costa Rica 2005/2006 Report

### Abstract

Populations of Prothonotary Warblers (*Protonotaria citrea*) were sampled at 4 sites in Costa Rica using constant-effort mist-netting and banding (Baillie et al 1986), mid-November through mid-March 2005/2006, 2004/2005, and 2003/2004 following MoSI (Monitoreo de Sobrevivencia Invernal) protocol (DeSante et al 2004) and participating in the program.

Three of the study sites were located in mangrove (*Avicennia germinans*) swamps in the Southern Dry Pacific Coast Mangroves ecoregion at:

(1) **Estero Naranjo** (MoSI Station **ESNA**) Área de Conservación Guanacaste, sector Naranjo - 10° 46'56" N, 085° 39'52"W

(2) **Estero Tamarindo** (MoSI Station **ESTA**) Área de Conservación Tempisque, Parque Nacional Marino las Baulas de Guanacaste - 10° 19' 49" N, 085° 50'24.5"W, and

(3) **Estero Iguanita** (MoSI Station **ESIG**) Área de Conservación Tempisque, Refugio Nacional de Vida Silvestre Iguanita - 10° 37'47" N, 085° 37'42"W.

We sampled a Central American Dry Forest site at:

(4) **Playa Grande** (MoSI Station **PLGR**), adjacent to the Estero Tamarindo site, Parque Nacional Marino las Baulas de Guanacaste - 10° 19' 40" N, 085° 50'39"W.

This southern dry pacific coast ecoregion marks the transition zone from dry to moist on the pacific coast (Spalding et al. 1997).

Five monthly, 3 day 'pulses' of mist-netting and banding were conducted at 3 of the sites; Estero Naranjo was visited only 4 times. Data was submitted to the MoSI program from all 4 stations. Feather samples were collected from up to 30 individuals of newly banded Prothonotary Warblers at each site and from a number of other species banded, for isotope analysis in collaboration with the Center for Tropical Research & Conservation Genetics.

The first monthly pulse commenced on November 17 2005 at Estero Tamarindo and the last monthly pulse was completed on March 12 2006 at Playa Grande. Each site was visited once a month between these dates. Estero Naranjo was not visited in March this season for technical reasons.

This season 168 Prothonotary Warblers were banded and 63 were recaptured that were banded previous season(s); for a total of 231 individuals captured (Table 1). After adjusting for variable effort among sites and years, the mean capture rate this season was calculated at 44 birds per 1,000 mist-net hours (mnh), up slightly from 42/1,000 mnh in 2004/05, but lower than the 47/1,000 mnh capture rate in 2003/04. The capture rates at 2 large mangrove swamps (Estero Naranjo & Estero Tamarindo) were much higher than the capture rates at the small swamp at Estero Iguanita or the Central American Dry Forest at Playa Grande. The capture rates in the 2 large swamps were much higher than in the previous 2 years. Capture rates at Estero Iguanita and Playa Grande were much lower than previous years bringing down the mean capture rate for all 4 sites.

More hatch year/second year (HY/SY) birds than after hatch year/after second year (AHY/ASY) birds were captured at all study sites. More males than females were banded at all sites except in the dry forest where there were more females than males, for the third successive year. The proportion of males in the population was higher in the HY/SY age class than in other age classes.

There were 165 recapture events involving 119 individuals. Among-year site fidelity was demonstrated by the recovery of 63 birds banded in previous seasons. There were 85 within-year recapture events involving 60 individuals demonstrating within-year site fidelity.

There was a regular movement of Prothonotary Warblers out of the mangroves into the dry forest in the early morning.

Recapture data demonstrates that birds move between the mangroves at Tamarindo and the dry forest site at Playa Grande on a regular basis and were observed similarly exiting the other mangrove sites early in the morning also. Observations were made of Prothonotary Warblers foraging in and around the flowers of dry forest trees late in the dry season and these flowers were scarce this season, perhaps accounting for the reduced numbers of birds encountered in the dry forest. This suggests that forested areas adjacent to mangrove swamps need to be protected to the same extent as the mangroves to conserve winter habitat for Prothonotary Warblers.

Observations and banding data indicate that Prothonotary Warblers were the most abundant songbirds in the mangroves (Nov. through March), readily detected in the first 2 hours of the day.

Location/year	banded	recaptures from other years	Total captured (banded+recaps)	mist-net hours	Mean Capture Rate per 1,000 mnh
ESTA 2005-2006	<b>82</b>	<b>37</b>	<b>119</b>	<b>1352.7</b>	<b>88</b>
ESTA 2004-2005	112	13	125	1600	78
ESTA 2003-2004	59	0	59	1025.5	57
PLGR 2005-2006	<b>5</b>	<b>8</b>	<b>13</b>	<b>1164</b>	<b>11</b>
PLGR 2004-2005	30	6	36	1264	28
PLGR 2003-2004	20	5	25	1026	24
ESIG* 2005-2006	<b>15</b>	<b>5</b>	<b>20</b>	<b>1944.1</b>	<b>10</b>
ESIG 2004-2005	24	0	24	1720	14
ESNA 2005-2006	<b>66</b>	<b>13</b>	<b>79</b>	<b>1168</b>	<b>68</b>
ESNA 2004-2005	61	15	76	1566	49
ESNA 2003-2004	61	0	61	1001	61
<b>Total 2005-2006</b>	<b>168</b>	<b>63</b>	<b>231</b>	5628.8	<b>44</b>
<b>Total 2004-2005</b>	227	34	262	6150	<b>42</b>
<b>Total 2003-2004</b>	140	5	145	3052.5	<b>47</b>

\* ESIG was not sampled in 2003-2004

## Study Areas

### Estero Tamarindo

This study site was located in a 500 ha stand of **Southern Dry Pacific Coast Mangroves** (worldwildlife.org<sup>a</sup>) in the transition zone between tropical wet and dry forest at Estero Tamarindo, Guanacaste, Costa Rica, within the Area de Conservación Tempisque, at Parque Nacional las Baulas de Guanacaste (10° 19' 49" N, 085° 50' 24.5" W) approximately 1 km west of the Playa Grande study site and separated from it by Tropical dry forest and patches of pasture in various stages of regeneration. The forest where mist-netting was conducted was dominated by *Avicennia germinans*, with mean percent cover of leafy *Avicennia* of 55% under 1 m, 54% at 1 to 2 m, 41% at 2 to 3 m, and 33% over 3 m. and was very similar in many regards to the study site at Estero Naranjo. Very little ground vegetation was present on the mud and sand substrate apart from the numerous ptenophores of the *Avicennia*. The average maximum height of trees within the mist-netting area was 4.0 m.

The edge between the mangroves and the dry forest was sharply defined, often with dense patches of the succulents *Acanthocerus pentagonus*, *Opuntia stricta*, or *Bromelia penguin*. The mangrove swamps are zoned into: external areas that are directly exposed to estuarine waters and internal areas that are mostly isolated from the estuaries' waters, however seasonally the tides inundate these areas. There is a strong salinity gradient between the estuary mouth and the inland areas where salt pans may form. Internal zones were the focus of this study.

### Playa Grande

This study site was located in a 100 ha stand of **Central American dry forest** (worldwildlife.org<sup>b</sup>) also in the transition zone between tropical wet/dry forest. This forest patch forms a narrow strip between the Pacific beach 'Playa Grande' to the west and Estero Tamarindo to the east. It is within the Área de Conservación Tempisque, at Parque Nacional Marino las Baulas de Guanacaste (10° 19' 40" N, 085° 50' 39" W). The forest where mist netting was conducted was dominated for the first 20 m in from the beach/forest edge by *Gliricidia sepium*, a tree species (up to 15 m) often associated with pioneer vegetation. Mixed with this species (up to about a 20% mix) were *Haematoxylum brasiletto*, *Simaruba glauca*, *Tabebuia orchracea*, *Enterlobium cyclocarpum*, *Caesalpinia eriosta* and *Bombacopsis quinata*, all tree species reaching a maximum height of 20 m and the vine *Combretum farinosum*. The mean maximum height of trees within the mist-netting area was 8.2 m. Very little ground vegetation was present on the sand/leaf litter substrate. Ground vegetation consisted mainly of scattered patches of *Asteraceae* and *Passiflora* sp. Patches of *Lianas* occasionally reached into the canopy. Much of the ground was covered in dead leaves.

### Estero Naranjo

This study site was located in a 400 ha stand of **Southern Dry Pacific Coast Mangroves** within the tropical wet/dry transition forest zone at Estero Naranjo, Guanacaste, Costa Rica, within the Area de Conservación Guanacaste, at Sector Playa Naranjo (10° 46' 56" N, 085° 39' 52" W). The forest where mist netting was conducted was dominated by *Avicennia germinans*, a mangrove species that grows within the estuary zone that is only periodically flooded. The percent cover of leafy *Avicennia* within the netting area averaged 29% under 1 m, 53% at 1 to 2 m, 60% at 2 to 3 m, and 36% over 3 m. Mixed with this species were *Laguncularia racemosa*, *Conocarpus erectus*, and *Rhizophora racemosa*, mangrove species that are typically more abundant in deeper estuary waters. The mean maximum height of trees within the mist-netting area was 4.6 m. Very little ground vegetation was present on the mud substrate apart from the numerous ptenophores of the *Avicennia*.

The edge between the mangroves and the dry forest was sharply defined, often with dense patches of the succulents *Acanthocerus pentagonus*, *Opuntia stricta*, or *Bromelia penguin*.

### **Estero Iguanita**

This study area was located in a 24 ha stand of **Southern Dry Pacific Coast Mangroves** in the tropical wet/dry transition forest zone at Estero Iguanita, Guanacaste, Costa Rica, within the Area de Conservación Tempisque at Refugio Nacional de Vida Silvestre Iguanita (10° 37' 47" N, 085° 37' 42" W). The forest where mist netting was conducted was dominated by *Avicennia germinans*, a mangrove species that grows within the estuary zone that is periodically flooded. Mixed with the *Avicennia* were *Laguncularia racemosa*, *Conocarpus erectus*, and *Rhizophora racemosa*, mangrove species that are typically more abundant in deeper estuary waters. The mean maximum height of trees within the mist-netting area was 7.0m and the percent cover of leafy *Avicennia* within the netting area averaged 29% under 1m, 39% at 1 to 2 m, 31% at 2 to 3 m, and 33% over 3 m. Very little ground vegetation was present on the mud substrate apart from the numerous ptenophores of the *Avicennia*. This swamp has similarities to both Estero Naranjo and Tamarindo though it is smaller in area and most of the trees in the netting area are taller. The edge between the mangroves and the dry forest was also sharply defined, often with dense patches of the succulents *Acanthocerus pentagonus*, *Opuntia stricta*, or *Bromelia penguin*.

### **Methods**

The capture data for this study was collected from mid-November 2005 through mid-March 2006. Results are compared with data from previous seasons at the same locations following the same protocol (DeSante et al 2004). Sixteen four-pocket mist-nets (12m x 2m, 36mm mesh) were used at all 4 study areas, spaced 5 to 50 m apart, in locations that were subjectively chosen, prior to the 2003-04 season, based on the perception of the likelihood of capturing the greatest number of birds. The same nets lanes were used that were established in previous seasons. The average daily mist-netting effort was 100 mist-net hours. Yearly mean capture rates are reported in 'captures per 1,000 mist-net hours' (mnh). Monthly results are reported in captures per 100 mnh. At Estero Naranjo, Estero Tamarindo, and Estero Iguanita nets were placed close to the edge between mangrove forests and tropical dry forests, but within mangroves, where leafy vegetation height was lowest. At Playa Grande nets were placed from 5m to 30m from the edge between the forest and the beach, also within the forest and taking advantage of the shorter vegetation near the edge. Nets were open at each study site for three successive days each month (Nov. – March) for at least 6 hours each day starting at 0530 Central time following the protocol of DeSante et al (2004). High winds developing late most mornings precluded netting in the afternoons but nets were kept open until dusk when there was little or no wind. Repeat visits were made 3 to 4 weeks apart to minimize net avoidance by the birds. All neo-tropical migrant species captured were banded (all those species listed in Pyle) with US F&W Service, numbered, aluminum bands. Birds were aged and sexed according to Pyle. Wing cord and fat measurements were taken, and molt limits documented. Two rectrix feather samples were taken from MoSI target species. Resident birds captured were similarly documented but were not banded and no feather samples were taken. Most resident birds were uniquely colour banded. Recaptured banded birds were similarly documented. Banding data was submitted to the Bird Banding Office of the Canadian Wildlife Service and to the Institute for Bird Populations for inclusion in the MoSI program. Data summaries were sent to conservation officials at each banding location in Costa Rica along with copies of this report.

## Results & Discussion

The number of new birds banded varied greatly among stations with more captures being made in the large tracts of mangrove swamps vs. either the small swamp or the dry forest. This is likely in part due to the fact that birds forage and move through leafy layers of vegetation and are less likely to be captured in areas where tall trees predominate as in the small swamp at Iguanita and the dry forest at Playa Grande. Fewer birds were banded this season than last season and this comes as no surprise given the numbers of birds that were banded previous seasons and that are now showing up as recaptures. The sum of all captures (banded plus recaps) with the effort factored in, best illustrates how the populations of Prothonotary Warblers are doing. The mean capture rate this season was 44 birds per 1,000 mist-net hours, up from 42 in 2004-05 but down from 47 in 2003-04. In the 2 large mangrove swamps ESTA and ESNA the capture rate was up significantly over previous years. The capture rate this season was down at ESIG, a smaller mangrove swamp. In the dry forest at PLGR the capture rate was down significantly over previous years (Table 1).

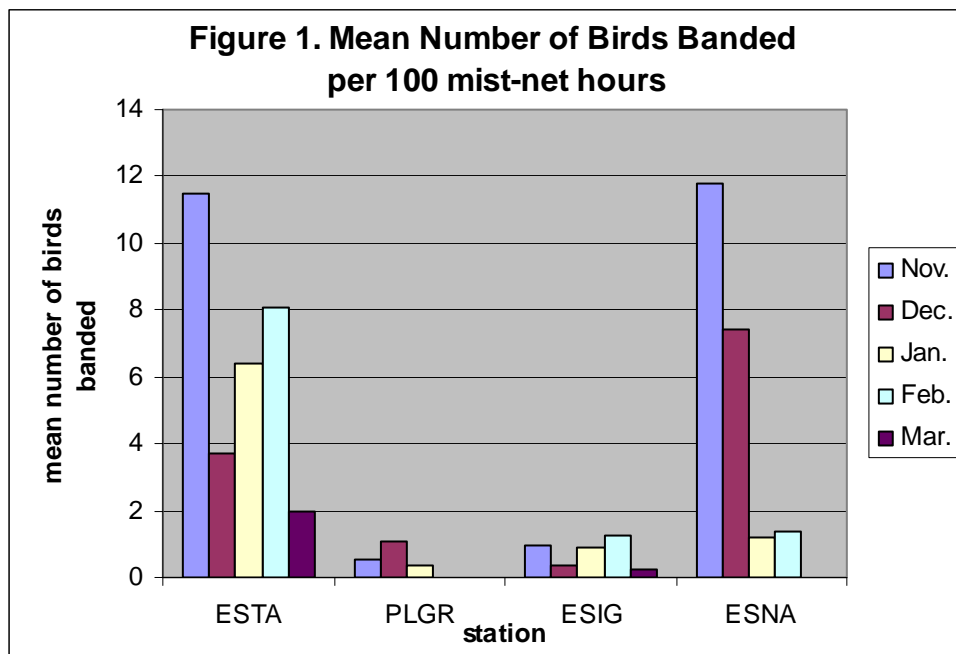
In almost all instances more males than females were captured. The lowest male to female ratio was found in the after second year & older age class (all birds that were banded in previous years) and the highest male/female ratio was found in the ahy/asy age class. As in previous years more females than males were captured in the dry forest at Playa Grande (Table 2).

	Age	Male	Female	total	male to female ratio
ESTA (Estero Tamarindo)	hy/sy	28	22	50	1.27
	ahy/asy	22	10	32	2.2
	asy & older	19	18	37	1.06
	Total	69	50	119	<b>1.38</b>
PLGR (Playa Grande)	hy/sy	1	2	3	0.5
	ahy/asy	1	1	2	1
	asy & older	4	4	8	1
	Total	6	7	13	<b>0.86</b>
ESIG (Estero Iguanita)	hy/sy	7	2	9	3.5
	ahy/asy	3	3	6	1
	asy & older	3	2	5	1.3
	Total	13	7	20	<b>1.86</b>
ESNA (Estero Naranjo)	hy/sy	32	19	51	1.68
	ahy/asy	11	4	15	2.75
	asy & older	9	4	13	2.25
	Total	52	27	79	<b>1.93</b>
Totals	Total hy/sy	68	45	113	1.51
	Total ahy/asy	37	18	55	2.06
	Total asy	35	28	63	1.25
Grand Totals		140	91	231	<b>1.54</b>

The number of birds banded declined between the visits in November and those in December at ESTA and ESNA. The decline continued into January at ESNA but increases were seen at ESTA between December and January and again between January and February. There were declines in numbers of birds banded at all locations between February and March. Similar patterns of declines were seen in previous years.

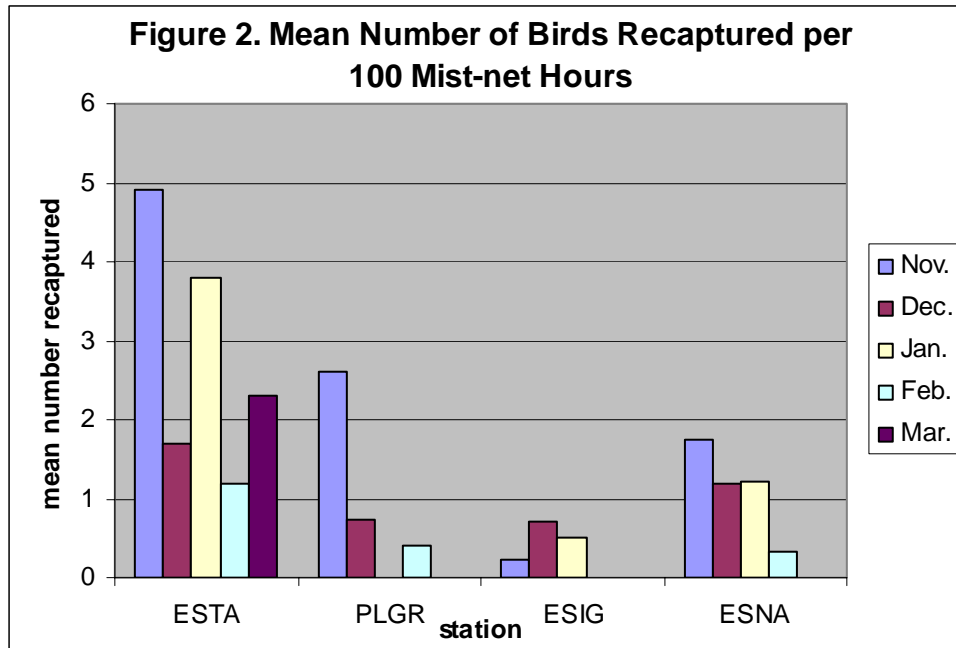
Most birds captured in March had fat deposits in the furcular hollow and under the wings, some bulging with fat, indicating that these birds were preparing to migrate. There was likely some attrition due to birds migrating out of the area at this time. The numbers of birds banded at ESIG and PLGR were low at all times (Table 3 & Figure 1).

	Nov.	Dec.	Jan.	Feb.	Mar.	Mean
ESTA	11.5	3.7	6.4	8.1	2	6.3
PLGR	0.52	1.1	0.35	0	0	0.4
ESIG	0.94	0.36	0.9	1.24	0.26	3.7
ESNA	11.8	7.44	1.21	1.35	n/a	4.5



The number of birds recaptured tended to decline between November and March. This was not expected given that increasingly more banded birds were in the population each succeeding month (Table 4 & Figure 2). The resurgence of numbers of birds captured in March at ESTA was unique to that site.

	Nov.	Dec.	Jan.	Feb.	Mar.	Mean
ESTA	4.9	1.7	3.8	1.2	2.3	2.8
PLGR	2.6	0.74	0	0.4	0	0.8
ESIG	0.24	0.71	0.5	0	0	0.3
ESNA	1.74	1.19	1.21	0.34	n/a	0.9



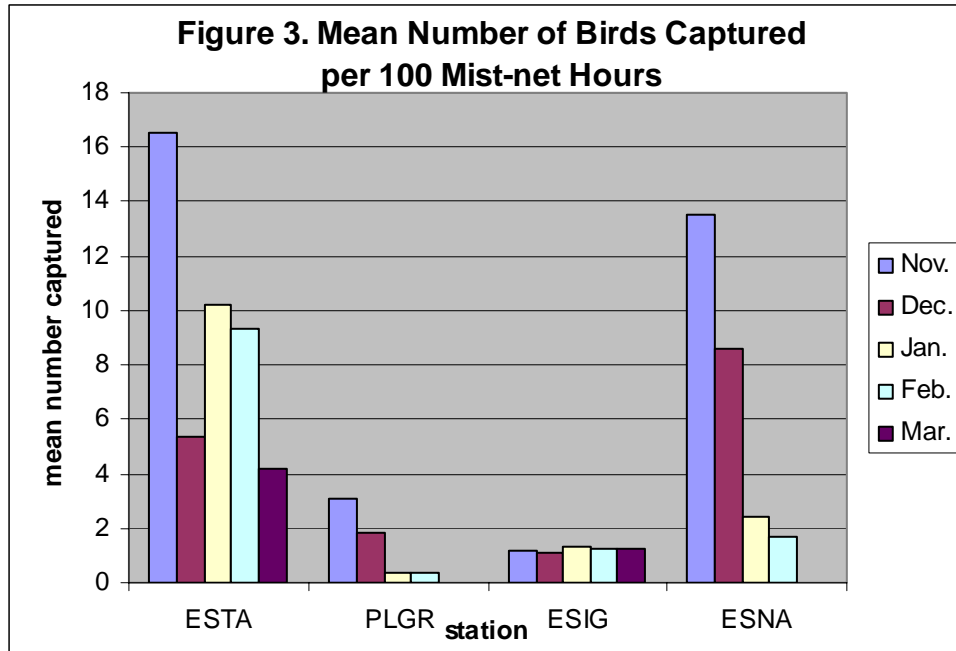
This season five Prothonotary Warblers that were banded in the mangroves at Estero Tamarindo were recaptured in the dry forest at Playa Grande and 2 that were banded at Playa Grande were recaptured in the mangroves at Estero Tamarindo further documenting the movement of birds between the two sites. In the dry forest Prothonotary Warblers and a number of other migratory species were observed feeding around the flowers of the trees *Haematoxylum brasiletto*, *Tabebuia orchracea*, *Tabebuia orchracea*, *Enterlobium cyclocarpum*, *Bombacopsis quinata*, *Gliricidia sepium*, and the vine *Combretum farinosum*. These flowers were in short supply this season so perhaps the dry forest was not as attractive to birds this season.

Although the mangrove site at ESTA and the dry forest site at PLGR had some birds in common there was a major difference, there were more females in the population in the dry forest. This was the case throughout the 3 years of this study.

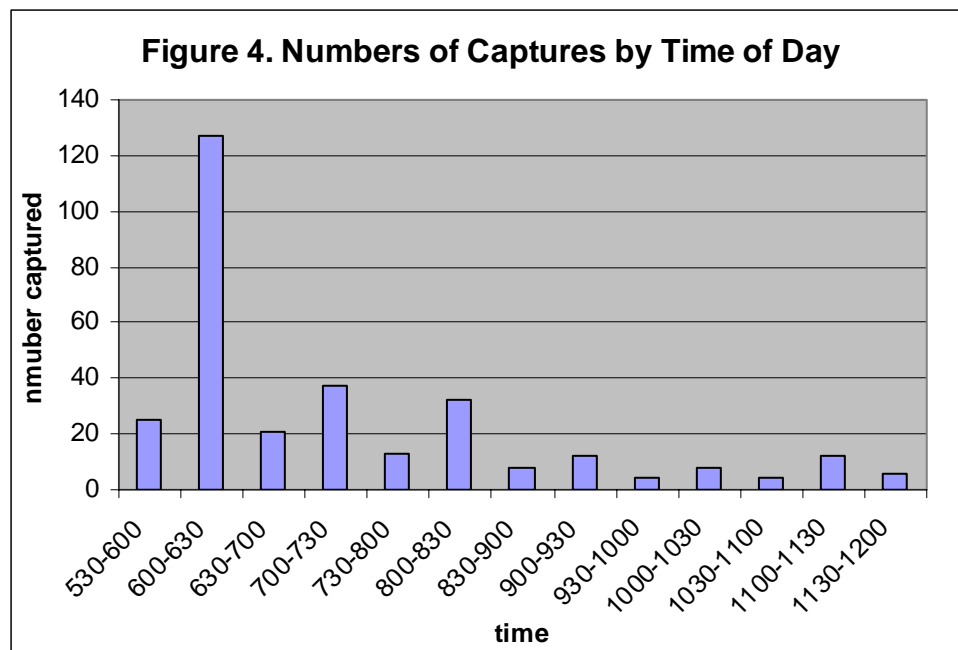
A combination of all birds captured (banded + recaptures), yields the clearest picture of the population dynamics. The picture that emerges is one of a month by month decline in the numbers of Prothonotary Warblers (Table 5 & Figure 3) at all sites except the small mangrove stand at Estero Iguanita where there was a small, but stable population.



	Nov.	Dec.	Jan.	Feb.	Mar.	Mean
ESTA	16.5	5.4	10.2	9.3	4.2	9.1
PLGR	3.1	1.84	0.35	0.4	0	1.1
ESIG	1.18	1.07	1.35	1.24	1.28	1.2
ESNA	13.5	8.6	2.42	1.69	n/a	5.2



The vast majority of birds were captured in the first half hour after sunrise (Figure 4), likely as they were leaving the mangroves to forage in the dry forest. Unfortunately high winds most afternoons precluded mist-netting at that time and so the return of the Prothonotary Warblers into the mangroves had not been well documented. However, the few days when nets were left open until dusk the numbers of birds captured increased towards sunset.



## Conclusions

Mean capture rates indicate that populations of Prothonotary Warblers in large tracts of mangrove swamp in Guanacaste, Costa Rica are on the increase. Declines were seen in a small tract of mangrove and in the Central American Dry Forest. The declines in the dry forest may be attributable to the reduced flowering of trees and vines flowering this season. Prothonotary Warblers, as well as Yellow & Tennessee Warblers were commonly seen foraging about the blooms. Can the declines in numbers this season be attributed to this failure to flower? More study is needed. It would be instructional to collect data during a season of abundance of flowers.

A monthly decline in the number of Prothonotary Warblers encountered was observed. These birds inhabit a harsh climate with a dry season that lasts from mid-November to early-April with little or no precipitation during this time and day time temperatures averaging 30°C (Polonia 1993). Salt pans form at the inland fringe of the mangroves. Does mortality account for this monthly decline? Are the birds going elsewhere? Again, more study is needed.

These results indicate that the mangrove swamps and adjacent dry forest provide important wintering habitat for significant numbers of migratory songbirds. Not previously well documented is the strong site fidelity that Prothonotary Warblers and many other species of migratory birds have for these wintering grounds. The same birds return year after year to the same wintering sites after migrating from their breeding grounds thousands of kilometers to the north.

Through continued collaboration with the Institute for Bird Populations, we will continue to collect data that will enable (1) the statistical modeling of survival and physical condition as functions of age, sex, habitat, geographic location, and weather; (2) linking winter population parameters with breeding season vital rates and population trends; and (3) the development of predictive population models. Perhaps their analyses will provide additional insight. They estimate that a minimal of 5 years data will be needed for meaningful analyses.

Collaborations with our Costa Rica partners have been strengthened through presentations and demonstrations. In the Area de Conservación Guanacaste commitments have been made to work further with interpretive staff and visiting students, to develop interest in

birds. At Parque Nacional Marino las Baulas de Guanacaste results of our studies are being used to generate additional support to halt the development in the dry forest there. Staff at Refugio Nacional de Vida Silvestre Iguanita are in the early stages of developing a management plan and are appreciative of our inventories of the birds there. At all locations we have assurances of continued cooperation in the future.

This document is submitted to the Canadian Wildlife Service March 31 2006, completing the terms of contract # KW405-05-1105.

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[worldwildlife.org<sup>b</sup> worldwildlife.org/wildworld/profiles/terrestrial\\_nt.html#drybroad](http://worldwildlife.org/wildworld/profiles/terrestrial_nt.html#drybroad) **Central American dry forests**, a reviewed document

## Appendix 2 Numbers of all Birds Banded

English Common Name	Scientific Name	Spanish Common Name	Number Captured
Mangrove Cuckoo	<i>Coccyzus minor</i>	Cuclillo de Antifaz, u Orejinegro	1
Green Kingfisher	<i>Chloroceryle americana</i>	Martin Pescador Verde	4
Common Pauraque	<i>Nyctidromus albicollis</i>	Tapacaminos Común	1
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	Añapero Menor	3
Ferruginous Pygmy-Owl	<i>Glaucidium brasilianum</i>	Mochuelo Común	1
Groove-billed Ani	<i>Crotophaga sulcirostris</i>	Garrapatero Piquiestraido o Tijo	2
White-tipped Dove	<i>Leptotila verreauxi</i>	Paloma Coliblanca	9
Common Ground-Dove	<i>Columbina passerina</i>	Tortolita Común	24
Inca Dove	<i>Columbina inca</i>	Tortolita Colilarga	14
White-winged Dove	<i>Zenaida asiatica</i>	Paloma Aliblanca	2
Least Sandpiper	<i>Calidris minutilla</i>	Correlimos Menudo	1
Spotted Sandpiper	<i>Actitis macularia</i>	Andarriós Maculado	5
Streak-backed Oriole	<i>Icterus pustulatus</i>	Bolsero Dorsilistado	3
Blue Grosbeak	<i>Passerina caerulea</i>	Picogrueso Azul	2
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	Picogrueso Pechirrosada	2
White-collared Seedeater	<i>Sporophila torqueola</i>	Espiguero Collarejo	17
Western Tanager	<i>Piranga ludoviciana</i>	Tangara Carirroja	7
Summer Tanager	<i>Piranga rubra</i>	Tangara Veranera	10
Rufous-capped Warbler	<i>Basileuterus rufifrons</i>	Reinita Cabecicastaña	9
Hooded Warbler	<i>Wilsonia citrina</i>	Reinita Encapuchada	4
Northern Waterthrush	<i>Seiurus noveboracensis</i>	Reinita Acuática Norteña	130
Prothonotary Warbler	<i>Protonotaria citrea</i>	Reinita Cabecidorada	168
Prairie Warbler	<i>Dendroica discolor</i>	Reinita Galana	2
Yellow Warbler	<i>Dendroica petechia</i>	Reinita Amarilla	122
Tennessee Warbler	<i>Vermivora peregrina</i>	Reinita Verdilla	183
Clay-colored Robin	<i>Turdus grayi</i>	Mirlo Pardo	3
Swainson's Thrush	<i>Catharus ustulatus</i>	Zoral de Swainson	4
Philadelphia Vireo	<i>Vireo philadelphicus</i>	Vireo Amarillento	3
Yellow-throated Vireo	<i>Vireo flavifrons</i>	Vireo Pechiamarillo	4
Rose-throated Becard	<i>Pachyramphus aglaiae</i>	Cabezón Plomizo	1
Tropical Kingbird	<i>Tyrannus melancholicus</i>	Tirano Tropical	7
Great Kiskadee	<i>Pitangus sulphuratus</i>	Bienteveo Grande	25
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	Copetón Crestipardo	32
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	Copetón Viajero	7
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	Mosquerito Vientriamarillo	1
Dusky-capped Flycatcher	<i>Myiarchus tuberculifer</i>	Copetón Crestioscuro	7
Traill's Flycatcher	<i>Empidonax alnorum/traillii</i>	Mosquerito traillii	2
Baltimore Oriole	<i>Icterus galbula</i>	Bolsero Norteño	2
Olive Sparrow	<i>Arremonops rufivirgatus</i>	Pinzón Aceitunado	3
Painted Bunting	<i>Passerina ciris</i>	Azulillo Sietecolores	63
American Redstart	<i>Setophaga ruticilla</i>	Candelita Norteña	6
Total			896

### Appendix 3 Numbers of Birds Captured but not Banded

Common English Name	Scientific Name	Common Spanish Name	Number Captured
Snowy Egret	<i>Egretta thula</i>	Garceta Nivosa	1
Little Blue Heron	<i>Egretta caerulea</i>	Garceta Azul	1
Green Heron	<i>Butorides virescens</i>	Garcilla Verde	3
White Ibis	<i>Eudocimus albus</i>	Ibis Blanco	1
Roadside Hawk	<i>Buteo magnirostris</i>	Gavilán Chapulinero	3
Inca Dove	<i>Columbina inca</i>	Tortolita Colilarga	1
Orange-fronted Parakeet	<i>Aratinga canicularis</i>	Perico Frentinaranja	1
White-fronted Parrot	<i>Amazona albifrons</i>	Loro Frentiblanco	1
Squirrel Cuckoo	<i>Piaya cayana</i>	Cuco Ardilla	1
Pacific Screech-Owl	<i>Otus cooperi</i>	Lechuchita Sabanera	1
Long-billed Hermit	<i>Phaethornis longirostris</i>	Ermitaño Colilargo	1
Green-breasted Mango	<i>Anthracothorax prevostii</i>	Manguito Pechiverde	5
Canivet's Emerald	<i>Chlorostilbon canivetii</i>	Esmeralda Rabihorcada	7
Mangrove Hummingbird	<i>Amazilia boucardi</i>	Amazilia Manglera	3
Steely-vented Hummingbird	<i>Amazilia saucerrottei</i>	Amazilia Culiazul	47
Rufous-tailed Hummingbird	<i>Amazilia tzacatl</i>	Amazilia Rabiruffo	1
Cinnamon Hummingbird	<i>Amazilia rutila</i>	Amazilia Canela	57
Plain-capped Starthroat	<i>Helimaster constantii</i>	Colibrí Pochotero	3
Ruby-throated Hummingbird	<i>Archilocus colubris</i>	Colibrí Garganta de Rubí	38
Black-headed Trogon	<i>Trogon melanocephalus</i>	Trogón Cabecinegro	6
Ringed Kingfisher	<i>Ceryle torquata</i>	Martín Pescador Collarejo	2
Hoffmann's Woodpecker	<i>Melanerpes hoffmannii</i>	Carpintero de Hoffmann	5
Olivaceous Woodcreeper	<i>Sittasomus griseicapillus</i>	Trepadorcito Aceitunado	2
Streak-headed Woodcreeper	<i>Lepidocolaptes souleyetii</i>	Trepador Cabecirrayado	4
Northern Beardless-Tyrannulet	<i>Camptostoma imberbe</i>	Mosquerito Chillón	1
Yellow-olive Flycatcher	<i>Tolmomyias sulphurescens</i>	Piquiplano Azufrado	16
Nutting's Flycatcher	<i>Myiarchus nuttingi</i>	Copetón de Nutting	5
Boat-billed Flycatcher	<i>Megarynchus pitangua</i>	Mosquerón Picudo	5
Social Flycatcher	<i>Myiozetetes similis</i>	Mosquero Cejiblanco	1
Streaked Flycatcher	<i>Myiodynastes maculatus</i>	Mosquero Listado	2
White-winged Becard	<i>Pachyramphus polychopterus</i>	Cabezón Aliblanco	3
Long-tailed Manakin	<i>Chiroxiphia linearis</i>	Saltarín Toledo	5
Rufous-naped Wren	<i>Campylorhynchus rufinucha</i>	Soterrey Nuquirrufo	8
Banded Wren	<i>Thryothorus pleurostictus</i>	Soterrey de Costillas Barreteadas	8
White-lored Gnatcatcher	<i>Poliptila albiloris</i>	Perlita Cabecinegra	12
Tennessee Warbler	<i>Vermivora peregrina</i>	Reinita Verdilla	1
Yellow Warbler	<i>Dendroica petechia</i>	Reinita Amarilla	1
Prothonotary Warbler	<i>Protonotaria citrea</i>	Reinita Cabecidorada	1
Scrub Euphonia	<i>Euphonia affinis</i>	Eufonia Gargantinegra	2
Painted Bunting	<i>Passerina ciris</i>	Azulillo Sietecolores	1
Total			267