



Expedition Field Report

Cloud Forest Bird Monitoring at Reserva Las Tangaras, Ecuador

December 2 -15, 2019



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Por su trabajo, entusiasmo, amistad, y apoyo!
(for your work, enthusiasm, friendships, and support!)

By: Dra. Dusti Becker and Kevin Shaw

Introduction

In June 2004, Dr. Becker began monitoring birds at Reserva las Tangaras on the western slope of the Andes near Mindo, Ecuador. Assisted by volunteers from Earthwatch Institute and Life Net Nature, the teams netted and surveyed birds during the early dry season (June to August) from 2004 to 2012. In 2013 and 2014, Life Net Nature volunteer teams sampled the avian community in both July and December (start of the rainy season). In 2015 and 2016 teams monitored birds only in December. In 2017, teams resumed avian monitoring during both seasons. This report summarizes results from monitoring birds at the reserve based on mist netting, a morning survey, daily tallies of birds, and the Mindo Christmas Bird Count (CBC) all completed by Life Net Nature volunteers during December 2-15, 2019.

Much can be discovered about tropical forest birds and their communities by doing long-term monitoring of individual birds (Shanahan et al. 2011). Although the Andes of Ecuador are famed for high avian diversity (Poulsen & Krabbe 1997), few long-term studies of avian communities have been completed in Andean tropical montane forest ecosystems. Since 2004, Becker and teams of volunteers have conducted annual surveys and mist netting of birds at Reserva Las Tangaras in western Ecuador with the aim of documenting the composition of Andean bird communities in relationship to local habitats as well as in response to either landscape or climate changes (Morris 2010). For example, if the tropics are warming, one might expect lowland bird species to move up in elevation, and that they might be found in more disturbed or forest edge sites than in mature forest.

The avian monitoring program at Reserva Las Tangaras has several goals: 1) to determine patterns of survival in tropical montane forest birds, 2) to compare avian community composition in various habitats over time, and in the early versus the late dry season, and 3) to add to our knowledge about tropical birds in general. Our research contributes to knowledge about breeding seasons, molt patterns, and habitat preferences of Andean bird species. Interestingly, from 2004 to 2010 we netted birds along an ecotone where pastures bordered mature forest, but the pastures were abandoned in 2011, and second growth forest has been gradually recovering. This regrowth has increased secondary growth habitat for birds and has eliminated the harsh ecotone and potential barrier for some forest species. Has the composition of the avian community changed in response to this habitat transition? We hope to determine that in the future.

Methods

Study Site

Reserva las Tangaras is a 51-hectare protected area ranging in elevation from 1250 m along the Nambillo River to 1600 m on the Nambillo ridge. Located southeast of Mindo, Ecuador at 0° 4' 53" S and 78° 46' 8" W, the reserve extends and buffers the Mindo-

Nambillo Protective Forest (*Bosque Protector*) from expanding agriculture, adventure tourism sites, and clearings for holiday home development (Figure 1).

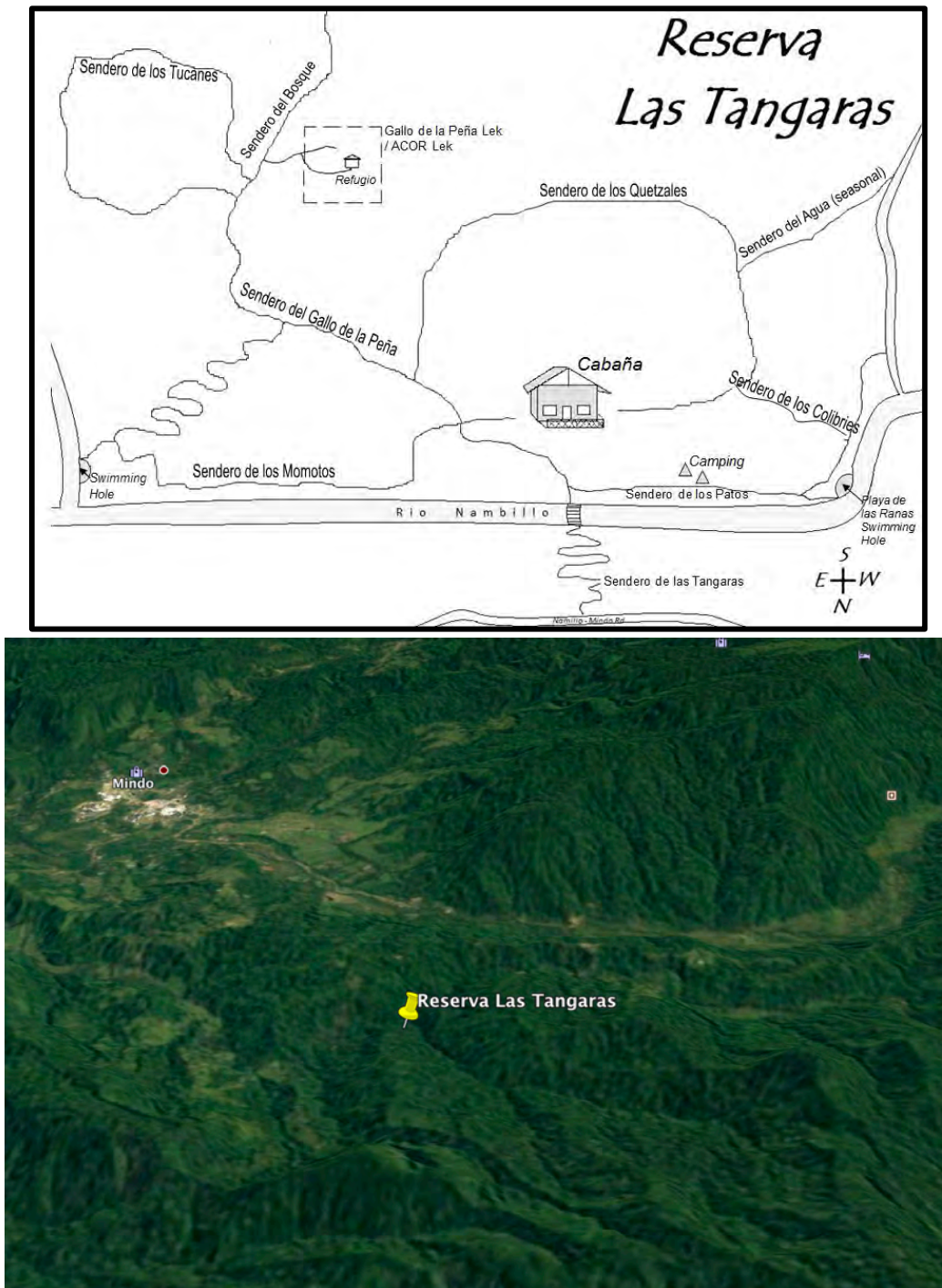


Figure 1. Map of trails and general layout of Reserva las Tangaras, Ecuador and Google Earth map showing deforestation near the reserve. (Note: The schematic map is abnormally oriented with North at the bottom).

Above the Andean cock-of-the-rock (ACOR) lek (Figure 1) at ~ 1450 m, mature tropical montane forest covers the reserve. Likewise, the forest around Sendero los

Tucanes (trail) at 1350 m is mainly mature forest (Figure 1), although one hectare was illegally cleared in November 2016 during a search for treasure (Figure 2).



Figure 2. By August 2019 dense, herbaceous understory with some young trees had recovered on the illegal clearing made November 2016 near the lower forest banding station.

The lower parts of the reserve near the “cabaña” support three integrated habitat types: 1) well-drained secondary forest on pastures abandoned in the late 1990s, 2) riparian primary forest, and 3) riparian second growth on abandoned pastures (Figure 1). On the mountainside opposite the reserve property, primary forest along drainages is interspersed with secondary-growth recovering on pastures abandoned in 2011. All forested habitats connect to forests along the Nambillo River, to the reserve’s forests and beyond. Thus, connectivity to higher and lower elevations is good and should facilitate altitudinal migration and dispersal by birds.

The range in elevation is similar on both sides of the river, and thus birds found in the Yanez pasture-edge (Net lanes C & D) can be compared with mature forest (Ridge Nets) on the reserve. Slope aspect is not likely to influence forest structure near the equator and thus differences in the avian communities on the two slopes result mainly from variation in the age of forest, elevation, and proximity to streams. Upland forest on the reserve, especially on the high ridge has been stable for many decades, whereas lower elevation forested habitats near the reserve cabin and in the Yanez pasture-edges have experienced more disturbance, are more patchy, and have more edges. We hypothesize that such habitat heterogeneity and connectivity with riparian corridors will boost species richness and be more conducive to arrivals of lowland species. We predict that species richness (number of species) will be lower in the more homogeneous and stable mature forest sites, than in the riparian corridor and habitat mosaic of the Yanez hillside during single studies and over long-term monitoring. We also predict that recapture rates should be higher in the mature stable forest sites than in the younger, patchier, and more disturbed habitats.

Mist Netting

We placed 15 mist nets (12 x 3 m; 36mm mesh) at six sampling sites representative of the different habitats on Reserva Las Tangaras and in the Yanez forest-pasture edge mosaic. As shown in Table 1 and Figure 4, mist net arrays were located at different elevations on the two slopes and along the Nambillo River. Figure 3 shows examples of net lanes in the three major habitats.

We opened nets just before sunrise (~6 am) and operated them for five hours. All habitats were sampled for at least two consecutive days (Table 1). We netted in the Yanez pasture for three days because capture rates were higher, inviting more effort.

Table 1. Mist Net Sites and Effort during August 2019 at Reserva Las Tangaras, Ecuador

Site, habitat, and elevation	Days of effort 2019	# of Nets	Net Hours
“Ridge” - Mature forest (1400 -1500 m)	2	15	150
“ForLow” – Mature forest (1350-1400 m)	2	15	150
“Second growth forest” (1300-1350 m)	2	15	150
Secondary riparian forest (1250 m)	2	15	150
Yanez pasture A & B (1300-1350 m)	3	15	225
Yanez pasture C & D (1400 – 1500 m)	3	15	225

Netted birds were carefully extracted, placed in soft cotton bags, and carried to banding stations where they were identified, banded, weighed and measured. We typically measured wing length, exposed culmen, tarsus, and tail length of each bird. When possible, we determined the sex and age of each bird based on plumage, molt, sexual dimorphism, size and form of the cloaca, presence of an active brood patch, and other evidence. We also examined each individual for ecto-parasites (ticks, mites, lice, etc.), quantity of furculum fat (none, light, medium, heavy), condition of primary feathers (in molt, faded and old, or new), and level of body feather molt (none, light, medium, heavy). Patterns of molting primary and secondary feathers were also noted. After recording the data, each bird was released from the banding station, with the exception of incubating females that were returned near the location of capture.

Figure 3. Net lanes in the Mature Forest (left), House Secondary Forest (center), and Yanez Pasture (Right). Note differences in understory, canopy height, and understory light. Net lanes were photographed in August 2019.



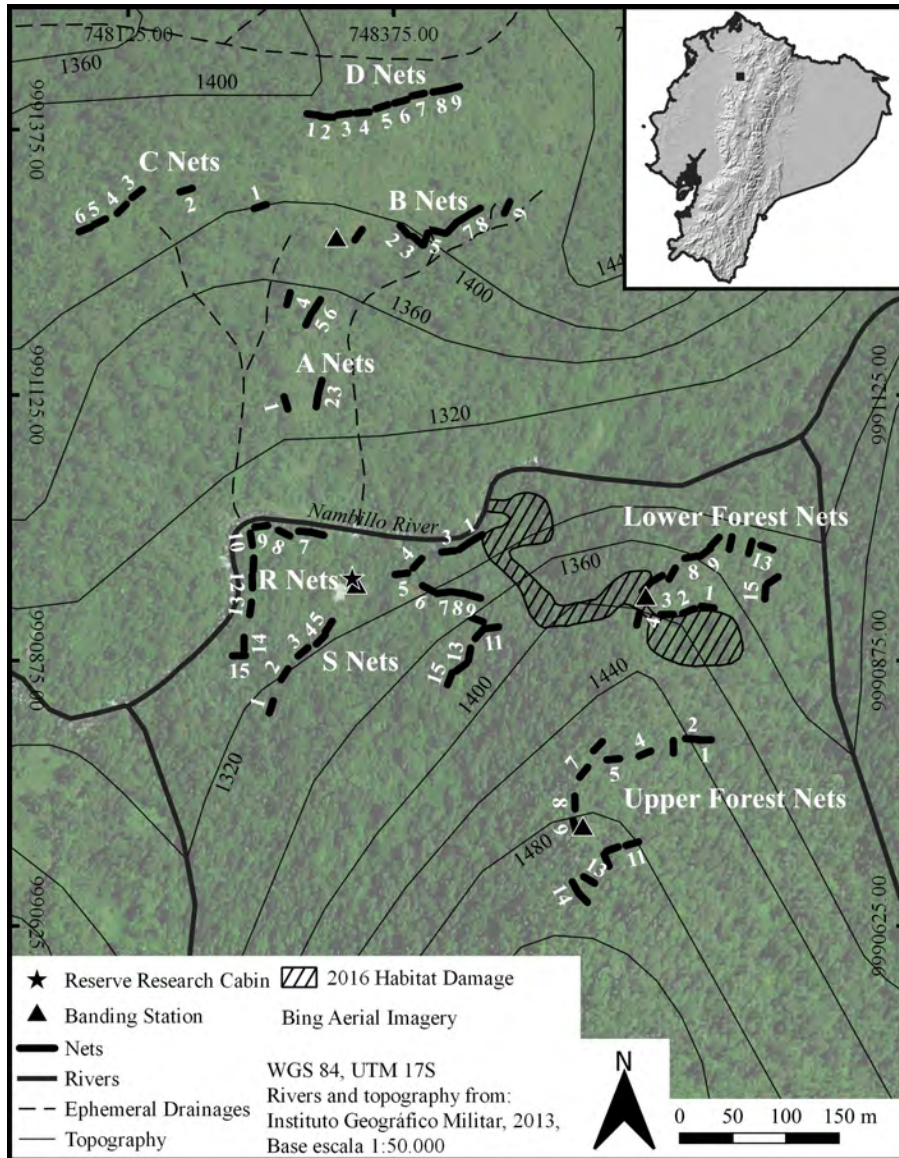


Figure 4. Locations of mist nets in the expedition study area. A, B, C, and D nets were in the Yanez pasture, R nets in the Riparian Secondary-growth Forest, S nets in the House Secondary-growth Forest, and Lower and Upper Forest nets in the Mature Forest. (Map produced by K. Shaw, 2019)

Hall Trapping

On most afternoons, we set up a Hall trap to sample hummingbirds at the visitor's cabin of Reserva las Tangaras (Figure 6). A single feeder was placed in the Hall trap, and the columnar net skirt of the trap was dropped to capture hummingbirds using the feeder. Similar handling procedures described for mist netting were used to collect data about each hummingbird. Hall trapping was done mainly to allow volunteers to learn how to capture, handle, and band hummingbirds. The data reveal which species are attracted to porch feeders and can be used for calculating survival and to describe recapture patterns around the cabin.

Habitat Surveys, Christmas Bird Count, and Daily Tallies (La Lista)

We scheduled two morning bird surveys and conducted the Christmas Bird Count (CBC) in representative habitats on and around Reserva las Tangaras (within 3 km of the cabaña). The survey transects and the CBC emphasized: 1) mature forests, 2) second growth and riparian areas, and 3) forest edges along a road and trails through two pastures transitioning back to forest.

During surveys and the CBC, each team of 3-4 observers recorded the number of individuals of each bird species encountered (seen or heard) along their route in a given area. They covered a 2-4 km survey route from ~6:00 to 9:00 am for surveys and longer for the CBC. During the CBC, four teams sought out birds for one-hour pre-dawn and 6.5 h afterwards covering a total of 11.87 km.

Every evening after dinner, the team tallied all bird species each day (*la lista*) based on all methods of detecting birds.

Individual Volunteer Projects

Given the amount of work to prepare for, complete, and compile data for the Mindo CBC, we did not do individual projects during this expedition. We invite Life Net Nature volunteers to use some of the long-term monitoring data for a class project, for presentations at a scientific meeting, or for publication.

Results

Rain on the second morning of the project resulted in cancellation of our first survey, but the weather improved permitting all mist netting, one survey, and the CBC as planned. CBC conditions were ideal with overcast skies and no rain, favoring bird activity more than sunny days.

Mist Netting

During 1050 net hours we had 368 capture events (~35 captures/100 nh) representing 70 bird species (Table 2). One death occurred when a bird of prey struck a netted Three-striped Warbler, but otherwise there were no mortalities.

Recaptures accounted for 42% of the birds netted, and these individuals had either been banded in previous monitoring sessions, or during our December 2019 project (Table 2). Common species (those captured more than ten times) included: Chestnut-capped Brushfinch, Club-winged Manakin, Fawn-breasted Brilliant, Three-striped Warbler, Tawny-bellied Hermit, Gray-breasted Wood-Wren, Orange-bellied Euphonia, Tawny-breasted Flycatcher, Spotted Barbtail, Swainson's Thrush, and Violet-tailed Sylph (Table 2). Still, 23 species (33%) were netted only once. Some of the most exciting captures in December included White-throated Quail-Dove, Flame-faced Tanager, Glistening-green Tanager, Golden-winged Manakin, and Pale-eyed and Pale-vented Thrush (Figure 5). Notably, an Andean Solitaire was caught, unusual for December, and several Swainson's Thrushes were netted, but none from previous winters.

Recapture percentages were similar and quite high (above 40%) in all habitats except for the lower forest banding station where recaptures accounted for only 28%

(Table 2). Species richness was highest in the Yanez pasture, but this value incorporates results for 30 nets and three days. When divided by 2 to more fairly compare with other sites, the Yanez pasture mosaic still has the highest richness (28.5 species) followed by second growth forest near the cabin at 27 species. The two forest sites both had 23 species, while contrary to our hypotheses, the riparian forest had the lowest species richness with only 19 bird species (Table 2).

Table 2. Mistnetted birds by net site at Reserva las Tangaras (December 2019)

Species	Ridge	ForLow	2°For	Rip2°	Yanez	Total
Acadian Flycatcher					1	1
Andean Solitaire					1	1
Ashy-headed Tyrannulet					1	1
Bay Wren		1			1	2
Black and White Becard			1		2	3
Brown Inca	2			1	1	4
Buff-throated Saltator					1	1
Chestnut-backed Antbird				1		1
Chestnut-capped Brush-finch	1		2		8	11
Choco Warbler			1			1
Club-winged Manakin	2	2	4	4	8	20
Crimson-rumped Toucanet		1				1
Dusky Bush-Tanager					2	2
Empress Brilliant	2	1	2	1		6
Fawn-breasted Brilliant	1	4	6	7	6	24
Fawn-breasted Flycatcher			1			1
Flame-faced Tanager					2	2
Glistening-green Tanager	1					1
Golden-crowned Flycatcher	1					1
Golden-winged Manakin	1				3	4
Gray-breasted Wood-Wren	2	5	8	1	5	21
Green-crowned Brilliant	1	2	2	4	12	21
Green-crowned Woodnymph		1	2	1	5	9
Green-fronted Lancebill				2	1	3
Lineated Foliage-gleaner	1		1		5	7
Ochre-breasted Tanager		1				1
Olive Finch	1	1	1			3
Olive-striped Flycatcher					4	4
One-colored Becard					1	1
Orange-bellied Euphonia	4	1	3	2	6	17
Orange-billed Sparrow				1	2	3

Species	Ridge	ForLow	2°For	Rip2°	Yanez	Total
Ornate Flycatcher	1	1	3			5
Pale-eyed Thrush					1	1
Pale-vented Thrush					1	1
Plain Xenops			1		3	4
Plain-brown Woodcreeper			1		2	3
Purple-bibbed Whitetip	2				6	8
Red-headed Barbet	1				1	2
Ruddy Foilage-gleaner					1	1
Rufous Motmot				2	1	3
Rufous-breasted Antthrush			2			2
Rufous-gaped Hillstar		1				1
Rufous-tailed Hummingbird					1	1
Rufous-throated Tanager					1	1
Scale-crested Pygmy-Tyrant			1		3	4
Scaly-breasted Wren	1	1			7	9
Scaly-throated Foliage-gleaner					1	1
Slate-throated Whitestart					2	2
Slaty Antwren				1	6	7
Slaty Spinetail					4	4
Slaty-capped Flycatcher	1				3	4
Smoky-brown Woodpecker	1			1	2	4
Spotted Barbtail	2	1	5	3	1	12
Spotted Woodcreeper		1			2	3
Streak-capped Treehunter			1			1
Stripe-throated Hermit			1			1
Swainson's Thrush		1	2	1	8	12
Tawny-bellied Hermit	5	1	2	3	5	18
Tawny-breasted Flycatcher		1		2	7	10
Tawny-throated Leaf-tosser					2	2
Three-striped Warbler		4	9	2	15	30
Tricolored Brush-Finch		1			2	2
Uniform Antshrike					1	1
Violet-tailed Sylph	7	2	1		5	15
Wedge-billed Woodcreeper		1			4	5
White-necked Jacobin					1	1
White-throated Quail-Dove	1					1
White-throated Spadebill					2	2
White-whiskered Hermit			2			2

Species	Ridge	ForLow	2°For	Rip2°	Yanez	Total
Yellow-throated Bush-Tanager			3		3	6
Species Richness	23	23	27	19	57	70
Total Captures	42	36	68	40	182	368
Total Recaptures	18	10	27	17	81	153
% Recaptures	43%	28%	40%	42.5%	45%	42%

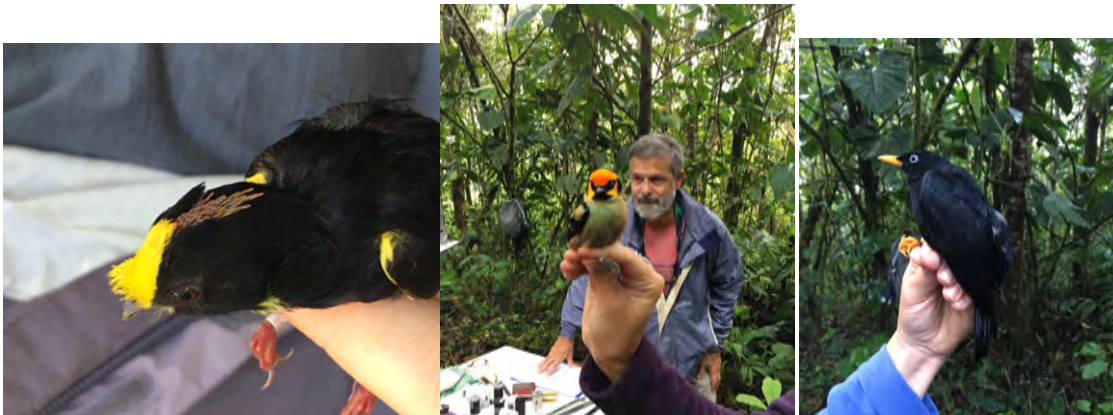


Figure 5. Notable Captures. Golden-winged Manakin, Flame-faced Tanager, and Pale-eyed Thrush.

Hall Trapping for Hummingbirds

Volunteers practiced trapping and banding hummingbirds on several afternoons, for a total effort of around 12 hours (Figure 6), resulting in 59 captures of 8 species (Table 3).

Recapture rate, 56%, was the highest recorded thus far in our avian monitoring. In August 2019 the recapture rate was 43%, and in June 2018 (N=29) it was 49%, while in December 2017 (N=58) it was 45%. Compared with 2019 summer results, Brown Violetear and Sparkling Violetear were notably absent in December, and although present, Rufous-gaped Hillstar and Andean Emerald were not trapped. Proportional representation differed for several species (Table 3), but captures were not completely random as volunteers selected species they wanted to band.

Table 3. Hummingbirds (N=59) captured in Hall trap sessions (December 2019) with comparison to August 2019 at Reserva Las Tangaras, Ecuador

Species	Captures		
	December 2019	% Dec 2019	% Aug 2019
Andean Emerald	0	2	2.8
Brown Violetear	0	10	13.9
Empress Brilliant	8	3	4.2
Fawn-breasted Brilliant	10	2	2.8
Green-crowned Brilliant	8	3	4.2
Green-crowned Woodnymph	17	19	26.4

Purple-bibbed Whitetip	7	15	20.8
Rufous-tailed Hummingbird	1	2	2.8
Sparkling Violetear	0	6	8.3
White-necked Jacobin	3	5	6.9
Rufous-gaped Hillstar	0	0	0.0
White-whiskered Hermit	5	5	6.9



Figure 6. Catching hummingbirds in a Hall trap and learning how to handle and band them.

Habitat Surveys

During one habitat survey, the 3 teams detected 79 bird species (Appendix 2) on 3 different transects covering all habitat types on and around the reserve. The species that were found only during surveys included canopy species such as tanagers and flycatchers, large birds, including hawks, guans, toucans, wood-quail, and trogon, and soaring birds such as swallows and swifts.

La Lista (Daily Tallies) & CBC results

Including the bird species that we observed in and around Mindo, the December 2019 monitoring effort detected 185 different bird species mainly on or within 3 km of Reserva Las Tangaras. As shown in Figure 7, additions of species each day relied on the different methods used to detect bird species, shifts to new habitat types, and sheer effort made.

The biggest daily count by the group occurred on December 14, 2019, when 150 different species were detected during the Christmas Bird Count (Appendix 2). The individual birds counted totaled 867, with the highest count of 353 by the team that surveyed along the Benavides road. The CBC effort found 18 species undetected by all methods used during the monitoring project: Roadside Hawk, Mottled Owl, Rufous-bellied Nighthawk, Oilbird, Velvet-purple Coronet, Lanceolated Monklet, Powerful Woodpecker, Rufous-winged Tyrannulet, Western Wood Pewee, Rusty-margined Flycatcher, Mountain Wren, Purple Honeycreeper, Fawn-breasted Tanager, Blue-and-black Tanager, Scarlet-rumped Cacique, and Broad-winged Hawk.

Overall, the Mindo CBC, conducted by 31 groups of birders, yielded 427 species in a 24-hour period within the count circle defined by a 25 Km-radius around the village of Mindo, Ecuador. Five species were found only by the Reserva Las Tangaras team: Oilbird,

White-thighed Swallow, Gray-rumped Swift, Gray-breasted Martin, and Rufous-winged Tyrannulet.

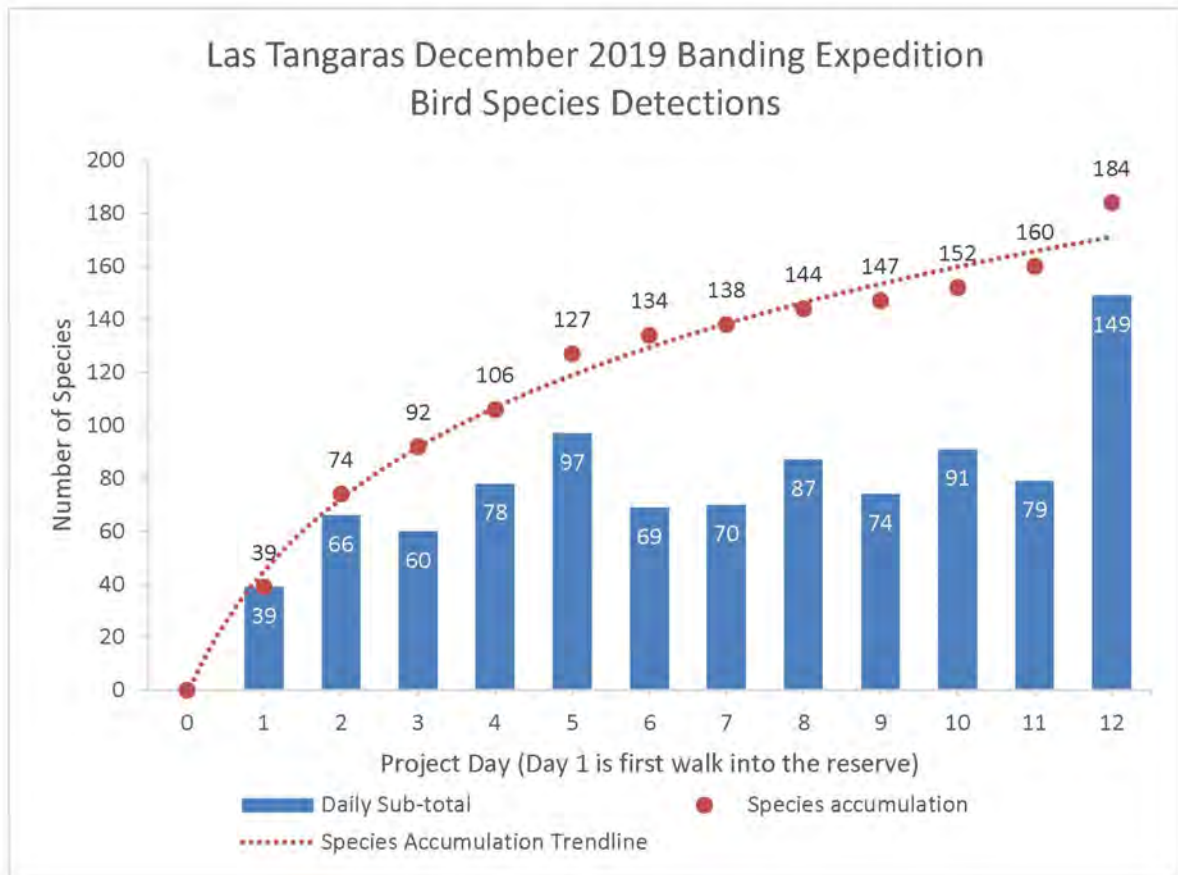


Figure 7. Accumulation curve showing increasing numbers of bird species found during the 2-week project due to use of different methods (includes some species only likely to be found around Mindo). Note the huge increase from the Christmas Bird Count effort.

Discussion & Conclusions

The results of even just one 2-week monitoring session support some of the community-level hypotheses presented in the introduction. For example, the more stable forest habitats had lower capture rates and thus, lower species richness than netting samples from the more dynamic Yanez pasture edges. Higher species richness was found in areas with many microhabitats and habitat linkages, and in contrast, lower species richness, was noted for our primary forest sites, consistent with Morris (2010). However, placement of mist nets on ridges can increase capture rates (Wang & Finch 2002) and species richness typically correlates with sample size (Boulinier et. al. 1998), so untangling patterns requires statistics beyond the scope of a simple field report.

We expected recaptures to be higher in the more stable habitats like the reserve's upland mature forest and they were highest for the ridge net site, but not significantly so. Recaptures in the low forest site were much lower than all other sites. This area experienced severe habitat destruction in 2016 and is near a busy waterfall tourism area, so these disturbances may have influenced the stability of birds. Recapture rates in the upper forest were, notably higher this year than in previous years, perhaps indicative of a particularly stable or abundant food source. Recapture percentages are also related to the behavior of particular bird species in each habitat, so a species by species percentage must be examined to make robust comparisons.

Mist netting detected 7 species that were not recorded by other methods: Acadian Flycatcher, White-throated Spadebill, Golden-winged Manakin, Pale-eyed Thrush, Pale-vented Thrush, Ochre-breasted Tanager, and Tawny-breasted Flycatcher. Aural detections of songs and calls were responsible for detecting another 7 species: Cloud-forest Pygmy-Owl, Common Potoo, Oilbird, Masked Trogon, Plate-billed Mountain Toucan, Scaled Fruiteater, and Lesser Greenlet. Finally, 18 additional species were found during the CBC supporting the adage "they are out there". Expanding our survey transects by a few extra kilometers, getting up early to search in the pre-dawn darkness for a full hour, and birding around in the afternoon paid off. Kerrith's recording of the Oilbird, Bianca seeing a juvenile Mottled Owl in near darkness, and Kevin's discovery of a pair of Lanceolated Monklets in the afternoon, rank as historical events for a Tangaras CBC!

As in August, some dedicated souls continued afternoon visits to the river and thus the daily list showed more regular records of Torrent Duck, Sunbittern, Black Phoebe, Torrent Tyrannulet, White-capped Dipper, and Fasciated Tiger-Heron (Figure 8). Ringed Kingfisher and Spotted Sandpiper were not recorded in December. Perhaps the raging chocolate milk river was too much for some bird species.

Trends in bird species potentially related to climate and land cover changes

Since 2004, our monitoring records suggest that quite a few bird species typically found at lower elevations in western Ecuador (Ridgely and Greenfield 2001) are becoming more frequently detected at Reserva Las Tangaras, suggesting that some bird species are shifting their ranges to higher elevations. White-throated Spadebill, which is generally more common at lower elevations, were first netted in 2010 and have been netted in small numbers in most years since. Russet Antshrike was first netted in 2013, two were netted in 2016, one in June 2018, and another this August 2019, thus, they seem to be here more in the summer than in winter. Slaty Antwren has also increased in mist netting samples over the years of monitoring at Reserva las Tangaras and was re-confirmed to be a breeding resident by recapture of an adult male initially captured in December of 2018 as a hatch-year bird with female-type plumage.

Such species responses to habitat change highlight how sensitive birds can be as indicator species for local, regional and global processes, such as land cover (Morris et al. 2014) and climate change (Wilson et al. 2007, Morris 2010).

Literature Cited

Boulinier, T. et al. 1998. Estimating species richness: the importance of heterogeneity in species detectability. *Ecology* 79: 1018-1028.

Morris, K. E. et al. 2014. Choosing and using diversity indices: insights for ecological applications. *Ecology and Evolution* 4:3514-25.

Morris, R. J. 2010. Anthropogenic impacts on tropical forest biodiversity: a network structure and ecosystem functioning perspective. *Philosophical Transactions of the Royal Society B*. Published 27 October 2010. DOI: 10.1098/rstb.2010.0273

Poulsen, B. O. & Krabbe, N. 1997. The diversity of cloud forest birds on the eastern and western slopes of the Ecuadorian Andes: a latitudinal and comparative analysis with implications for conservation. *Ecography* 20: 475-482.

Shanahan, D. F., Miller, C., Posingham, H. P. & Fuller, R. A. 2011. The influence of patch area and connectivity on avian communities in urban revegetation. *Biological Conservation* 144: 722-729.

Wang, Y. & Finch, D. M. 2002. Consistency of mist netting and point counts in assessing landbird species richness and relative abundance during migration. *Condor* 104: 59-72.

Wilson R. J., Davies Z. G., & Thomas C. D. 2007. Insects and climate change: processes, patterns and implications for conservation. In *Proc. Royal Entomological Society's 23rd Symp. Insect Conservation Biology* (eds Stewart A. J. A., New T. R., Lewis O. T.), ch. 11, pp. 245–279. Wallingford, UK: CABI Publishing.



Figure 8. Fasciated Tiger Heron and Sunbittern were seen more often this December, probably due to more time spent birding near the river.

Appendix 1 – Habitat Survey – December 7, 2019

Total counts of 79 bird species during one habitat survey completed at Reserva Las Tangaras, Ecuador (December 2019). A blank cell indicates the species was not detected along the transect during the survey.

Species	Barbudos & Bosque (Forest)	Benavides Road (Forest edges)	Guerro's Trails (Edges and riparian forest)	Total Count of Individuals
Andean cock-of-the-rock	6		1	7
Andean Solitaire		1	2	3
Barred Hawk			1	1
Bay Wren	1	2	6	9
Black Phoebe			1	1
Black Vulture		1		1
Black-and-White Seedeater		3		3
Black-winged Saltator		1		1
Blackburian Warbler	1		1	2
Blue-necked Tanager		2		2
Booted Racket-tail	1			1
Bronze-winged Parrot	3		4	7
Brown Violetear		1		1
Brown-capped Vireo			1	1
Buff-fronted Foliage-gleaner	1		2	3
Choco Toucan	4	5	2	11
Choco Warbler		1		1
Cinnamon Becard	2	2		4
Club-Winged Manakin		3		3
Collared Forest Falcon	1			1
Crested Guan		1		1
Crimson-rumped Toucanet	1			1
Dark-backed Wood-Quail		1		1
Dusky Bush-Tanager		1		1
Dusky-capped Flycatcher		1	1	2
Glistening-Green Tanager			1	1
Golden Tanager	1	3	2	6
Golden-crowned Flycatcher		2	2	4
Golden-naped Tanager		1		1
Golden-olive Woodpecker	2	2		4
Gray-breasted Wood Wren	13	7	8	28
Green-crowned Woodnymph	1	2	3	6
Guayaquil Woodpecker	2	2		4

House wren		1		1
Laughing falcon	1	1		2
Lemon-rumped Tanager		10		10
Lesser Greenlet		1	2	3
Lineated Foliage-gleaner	3	1	2	6
Masked Trogon			1	1
Olive Finch			1	1
One-colored Becard	2		1	3
Orange-bellied Euphonia	7	4	3	14
Orange-billed Sparrow			2	2
Ornate Flycatcher	3	2	4	9
Palm Tanager		2		2
Plain-brown Woodcreeper		3		3
Purple-crowned Fairy			1	1
Red-billed Parrot		22		22
Red-eyed Vireo	8	1	3	12
Red-faced Spinetail	4	3	2	9
Red-headed Barbet	2	1	2	5
Ruddy Foliage-gleaner	1	1		2
Ruddy Pigeon		1		1
Rufous Motmot			1	1
Rufous-breasted	5	1	2	8
Rufous-throated Tanager	3	2		5
Scale-crested Pygmy-Tyrant		7		7
Scaly-breasted Wren		3	3	6
scaly-throated Foliage-gleaner	4		1	5
Silver-throated Tanager	2	1	1	4
Slate-throated Whitestart	8	6	3	17
Slaty Spinetail		2	3	5
Slaty-capped Flycatcher	3		3	6
Smoke-colored Pewee		2	2	4
Spotted Woodcreeper	3	1	1	5
Squirrel Cuckoo		2		2
Streaked Flycatcher		1		1
Swainson's Thrush		6	1	7
Swallow Tanager		2		2
Tawny-bellied Hermit	2			2
Thick-billed Euphonia		1		1
Three-striped Warbler	10	3	4	17
Tricolored Brush-Finch	2	1	4	7
Tropical Parula	9		4	13
Violet-tailed Sylph	2			2
White-capped Dipper			1	1

White-collared Swift	10		9	19
White-throated Quail-Dove		2		2
White-winged Tanager		2	5	7
Yellow-bellied Seedeater		1		1
Yellow-throated Bush-Tanager	12	1	4	17
Yellow-throated Toucan	1			1
Zeledon's Antbird (Immaculate)		1		1
TOTALS	147	147	114	408

Appendix 2. Record of 150 bird species detected during the Christmas Bird Count, nocturnal (N) and diurnal, on 4 transects (T1=Benavides Road and Entrada Trail, T2 = Bosque trail, T3 = Guerrero's forest edges and Rio Nambillo, T4= Yanez forest edges, primary forest, and Rio Nambillo), at hummingbird feeders (HF), and during random birding (R) on and adjacent to Reserva Las Tangaras, December 14, 2019.

SPECIES	T1	T2	HF	N	R	T3	T4	Grand Total
Andean cock-of-the-rock		4				2	1	7
Andean Emerald			2					2
Andean Solitaire	1					3	3	7
Ashy-headed Tyrannulet	1							1
Bananaquit	1							1
Barred Hawk	1	1						2
Barred Puffbird	1	2					1	4
Bay Wren	2	1				1	3	7
Bay-headed Tanager	4							4
Beryl-spangled Tanager	3					1		4
Black Phoebe	2					1	2	5
Black Vulture	2						5	7
Black-and-White Becard		1				2		3
Black-and-White Seedeater	1							1
Black-winged Saltator	4						2	6
Blackburian Warbler	2					5	3	10
Blue-and-black Tanager	2						1	3
Blue-and-white swallow					2			2
Blue-gray Tanager	1							1
Blue-necked Tanager	1							1
Blue-winged Mountain-Tanager		2				2		4
Booted Racket-tail	1					3	2	6
Broad-winged Hawk						1		1
Bronze-winged Parrot		3				1	4	8
Brown Inca						1		1

Brown Violetear	1	3		1		5
Brown-capped Vireo				1	1	2
Buff-fronted Foliage-gleaner	1	4		3	1	9
Buff-tailed Coronet				1		1
Buff-throated Saltator					1	1
Cattle Egret					3	3
Chestnut-capped Brushfinch				2	1	3
Choco Daggerbill	1	1				2
Choco Toucan	6	6		2	4	18
Cinnamon Becard		1				1
Cloud-forest pygmy-owl			1			1
Club-Winged Manakin	5	1		7	1	14
Common Paraque			4			4
Common Potoo			1			1
Crested Guan		2			4	6
Crimson-rumped Toucanet	3	1			2	6
Dark-backed Wood-Quail	3	2		4		9
Dusky Bush-Tanager		1		2		3
Dusky-capped Flycatcher	1					1
Ecuadorian thrush	3					3
Empress Brilliant			3	1		4
Fawn-breasted Brilliant	1		4	1	1	7
Fawn-breasted Tanager				1		1
Flame-faced Tanager	1			9	3	13
Glistening-Green Tanager	3	2			1	6
Golden Tanager	4	5		7	4	20
Golden-crowned Flycatcher	2			3	1	6
Golden-headed Quetzal	1			2		3
Golden-naped Tanager	4			6	1	11
Golden-olive Woodpecker	3	1		1	2	7
Gray-breasted Martin					3	3
Gray-breasted Wood Wren	7	9		22	8	46
Gray-headed Kite	1					1
Gray-rumped Swift	14				2	16
Green-crowned Brilliant			5			5
Green-crowned Woodnymph		1	6	2	2	11
Green-fronted Lancebill				1		1
Guayaquil Woodpecker	1	1			4	6
House wren	5				1	6
Lanceolated Monklet				2		2
Laughing falcon	1				1	2
Lemon-rumped Tanager	6	1		1	3	11
Lesser Greenlet	1			1	1	3

Lineated Foliage-gleaner	4	1		2	1	8
Metalic-green Tanager	2			1	1	4
Montane Woodcreeper					1	1
Mottled Owl (Juvenile)			1			1
Mountain Wren				1		1
Oilbird			1			1
Olive Finch				1	1	2
Olive-sided Flycatcher	1				2	3
One-colored Becard	1			1	1	3
Orange-bellied Euphonia	9	5		11	1	26
Orange-billed Sparrow	1					1
Ornate Flycatcher	4	1		2	1	8
Pale-mandibled Aracari	3				5	8
Palm Tanager	7				1	8
Plain-brown Woodcreeper	3				2	5
Plumbeous Pigeon	2	2		2	2	8
Powerful Woodpecker				1		1
Purple Honeycreeper			1			1
Purple-bibbed Whitetip		1	5			6
Red-eyed Vireo	1	8		2	1	12
Red-faced Spinetail	3	1		6	3	13
Red-headed Barbet	4	2		1	2	9
Roadside Hawk	4				2	6
Ruddy Pigeon	3				2	5
Rufous Motmot	4	2				6
Rufous-bellied Nighthawk			1			1
Rufous-breasted Antthrush		3		5	4	12
Rufous-tailed Hummingbird			1			1
Rufous-throated Tanager	1	2			2	5
Rufous-winged Tyrannulet				1		1
Rusty-margined Flycatcher					1	1
Scale-crested Pygmy-Tyrant	5			7	4	16
Scaled Fruiteater	1					1
Scaly-breasted Wren	1	1			4	6
scaly-throated Foliage-gleaner	1	1			2	4
Scarlet-rumped Cacique					2	2
Sickle-winged Guan			2			2
Silver-throated Tanager		1				1
Slate-throated Whitestart	4	10		5	4	23
Slaty Antwren	2					2
Slaty Spinetail	3			4		7
Slaty-capped Flycatcher		2			2	4

Smoke-colored Pewee	1					3	2		6
Smoky-brown Woodpecker	1								1
Snowy Egret	3								3
Social Flycatcher							1		1
Southern Rough-winged Swallow	3					4			7
Spotted Barbtail		1							1
Spotted Woodcreeper	1	1				1	2		5
Squirrel Cuckoo	1					1			2
Strong-billed Woodcreeper						3	4		7
Summer Tanager					1				1
Sunbittern							1		1
Swainson's Thrush	8					3	8		19
Swallow Tanager	4								4
Swallow-tailed Kite	2								2
Tawny-throated Leaf-tosser		1					1		2
Thick-billed Euphonia							3		3
Three-striped Warbler	3	3				2	7		15
Torrent Duck						2			2
Torrent Tyrannulet							4		4
Tricolored Brush-Finch	3	1				4	1		9
Tropical Kingbird	2						2		4
Tropical Parula	3	4				5	4		16
Turkey Vulture	5	1					2		8
Uniform Antshrike	1								1
Variable Seedeater					1				1
Velvet-purple Coronet						1			1
Violet-tailed Sylph		1	1			2			4
Wedge-billed Woodcreeper	4					1			5
Western Woodpewee							2		2
White-capped Dipper							1		1
White-collared Swift	14	15				3	15		47
White-necked Jacobin			3						3
White-shouldered Tanager	1								1
White-thighed Swallow					6				6
White-throated Quail-Dove	1	1				1			3
White-whiskered Hermit			5			1			6
Yellow-bellied Seedeater	1					2	2		5
Yellow-throated Bush-Tanager	1	9				4	5		19
Yellow-throated Toucan	2	5				4	5		16
Zeladon's Antbird	5								5
TOTAL	353	142	35	11	15	202	209		867



Not too seriously – THE END....or is it? Come back again!