Avifaunal Diversity in Various Habitat Types in a Costa Rican Montane Cloud Forest with the Implementation of CyberTracker

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Introduction

Cloudbridge Nature Reserve is a 700 acre parcel of land in the montane cloud forest adjacent to Chirripo National Park, Costa Rica. Since 2002, reforestation efforts at Cloudbridge have been coupled with intensive research investigations in hopes of learning more about cloudforest ecosystem. Cloudbridge is a living laboratory where volunteer researchers spend their time developing questions and seeking answers about the natural world. There has been particular interest in ongoing bio-monitoring – the evaluation of a plant or animal's ecology – and in documentation of the dynamics of a continually evolving ecosystem. An ongoing study initiated by Nathan Marcy in 2003 has continually examined the avifauna at Cloudbridge. In subsequent years he and others have continued his point counts and last year he conducted a mist-netting and banding project.

The great diversity of bird life at Cloudbridge gives rise to several questions. How are bird populations responding to evolving forests and reforested areas? What are the ambient, temporal and physical factors related to bird distribution, abundance and richness? These questions can only be answered after years of data collection and analysis. Therefore, this study seeks to continue data collection that Marcy has initiated in an effort to reconfirm avifaunal distribution throughout several different habitat types at Cloudbridge. Furthermore, this study aims to develop and customize a data capturing device known as CyberTracker. With the assistance of CyberTracker, it is expected that future volunteers will increase their ability to make correct identifications in the field, therefore increasing the overall efficacy of bird point count surveys.

Survey Methods

To ensure reliable data comparison, point count surveys described by Marcy (2006) were replicated. These point counts follow a fixed radius method and extended 25m outward from the site location. All birds heard and seen within this radius were documented. Each count lasted 10 minutes, which were divided into periods corresponding with the first 3 minutes, the next 2 minutes, and the final 5 minutes. Counts were conducted during the first 3 hours after sunrise and each site was counted 3 times (Marcy, 2006). The first 2 counts involved standard data recording while the final count implemented the use of CyberTracker.

Point Count Sites

The following sites were described by Marcy in his 2006 report. Each site was separated by at least 200m in order to ensure the statistical independence of point counts (Ralph et

al. 1995). In order to facilitate future volunteers with point counts, numbered wooden blocks were fixed upon pieces of rebarb and posted at respective survey points.

1-4: Ridge Trail; between gate and forest edge; open habitats.
5-8: Ridge Trail; between forest edge and Chirripo Trail; forested habitats.
9-11: Chirripo Trail; between park entrance and Gavilan Trail; forested habitats.
12-13: Gavilan Trail; between Chirripo Trail and forest edge; forested habitats.
17-20: River Trail; mixed habitats.
21-24: Victor's Falls Trail; forested and mixed habitats
25-26: Cloudbridge North Trail; between Victor's Hut and property line; mixed habitats.

Data Analysis Methods

The 3 point counts done at each site were combined to give a total number of species, individuals, rare species, and large species at each site. These data were correlated with existing vegetative data collected by Marcy in his 2006 study. Marcy took a series of measurements to quantify the vegetation at each point count site. He then grouped each site into four strata based on vegetation data. These data were used to correlate species abundance/richness with habitat type. Those strata are as follows:

A: Sites 1, 2, 3, 4, 17, 18; mostly open, with some scattered trees.
B: Sites 14, 15, 16, 20, 23, 24, 26; mixed habitats, usually including a forest edge.
C: Sites 5, 6, 19, 21, 22, 25; mostly forested, with some clearings and edges.
D: Sites 7, 8, 9, 10, 11, 12, 13; entirely forested.

CyberTracker Background

Late mornings and afternoons were spent developing a working sequence for CyberTracker. CyberTracker is a mobile data capture device that facilitates record-keeping through the use of prompting picture icons. The program resides in a PDA (personal data assistant), a handheld device. Originally developed for wildlife-tracking tribes of the Kalahari, CyberTracker makes it possible for illiterate groups to convey important information about wildlife resources to biologists throughout the world. Thus, CyberTracker serves as a bridge for a wealth of untapped knowledge that would certainly behoove the scientific community. It has been proved that researchers make more accurate field observations when prompted by picture icons. Therefore, CyberTracker guides the researcher with a network of pictures. For example, a San Bushman may witness a herd of Gemsbok congregating at a drinking hole. In CyberTracker language, this would be depicted in picture form – first the animal and then its associated behavior. While the most scrutinous detail can only be depicted in words and numbers, biologists can learn a lot from simple observation over long periods of time. This was CyberTracker's initial purpose: to generate long-term data in an effort to better manage wildlife populations.

Today, CyberTracker has been applied to a multitude of conservation projects, including studies comparing environmentally geo-referenced data to remote-sensing spatial

information (Janvier & Mayaux 2003), tracking rhinos in the Karoo National Park (Leibenberg et al. 1999), and observing wild animal mortality and human Ebola outbreaks in Gabon and Congo (Rouquet et al. 2005).

Implementation at Cloudbridge

CyberTracker has the potential to substantially increase the efficiency of any natural resource survey. Today, it is not easy for reserves to come by overly-skilled volunteers willing to do work free of charge. Many volunteers may have a limited knowledge of wildlife biology and/or tropical ecology and would benefit greatly from supplemental aid in the field. In this case, volunteers will be assisted in making avian identifications through sites and sounds provided by CyberTracker.

Most of Cloudbridge's 160 species of birds have been recorded in a CyberTracker database entitled "Cloudbridge Bird Survey" maintained on the Cloudbridge server. Many of the common species have been given detailed species profiles with associated descriptions, distributions, statuses, and vocalizations. These pages can be used in the field when one is unsure of an accurate identification. Due to time constraints, species profiles were limited to only the most common birds of Cloudbridge. Future volunteers are encouraged to add descriptions for more species using the step-by-step protocol below.

CyberTracker works via the use of a linked network of screens, or a screen sequence. This is most easily portrayed with the use of a flowchart. The flowchart below shows a simple sequence that starts with an opening screen prompting the researcher to choose one or more elements. When one element is chosen, the researcher is brought to another screen where one or more elements can be selected. In the case of documenting a particular species of bird, one must follow screens linked from a more general family of birds to an exact species.
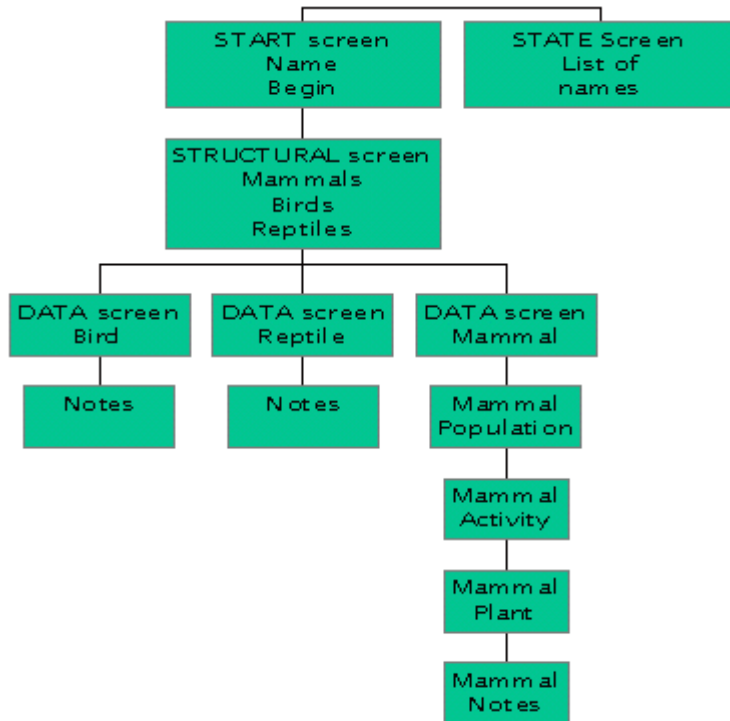
This flowchart – borrowed from http://www.cybertracker.co.za/Help/Index.htm - shows a sequence that has been chosen for mammals, and thus an individual species and/or behavior will be recorded in the PDA.

Step-by-Step CyberTracker Methods

CyberTracker is software that can be downloaded from Steventon Consulting at http://www.cybertracker.co.za/Help/Index_v3.htm and is free with an agreement that all data collection is conducted in the interest of conservation research. The software is user friendly and requires no knowledge of computer programming. It comes equipped with online tutorials and pages of online reference information. A researcher devising a CyberTracker sequence can also join an online discussion group for any questions he or she may have. In addition, one needs hardware such as a Palm Pilot or Pocket PC; at Cloudbridge, we use a Hewlett Packard Ipaq which has built-in GPS capabilities. CyberTracker is compatible with most PDAs. The PDA should be synchronized to the PC in which the CyberTracker software is housed. This is done using the ActiveSynch software that comes along with the PDA. Once installed, data can be readily transferred to and from the PC/PDA.

Once these preliminary steps are taken, the researcher is ready to begin customizing CyberTracker. To avoid being redundant, methodology from the initial stages of customization are omitted here but can be found at http://www.cybertracker.co.za/. The following methodology describes how to design a species profile for programmed or non-programmed birds:

1. From a blank CyberTracker page, select *Open Database* and then select *Cloudbridge Bird Survey*.
2. Suppose a researcher saw a Barred Forest Falcon and wanted to update the database with a species profile. Click once on *Raptors* on the left hand panel and then click *New Subscreen* (up on the toolbar). Scroll down on the *Screen Templates* tab and select *Blank with Title and Navigator* under *Professional Templates.* Be sure you are in the Professional Version and not the Standard Version. Click OK.
3. Now make a title for the screen by single clicking on the subscreen, writing Barred Forest Falcon, and pressing enter. You should see the title at the top of the screen.
4. Use the *Lock* feature in the toolbar and select the Notebook option from the toolbox on the right. Click once in the middle of the screen.
5. On the left of the screen there will be a list of properties. Select the *Dock* option and go to *Fill.*
6. Now go to the *Pages* option and write the following: image; description; status; vocalization. Press enter. There should be 4 tabbed headings at the top of the screen.
7. Now click on the image tab. Make sure 1 is the *Default Page Index*. Go to the toolbox and select the image icon. Click once on the middle of the screen.
8. Select the *Dock* option and go to *Fill*. Then go to the image option, click on the gray box to the right, and retrieve an image from elsewhere on the computer.
9. Select the *Description* tab and change the *Default Page Index* to 2. Click once more on *Description.*
10. Now go to the toolbox on the right, select *Memo*, click on the middle of the screen, and set the *Dock* to *Fill*.
11. Under *Properties* there is a *Caption* option where text can be entered. Enter text.
12. Click on the *Status* tab and change the *Default Page Index* to 3. Follow steps 10-11.
13. Click on the *Vocalization* tab and set the *Default Page Index* to 4. Select the *Sound* icon from the toolbox on the right. Click on the middle of the screen and set the *Dock* to *Fill*.
14. Now click on the *Sound* option under *Properties* and retrieve a sound file from elsewhere on the computer. A good website for downloading tropical bird calls and songs is www.xeno-canto.org.
15. Make sure to set the image page as the first page the researcher sees. This is done by clicking on the *image* tab and changing the *Default Page Index* back to 1.
16. After the species profile is created, unclick the *Lock* feature and link this screen to the screen before it and the screen after it.

Results

Point counts were conducted 3 times, yielding a total of 69 species. This is 43% of Cloudbridge's 160 documented species. When correlated with vegetative strata, species richness was greatest in mixed and entirely forested habitats. This is a different result

from Marcy's 2006 study which concluded that species richness was greatest in mixed habitats and least in open habitats.
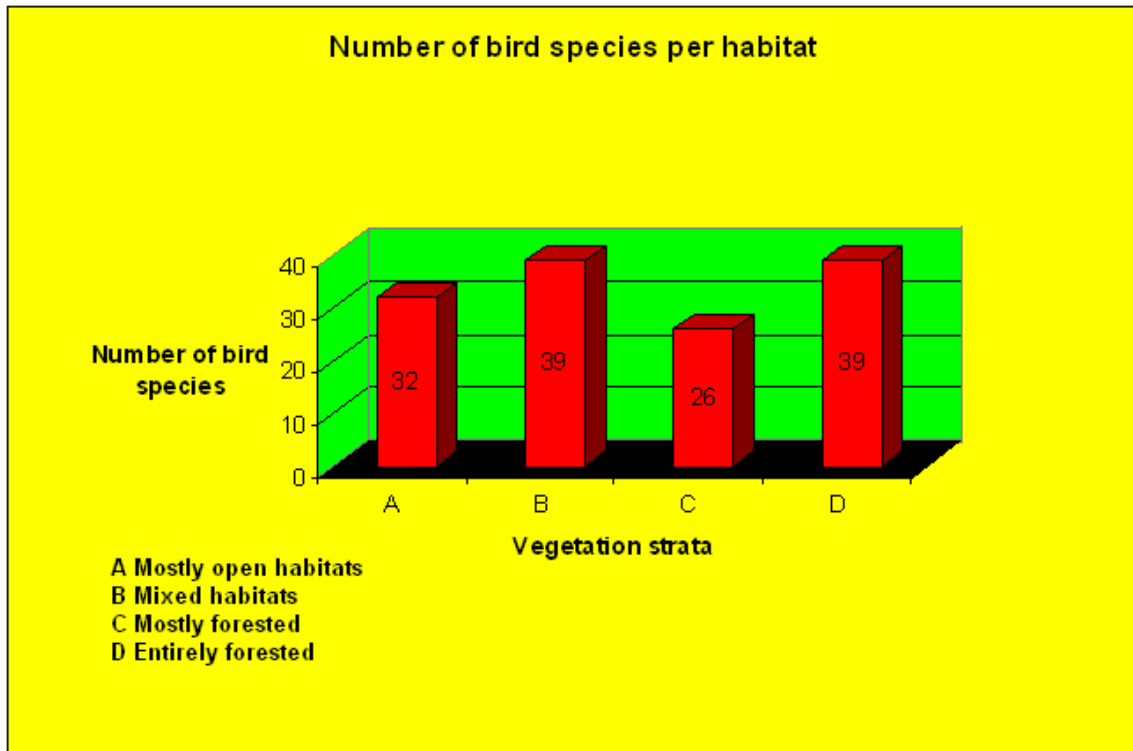

Figure 1: Bar graph showing correlation between number of bird species and habitat types. Habitats are grouped into 4 vegetative strata.

The implementation of CyberTracker in the third count aided in the identification of several species that had before gone unnoticed. The forest is the most difficult area to survey because of the thick foliage and the researcher must depend on identifying birds only through knowing vocalizations. Therefore, CyberTracker's ability to play recordings of vocalizations is an asset while conducting bird point counts in the forest and could be why this study counted for a greater richness in entirely forested plots.

Table 1 lists the species for which there have been documented sightings at Cloudbridge. Four new species of birds were added to the existing species list; these are highlighted in red in Table 1.

Discussion

It is not entirely clear that CyberTracker will increase the efficacy of Point Count Surveys at Cloudbridge. More birds were detected in dense forest cover because of vocalization certainty, but many birds were probably undetected in open areas because of time spent fidgeting with the computer. For volunteers unskilled in identifying bird calls, there are other instruments that can detect and identify bird calls and songs.

The main advantage of CyberTracker is its ability to combine and export data directly to PCs. However, data queried from the third survey (where CyberTracker was implemented) was jumbled and difficult to interpret. There were even species recorded that were never documented. These could have been saved unintenchinally outside of surveys. Nonetheless, exporting data directly from CyberTracker saves the researcher from the long, tedious process of data entry.

Among one of the drawbacks of CyberTracker was its short battery life. It is recommended to save the program after a site is counted and turn off the computer until the next site. Additionally, the PDA's pen was constantly sliding out of its holder and proving to be a bit of a nuissance. Trying to hold the pen, PDA, and binoculars all at once was very difficult as well. It would be a good idea to make a necklace for the pen so that it can be worn around the researcher's neck. A weatherproof case for the PDA is also advisable.

Conclusion

Despite these drawbacks, CyberTracker will be a definite asset to Cloudbridge. Volunteers will have access to pertinent information while in the field and if nothing else, it can be used for geo-referencing. CyberTracker is also capable of being customised for plants, arthropods, mammals, etc. These can all be stored simultaneously in the PDA and would be a valuable reference and data logging tool for future volunteers at Cloudbridge.

References

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Table 1: List of all species of birds documented at Cloudbridge Private Reserve. Species listed in red are new additions to the list.

CLOUDBRIDGE BIRD SPECIES MASTER LIST

	SPECIES		RES/MIG	STATUS
1	**Highland Tinamou**	*Nothocercus bonapartei*	R	Rare
2	**Black Guan**	*Chamaepetes unicolor*	R	Uncommon
3	**Spotted Wood-Quail**	*Odontophorus gujanensis*	R	Uncommon
4	**Gray-headed Chachalaca**	*Ortalis cinereiceps*	R	Rare
5	**Black Vulture**	*Coragyps atratus*	R	Common
6	**Turkey Vulture**	*Cathartes aura*	R	Common
7	**Swallow-tailed Kite**	*Elanoides forficatus*	M	Common
8	**Red-tailed Hawk**	*Buteo jamaicensis*	R/M	Uncommon
9	**Broad-winged Hawk**	*Buteo platypterus*	M	Uncommon
10	**Great Black Hawk**	*Herpetotheres cachinnans*	R	Uncommon
11	**Barred Forest Falcom**	*Buteogallus anthracinus*	R	Rare
12	**Laughing Falcon**	*Micrastur mirandollei*	R	Rare
13	**Ruddy Pigeon**	*Columba subvinacea*	R	Common
14	**Band-tailed Pigeon**	*Columba fasciata*	R	Common
15	**White-tipped Dove**	*Leptotila verreauxi*	R	Rare
16	**Buff-fronted Quail-Dove**	*Geotrygon costaricensis*	R	Rare
17	**Chiriqui Quail-Dove**	*Geotrygon chiriquensis*	R	Uncommon
18	**Sulfur-winged Parakeet**	*Pyrrhura hoffmanni*	R	Abundant
19	**Red-fronted Parrotlet**	*Touit costaricensis*	R	Uncommon
20	**White-crowned Parrot**	*Pionus senilis*	R	Uncommon
21	**Squirrel Cuckoo**	*Piaya cayana*	R	Uncommon

22	**Mottled Owl**	*Ciccaba virgata*	R	Uncommon
23	**Bare-shanked Screech-Owl**	*Otus clarkii*	R	Rare
24	**Spectacled Owl**	*Pulsatrix perspicillata*	R	Uncommon
25	**Andean Pygmy-Owl**	*Glaucidium jardinii*	R	Rare
26	**Common Pauraque**	*Nyctidromus albicollis*	R	Uncommon
27	**White-collared Swift**	*Streptoprocne zonaris*	R	Common
28	**Vaux's Swift**	*Chaetura vauxi*	R	Common
29	**Blue-and-White Swallow**	*Notiochelidon cyanoleuca*	R	Common
30	**Little Hermit**	*Phaethornis longuemareus*	R	Rare
31	**Green Hermit**	*Phaethornis guy*	R	Common
32	**Green Violet-ear**	*Colibri thalassinus*	R	Uncommon
33	**Violet Sabrewing**	*Campylopterus hemileucurus*	R	Rare
34	**Purple-crowned Fairy**	*Heliothryx barroti*	R	Uncommon
35	**Snowy-bellied Hummingbird**	*Amazilia edward*	R	Common
36	**Gray-tailed Mountain Gem**	*Lampornis cinereicauda*	R	Common
37	**Rufus-tailed Hummingbird**	*Amazilia tzacatl*	R	Uncommon
38	**White-tailed Emerald**	*Elvira chionura*	R	Rare
39	**Striped-tailed Hummingbird**	*Eupherusa eximia*	R	Common
40	**Scintillant Hummingbird**	*Selasphorus scintilla*	R	Common
41	**Magnificent Hummingbird**	*Eugenes fulgens*	R	Uncommon
42	**Green-crowned Brilliant**	*Heliodoxa jacula*	R	Uncommon
43	**Green-fronted Lancebill**	*Doryfera ludoviciae*	R	Rare
44	**Collared Trogon**	*Trogon collaris*	R	Common
45	**Resplendent Quetzal**	*Pharomachrus mocinno*	R	Uncommon
46	**Blue-crowned Motmot**	*Momotus momota*	R	Uncommon
47	**Emerald Toucanet**	*Aulacorhynchus prasinus*	R	Common

48	**Red-headed Barbet**	*Eubucco bourcierii*	R	Uncommon
49	**Golden-olive Woodpecker**	*Piculus rubiginosus*	R	Rare
50	**Acorn Woodpecker**	*Melanerpes formicivorus*	R	Uncommon
51	**Hairy Woodpecker** .	*Picoides villosus*	R	Uncommon
52	**Olivaceous Piculet**	*Picumnus olivaceous*	R	Rare
53	**Red-crowned Woodpecker**	*Melanerpes rubricapillus*	R	Rare
54	**Smoky-brown Woodpecker**	*Veniliornis fumigatus*	R	Rare
55	**Ruddy Treerunner**	*Margarornis rubiginosus*	R	Uncommon
56	**Spotted Barbtail**	*Premnoplex brunnescens*	R	Uncommon
57	**Wedge-billed Woodcreeper**	*Glyphorhynchus spirurus*	R	Rare
58	**Spotted-crowned Woodcreeper**	*Lepidocolaptes affinis*	R	Abundant
59	**Brown-billed Scythebill**	*Campylorhamphus pusillus*	R	Rare
60	**Buffy Tuftedcheek**	*Pseudocolaptes lawrencii*	R	Uncommon
61	**Buff-fronted Foliage-gleaner**	*Philydor rufus*	R	Uncommon
62	**Lineated Foliage-gleaner**	*Syndactyla subalaris*	R	Common
63	**Spectacled Foliage-gleaner** .	*Anabacerthia variegaticeps*	R	Rare
64	**Streaked-breasted Treehunter**	*Thripadectes rufobrunneous*	R	Uncommon
65	**Red-faced Spinetail**	*Cranioleuca erythrops*	R	Common
66	**Streaked Xenops**	*Xenops rutilans*	R	Rare
67	**Barred Becard**	*Pachyramphus versicolor*	R	Common
68	**White-ruffed Manakin**	*Corapipo leucorrhoa*	R	Uncommon
69	**Masked Tityra**	*Tityra semifasciata*	R	Common
70	**Slaty Antwren**	*Myrmotherula schisticolor*	R	Uncommon
71	**Golden-bellied Flycatcher**	*Myiodynastes hemichrysus*	R	Common
72	**Boat-billed Flycatcher**	*Megarhynchus pitangua*	R	Rare
73	**Great Kiskadee**	*Pitangus sulphuratus*	R	Rare

74	**Social Flycatcher** .	*Myiozetetes similis*	R	Rare
75	**Bright-rumped Attila**	*Attila spadiceus*	R	Uncommon
76	**Gray-capped Flycatcher**	*Myiozetetes granadensis*	R	Rare
77	**Dusky-capped Flycatcher**	*Myiarchus tuberculifer*	R	Rare
78	**Torrent Tyrannulet**	*Serpophaga cinerea*	R	Common
79	**Dark Pewee**	*Contopus lugubris*	R	Rare
80	**Ochraceous Pewee**	*Contopus ochraceous*	R	Rare
81	**Black Phoebe**	*Sayornis nigricans*	R	Uncommon
82	**Eastern Wood-Pewee**	*Contopus virens*	M	Common
83	**Tufted Flycatcher**	*Mitrephanes phaeocercus*	R	Common
84	**Black-capped Flycatcher**	*Empidonax atriceps*	R	Rare
85	**Yellowish Flycatcher**	*Empidonax flavescens*	R	Common
86	**White-throated Spadebill**	*Platyrinchus mystaceus*	R	Uncommon
87	**Yellow-olive Flycatcher**	*Tolmomyias sulphuresecens*	R	Rare
88	**Slaty-capped Flycatcher**	*Leptopogon superciliaris*	R	Rare
89	**Olive-striped Flycatcher**	*Mionectes olivaceus*	R	Uncommon
90	**Mistletoe (Paltry) Tyrannulet**	*Zimmerius vilissimus*	R	Abundant
91	**Eye-ringed Flatbill**	*Rhynchocyclus brevirostris*	R	Rare
92	**Mountain Elaenia**	*Elaenia frantzii*	R	Uncommon
93	**House Wren**	*Troglodytes aedon*	R	Common
94	**Gray-breasted Wood-wren**	*Henicorhina leucophrys*	R	Abundant
95	**Plain Wren**	*Thryothorus modestus*	R	Rare
96	**Rufous-breasted Wren**	*Thryothorus rutilus*	R	Rare
97	**Ochraceous Wren**	*Troglodytes ochraceus*	R	Common
98	**Mountain Robin**	*Turdus plebejus*	R	Common
99	**Clay-colored Robin**	*Turdus grayi*	R	Common

100	**Orange-billed Nightingale Thrush**	*Catharus aurantiirostris*	R	Rare
101	**Ruddy-capped Nightingale-Thrush**	*Catharus frantzii*	R	Common
102	**Slaty-backed Nightingale-Thrush**	*Catharus fuscater*	R	Uncommon
103	**Swainson's Thrush**	*Catharus ustulatus*	M	Uncommon
104	**Black-faced Solitaire**	*Myadestes melanops*	R	Common
105	**American Dipper**	*Cinclus mexicanus*	R	Common
106	**Long-tailed Silky-flycatcher**	*Ptilogonys caudatus*	R	Uncommon
107	**Silvery-throated Jay**	*Cyanolyca argentigula*	R	Uncommon
108	**Brown Jay**	*Cyanocorax morio*	R	Common
109	**Rufus-browed Peppershrike**	*Cyclarhis gujanensis*	R	Common
110	**Red-eyed Vireo**	*Vireo olivaceus*	R	Common
111	**Philadelphia Vireo**	*Vireo philadelphicus*	M	Uncommon
112	**Brown-capped Vireo**	*Vireo leucophrys*	R	Common
113	**Yellow-winged Vireo**	*Vireo carmioli*	R	Common
114	**Black-cheeked Warbler**	*Basileuterus melanogenys*	R	Abundant
115	**Three-striped Warbler**	*Basileuterus tristriatus*	R	Abundant
116	**Golden-crowned Warbler**	*Basileuterus culicivorus*	R	Rare
117	**Bananaquit**	*Coereba flaveola*	R	Common
118	**Black-and-White Warbler**	*Mniotilta varia*	M	Uncommon
119	**Tennessee Warbler**	*Vermivora peregrina*	M	Common
120	**Golden-winged Warbler**	*Vermivora chrysoptera*	M	Uncommon
121	**Tropical Parula**	*Parula pitiayumi*	R	Common
122	**Flame-throated Warbler**	*Parula gutturalis*	R	Uncommon
123	**Blackburnian Warbler**	*Dendroica fusca*	M	Common
124	**Black-throated Green Warbler**	*Dendroica virens*	M	Common
125	**Wilson's Warbler**	*Wilsonia pusilla*	M	Abundant

126	**Gray-crowned Yellowthroat**	*Geothlypis poliocephala*	R	Rare
127	**Louisiana Waterthrush**	*Seiurus motacilla*	M	Uncommon
128	**Canada Warbler**	*Wilsonia canadensis*	M	Rare
129	**Collared Redstart**	*Myioborus torquatus*	R	Abundant
130	**Slate-throated Redstart**	*Myioborus miniatus*	R	Abundant
131	**Baltimore Oriole**	*Icterus galbula*	M	Uncommon
132	**Blue-hooded Euphonia**	*Euphonia elegantissima*	R	Common
133	**Golden-browed Chlorophonia**	*Chlorophonia callophrys*	R	Uncommon
134	**Silver-throated Tanager**	*Tangara icterocephala*	R	Abundant
135	**Speckled Tanager**	*Tangara guttata*	R	Common
136	**Bay-headed Tanager**	*Tangara gyrola*	R	Common
137	**Spangled-cheeked Tanager**	*Tangara dowii*	R	Common
138	**Golden-hooded Tanager**	*Tangara larvata*	R	Common
139	**Shining Honeycreeper**	*Cyanerpes lucidus*	R	Uncommon
140	**Scarlet-thighed Dacnis**	*Dacnis venusta*	R	Common
141	**Blue-gray Tanager**	*Thraupis episcopus*	R	Uncommon
142	**Scarlet-rumped Tanager**	*Ramphocelus passerinii*	R	Common
143	**Summer Tanager**	*Piranga rubra*	M	Uncommon
144	**Hepatic Tanager**	*Piranga flava*	R	Rare
145	**Flame-colored Tanager**	*Piranga bidentata*	R	Common
146	**White-winged Tanager**	*Piranga leucoptera*	R	Uncommon
147	**Common Bush Tanager**	*Chlorospingus ophthalmicus*	R	Abundant
148	**Sooty-capped Bush Tanager**	*Chlorospingus pileatus*	R	Rare
149	**Buffy-throated Saltator**	*Saltator maximus*	R	Uncommon
150	**Black-thighed Grosbeak**	*Pheucticus tibialus*	R	Uncommon
151	**Rose-breasted Grosbeak**	*Pheucticus ludovicianus*	M	Rare

152	**Yellow-faced Grassquit**	*Tiaris olivacea*	R	Abundant
153	**Blue Seedeater**	*Amaurospiza concolor*	R	Rare
154	**Slaty Flowerpiercer**	*Diglossa plumbea*	R	Uncommon
155	**Yellow-thighed Finch**	*Pselliophorus tibialis*	R	Abundant
156	**Chestnut-capped Brush Finch**	*Atlapetes brunneinucha*	R	Common
157	**Yellow-throated Brush Finch**	*Atlapetes gutturalis*	R	Uncommon
158	**Rufus-collared Sparrow**	*Zonotrichia capensis*	R	Abundant
159	**Yellow-bellied Siskin**	*Carduelis xanthogastra*	R	Uncommon
160	**Lesser Goldfinch**	*Carduelis psaltria*	R	Uncommon