CONSERVATION OF THE SCARLET MACAW
*Ara macao*

IN A SUBTROPICAL MOIST FOREST LIFE ZONE IN
BELIZE, CENTRAL AMERICA

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BACKGROUND INFORMATION

Description
The Scarlet Macaw (*Ara macao*) is a monotypic and sexually
monomorphic species in the order Psittaciformes. With a length of 85 cm
and an average weight of 900 grams (Foreshaw, 1978; Stiles and Skutch,
1989), it is the third largest of the remaining 16 macaw species; all of which
are confined to the Neotropics. Its plumage is bright scarlet with pale-blue
lower back, rump, upper and lesser tail-coverts, tips of the tail, and outer
webs of the primaries and secondaries. The greater and median-coverts are
green with yellow tips. The upper mandible is horn-colored with black on
the lower lateral sides of the base, and the lower mandible is grey-black.
The bare facial patch, which is characteristic of the genus *Ara*, is white with
traversed scarlet feather stripes (Forshaw, 1978).

Distribution and Ecology
The present distribution of the Scarlet Macaw is southern Mexico in the
state of Chiapas, south through Middle America into South America where it
exists east of the Andes in Columbia, Venezuela, the Guianas, Peru, Bolivia,
and Brazil (AOU, 1983). The Scarlet Macaw generally inhabits lowland
forests below 500 m. In the Orinoco and Amazon basins the Scarlet Macaw
occupies humid tierra forest (high ground forest without common flooding)
avoiding the wetter regions inhabited by the Blue and Yellow Macaw (*Ara
ararauna*) and the hilly regions used by the Green-winged Macaw (*Ara
chloroptera*). The Scarlet Macaw also inhabits the llanos of Venezuela and
other semi-open areas within its range where disturbance is minimal. It
occupies the deciduous forests, especially along drainage basins more
frequently in Central America, while the Great-green Macaw (*Ara ambigu*
exists in more humid forests (Ridgely, 1980).

The Scarlet Macaw is a gregarious species often seen in groups of 20 or
more except during the breeding season when they are usually observed in
pairs. They nest primarily in natural cavities of tall trees, but the use of
enlarged woodpecker holes as nest-sites has been documented (Stiles and
Skutch, 1989). Ridgely (1980) suggested a limiting factor for the presence of
the macaw in a particular habitat was the availability of tall trees with
potential nesting cavities. The breeding period occurs at the end of the dry
season, March through July, with clutch size varying from 1-2 eggs annually
(Barlow and Caddick, 1989; Stiles and Skutch, 1989). There is some concern
about the breeding success of the Scarlet Macaw in Belize. There were no
documentations of young bird sightings located during the past five years, even though many of the existing observations were made during the summer months after the breeding season.

Little is known about the food habits of the Scarlet Macaw (Munn, 1988). Most references on foods utilized by the macaw consist of feeding observations by biologists involved in status or distribution studies (Table 1). Food items were documented in various ecological settings, and no reference describe foraging behavior in the subtropical moist forest life zone which the macaw inhabits in Belize.

Table 1. Documented feeding observations of the Scarlet Macaw in Central and South America

<table>
<thead>
<tr>
<th>Author</th>
<th>Food Items</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dickey and Rossem, (1936)</td>
<td><em>Spondias monbin.</em></td>
<td>El Salvador</td>
</tr>
<tr>
<td>Dugand, (1945) Columbia</td>
<td><em>Hura crepitans.</em></td>
<td>Brazil</td>
</tr>
<tr>
<td>Low, (1972)</td>
<td>various figs and palms esp. coucorite palm and tonca bean.</td>
<td>S. America</td>
</tr>
<tr>
<td>Sosa, (1987)</td>
<td><em>Maritia flexuosa, Proium sp., Inga sp., and various species of Lauraceae, Flacouriaceae and Araceae.</em></td>
<td>Ecuador</td>
</tr>
<tr>
<td>Munn, (1988)</td>
<td><em>Spondias monbin, Borismene janurensis, Iriarteaventricosa, Cedrela ordanata, and Terminalia oblonga.</em></td>
<td>Peru</td>
</tr>
</tbody>
</table>

It is generally accepted that psittacine birds are primarily frugivores or granivores. However, Noel et al. (1989) reported leaves and shoots comprised a small but significant portion of the Puerto Rican Parrot diet in the Luquillo National forest, primarily in the two months prior to the breeding season. Belizean Forestry personnel in Augustine have observed Scarlet Macaws feeding on the shoots of the Quamwood tree in the Chiquibul Forest Reserve. Other feeding observations within the study site include the fruits of santa maria, ceiba, crabou, and various palms. One of the primary objectives of this study is to quantitatively document the food habits of the Scarlet Macaw in the subtropical moist forest in Belize.
Status

The present status of the Scarlet Macaw in South America varies from region to region within its range. There is a remarkable contrast between the status reports of South and Central America. The Scarlet Macaw in South America is locally common except in areas immediately surrounded by human settlements (Ridgely, 1982; AOU, 1983). The situation in Central America is quite different. Macaw populations are greatly reduced or extirpated throughout much of its Middle America range (AOU, 1983). Ridgely (1982) suggested a bleak future for the Scarlet Macaw in Central America because the bird inhabits the forests which are most apt to be developed for agriculture. The bird is already extinct in El Salvador (Forshaw, 1978). The macaw is an uncommon resident in the lowlands of Guatemala being confined to the Peten Region along the Usumacinta River (Land, 1962; Ridgely, 1980). The species distribution and populations have been declining in Mexico for 50 years and is now restricted to dense rainforests and gallery forests of the south (Edwards, 1972; Ridgely, 1980). Historically abundant in Panama, the Scarlet Macaw is now confined to the Isla Coiba and the lower Anquero Peninsula in southwest Los Santos (Wetmore, 1968). It is disappearing on the Pacific Slope of Honduras (Ridgely, 1980). The macaw range and numbers have declined in Costa Rica (Ridgely, 1982).

Prior to 1989, the status of the Scarlet Macaw in Belize was based on a report by Russell (1964). He documented the bird frequented the headwaters of the major drainage basins in the Chiquibul and Mountain Pine Ridge Forest Reserves as well as the region adjacent to Hummingbird Highway. An investigation completed in August 1989 by the Center for the Study of Tropical Birds on the status of the Scarlet Macaw in Belize confirmed the macaws are most frequently observed along major drainage systems, but the report also suggested the historical range of this species is contracting. There were no macaws observed north of the Macal River in the Mountain Pine Ridge Forest Reserve or south of the Maya Divide (Barlow and Caddick, 1989). Several of the forestry personnel at Augustine, who inhabit a portion of the Mountain Pine Ridge Forest Reserve, confirmed the Scarlet Macaw's absence from that region for at least five years. The Scarlet Macaw is not listed as endangered by the International Council for Bird Preservation but it is considered a species with extremely low populations in Belize (Hartshorn, 1984).
OBJECTIVES

The purpose of this study was to provide updated information on the status, distribution, and ecology of the Scarlet Macaw in Belize, Central America. The range of the Scarlet Macaw has been reduced in Belize, and knowledge of its status and basic ecological requirements is necessary to initiate appropriate management strategies for its survival. During the beginning phase of this project, we intended to determine the location and movement patterns of the Scarlet Macaw in the Chiquibul Forest. This objective must be met first to ensure an adequate number of feeding and nesting data are collected to provide ecologically meaningful results in subsequent phases of this project. The logistical challenges with regard to future investigations in the study site, and with the proposed methodologies were identified and discussed with appropriate recommendations included.

Another objective of this project was to increase public awareness of the status and the ecological and economical importance of the Scarlet Macaw in Belize. We were particularly interested in the involvement of the Belizean government, through the Forestry Department in the project. This type of cooperation would enhance the relationship between residents of Belize and foreigners interested in the conservation of Belizean wildlife. Knowledge of ecological principles and local biological history could be exchanged between parties. The result would be a faster more economical method for investigating the ecology of the species and would perpetuate the knowledge base in Belize. All background and resulting literature concerning the Scarlet Macaw will be furnished to the appropriate personnel in Belize.

STUDY SITE

The study site is situated in the subtropical moist forest life zone in the Chiquibul Forest Reserve. The reserve comprises 1,849 square in the southwest corner of Belize (Barlow and Caddick, 1989). The Macal River between the Guacamallo Bridge upstream to Blue Hole Camp on the Raspaculo Branch form the north and east borders of the study site. The study area will encompass the deciduous forest south of the river to Natural Arch and west to the Caracol Ruins. This choice was based on the following criteria: 1) it contains suitable habitat for the species under consideration; 2) it has the highest level of Scarlet macaw activity recorded in Belize; 3) there are panoramic views above the canopy for observation; 4) it is accessible by road to within a reasonable distance to our proposed base camp; 5) it has fresh water available; 6) research conducted in this region will encourage its use as an official wildlife reserve for future scientific investigations; 7) there
is a potential for limited outside communication. The study site was chosen based on the recommendations of Barlow and Caddick (1989), who investigated the area to determine the optimum site for more a inclusive study of the Scarlet Macaw in the Chiquibul Forest Reserve.

METHODS

The methodology employed for the first phase concentrated on the two logical starting objectives. The geographics of macaw activity in the Chiquibul Forest and the problems associated with living there. An investigation in the study site was conducted in the summer of 1990 during the months of May and June to determine the location and status of the Scarlet Macaws, and to field test the proposed methodologies for the study. Two trips up the Macal River and the Raspaculo Branch upstream to Blue Hole Camp were made using a kayak and a canoe equipped with an small outboard motor. Several visits into the forest were conducted utilizing different modes of transportation including hiking, the watercraft, a truck, and a tractor, to assess the difficulties of travel throughout the study site. The road from the Guacamallo Bridge to Millionario was frequented because it was the only navigable road into the center of the study site. Three of the less traveled logging roads were explored to determine their potential use. Proposed methodologies for collecting the food habit data such as tree blind placement, photo documentation, quadrat sampling, and forage specimen collection techniques were not field tested due to the difficulties encountered in locating the macaws and the shortage of time. However, observations were made concerning the vegetative structure which may assist in overcoming some of the challenges facing investigators of this project.

RESULTS

Two Scarlet Macaw sightings were made by the authors. A pair was observed June 5, 1990 at 6:30 pm. flying a direct course from west to east perpendicular to the Chiquibul Road at Millionario. The following morning a single bird was observed on the same course at 7:00 am. Another five observations were collected from interviews with Belizean forestry personnel, biologists and residents. No macaws were seen along the Raspaculo Branch despite the many previous sightings in the vicinity of Blue Hole Camp. Table 2 outlines Scarlet Macaw observations in and immediately surrounding the study site over the past five years. Although no macaws were sighted along the rivers, the undisturbed areas provided the
investigators with many wildlife observations including tapir, river otter, iguanas, and many uncommon birds such as the Black and White Hawk-Eagle. Appendix I contains a list of all vertebrates encountered while in the study site.

Some of the logistic challenges associated with travel and lodging within the study site were identified. The water level of the river fluctuates rapidly during the rainy season due to the steep contour of the valleys. This will undoubtably pose a threat to anyone who is depending on the river for access to a base camp or observation point. Another consideration is the accessibility via the Chiquibul road down to Millionario and the roads within the study site. These roads are valuable to the investigators working in the Chiquibul Forest, but they are dry season roads and passage is never guaranteed. The roads are not maintained and many of the less traveled roads are overgrown with vegetation. Steps must be taken to increase the mobility of the researchers in the study site.

The proposed base camp sites on the river were found to be unsuitable for this project due to lack of adequate camp sites for lodging. The banks of the river are generally too steep for tents and the fluctuating water level poses an unpredictable threat. Alternate camp sites outlined in our proposal were explored for potential use in subsequent studies. Millionario and a site on the Chiquibul Road about six miles south of the Guacamallo Bridge were found to be the best sites for a future base camp. Both of these are centrally located within the study site and offer access to all parts of the study site.
<table>
<thead>
<tr>
<th>Area</th>
<th>Date</th>
<th># sightings</th>
<th># birds/sighting</th>
<th>observer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Hole Camp</td>
<td>May</td>
<td>2</td>
<td>2 and 8</td>
<td>D. Woods</td>
</tr>
<tr>
<td></td>
<td>Jun</td>
<td>2</td>
<td>5 and 6</td>
<td>D. Woods.</td>
</tr>
<tr>
<td></td>
<td>Oct</td>
<td>1</td>
<td>22</td>
<td>N. Smith</td>
</tr>
<tr>
<td></td>
<td>Dec</td>
<td>5</td>
<td>15 to 18</td>
<td>M. Fleming</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 to 28</td>
<td>G. Caddick</td>
</tr>
<tr>
<td>Caracol Ruins</td>
<td>Apr</td>
<td>1</td>
<td>2</td>
<td>B. an C. Miller</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>1</td>
<td>unknown</td>
<td>P. Triggs</td>
</tr>
<tr>
<td></td>
<td>Sept</td>
<td>several</td>
<td>?</td>
<td>Caracol caretaker</td>
</tr>
<tr>
<td>Cockscomb Basin</td>
<td>Jan-Feb</td>
<td>several</td>
<td>2-18</td>
<td>H. Kamstra</td>
</tr>
<tr>
<td></td>
<td>Feb</td>
<td>1</td>
<td>18</td>
<td>H. Kamstra</td>
</tr>
<tr>
<td></td>
<td>Jan-Feb</td>
<td>1</td>
<td>2</td>
<td>Audubon official</td>
</tr>
<tr>
<td></td>
<td>?</td>
<td>1</td>
<td>20</td>
<td>N. Smith</td>
</tr>
<tr>
<td>Cueva</td>
<td>May, 1990</td>
<td>1</td>
<td>2</td>
<td>Oswaldo Sabido</td>
</tr>
<tr>
<td>Guacamallos Bridge</td>
<td>May</td>
<td>1</td>
<td>4</td>
<td>Army Officer</td>
</tr>
<tr>
<td></td>
<td>Jun-Aug</td>
<td>several</td>
<td>2-20</td>
<td>J. Fragosa</td>
</tr>
<tr>
<td></td>
<td>July</td>
<td>1</td>
<td>6</td>
<td>S. Matola</td>
</tr>
<tr>
<td></td>
<td>Aug</td>
<td>1</td>
<td>4</td>
<td>S. Barlow, G. Caddick</td>
</tr>
<tr>
<td></td>
<td>?</td>
<td>1</td>
<td>8</td>
<td>D. James</td>
</tr>
<tr>
<td></td>
<td>Nov, 1989</td>
<td>1</td>
<td>5</td>
<td>M. Fleming</td>
</tr>
<tr>
<td>Grano de Oro</td>
<td>May, 1990</td>
<td>1</td>
<td>7</td>
<td>Jack Minten</td>
</tr>
<tr>
<td>Macal River at Ballarina Line</td>
<td>Apr, 1989</td>
<td>1</td>
<td>2</td>
<td>Forestry personnel</td>
</tr>
<tr>
<td>Macal River Headwaters</td>
<td>March, 1990</td>
<td>1</td>
<td>12</td>
<td>Amin Bodran</td>
</tr>
<tr>
<td>Millionario</td>
<td>June, 1990</td>
<td>2</td>
<td>1-2</td>
<td>Mark Kainer, Jack Eitnier</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>1</td>
<td>2</td>
<td>M. Meadows</td>
</tr>
<tr>
<td></td>
<td>Mar-Apr</td>
<td>2</td>
<td>2</td>
<td>M. Meadows</td>
</tr>
<tr>
<td></td>
<td>Jul-Aug</td>
<td>several</td>
<td>2-6</td>
<td>Guatemalan interviewee</td>
</tr>
<tr>
<td>Natural Arch</td>
<td>Apr</td>
<td>1</td>
<td>2</td>
<td>B. La Croix</td>
</tr>
<tr>
<td></td>
<td>Jul</td>
<td>1</td>
<td>4</td>
<td>D. Coward</td>
</tr>
<tr>
<td>Rio Ceiba Grande</td>
<td>May</td>
<td>1</td>
<td>2</td>
<td>D. Woods</td>
</tr>
</tbody>
</table>

(! redrawn from Barlow and Caddick, 1989) with additional sightings in this report included.)
DISCUSSION and RECOMMENDATIONS

The importance of this project should not be underestimated. The family Psittacidae has more threatened species than any other in the neotropics. Out of 23 taxa at risk, 17 are due to habitat destruction, primarily the burning of forest land for agricultural use (Ridgely, 1982). Conservation efforts such as this one will certainly enhance the chances of survival for many species. Knowledge of the status and ecological requirements of the Scarlet Macaw in Belize is necessary for future management strategies.

Several recommendations are included in this report to assist in subsequent studies on the Scarlet Macaw in the study site. First it will be necessary for the investigators to determine the movement patterns and present distribution of the macaw in the study site before attempting to set up observation points. Since seasonal movements are logical for an animal whose diet is based on fruit, it will be necessary to become familiar with any patterns which might emerge as controlling factors of these movements. This could be accomplished using a combination of methods. An observation notebook should be placed at the Forestry headquarters in Augustine for the purpose of keeping a continuous log of the macaw’s movement in and around the forest. This log would include the date, year, number of macaws in sighting, person sighting, exact location, and any other miscellaneous notes or observations.

A Belizean biologist should be hired to make periodic trips into the forest to designated spots for the collection of macaw movement, feeding, and nesting data. There are two reasons why this would benefit the project. The number of trips a visiting biologist could make into the study site is limited and the help of a resident biologist would greatly speed up the collection phase of the project. The cooperation of the two organizations will also enhance the future relationships between research institutions and the Belizean government, as well as increase the biological knowledge base where it is needed most, in the country where the wildlife exists.

Aerial transects conducted over the entire study site would assist in gathering data on the distribution and movement patterns of the Scarlet Macaw. Their habit of frequenting the upper canopy and the bright coloration of their plumage should make them visible to an airplane flying 500 feet above the trees. The plane could operate out of the airfield in Belmopan which is approximately 35 miles from the study site. A trial run should be made in January, 1990 while Center for the Study of Tropical Birds personnel will be near the study site.

Radiotelemetry might be a useful technique for gathering data on the distribution of the Scarlet Macaw, although there are a few obstacles involved. To my knowledge, this technique has never been field tested on a macaw, and some of the standard telemetry procedures would have to be
altered for this species. A method for trapping the birds must be devised, and it might prove to be too labor intensive for the benefits. The terrain of the forest might prevent the success of this technique because the macaws generally travel great distances, and the signal will probably only be effective in the valley where the receiver is located unless aircraft are used. The potential for utilizing radiotelemetry will have to be investigated for its cost effectiveness.

A group of biologists, forestry personnel, and residents could be organized into a Scarlet Macaw census team. If 10 or more individual groups could be formed to systematically search for the macaws over a weekend in the study site, the resulting data would be valuable to this project. Each group could be assigned a sector of the forest to locate the birds and they could meet at the Guacamallo Bridge to compare and consolidate information. The exact location and time of the observations is important. A data entry sheet should be designed to ensure all desired information is obtained from each sighting. The entry blanks should include the exact location and time of sightings, the number of birds observed, direction and altitude of the birds if in flight, the activity the birds are engaged in at the time of each sighting, and any other miscellaneous notes available. The synchronization of the observers watches should be accomplished to determine whether the sightings are different birds or possibly the same birds at different times.

The use of time lapse photography for gathering data on the macaw's movements within the study site has been discussed but it would have to be field tested to determine the feasibility of attaining meaningful results. Cameras could be placed at strategic locations in the study site and set to take pictures at a preferred interval. If attempted, the recommended placement of the cameras should coincide with the sites where the most observations have been reported.

The use of the river as a site for a future base camp is not recommended for this project. Although many Scarlet Macaw sightings occur on the river, its unpredictable nature and the associated dangers outweigh the benefits. The river floods often in the rainy season, and the potential for being cut off from outside aid or supplies exists. However, the river is an important component in the habitat of the Scarlet Macaw and cannot be excluded. There is a road junction about 6 miles south of the Guacamallo Bridge on the Chiquibul Road which could serve as an excellent site for the base camp. The trail leading off to the east served as a logging road and is now overgrown with secondary vegetation, but it is valuable because it goes to the Blue Hole Military Camp which is known for inhabiting Scarlet Macaws. If this site is not found to be suitable, the second choice for a base camp site would be in the Millionario area. These two sites are centrally located in the study area on the Chiquibul Road and are the most accessible. Most of the roads in the Chiquibul Forest are connected to the Chiquibul Road and travel anywhere in
the forest requires its use. Some of these logging roads will have to be cleared of brush before use. 

A time frame for the summer of 1991 should be set to conduct the subsequent phases of this project. During this period, the proposed methodologies should be field tested. Tree blinds should be placed at various points which offer the best views of the canopy, where macaws feed, to test the validity of gathering feeding observations using this method. An attempt to measure the relative importance a forage plant has in the community using the quadrat sampling technique should be made to ensure the feasibility of using this method in the study site. Samples of fruit, leaves, and shoots which are foraged upon by the macaws should be collected and preserved to test the proposed techniques for documentation of the food items utilized by the macaw. 

The final recommendation for this project is the acquisition of a four-wheel drive all terrain vehicle for transportation while in the study site. At present the predictability of access by road is as uncertain as the river, especially during the rainy season. An all terrain vehicle could carry supplies and provide necessary access into the forest in the worst conditions possible. If equipped with a brushguard, the vehicle could travel down the old logging trails with a minimum of brush clearing. The one problem with utilizing a recreation vehicle for this project is maintenance. It is not known whether there is a source for spare parts in Belize. This would have to be investigated before making a decision on the use of this type of vehicle.

ACKNOWLEDGEMENTS

I would like to thank Mr. Jack Eitniear, director of the Center for the Study of Tropical Birds for the opportunity to conduct the first phase of this project as principal investigator. The technical advise and reference material supplied by Mr. Eitniear was essential for the project. Dr. John Baccus, chairman Southwest Texas State University Biology department, generously donated his time and effort to assist in the drafts of the proposal and the final report. Finally, special thanks to all the Belizean residents who offered us valuable information concerning the status and ecology of the Scarlet Macaw.

**Mammals:**
- Yucatan Squirrel
- Deppe's Squirrel
- Baird's Tapir
- Red Brocket Deer
- White-tailed Deer
- Central American River Otter
- Bush Dog
- tracks of:
  - Jaguar
  - Nine-banded Armadillo

**Birds:**
- Olivaceous Cormorant
- Laughing Falcon
- Roadside Hawk
- Ornate Hawk-Eagle
  - Black and White Hawk-Eagle
  - American Swallow-tailed Kite
  - Plumbeous Kite
  - White Hawk
  - Gray Hawk
- Lesser Yellow-head Vulture
- Black Vulture
- King Vulture
- Great Curassow
- Crested Guan
- Plain Chachalaca
- Thicket Tinamou
  - Ocellated Turkey
- Gray-necked Wood Rail
- Pale-vented Pigeon
  - White-tipped Dove
- Ruddy Ground Dove
  - Blue Ground Dove
- Scarlet Macaw
- Red-lobed Parrot
  - White-fronted Parrot
  - Brown-hooded Parrot

* Sciurus yucatanensis balidus
* Sciurus deppei vivax
* Tapirus bairdii
* Mazama americana
* Odocoileus virginianus
* Lontra longicaudis annectans
* Speothos venaticus

* Felis onca
* Dasypus novemcinctus

* Phalacrocorax olivaceus
* Herpetotheres cachinnans
* Buteo magnirostris
* Spizaetus ornatus
* Spizastur melanoleucus
* Elanoides forficatus
* Ictinia plumbea
* Leucopternis albicollis
* Buteo nititus
* Cathartes burrovianus
* Coragyps atratus
* Sarcoramphus papa
* Crax rubra
* Penelope purpurascens
* Ortalis vetula
* Crytorellus cinnamomeus
* Agriocharis ocellata
* Aramides cajanea
* Columba cayennensis
* Leptotila verreauxi
* Columbina talpactoi
* Claravis pretiosa
* Ara macao
* Amazona autumnalis
* Amazona albfrons
* Pionopsitta haemototis
* Aztec Parakeet
  Aratinga aztec

* Groove-billed Ani
  Crotophaga sulcirostris

* Squirrel Cuckoo
  Piaya cayana

* Mottled Owl
  Ciccaba virgata

* Pauraque
  Nyctidromus albicollis

* Tree Swallow
  Tachycineta bicolor

* Rufous-tailed Hummingbird
  Amazilia taacati

* Little Hermit
  Phaethornis longuemareus

* Citreoline Trogan
  Trogon citreolus

* Violaceous Trogan
  Trogon violaceus

* Keel-billed Toucan
  Ramphastos sulturatus

* Collared Aricari
  Pteroglossus torquatus

* Blue-crowned Motmot
  Momotus momota

* Rufous-tailed Jacamar
  Calbula ruficanda

* Belted Kingfisher
  Megaceryle alcyon

* Amazon Kingfisher
  Chloroceryle amazona

* Ringed Kingfisher
  Ceryle alcyon

* Golden-fronted Woodpecker
  Centuris aurifrons

* Chestnut-colored Woodpecker
  Celeus castaneus

* Pale-billed Woodpecker
  Campephilus guatemalensis

* Acorn Woodpecker
  Melanerpes formicivorus

* Wedge-billed Woodcreep
  Glyphorniscus spirurus

* Ivory-billed Woodcreep
  Xiphorynchus flavicinctus

* Olivaceous Woodcreep
  Sittasomus griseicapillus

* Dot-winged Antwren
  Microhynchus quixensis

* Plain Xenops
  Xenops minutus

* Red-capped Manakin
  Pipra mentalis

* White-collared Manakin
  Manacus candei

* Tropical Kingbird
  Tyrannus melancholicus

* Black Phoebe
  Sayornis nigricans

* Streaked Flycatcher
  Myiodynastes maculatus

* Great Kiskadee
  Pitangus sulphuratus

* Social Flycatcher
  Myiozetetes similis

* Brown Jay
  Psilorhinus morio

* Spot-breasted Wren
  Thryothorus maculipennis

* Louisiana Waterthrush
  Seirus motacilla

* Montezuma Oropendula
  Gymnostinops montezuma

* Melodious Blackbird
  Dives dives

* Yellow-tailed Oriole
  Icterus mesomelas

* Yellow-backed Oriole
  Icterus chrysalis

* Yellow-throated euphonia
  Euphonia hirundinacea

* Scrub Euphonia
  Euphonia affinis

* Masked Tanager
  Tangara larvata
LITERATURE CITED


