

Avifauna in Nicaragua

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Nicaragua is bordered on the south by Costa Rica and on the north by Honduras and El Salvador, and it extends from the Pacific Ocean to the Caribbean Sea. It is the largest of the Central American republics, but I am uncertain of the exact area, as the World Court decision of 1960 recognized the line proposed by King Alfonso XIII as the boundary between Honduras and Nicaragua. This put some areas claimed and occupied by Nicaragua into Honduras. (As Monroe never tires of reminding me, this transferred some of my best specimen records from what used to be northern Nicaragua into his domain.)

Nicaragua may be divided, geographically and ecologically, into two slopes and several divisions. There is a relatively arid Pacific slope and a wet Caribbean or Atlantic slope. There are highlands in the north-central area that extend from the northern boundary south to the valley of the Río Grande de Matagalpa, and there are isolated volcanic peaks in some otherwise lowland regions. Elsewhere, the country is of low relief, and there are two large lakes in the southwestern sector. For purposes of this presentation, I will designate habitats in general and popularly used terms. The categories of the Holdridge system of vegetation classification into which these Nicaraguan areas best fit are given in parentheses.

Most of the Pacific slope lowlands were originally covered with broad-leaved forest (much of it deciduous) in more humid situations, thorn scrub in the more arid localities (roughly, tropical dry forest and tropical very dry forest, respectively). At higher elevations, up to about 4,000 feet, there is either broad-leaved forest or, in the north-central highlands, pine forest (mostly *Pinus oocarpa*). This pine forest seldom extends below 3,000 feet. Above 4,000 feet there is usually cloud forest (premontane wet forest). The Caribbean slope lowlands are largely covered by evergreen rain forest (tropical moist forest and wet forest), but the equal humid northeast corner of Nicaragua includes a lowland pine savanna in which the elevation seldom

exceeds 400 feet and where only one species of pine, *Pinus caribaea*, is present. There are interdigitations and islands of rain forest along watercourses and in low, wet areas within the savanna.

The two great lakes, Lake Managua and Lake Nicaragua, are large but relatively shallow and likely to be rough as they are almost constantly swept by winds. This turbulence, plus the silt washed into them from many small streams, means that the lakes are always turbid or muddy. They lie almost entirely within the more arid Pacific slope except for the southeast section of Lake Nicaragua, which drains to the Caribbean by way of the Río San Juan. There are no extensive marshy areas around most of the lake shores.

This provides a brief outline of the major kinds of habitats that are found in Nicaragua. Now let us examine the effects of human activity on both the migrant and resident species of birds in each of these habitats. On the Pacific slope one finds certain migrant species that breed in the western part of North America. For instance, around the city of Managua one of the most abundant birds in the winter is the scissor-tailed flycatcher. It is present in enormous numbers and the air over the city is virtually filled with these birds at sundown as they go to their roosting places. Other winter residents include the western tanager, which is numerous in the lowlands of western Nicaragua. In the north-central highlands, one may find the Townsend warbler and hermit warbler occupying the pines of that region. On the Caribbean or Atlantic slope one finds wintering birds which breed in eastern North America, such as many of the warblers, for example, hooded, Kentucky, chestnut-sided, and magnolia warblers. Some of these are also found on the Pacific slope. As a rule, one does not find birds of western North America on the Caribbean slope of Nicaragua, but some breeding species of eastern North America are found as migrants or winter residents over both slopes of the country. Migratory waterfowl are present in moderate numbers at the appropriate season on numerous small

lakes, ponds, and lagoons throughout the country. The two great lakes do not support large populations of waterfowl, possibly because conditions on and around the lakes, as described previously, are not especially favorable.

The Pacific slope has been very much affected by agriculture, in particular since the late 1940's. Following the end of World War II, two North Americans came to Nicaragua and planted cotton. This was a tremendous financial success and, needless to say, encouraged a great boom in cotton planting which had not existed before. A great many areas were cleared for planting of cotton and much of the forest that persisted into the 1950's is no longer present. Almost every wooded section of western Nicaragua that would be suitable for cotton growing has been or is in danger of being converted to this purpose. With the sudden advent of a new crop of this kind the characteristic insect pests did not make their effect obvious immediately, but after a few years the boll weevil was present in destructive numbers along with other kinds of injurious insects. As a result, as Vogt has pointed out in reference to other countries, tons of insecticides are sprayed every year over the cotton fields of western Nicaragua. The effects of this are difficult to assess because we do not have any accurate figures or estimates on the numbers of birds that were originally present or how many there are now. It certainly seems obvious that this constitutes a very clear and present danger, not only because the quantity of insecticide sprayed over this region is enormous, but because it filters into streams that drain into the two great lakes where the effects may be felt for a great many years to come.

In the city of Managua there is a small museum, the Museo Nacional, founded by Diocletiano Chávez, which includes many mounted specimens of birds that he collected in the vicinity of Managua about half a century ago. On looking at this collection one is struck by the great number of large raptorial birds which used to occur but are no longer found in this region. This is a result of clearing of the forest, first for planting of coffee in the moderately high elevations and later for planting of cotton in the lowlands. It also goes without saying that the large galliform birds have disappeared from most of this area as well. Such species as the great curassow (*Crax rubra*), the crested guan (*Penelope purpurascens*), and to some extent the chachalacas (*Ortalis*) are greatly reduced, although the chachalacas are rather a resilient group and seem to do

rather well in second-growth areas even under fairly heavy pressure. Apart from large-scale coffee and cotton growing, there has been long-term destruction of the original Pacific slope forest for small-scale farming and for extensive cattle grazing. Thorn scrub is most likely to become established in overgrazed areas, and this type of vegetation has doubtlessly increased and extended into places where there was once broad-leaved forest.

The pine-forest birds of the north-central highlands have probably not been very much reduced by the presence of humans in this area. However, logging has certainly had effects on the habitat as has fire, but I think it is reasonably safe to say that the existence of these birds is not seriously threatened by the effects of human habitation and use of this region. The cloud forest is another matter, of course. This habitat disappears as rapidly as it can be cut for the planting of coffee, which is a very important cash crop in the economy of Nicaragua. Since there are not too many areas in Nicaragua of high enough elevation to support cloud forest, this does represent a serious problem and I need hardly emphasize again the fact that what is needed is the preservation of the habitat. If the habitat is preserved then the characteristic avian species such as the quetzal (*Pharomachrus mocinno*), the three-wattled bellbird (*Procnias tricarunculata*), and various others that are found in this region stand a chance. Without the habitat they stand no chance whatsoever.

The Caribbean slope rain forest has been cut very extensively where it is accessible. Until very recently, however, there was no communication except by airplane and by dugout canoe or mule trail from the Pacific slope to the Caribbean slope. A road has recently been completed after many years of work which connects the western part of Nicaragua with part of the Caribbean slope along the Río Escondido, and this will inevitably open up more of the country. As one flies across from one coast to the other, one is impressed by the frequent patches that have been cleared along the rivers for planting of bananas, corn, and beans. There is no question that the disappearance of the forest will continue and will be accelerated as time proceeds.

The lowland pine savanna has been extensively lumbered for the last 40 years, and most of the trees that remain are small ones, perhaps about 70 years old. Also, the area is subjected to periodic burning. Every dry season the local people set fire to the grass in order to clear away the coarse dry growth and allow tender

new shoots to come up and thus provide some food for cattle. Some of the fires may begin through natural causes such as lightning; in any case there is extensive destruction of seedlings. The seedling pines grow up in great numbers if they are not destroyed by burning, and a very dense growth of small pines quickly appears. A certain amount of burning may be desirable, because in areas protected from fire one finds a very dense cluster of exceedingly spindly seedlings; a healthier, more vigorous forest would probably result if there were some thinning out at an earlier time. Characteristic ground-dwelling savanna birds such as the black-throated bobwhite (*Colinus nigrogularis*) and common meadowlark (*Sturnella magna*) are very abundant despite burning, and these species could not exist in thick forest.

The sum total of the effect of human activity on bird populations in Nicaragua is not very different (if at all) from that mentioned for Honduras and British Honduras and undoubtedly for other regions. My impression is that the migrant passerines have not been affected detrimentally by the kinds of human activity that we have discussed here. Certainly they do utilize primeval forest, but without the primeval forest the migrants seem to be equally abundant, and it would not appear that destruction of the habitat on the wintering grounds is anything remotely approaching a limiting factor in the populations of these birds. The migratory waterfowl are hunted very little in Nicaragua, and in fact there is little sport hunting of any avian species. Very few Nicaraguans use shotguns, and only those with shotguns hunt quail, which are very abundant both on the Pacific slope and in the pine savanna region. Most hunting is done with a rifle by pot hunters, and a rifle is not a very effective weapon for hunting birds other than the largest game species. As mentioned yesterday in one of the talks, many of the lumber camps and mining communities employ local hunters whose job is to go out and secure meat for the camp. These men are mostly after deer and other large edible mammals, but naturally they take any of the large game birds, such as the curassow, the guan, and perhaps chacalacas and pigeons. In Nicaragua there is no extensive shooting of just any bird that happens to be big enough to use in the cook pot, as there is in many other parts of the world and some other parts of Latin America for that matter. Thus, the results of shooting are not serious as compared to the destruction of habitat, but shooting does have local effects on the populations of the large edible species and possibly the large

raptors. Among those who make shooting a conservation problem are some North Americans who come to work in Nicaragua. These people are often rugged outdoorsmen who like to use a gun and regard freedom from hunting and shooting regulations as one of the fringe benefits of their jobs. Some are real sportsmen, but others are inclined to take shots at any large or colorful bird just for target practice. Although this may not have serious effects on the total population of any species, it is a distressing thing and does nothing to aid the cause of conservation in these areas.

What about the species that might be endangered in Nicaragua? There are only three species of birds that are more or less confined to this country. These are the little pearl kite (*Gampsonyx swainsonii*), which inhabits the western part of Nicaragua, the Nicaraguan grackle (*Cassidix nicaraguensis*), found around the vicinity of the great lakes, and the little-known Nicaraguan seed finch (*Oryzoborus nuttingi*) which is found only on the Caribbean slope in wet meadows. The pearl kite is apparently the same subspecies as that found in northern South America, but the other two are usually considered distinct endemic species, although some authorities feel that the seed finch is conspecific with *O. crassirostris* of South America. The pearl kite, I would guess (and this is only a guess), is in danger of being affected by the spraying of large quantities of insecticides over the cotton fields of western Nicaragua. Since it feeds largely on insects and very small vertebrates—organisms in which these insecticides tend to accumulate—the kite would be a likely victim of any deleterious effects. The seed finch is a little known form, and I would only be guessing if I said anything about the effects of human activity on its numbers and its range. These might even be increased by human activity, since the bird is an inhabitant of open areas and not forest. The Nicaraguan grackle, the only unquestioned endemic species, is abundant and has probably increased its range as a result of human activity. It associates very closely with cattle, and wherever one finds cattle around the two great lakes one usually finds this grackle. As certain areas around the lakes have been cleared for pastures, the grackles have extended their range and will undoubtedly be found in northern Costa Rica before very long. In brief, the grackle is certainly in no danger at the present time.

Now, I would like to say something about the prospect for preservation of habitat and animal life in Nicaragua. The problems are very similar to those

that the other speakers have discussed—land is cleared for agricultural or commercial purposes at an accelerating rate, with generally predictable effects on the fauna. Political and economic conditions are of paramount importance in this situation. In Nicaragua, which lacks most of the resources necessary for industrial development, most of the real wealth is ultimately derived from agricultural and forest products. This means, inevitably, that those individuals and families with large holdings of land play key roles in the economic, political, and social life of the country, and these people are naturally extremely influential in matters of public policy. I believe I would be justified in saying that whether or not areas representing different kinds of habitat are preserved depends largely on the position of these influential groups. If preservation of certain natural areas has the support of particular Nicaraguan leaders, this can be done. Without their support it will not be accomplished. The question becomes, then, how can those in critical positions of authority best be appealed to for the cause of conservation? I think that the most hopeful prospect is an appeal to national pride. Nicaraguans in all walks of life, irrespective of their political affiliation, are intensely patriotic and proud of their country. By way of illustration I would like to mention the poet Rubén Darío. He was born in Nicaragua in a little village since renamed for him, and although he lived most of his life abroad he returned to his native land to die and is buried in the city of León. This man of letters is unquestionably Nicaragua's greatest national hero; there are statues and portraits of him everywhere and his name appears wherever printed words are found. All this points up the fact that when there is something or someone for whom national pride can be aroused, a great deal of popular and powerful support can be developed. If there is some way that national pride could be associated with the establishment of national parks or preserves of some kind, I think that much could be accomplished. This will require at the very least the active support of the leaders mentioned previously as well as the cooperation of the citizenry at large.

Discussion

ALDRICH. It had been mentioned several times now that in different countries there does not appear to be the likelihood of an effect of habitat change on migra-

tory birds of North America because of their tolerance for varieties of habitat. We have not distinguished, as I recall, between birds which are actually in progress of migration and those which have reached their wintering grounds and have become fairly static as winter residents. We are beginning to hear more and more about territorialism in birds on their wintering grounds, similar to that on their breeding grounds. I am wondering, in true wintering habitat due to this business of territorialism, whether there would be more restriction of tolerance of habitat than when the birds are migrating. Maybe that situation would be obscured by the movement of migrants through wintering areas of the same species.

HOWELL. I would say certainly this is a possibility. In Nicaragua at least there are very few resident species of warblers that would seem to be competitive with the North American migrants. About the only specific instance of competition that I can think of is in the pine areas where the Grace warbler shows very distinct aggressiveness toward the wintering species. Those found in Nicaragua do not seem to have any competitors among the resident species that would appear to affect their numbers to any great degree. In other areas farther north and perhaps farther south this may not be the case. As pointed out, scissor-tailed flycatchers are extraordinarily abundant as a wintering species in western Nicaragua, and they are, in contrast to their activity on the breeding grounds, extremely social. As I think everyone here knows, the scissor-tails will, on their breeding territory, sometimes fight to the death, whereas in the wintering area one can see trees with large numbers of scissor-tailed flycatchers and tropical kingbirds roosting next to one another, and the situation is very markedly different from what we are accustomed to on the breeding grounds.

ALDRICH. I was not talking so much about competition among species for territory but, rather, the selection of habitat for territory.

EISENMANN. The fact was mentioned, and it is certainly true, that the winter range of the migrant western birds usually ends around Nicaragua. Is that not, perhaps, in part a consequence of the presence of pines? Most of the western birds, except for the open country birds, follow the pines, which range south only to Nicaragua. Now, if you cut down the pines, is not that going to affect the winter habitat?

HOWELL. What I intended to say was not that the western forms are necessarily limited to Nicaragua and

extend no farther, but that there are certain species which are migrants from western North America that are found only on the Pacific slope in Nicaragua. None of these characteristically western species also occupies the Caribbean slope, whereas a number of the forms from eastern North America that winter on the Caribbean slope also flow over and occupy the western part of Nicaragua as well. Now as for the cutting of the pines, in this region the larger pines are already cut, but there is not much interest in the small ones and these are left alone. Those that are too small to cut for lumber are, nevertheless, quite adequate for the needs of the wintering warblers and other pine-forest species. For example, in the savanna and also in the montane pine forests in the south-central highlands, which have been pretty extensively cut, one still finds species such as the red crossbill and a number of very characteristic pine-forest birds. The Grace warbler, which never goes out of the pine trees, is very abundant in these regions and there is, it seems to be, little danger that the pines will disappear. Rather, the pines seem to do very well when everything else is gone. They will grow on soils that have been eroded or de-

pleted and will not support some of the other kinds of forests; and again, as has been previously mentioned, there is a body of opinion among plant geographers and ecologists that the pines, both in the highlands and especially in the savanna, owe their existence to human disturbance, to cutting and burning by aboriginal Indians. I think this is more likely to be the case in the savanna than in the highlands, but nevertheless the extent of the pine forest in northern Nicaragua does correspond quite closely to the historical records of habitation by the Spaniards in earlier periods, and also where they found Indians occupying this region. Now, whether they were there because the pines were there or whether they are responsible for the presence of the pines, I could not say on the basis of what evidence there is. But the point is that, at least in Nicaragua, pine forest and human habitation do not seem to be at all incompatible, and there is at least some interest in preserving the pines as a resource.

This one of the very few conservation activities that is going on—protection of pine areas from burning to allow seedlings to come up and renew the crop of trees.