

Wednesday, March 6, 2013

Year-round Songbirds Ready for Romance

By Charles Seabrook

For the AJC

It is early March, and romance is on the minds of many of our year-round songbirds. Their plumages are at their spiffiest and their voices are as fine-tuned as they will be all year. They seem anxious to get on with the task of baby-rearing. For some, the season already is under way.

Some observations:

— Bluebirds are flitting about with nesting material in their beaks. And how glorious is their blueness. Other blue-feathered songbirds (blue jays, indigo buntings, blue grosbeaks, cerulean warblers) may be just as blue. But in early spring, I can't imagine a more brilliant blue than that of the bluebird.

— Just as brilliant is the redness of male cardinals. I regularly hear them singing their courting songs now, trying to win over a female while at the same time warning other males to stay away. As an extra touch, a male cardinal will try to woo a female by feeding her seeds. If she accepts, they will mate and then sing to each other in soft, bubbly whistles for the rest of the year. It's one of the strongest pair bonds in the bird world.

— Male white-breasted nuthatches also offer food morsels to potential mates. To further impress a female, a male nuthatch bows and spreads his tail and droops his wings while swaying back and forth before her, as I observed this week. White-breasted nuthatches nest in cavities, as do Carolina chickadees, tufted titmice and brown-headed nuthatches, all of them potential competitors for nesting sites.

— Another favorite songbird in full voice now is the brown thrasher, Georgia's official state bird, which has one of the largest repertoires (as many as 2,000 songs) of any bird, including the mockingbird, which also is singing loudly and lustily now.

— Carolina wrens, which sing cheerily all year long but with seemingly more vigor in early spring, started nesting in late February, according to a neighbor, but I haven't seen any of their nests yet. They also are cavity nesters but aren't very particular about where they nest.

But this is only the beginning. The full glory of the spring nesting season in Georgia is still weeks away, when our neo-tropical songbirds — warblers, tanagers, flycatchers, vireos, thrushes, ruby-throated hummingbirds — return from their winter homes in Latin America. It is then, on a morning in April, that you may hear more than 30 species singing vibrantly at the top of their little lungs.

Sunday, May 20, 2001

Dying in Silence

What if you woke up one morning and all the birds in your back yard were gone? Forever.

By Charles Seabrook

At the first sliver of morning light, the chorus begins.

A bright red cardinal proclaims in a loud, descending note: "Cheer-cheer-cheer-purty-purty-purty."

A tiny magnolia warbler chimes in: "Wheedle, wheedle, sweetie-oh."

Then, from a dogwood, flows the rich, flutelike ee-o-lay, ee-o-lay of a wood thrush, one of Georgia's sweetest songsters.

By the time the sun is up, 30 or more different birds in the woods, the fields and in our back yards are in full voice, adding a joyful sparkle to a morning in May.

But the chorus is growing fainter.

Dozens of Georgia's most colorful, sweet-sounding songbirds are in serious trouble.

Since 1980, more than 20 of Georgia's melodious songsters --- including warblers, tanagers and thrushes --- have declined at a rate of 1 percent to 4 percent per year, or between 18 percent and 70 percent per species.

If there is no reversal of the trend, conservationists warn, today's children may never know the sprightly trill of a hooded warbler, the vibrant red, blue, green and yellow of a painted bunting or the antics of a brown-headed nuthatch creeping up and down a tree trunk, ferreting out insects.

The songbirds are the creatures that bird-watchers adore, whose songs fill the woods and fields in summer and the voracious consumers of tons of pesky insects.

Rachel Carson, in her monumental 1962 book "Silent Spring," called the little songbirds "woodland sprites" that "flow through the trees in spring in a multi-colored tide of life."

Marilyn Wrhel, who lives in Lawrenceville, knows how Carson felt. Wrhel (pronounced WHIRL) keeps four backyard feeders and two watering stations full to attract the birds.

"I just couldn't imagine life without the wonderful creatures," Wrhel says.

Many bird-watchers are unaware that a "silent spring" is a possibility again. When Carson first sounded that warning nearly four decades ago, it helped start the modern environmental movement and spell the end of the use of DDT, a pesticide that was deadly for birds.

The nation heeded Carson's warning and averted the silent spring she predicted. Now, the causes of declining numbers of birds are more complex and extend thousands of miles beyond the borders of the United States.

The average bird-watcher doesn't pore over annual breeding bird survey results or study radar images of bird migrations or mull over reams of other scientific data. But those who do --- the scientists, conservationists and full-time birders who take to the woods and fields every weekend --- have solid evidence of birds in peril:

> Seventy-eight species, or about one in every five of the 350 species that live in Georgia for at least part of the year, face population declines.

> Thirty-eight species --- 30 of them songbirds --- are on the National Audubon Society's high priority concern list for Georgia, meaning their numbers are declining at a rate of 1 percent to 4 percent per year or they face other pressures of survival.

> Some songbird declines are alarming. Cerulean warblers have dropped by 70 percent in the past 25 years, golden-winged warblers by 46 percent, painted buntings by nearly 50 percent, wood thrushes by 40 percent.

Many other birds, including the brown thrasher, Georgia's official state bird, show early signs of population loss.

Songbirds are not the only class of birds with shrinking numbers. The whippoorwill and the chuck-will's-widow, whose mournful calls are the essence of a summer night in Georgia, are in trouble. So is the clapper rail, whose loud, throaty cackle, which sounds like clapping hands, is a hallmark of coastal salt marshes.

"We need another wake-up call, another call to action to save our birds," says Duke University ornithologist John Terborgh, whose pioneering research helped call attention to the birds' plight.

Vanishing habitats

Twice a year, "neotropical" birds, most of them tiny songbirds --- warblers, tanagers, flycatchers, vireos, orioles, gnatcatchers --- pull off one of life's greatest miracles.

Each spring, tens of millions of the songbirds, some weighing no more than an ounce, leave the Caribbean and Mexico and fly up to 20 hours nonstop over more than 600 miles of the Gulf of Mexico. They make landfall along the coasts of Florida, Alabama, Louisiana or Texas, depending on the prevailing wind patterns.

That nonstop trek is only one leg of the amazing journey. After resting and refueling for a day or so, they fly hundreds of miles more to their summer breeding areas in Georgia and elsewhere in North America.

Then, in the fall, they make the return trip to the tropics.

Most of us don't see the huge songbird waves because they fly over our homes at night, when temperatures are cooler and predators are not as prevalent.

But even if the birds make it across the open sea --- and many do not --- their survival is still in jeopardy.

The growing number of telecommunication towers, skyscrapers and other obstacles poking into the sky kill more than 100 million birds a year as they slam into the structures. Migratory

songbirds suffer the heaviest losses by far, mostly because they migrate at night. On the ground, pesticides, roaming house cats and other predators kill tens of millions more.

But the towers, chemicals and animals aren't the biggest threats to songbirds and all of Georgia's imperiled bird species. The worst threat is the loss of habitat --- the woods, grasslands and swamps where the birds feed, raise their young and escape from predators.

The Atlanta Audubon Society's yearly Christmas Bird Count used to turn up sparrows, northern bobwhite quails, eastern meadowlarks and other "field birds" in abundance in the region. But their numbers have plummeted as subdivisions and shopping centers chewed up the landscape.

"It's unlikely that we'll ever see the high numbers for any of the field birds again," says Bill Blakeslee, a Marietta birder who has helped conduct the Christmas count for more than two decades. "It's only a matter of time, for instance, before the eastern meadowlark joins the northern bobwhite as a species not to be found on our count."

Some Audubon members think the Atlanta survey should be discontinued because of plummeting bird populations. "It's hard to find birds in a Wal-Mart parking lot," says Atlanta birder Jeff Sewell.

Neotropical birds face similar threats in their winter habitats.

"If we want to protect these birds, we must protect them at home in the United States as well as in Latin America and the Caribbean," says Daniel Beard, senior vice president of the National Audubon Society.

However, millions of acres of tropical forests are being destroyed every year for cattle ranches, agriculture, mining, fuel, home building and timber export.

More than half of Georgia's neotropical birds spend the winter in Mexico, Central America, the Bahamas, Cuba, Haiti, the Dominican Republic and Puerto Rico. Haiti, for example, is nearly devoid of native forest. Mexico is losing an estimated 5 million acres a year. Much of Cuba is under sugar cane cultivation.

But what's going on in the coffee-growing region in Puerto Rico and in Latin America is particularly alarming. Numerous tracts of shade-grown coffee are being bulldozed for conversion to the more profitable sun-grown coffee groves.

Neotropical songbirds thrive in the dense canopies of shade-grown coffee plantations, but they shun the thin, exposed sun-grown coffee fields. The U.S. Department of Agriculture is encouraging farmers to go to the more profitable sun-grown coffee, even threatening to withhold crop insurance and other subsidies if they don't.

"Shade-grown coffee plantations are the last remaining refuges for (overwintering) neotropical songbirds, but the habitat is threatened by the incentives from the Agriculture Department," says Leopoldo Miranda-Castro, a biologist who keeps track of neotropical birds in Puerto Rico for the U.S. Fish and Wildlife Service.

USDA officials say they are aware of the concerns, and the agency is considering re-examining its policy favoring sun-grown coffee over shade-grown.

For North American birds spending the winter in the tropics, the loss of even a few acres could spell disaster. The total combined area of Mexico and the Central American and Caribbean countries is roughly one-sixth of the landmass of the United States and Canada south of the Arctic Circle. That means the birds overwintering in the Southern Hemisphere are concentrated into much smaller areas than they are in North America during the summer.

"So, when you lose one acre of the rain forest, it might be equivalent to losing hundreds of acres of forest in Georgia," Miranda-Castro says.

The neotropical birds that migrate farther south, deeper into South America, find conditions there as harsh as those in Mexico, Central America and the Caribbean.

The tiny cerulean warbler, a candidate for the federal Endangered Species List, is a case in point. The brilliantly blue bird, no bigger than an adult index finger and weighing no more than a couple of nickels, builds its nest of moss and bark in the treetops of old-growth forests in North Georgia.

It wings its way here from the eastern slopes of the South American Andes, where it spends the winter in a narrow, snakelike band of misty forest 2,000 to 4,500 feet above sea level.

Unfortunately, that ribbon of temperate forest harbors native trees that are among the most valuable timber in South America.

And the cool temperatures, abundant rainfall and rich soil make the region ideal for growing coffee, rice and coca, the raw ingredient of cocaine.

In the spring, when the cerulean returns to Georgia and other points north, it faces an equally hard struggle for survival. It prefers to nest in mature hardwood forests with tall trees and relatively few saplings and shrubbery. It rarely breeds in tracts of woods smaller than 500 acres, and it prefers unbroken forest tracts of several thousand acres.

Thousands of square miles of this sort of habitat have been lost to reservoirs, stream channelization, highways, power lines, housing and commercial development, according to Fish and Wildlife Service biologists.

"I'm afraid it's not going to get any better, at least not in Georgia," says Brent Martin, director of Georgia Forest Watch, one of 28 organizations nationwide that petitioned the government to add the cerulean to the Endangered Species List.

"The only place where ceruleans still nest in Georgia is in the northwest corner of the state," Martin says. "But development is gobbling up everything between Atlanta and Chattanooga, and the bird doesn't stand a chance."

Eagles, falcons beat odds

By the time Rachel Carson sounded her alert in 1962, the widespread and indiscriminate use of powerful pesticides such as DDT had devastated birds and other wildlife.

The main damage was eggshell thinning, which killed baby birds before they hatched. Bird populations plummeted. In 1970, not a single bald eagle nest could be found in Georgia.

With the banning of DDT, state and federal biologists established an intensive eagle recovery program. This spring, biologists found a record 61 eagle nests in Georgia, which produced 89 new fledglings. The bald eagle and peregrine falcon are no longer on the Endangered Species List.

But saving migratory songbirds may be the most daunting task ever faced by American conservationists.

"There might be 20 reasons why neotropical birds are declining," says Chuck Hunter, an ornithologist with the U.S. Fish and Wildlife Service's regional office in Atlanta.

Scientists first detected substantial clues of songbird declines in the 1970s. The best evidence came from the North American Breeding Bird Survey, organized in 1966 by the Fish and Wildlife Service. The data indicated that populations of several species were declining.

The survey, conducted by thousands of professional and amateur ornithologists across the continent, takes place between May 28 and July 7 every year. Birders drive along more than 3,500 routes, including 55 in Georgia, each of which is 25 miles long. Every half-mile, a birder stops for three minutes and counts the number of singing male birds.

Scientists analyzing the tallies started finding populations of several species dropping steeply. Other researchers, though, wanted more solid evidence.

It came in 1989 from ornithologist Sidney Gauthreaux of Clemson University. He had been using weather radar to study neotropical migrations across the Gulf since the 1960s. His analysis of 33 years' worth of archived radar images found that the frequency of springtime migrant waves across the Gulf had declined by a shocking 50 percent.

Species on the ropes

Once-abundant birds can become extinct quickly. Gone forever from Georgia is the passenger pigeon, whose mind-boggling flocks were so huge (hundreds of millions of birds by some accounts) that they darkened the skies for hours. Passenger pigeons were believed to have been the most common bird ever in the world. Now they are extinct, due to overhunting and the loss of the chestnut tree, which once represented one in every four trees in the Appalachians, to disease.

"We have the answers, such as better protection of our natural areas, to save our songbirds from this fate," says Derb Carter of the Southern Environmental Law Center. "But I don't know if we have the will to carry it out."

Last year, the Southern Environmental Law Center and 27 other conservation groups petitioned the U.S. Fish and Wildlife Service to list the cerulean warbler on the federal Endangered Species List because of the bird's steeply declining numbers. Several other groups also petitioned to have the yellow-billed cuckoo listed.

Conservationists say several other songbirds also should be considered for listing.

But last month, the Bush administration asked Congress to set aside, at least for a year, a crucial provision in the Endangered Species Act. It allows citizens to use the courts to force the U.S. Fish and Wildlife Service to list a species as endangered or threatened.

Administration officials said the Fish and Wildlife Service already is overburdened with more than 400 petitions and lawsuits to add other species to the list.

Conservationists denounced President Bush's plan, saying it would take power away from citizens and put it in the hands of the federal agency, which they said has been reluctant to make the tough decisions involved in designating endangered species.

"One of the reasons the (Endangered Species Act) works is that Congress gave citizens a right to petition and to sue," Carter says. "The only way many of the species on the list are there is because of citizen lawsuits. The government has to be prodded to act."

The government banned DDT only after a conservation group, the Environmental Defense Fund, sued to have its use stopped.

Once the federal government designates a species as threatened or endangered, it must map the "critical habitats" that should be protected to save the species. Detailed plans to restore the species' wild populations must be drawn up and implemented.

The process can take years.

"Several of our songbirds don't have that much time," Carter says.

If the birds are in peril, we may be in trouble, too.

"The birds' decline should be a red flag that something is wrong with our environment." says Hunter, the Fish and Wildlife Service ornithologist.

For the average bird-watcher, however, there is ample reason for saving the birds in their uncanny ability to brighten up a morning in May.

A SAMPLE OF BIRDS IN PERIL

Prothonotary Warbler

Named for court officers, or "prothonotaries," who wore bright yellow robes; declining at rate of 1-3 percent per year.

Cerulean Warbler

Brilliant blue feathers; declines since the 1970s have been severe.

Wood Thrush

Sweet song has inspired poets; declined about 40 percent since 1980.

Painted Bunting

North America's most colorful songbird; severe declines on Georgia coast.

Yellow-billed Cuckoo

Sharp kuk-kuk-kuk announces this bird, but it's disappearing in the East.

Monday, May 21, 2001

Nowhere to Land

By Charles Seabrook

The problem had to come from south of the border, scientists had decided.

It was the 1970s, and bird populations were declining. It had to be because of the destruction of tropical forests in Latin America. Forests there were being leveled by the millions of acres per year to make way for mines, cattle ranches, agriculture crops and other development.

But tropical forest loss alone could not account for all bird declines --- especially for species like the northern bobwhite and the clapper rail, which don't migrate. Researchers began looking for answers in the forests and fields of Georgia and elsewhere in North America.

They had to look no farther than down the street.

Massive urban sprawl was rapidly engulfing the landscape, displacing numerous birds in its wake.

Now, the unceasing human encroachment has nearly eliminated field and grassland birds --- the bobwhite, field sparrow, eastern meadowlark, loggerhead shrike, prairie warbler, Bachman's sparrow --- from many parts of metro Atlanta. Forest destruction also has decimated populations of "forest interior" birds like the wood thrush, which naturalist Henry David Thoreau said "declares the immortal wealth and vigor that is in the forest."

One songbird, the Bewick's wren, once common throughout Georgia and famous for nesting in old cars, junkyards and outbuildings, has all but disappeared from the state.

Ornithologist Georgeann Schmalz, who has kept tabs on birds in Atlanta's Fernbank Forest for more than 25 years, says nesting neotropical birds are becoming scarce in the 82-acre forest, and she suspects the intense development surrounding it is a reason.

Experts say there are several reasons for bird declines, but the biggest reason is the rapid loss of habitat --- forests, grasslands, marshes, swamps where the birds breed, feed and protect themselves from predators.

The dwindling bird numbers have prompted state and federal biologists and conservation groups to undertake an array of bird-saving missions.

Neotropical songbirds are a primary focus. The efforts make up the largest conservation effort undertaken for a segment of wildlife neither exploited by hunters --- such as ducks and wild turkeys --- nor on the Endangered Species List.

Why the fuss? The prompt answer from ecologists is that the birds are vital to the health and functioning of ecosystems. Their appetites are voracious, consuming mind-boggling numbers of insects every summer. A pair of nesting warblers and their brood may consume more than 2,000 leaf-chomping caterpillars a day.

Some studies have shown that without the songbirds, entire forests would be denuded.

"When forest birds eat insects, the result is greater tree growth and a longer period between insect outbreaks --- services that may be worth as much as \$5,000 per year for each square mile of forest," says Scott Robinson, an ornithologist with the University of Illinois.

Birders have another perspective: The birds, with their sweet morning songs and dazzling reds, yellows and blues, are worth saving for no other reason than the great joy people find in watching, studying and listening to them.

Biologists predict many more areas of metro Atlanta and Georgia will lose birds as development steams ahead unabated. The 2000 census, for instance, shows that the 20-county metro Atlanta area boomed to 4.1 million residents from 1.8 million in 1970. The exploding growth translates into the loss of an estimated 50 acres of tree cover per day for new homes, malls and other development.

Bands of suburbs also have started merging with each other along Southern transportation corridors, in some cases forming almost unbroken chains of medium-density areas hundreds of miles long --- from Atlanta to Charlotte along I-85 or Atlanta to Chattanooga along I-75.

"The entire Piedmont region is heading toward one big area of sprawl, and when you lose habitat outright, you lose birds. Period," says Chuck Hunter, the U.S. Fish and Wildlife Service's Southeast coordinator for nongame bird species. "With farming or logging, you can always restore it. But once you've got houses and Wal-Marts, there's no return. It's the final nail in the coffin."

About 65 percent of Georgia is now forested --- nearly twice as much as at the turn of the last century, when cotton fields dominated the Piedmont and massive clear cuts had leveled

mountain forests. With the decline of cotton and the timber industry's shift to the West Coast after the Eastern forests were felled, scores of old fields and clear cuts reverted back to forest.

Now, the landscape is rapidly changing again.

The U.S. Department of Agriculture last year ranked Georgia third in the nation --- behind Texas and Pennsylvania --- for the amount of farmland and woodland being converted to subdivisions, malls and other development. Between 1992 and 1997, about 211,000 acres of farmland and forests per year --- more than 1 million acres altogether --- were developed. It was nearly three times the 77,000 acres developed per year between 1982 and 1992.

The pace of the growth does not portend a good future for many songbirds.

On the coast, rapid development is a major reason for the steep decline --- about 50 percent in the past 20 years --- of the painted bunting, which without doubt is North America's most colorful songbird. The male sports a blood red belly, a royal blue hood, a red eye ring and a chartreuse cape on his back.

Ornithologist Joe Meyers with the U.S. Geological Survey in Athens says the wax myrtle thickets and other shrubby habitat preferred by the bunting are being gobbled up by new subdivisions and vacation resorts.

Elsewhere in the state, especially in the gently rolling Piedmont, where most of the state's human population is concentrated, development has created a highly fragmented landscape, with subdivisions and malls popping up all over the place, separated by isolated patches of woods or grasslands. Roads, power lines, farm fields and logging clear cuts also have partitioned the terrain into a patchy quiltlike pattern.

Fragmentation can be devastating to songbirds. Study after study shows that the birds have trouble raising their babies in small blocks of islandlike woods surrounded by clear cuts, farmland and suburbs, as compared with large forest tracts.

Fragmentation creates avenues in which predators --- house cats, snakes, raccoons, opossums --- are virtually funneled into nesting sites, giving the marauders greater access to forest-nesting birds.

Neotropical songbirds' choice for nest locations doesn't help their cause. They often build their cup-shaped nests in the forest understory, relatively close to the ground or on the ground in easy reach of hungry, prowling creatures. White-tailed deer can make it easier for the birds'

enemies. The deer, which have become pests throughout Georgia, often over-browse critical cover for the birds, leaving them sitting ducks for predators or even homeless.

The end result of fragmentation is that fewer nests succeed, fewer young birds return the next spring to replace adults lost to natural mortality, and the population declines and eventually crashes.

In Atlanta, Schmalz believes a variation on that scenario may be playing out in the Fernbank Forest, where the nesting neotropical birds' numbers have declined sharply over the years.

A predator that is becoming a major threat in Georgia's fragmented landscape is the brown-headed cowbird, a nondescript robin-size bird that prospers on forest edges, says biologist Terry Johnson of the Department of Natural Resources.

Cowbirds are brood parasites, laying their speckled eggs in the nests of other birds, leaving their chicks to be raised by the foster parents. In many cases, the cowbird will remove the eggs of the other bird and replace them with its own. With much of the foster parents' energy devoted to raising the voracious, fast-growing cowbird young, the songbirds' offspring, which are usually much smaller in size, often perish.

Schmalz and other experts, however, don't totally disparage the isolated, fragmented woodlots: Even though fragmentation is not good for the birds, they say, the woodlots are still more desirable than felling them for cluster homes and condominiums. Wooded tracts like Fernbank Forest are still important for neotropical migrants passing through and for the year-round urbanized birds.

But the urban woodlots themselves are endangered.

To illustrate that, biologist Malcolm Hodges of the Nature Conservancy of Georgia recently drove a visitor around some newly built subdivisions near Riverdale in Clayton County, pointing out stands of pines, some more than 40 acres in size, that are slated for the chain saw within the next year.

Some songbirds, like the summer tanager and probably the brown-headed nuthatch, still nest in the remaining stands, he said. But when the blocks of trees are destroyed, the birds living there must fly in search of other woods. Those woods, however, probably already have all the birds they can hold, and the new arrivals must run off the established residents or, if they can't, fly even farther for a place to live.

"The likely outcome is that some birds die." Hodges said.

Tuesday, May 22, 2001

Forest of Human Obstacles Deadly for Migrating Birds

By Charles Seabrook

Birds are on a collision course with modern technology.

The age-old migration routes of songbirds now returning to Georgia and other points north have become dangerous obstacles courses --- virtual death traps for millions of birds along the way.

The trek to their summer breeding grounds in North America is arduous enough. After departing staging areas in Mexico and the Caribbean, the tiny birds wing it up to 20 hours over 600 miles of the Gulf of Mexico before making landfall on the Gulf Coast --- a truly remarkable feat.

Then they must fly hundreds of miles more to reach the spots where they build their nests and rear their young.

But modern technology has put thousands of obstacles --- broadcasting and telecommunication towers and soaring skyscrapers --- in the birds' paths, vying with them for airspace. At the same time, rampant development is paving over vital wild places known as "stopovers," which exhausted birds need for refueling and resting along migratory routes.

The result: Millions of birds survive the rigors of crossing the open Gulf only to perish in the homestretch.

Biologists and conservationists estimate that communication towers, some stretching as high as 2,000 feet into the air, are causing the deaths of as many as 40 million birds a year. They die when their bodies slam into the structures or they become disoriented by the towers' lights and crash into guy wires or into each other.

When telephone line towers, power lines, tall buildings and even modern-day wind mills --- or wind turbines --- are factored into the mix, the death toll may exceed 100 million, bird experts say.

At highest risk are the tiny neotropical songbirds, the warblers, tanagers, thrushes, vireos, flycatchers and orioles that breed and nest in North America in the spring and

summer and migrate to Latin America and the Caribbean for the winter. Unlike migrating flocks of cranes, ducks, geese and other large birds, neotropical songbirds migrate at night to avoid daytime heat and predators.

U.S. Fish and Wildlife Service biologists say the annual "tower kill" tally is a significant reason for alarming declines in migratory songbird populations since 1970.

More than 25 of Georgia's neotropical songbirds --- including wood thrushes, painted buntings, golden-winged warblers, cerulean warblers --- are among those facing diminishing numbers.

"The next step for some of these birds could be listing under the Endangered Species Act . . . and this is a train wreck we're trying to avoid," says Albert Manville, a Fish and Wildlife Service biologist in Washington, who keeps track of migratory birds and other international issues.

The Fish and Wildlife Service estimates that towers 200 feet or higher are killing between 4 million and 5 million birds a year nationwide, while an American Bird Conservancy study released last summer says the grim toll runs as high as 40 million birds annually.

If one considers just the lowest estimate of 4 million birds, "that means that towers are on average killing one bird every 7 1/2 seconds, every day and every night, all year long," Manville says. "These are mostly the little birds, the songbirds. So this is a fairly significant impact."

The study cites more than 230 bird species --- more than 50 of them rare, endangered or facing plummeting numbers --- as victims of the slaughter. Atop the list are neotropical songbirds.

According to the report, the ovenbird, a 5-inch-long, brown and white warbler that builds its ground level nest resembling a Dutch oven in Georgia's mountains, is the species most often killed by towers in the past 50 years. The red-eyed vireo, a 5-inch-long, greenish-backed bird with a warbling song that nests in forests throughout the state, is second on the list. Third is the Tennessee warbler, a tiny vocal bird that pays short visits to Georgia during migration.

Also fairly high up the list are migratory species of special concern in Georgia

because of dwindling numbers --- Swainson's warbler, cerulean warbler, Bachman's sparrow and Henslow's sparrow. The warblers are neotropicals; the sparrows are short-distance migrants.

The study is a "smoking gun," implicating towers as major killers of migratory birds, says Gerald Winegrad, vice president for policy at the Washington-based conservancy. "In fact, it's a blazing gun," he says.

Birds have been dying for centuries from smashing into tall structures, such as lighthouses and smokestacks. Biologists also have been coming across birds killed by slamming into TV and radio towers for decades. For many researchers, the towers were favored places to collect dead birds for study purposes.

Only in the past few years have researchers come to regard tower kills as an urgent problem.

Generally, the taller the tower, the higher its risk to birds.

Only towers of 200 feet or taller, which are required by the Federal Aviation Commission to have safety lighting, are federally registered. There are more than 45,000 of those nationwide, says the Federal Communications Commission. Georgia has 2,059 --- one of the highest tower densities per square mile in the nation.

Clemson University ornithologist Sidney Gauthreaux recently showed visitors a map of Georgia with colored dots representing the locations of telecommunication and broadcasting towers. So many dots were around metro Atlanta that they merged into a solid block.

"It's a wonder how the birds get through it," said Gauthreaux, who in the 1980s used radar images of migrating birds to provide compelling evidence of songbird declines.

No one, though, is keeping official records of tower kills in Georgia.

Most songbird species fly aloft at 1,000 to 2,000 feet at night. During spring and fall migrations, birds may simply collide with the towers or with the supporting guy wires, especially on dark and stormy nights when visibility is poor.

Gauthreaux and other experts, however, say that the aviation safety lights on the towers are mainly responsible for the highest numbers of bird deaths.

The worst kills happen, they say, when a flock, perhaps numbering hundreds of thousands of birds, flaps toward a lighted tower during conditions of low cloud ceiling or fog. The birds lose their celestial aids for nocturnal migration --- the stars, moon and other natural light --- and have no way of orienting themselves, either from the sky or from the landscape below.

The tower's beacons then become the birds' strongest visual cues. Consequently, they end up flying endlessly in circles around the structure, uttering eerie distress calls. Thousands may cram into a relatively small space around the tower, getting caught up in a vicious whirlpool. Many others, already stressed out from the rigors of migration, fall to the ground from sheer exhaustion and quickly are snatched up by predators.

Studies document that hundreds or thousands of broken bird carcasses may be found beneath a single tower after one night. Some of them hit the ground with such force that they impale themselves on grass stubble.

Most kills, however, probably are never reported because predators are very efficient at grabbing the bird carcasses before anyone sees them, researchers say.

The general estimates of tower kills come from five or so long-term studies of bird deaths at individual towers 800 feet tall or higher around the nation. In one pioneering study, ecologist Herbert Stoddard and researchers at the University of Georgia dutifully counted --- at just before dawn every morning --- the birds killed at a 1,010-foot TV tower near Tallahassee.

The study took place from 1955 to 1980. During those 25 years, Stoddard found the broken bodies of 42,384 birds --- an average of about 1,700 a year --- from 189 species lying at the foot of the tower.

Using the results of the long-term studies and scores of limited tower kill reports from around the nation, biologists concluded that the total number of tower-related bird deaths runs into the millions each year.

Joe Meyers, a UGA graduate student in the 1970s, says the sight of several dead birds in a small area can be a gut-wrenching experience. He recalls opening a big freezer in a UGA laboratory once and finding it filled to the hilt with frozen songbird carcasses retrieved by Stoddard from around the broadcasting tower.

"It made quite an impression on me, seeing so many dead birds," says Meyers, now an ornithologist with the U.S. Geological Survey's field office in Athens.

The death toll likely will get worse, conservationists warn. The erection of communications towers --- including radio, television, cellular and microwave --- in the United States is growing at a breathtaking rate, increasing at an estimated 6 percent to 8 percent per year to serve the booming communications industry. Industry projections are that the nation's landscape will be bristling with as many as 100,000 new towers by the end of this decade.

More than 1,000 of them will be megatowers more than 1,000 feet high to meet the demands of digital television. Federal laws requires that all television stations broadcast digitally by 2003.

"When you get into the 1,000-foot range, you're really into migrating songbirds' altitude," says Gauthreaux.

DTV towers already are poking into Georgia's sky, and four Atlanta television stations --- WXIA-TV, WGCL-TV, WAGA-TV and WSB-TV --- already are broadcasting digitally.

Alarmed over the annual bird killings and the possibility of the death rate worsening, several professional ornithological groups in 1998 urged the Fish and Wildlife Service to form a "working group" of representatives from the telecommunications industry, other federal agencies and academic institutions to study the problem.

Last fall, the agency issued a report saying, "The construction of new towers creates a potentially significant impact on migratory birds, especially . . . night migrating birds."

It also issued interim guidelines to reduce bird mortality from tower collisions --- lowering tower heights, employing different lighting and tower designs with fewer guy wires and limiting towers in areas where birds are more likely to fly in great numbers.

The temporary recommendations will remain in effect until a more comprehensive national policy on tower kills is worked out. Meanwhile, Fish and Wildlife Service personnel will follow them in evaluating the potential impact of new towers on migrating birds.

Fish and Wildlife Service also has approved a nationwide research program to

scrutinize tower kills to craft a permanent policy for reducing the annual death toll. The study will cost \$5 million to \$10 million.

How much cooperation the agency gets from industry --- even from its sister federal agencies --- in following the guidelines and helping in the research remains to be seen.

Fish and Wildlife Service acknowledges that the guidelines are voluntary and in some cases will be expensive for industry to carry out --- reasons perhaps why response to the guidelines so far has been lukewarm.

Building a structure without supporting guy wires requires more concrete and steel, adding about \$70,000 to the cost of building a 300-foot tower, say tower construction industry officials. And the higher the tower, the higher the costs.

Until now, the broadcasting and telecommunications industries have largely avoided the tower kill issue. Bill Evans, a consultant to the Cornell Laboratory of Ornithology, says simple ignorance has a lot to do with it and lays some of the blame on ornithologists themselves. "We have known for more than 50 years that TV towers kill birds, but we didn't make the industries aware of the problem until recently," he says.

Evans has made tower kill prevention a lifetime crusade. His Web site ---www.towerkill.com --- documents bird deaths around the country.

On the other hand, some ornithologists say the bigger reason for industry's failure to come to grips with bird kills may be the realization that tower owners possibly are in violation of federal law if their structures cause harm to migratory birds.

The 1918 Migratory Bird and Treaty Act prohibits the "taking, killing, possession, transportation and importation of migratory birds, their eggs, parts and nests" without a special permit.

The measure may be a reason many tower owners decline to take part in studies, says Gauthreaux.

The Fish and Wildlife Service says the law is the law. "It is not possible under the act to absolve (tower owners) from liability," even if they follow the agency's new guidelines, said Jamie Rappaport Clark, Fish and Wildlife Service director under the

Clinton administration.

Gauthreaux says several tower kill solutions, albeit controversial, are at hand. For instance, birds seem to be most in danger from towers with red lights, but appear to give wide berth to structures with flashing white strobe lights. "We've found that bird strikes decline considerably when white strobes are installed on towers," Gauthreaux says.

But while white strobes might benefit birds, humans hate them. "If you have flashing strobes near a residential area, you're going to get a lot of complaints," says Gauthreaux.

Another bird collision peril is getting less attention --- birds crashing into office buildings that stay lit up at night. During peak migration periods, downtown Atlanta office workers coming into work in the morning often report finding dead songbirds on sidewalks around tall buildings.

The same mechanisms that disorient birds and cause them to collide with communication towers may be the culprits in skyscraper kills. The birds crash into windows of office buildings where lights are on or into buildings lit up by floodlights. One solution to the problem: Turn off the lights at night. Says Meyers: "By turning off the lights, you not only help the birds, you save energy."