DOWN BUT NOT OUT

The Declining Cerulean Warbler

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The song came from the top of a cottonwood tree that towered through a small gap in the dim, green light of the dense canopy of a bottomlands forest along the Upper Mississippi River in southeastern Minnesota. It was barely a faint buzz, a *twee*-twee-twee-twee-twee-*tweez* that rang so softly that I began to wonder if its source really was a bird and not some minuscule insect instead, making an extremely hushed noise. After all I had been listening for more than twenty minutes, staring at the crown of the 80-foot high cottonwood, and I certainly had not seen any bird!

The buzz repeated itself at a fast pace, and a breeze blew, and a clatter of leaves drowned out the twee-twee-*tweez* completely. Then the breeze stopped, and a small, blue warbler darted up from a thick mass of foliage and lit high on a sunny, bare branch.

The bird's throat and belly were snow-white. A dashing, dark band ringed its breast; two white bars marked each of its grayish, blue wings, and black streaks ran down its flanks. The bird sang once more and then flew in a straight burst from his perch and was instantly gone in the top of the woods again.

Later in the same month, May, another male of the same species zoomed into a chest-high box elder tree, and while the bird preened, he bowed his head, and for several precious seconds his crown showed off the bright, unblemished blue that lends the warbler its name–cerulean.

Both sightings made me glad, but the first piqued a special hope. The first occurred two kilometers deep in a forest on the Upper Mississippi River National Fish and Wildlife Refuge, and in a few weeks I planned to return to the spot and document breeding birds. If the cerulean warbler stayed in the forest and attempted to nest, it would be the most important species to count in the woods all summer.

For the cerulean warbler appears to diminishing faster than any other warbler in North America. Breeding Bird Survey routes indicate the species declined at a rate of 3.7 percent per year from 1966 to 1993.

That rate suggests that there were roughly twice as many cerulean warblers 25 years ago as there are today. If the same decline were to continue for another 25 years, the population would be cut in half again. Of the 650 bird species that breed in North America, only five have shown greater declines than the cerulean warbler.

The bird breeds in mature, deciduous forests in floodplains and other moist conditions such as ravines, coves and upland slopes from north-central Texas and Louisiana, Mississippi and Alabama northward to Minnesota, Wisconsin, Michigan, New York and Vermont. According to Paul Hamel of the Southern Hardwoods

Laboratory in Stoneville, Mississippi the cerulean warbler is found most frequently in mature forests where there are exceptionally tall trees and slight openings in the forest canopy, about the size of a gap created by a tree fall. The species is virtually absent from stands in forests where only small trees exist. According to Chandler Robbins, Pautexent Wildlife Research Center, Maryland, the species is rarely found in tracts of forests smaller than 250 hectares.

Hamel, Robbins and other researchers agree that the cerulean warbler has suffered considerable habitat loss due to deforestation since the 1800's and current forest fragmentation. The species nests high in forest canopies where nests are difficult to see, so nesting data for specific habitats for the past or even the last decade are scarce. Consequently the extent of loss of cerulean warbler habitat may never be known.

Other factors limiting the population of cerulean warblers are also suspected but not quantified by science yet. Cowbird parasitism. Loss of winter habitat. Logging practices in the U.S. that prevent forests to achieve old-growth status. Pollution of waterways. Disease to trees where nests have been historically located–elm, American chestnut, oak and sycamore trees.

Early last June I walked into the bottomlands woods in Minnesota again, hoping there was still a cerulean warbler near the 80-foot-high cottonwood. I approached the cottonwood and was surprised to see a woman standing below the tree, wearing a cloth hat with a round brim curled up at a luxurious angle. She lowered a pair of binoculars and smiled a big, white, silent smile–a birder's grin obviously, brimming with the joy of seeing and hearing something very good.

She was Dawn Hinebaugh, wildlife ecologist, monitoring cerulean warblers in 1994 on the Upper Mississippi River for the Wisconsin Department of Natural Resources.

"The male cerulean warbler is singing his partial song!" she said. "He's leaving the emphasis off the end, and that's what he does when his female is on a nest somewhere!"

Dawn and I searched for a female cerulean warbler–a bluish gray and olive green bird with a dull white belly and white wingbars and white eyebrow stripe–on or near a nest, but we did not find one that day. Still it was a day of discovery for me. Dawn had studied cerulean warblers in 1993 with Paul Hamel, who has monitored the species on its breeding grounds since 1984 and who is currently writing its life history. As we returned to our cars, she told me the natural history of the bird.

Male cerulean warblers arrive on their nesting grounds during early or mid-April in the southern region of their breeding range, and during the last days of April and the first week of May in the northern part of their range. They engage in constant sing-offs until females arrive on the nesting grounds about two weeks later.

The female cerulean warblers seem to be aware of the general areas of male

territories when they first fly in during the spring, said Dawn. Once in Tennessee a female made its initial appearance in an area and lingered in a tree bordering on the point of three, separate male territories. Occasionally Dawn has observed females perched intermittently on one male territory and then an adjacent territory shortly after females arrived.

Males are aggressive with one another during early breeding season. During mid-May in the bottomlands woods in Minnesota a male sang loudly from a tall, black willow tree while a female fed quietly in a lower tree. A second male appeared beside the female, and the first male swooped down at the intruder instantly. Both males shot away in a chase that seemed as fast and intense as a hummingbird chase. Males also grapple each other fiercely when they are near a single female during early breeding season, said Dawn.

Dawn showed me the nest of a cerulean warbler she thought was almost complete. The nest consisted primarily of shreds of grapevines that were as thin as pine needles. Its cup was only 3.5 centimeters deep and had a diameter about 4.5 centimeters, smaller than the "o" I could make with my thumb and forefinger.

The female cerulean warbler gathers materials and builds the nest herself. While searching for nests Dawn has learned to listen for the quiet sound of the female's bill opening and closing as the bird snips a spider's nest free from the furrows of a tree. The spider silk is used to bind shreds of grapevines, bark strips and other plant fibers to form the outside of the nest.

The female arranges the nest material on a branch high in the forest canopy, usually at least 10 meters above the ground. Then she hunkers her belly down on the material as if it were her brood and spins around and around at a frantic pace to form the cup of the nest. Nests Dawn has seen have had cups lined with dry grasses and shreds of vines. Cups are also lined with moss and occasionally with hair.

The outside of the nests appear whitish and brownish from the ground and are frequently decorated with cocoons. Nests are nearly always placed on a limb above an open space, perhaps to facilitate the female's exit from her quarters. Dawn has never seen a female fly directly up into the air from a nest. Instead the female performs a maneuver Paul Hamel called the "bungee drop." The female bird hops out of the nest and then drops straight down below the limb and veers up in a sudden fish hook. From the ground, smiled Dawn, the female gives off the comical illusion that she is simply falling off the nest.

The female lays 3-5 eggs and incubates them for 9-12 days. In the meantime the male spends much of his time perched high in a tree adjacent to the nest tree, singing and watching the female. When another small bird–a redstart or a blue-gray gnatcatcher or a brown-headed cowbird for instance–flies into the nest tree, the male cerulean warbler is apt to dive-bomb the intruder and chase it away immediately.

Both the male and female cerulean warbler bring food to nestlings. Caterpillars have been the prey Dawn has witnessed adults carrying most, but diet is another unknown aspect of the cerulean warbler's life.

Cerulean warblers are believed to be largely insectivorous like most other warblers. They glean tiny bugs from the undersides of leaves and sometimes perch on bare branches and dart after insects like flycatchers.

The last time someone performed a quantitative examination of the cerulean warbler's fare was 1912. Four stomachs were sampled in Alabama, and the primary prey were Hymenoptera, Coleoptera and Lepidoptera.

Cerulean warblers leave their nests 9-10 days after hatching. About two weeks later each fledgling is nearly the full size of an adult and has a tail about two-thirds grown. It has faint yellow eyebrow stripes, two white wingbars on each grayish blue wing and a downy breast and belly the color of smudgy, gray ash.

In mid-June a bird of this description perched on a branch in an ash tree near the 80-foot cottonwood where I had first heard a cerulean warbler sing in the bottomlands woods in Minnesota. Several yards away a twee-twee-*tweez* buzzed from deep in a mass of grapevine leaves that hung over and grew all around a dead tree trunk.

The song quieted, and then a male, adult cerulean warbler flew out of the grapevine and lit in the ash tree beside the fledgling. The fledgling arched its head upward and began to chip. Its wings fluttered rapidly, looking awkward and stiff, and the gray down on the fledgling's belly fluffed up as the little bird shook his head up and down.

The adult male fed the fledgling once and then hopped a few branches higher and disappeared in foliage again. A couple minutes later the twee-twee-*tweez* rang softly from the top of the ash tree, perhaps indicating a contact song to the fledgling or the male's mate.

In general each cerulean warbler parent feeds different fledglings. Frequently Dawn has seen a male feed two fledglings in one tree and a female feed another pair of fledglings in a second tree close by. The female chips quietly while foraging for fledglings, and the males sings a soft, shortened song.

"Once," groaned Dawn, "a male fed a fledgling in one tree while a female fed a brown-headed cowbird fledgling in an adjacent tree." Like most other warblers, cerulean warblers show no evidence of possessing defenses against the brown-headed cowbird. No reports exist of a cerulean warbler building a second nest on top of a brown-headed cowbird egg or of recognizing or breaking or pushing a cowbird egg out its nest.

"It is disheartening," said Paul Hamel, to watch cerulean warblers fail at their first nesting attempt and then to see two little heads pop over the rim of a nest during a second try and then to notice that only one head remains and finally to watch as that nestling grows into a begging cowbird chick.

Predators that raid cerulean warbler nests probably include the common nest robbers of eastern and midwest woods–the blue jay, American crow, common grackle, common raven and squirrels. Other predators may not be those that come easily to mind. In Tennessee Dawn and other workers observed both male and female cerulean warblers chipping wildly at a red-bellied woodpecker in their nest tree, probably for good reason. Paul Hamel once observed a red-bellied woodpecker snatch four young, blue-gray gnatcatcher from a nest.

Fall migration routes of the cerulean warbler are also unknown, but the species may be among the earliest neotropical migrants to fly south. The species has showed an earlier average date of occurrence, August 7, on the coast of Mississippi than any other neotropical migrant except the Louisiana waterthrush. Bent's Life Histories of North American Wood Warblers reports cerulean warblers seen in Ecuador as early as mid-October.

The precise habitat requirements for cerulean warblers in South America are–you might guess–not nearly defined yet. The generalties that are known paint an unsettling picture for the species. During winter cerulean warblers are found mostly on the eastern side of the Andes Mountains in Venezuela, Ecuador, Bolivia and Peru. They are found in virgin forests and some second-growth habitats such as shade coffee plantations at elevations in the Andes between 500 and 1,500 meters. According to Paul Hamel, Chandler Robbins and John Fitzpatrick, Archbold Biological Station, Florida, this zone of the Andean foothills is the principal one in the region for coffee, cacao, coca, tea, rice and vegetable plantations. In all of the Neotropics only one habitat has lost a higher percentage of its original acreage, the coastal forests of Brazil.

The 500-1,500 meter zone of elevation is the narrowest zone of elevation used by any bird found in the Andes, resident or migrant. Inside that range cerulean warblers are found almost always as only one or two individuals among flocks of mixed species feeding on insects. Whenever a flock contains a blackburnian warbler, cerulean warblers are absent.

At home, when the floor of the forest where I count breeding birds is covered with snow, I worry about how the cerulean warblers seen last summer are making out and if they'll return next spring. Glum scenarios present themselves. Maybe there are not enough large, unbroken forests left along the Upper Mississippi River to sustain a local population of breeding birds from year to year. Or maybe the section of virgin forest that provides winter habitat for a cerulean warbler that bred locally was burned this year. Or maybe a blackburnian warbler, also suffering a winter habitat loss, appeared anew in the cerulean warbler's flock, and the cerulean warbler left the flock, and lacking the protection of numbers, fell prey to a predator.

Or maybe the cerulean warbler tried to feed at a higher elevation in the Andes and could not find enough insects. Or maybe the bird and its mate both died of old age, and the pair's one fledgling from this year also died, and the only result of 1994's breeding effort was a brown-headed cowbird.

Despite apparently diminishing odds, Dawn suggested an excellent place to begin looking for a cerulean warbler next May. In Tennessee in 1993 she and other workers tagged trees where male cerulean warblers were first heard to sing in the spring. Almost inevitably these trees would have old tags that indicated they were also the first trees where cerulean warblers buzzed their first spring songs in 1992 and other years. Territories were marked and remained mostly consistent from year to year, but no bird was banded, so it is unknown if the cerulean warblers were individuals practicing site fidelity, returning to the same territory as the previous year.

Nonetheless the cottonwood that rises above the dim, green canopy of the bottomlands woods will loom foremost in my mind when I listen for the first *twee*-twee-twee-twee-*tweez* of the year next spring. If the song does indeed buzz softly down from that tree, it can be added to at least a couple glimmers of hope for the cerulean warbler.

A decade ago details of the breeding-habitat requirements of the species were fundamentally unknown. Now the basics are recognized, and the U.S. Fish and Wildlife Service has listed the warbler as a species of management concern and is beginning to manage habitat for cerulean warblers.

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Paul Hamel suggests the management of a network of forest tracts at least 4,000 hectares throughout the cerulean warbler's range in the United States. In the Neotropics he suggests a similar chain of mature forest tracts that will extend across the breadth of the species' winter range.

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