

Cooper's Hawks: A Population Study with a Brief Discussion of Sharp-shinned Hawks

Lawrence B. Fischer

In 1978 I began an independent survey of nesting raptors in western Connecticut. The survey has been continuous and is presently ongoing. Of special interest have been Cooper's Hawk (*Accipiter cooperii*) and Sharp-shinned Hawk (*Accipiter striatus*).

The study area is located principally in northern Fairfield County but also includes the southern part of Litchfield County and the western part of New Haven County. The population density is about 390 people per square mile. However, human development tends to be concentrated around town centers, and the region is still fairly rural. Unfortunately for raptors, escalating land values have caused a rapid sell-off of large tracts of land for housing developments over the last decade.

The study area covers about 150 square miles within the Transition Life Zone with traces of Carolinian Life Zone (Forbush, E. H. 1927. *Birds of Massachusetts and Other New England States, Vol. II*, p. xix). It intersects the Shepaug, the Housatonic, the Aspetuck, and the Saugatuck river valleys. Because the sides of the river valleys are steep and because the Aspetuck and Saugatuck are drinking-water watersheds, the valleys themselves remain for the most part undeveloped, even wild in parts.

Woodland in the region is about ninety percent deciduous trees, principally oaks, maples, tulips, and birches, with scattered hickories and small stands of beech trees. The only natural conifer growth consists of scattered stands of hemlocks (*Tsuga canadensis*). In the southern third of the study area, which includes a lot of watershed property, there are numerous white pine (*Pinus strobus*) and some Norway spruce (*Picea abies*) plantings.

Cooper's Hawks in western CT nest in two very distinct woodland habitats. One might be described as a small tract of young hemlocks (varying ages with few trees over 40 feet) mixed in among maturing deciduous trees, surrounded by maturing deciduous forest. Quite often this habitat occurs where a mature stand of hemlocks is dispersing outward into mature deciduous forest.

In this type of habitat the hawks are most apt to nest in a mature deciduous tree in among the young hemlocks or occasionally just outside the hemlocks in pure deciduous forest. Even when Cooper's Hawks occupy mature hemlock stands, they tend to nest around the edges of the stand or near openings within the stand, utilizing smaller hemlock trees for nest sites. A nest in a mature hemlock is a rarity.

When a hemlock is chosen as a nest tree, it is almost always young and typically very full, the nest being placed 20 to 40 feet from the ground (two-thirds to three-quarters of the way up the tree). When a deciduous tree is chosen, it is a mature tree,

black birch (*Betula* sp.) clearly preferred, with the nest being placed 45 to 60 feet above the ground in the main crotch or sometimes in a secondary crotch higher up.

The other woodland nest habitat is a pure stand of mature or maturing white pines. Some of these stands can be quite small (a few dozen trees). The stands are always part of a larger tract of mature deciduous forest. However, they are often on the edge of the larger tract of woodland and are often bounded on one or two sides by roads, fields, or rural wooded yards. Some nests have been quite close to houses. Sometimes large tracts of white pines are occupied by Cooper's Hawks, but these larger tracts are also attractive to Great Horned Owls (*Bubo virginianus*), which prey on adult, nestling, and fledgling Cooper's Hawks.

Cooper's Hawks nesting in pine woods habitat have always chosen a mature pine for a nest site. Usually, the tree is near the edge of the stand or opening in the stand. Sometimes a lone pine outside of the stand, but still surrounded by deciduous woods, is chosen. The height from the ground for a nest in a pine typically ranges from 50 to 75 feet (occasionally higher, rarely lower). Typically the nest is well hidden in the live crown of tree.

Rarely are mature stands of Norway spruce occupied by Cooper's Hawks. When this does occur, the hawk's nesting behavior is identical to that in pine woods habitat.

During the nesting season, the male Cooper's Hawk provides most, if not all, of the food until well after the young fledge from the nest. The preferred hunting habitat is broken, open woodland with many small to moderate size openings (one to several acres). These openings include clearcuts, pastures, uncultivated fields, and brushy fields. Large tracts of cultivated farmland are suitable hunting habitat if divided by brush and tree lines. Simply put, the Cooper's Hawk needs a diverse collection of habitats within a relatively small area. Nesting season hunting ranges average 0.5 mile wide by 2.5 miles long for a large territory and 0.25 mile wide by one mile long for a small territory, distinctly linear in shape. The Cooper's Hawk, often called a quintessential forest raptor, is actually a fragmented forest specialist.

Food/Survey Methods

In western CT, Cooper's Hawks show very little tendency to establish a plucking post in the nest woods. Feathers from prey are noticeably absent from the nest and nest woods for most breeding pairs. Until the young are about three and one-half weeks old, prey brought back to the nest woods is mostly plucked. After this time, prey is much less plucked and feathers from prey begin to show up in the nest woods. Young recently fledged sometimes establish a plucking post in the nest woods. Food studies have involved the collection of feathers in the nest woods, random observations of prey brought back to the nest woods, and direct observation of kills made by adults. Also, some analysis of pellets cast off by the young and collected from nests has been done. Many species of birds and mammals have been recorded, but no attempt has been made to determine percentage of diet for any species. A preponderance of the evidence shows that Blue Jays (*Cyanocitta cristata*) and Mourning Doves (*Zenaidura macroura*) make up most of the avian prey throughout

the year; gray squirrels (*Sciurus carolinensis*) and chipmunks (*Tamias striatus*) make up most of the mammalian prey during the breeding season; and finally, neotropical migrants make up only a small portion of the diet during the breeding season.

Survey techniques have included road surveys throughout the year, winter searches of woodlands on foot for old nests, and, since what might be considered typical nest woods habitat for Cooper's Hawks is very restricted in the study area, most or all typical nest woods are walked one to three times during the breeding season. Winter road surveys can accomplish two things. First, this is the easiest time of year to locate potential breeding habitat, and second, in March, males reclaim nest woods and can sometimes be seen perched on the edge sunning themselves. Another useful technique for locating Cooper's Hawk nests is to watch for males carrying prey. This is best accomplished in late June or early July when the young are large and the adult male is bringing quantities of prey back to the nest woods. Useful methods for locating males carrying prey are road surveys of potential hunting areas (previously discussed) and, if topography permits, making observations from a knoll or large open area that overlooks areas of potential breeding habitat.

In 1982 the first evidence of breeding by Cooper's Hawks in the study area was detected. While I was doing a road survey in early June, I observed an adult Cooper's Hawk catching a Chipping Sparrow (*Spizella passerina*) on the edge of a small field along a paved road. The hawk then flew out of the field down the road a short distance and into some mixed woods (oaks, birches, hemlocks). I found the nest approximately 0.25 mile from where the prey was caught, 60 yards in from the road and about 75 feet from a house. Except for lawn mowing, very little human activity was observed within sight of the nest. The nest was located approximately 18 feet from the ground (three-fourths of the way up the tree) in a thick young hemlock located in the middle of a small forest opening about 35 feet in diameter. Over the years this has proved to be a very atypical nest site.

From 1982 up to and including 1988, the average number of breeding pairs found was 2, with a maximum of 3 and a minimum of 1. From 1989 to 1993 a noticeable increase occurred with an average of 6 breeding pairs per year within the study area. By 1996 the breeding population was recorded as 10 pairs, and in 1997, 11 nests were confirmed, with two more territories occupied with breeding probable. It should be noted that most of the increase in the breeding population occurred in woodlands that were regularly being surveyed. In 1997 only one nest and one territory involved woodlands not previously included in surveys.

The longest continuous occupation of a nest woods by Cooper's Hawks has been 12 years. Several have been occupied continuously for 5 to 7 years. Most territories, however, are short-lived. In fact, breeding-bird atlasing may over-record the presence of Cooper's hawks, since most of the breeding birds recorded will not occupy the same territory a few years later. (When a state uses "occurrences of" in determining endangered, threatened, or special concern, the information is outdated before it is compiled!). Most nest woods are occupied for a very short period of time (1 to 3 years). Some nest woods are periodically unoccupied for a year or two and then

reoccupied. Only one nest woods has been reoccupied after a long (5 years) absence of hawks. Great Horned Owls appear to play a big role in the periodic gaps in breeding by Cooper's Hawks in what appear to be some of the better nesting territories.

In 1998 and 1999, survey time was limited, but I noticed a steep decline in the breeding population of Cooper's Hawks. The rapidity of the decline seemed to be so dramatic that in the year 2000 extra time and effort was put into surveys of nesting Cooper's Hawks.

Cooper's Hawks were found breeding at 5 of 17 sites surveyed. Two of the sites where breeding was confirmed were new confirmations, although one of these two sites has been surveyed in the past because breeding was suspected. Of 15 sites where breeding had been confirmed for two or more years in the past, 3 were active, and 12 were inactive. Of these 12 inactive sites, 5 of them have had breeding Cooper's Hawks for 5 or more years. Of the 5 active sites, 2 have had breeding confirmed for 5 or more years. Obvious problems for Cooper's Hawks are loss of habitat to home construction and invasion of territories by Great Horned Owls. However, this accounts for perhaps four territories being unoccupied. Clearly, after an initial population boom in the early 1990s, the Cooper's Hawk population has declined, but hopefully has stabilized.

Sharp-shinned Hawks

Sharp-shinned Hawks in western CT have clearly preferred the more heavily wooded regions within my survey area. Nesting has always occurred within pure stands of conifers with all of the trees in the stand being of the same age and height. Dense stands have been preferred, but nesting has also occurred in more open conifer stands used by Cooper's Hawks. Nest height from the ground is determined by the height of the conifer stand and has ranged from 25 feet to 75 feet. The nest is usually placed near the top of the tree, and the higher nests are often not visible from the ground.

By mid-June a conifer stand with nesting Sharp-shinned Hawks is well marked by feathers from prey. Prey is brought to the female by the male. It is exchanged in a specific food exchange area where plucking started by the male before entering the nest woods is finished by the female. Molted feathers from the hawks can also be found here.


Examination of feather remains indicates a high degree of dependency on neotropical migrants for food. The composition of prey species depends on the composition of the surrounding habitat. Once what was probably a young meadow vole (*Microtus* sp.) was observed as prey.

Sharp-shinned Hawks have never been a common breeder in western CT. The first nest was discovered in 1991 in a grove of Norway spruce that had been regularly surveyed since 1985. At least one nest per year was found from 1991 through 1996. A total of three nests were found in 1993. Since 1996 only one nest has been found in the study area. A hemlock grove occupied by Sharp-shinned Hawks in 1993 contained

three old Sharpshin nests. A grove of Norway spruce occupied by Sharp-shinned Hawks in 1993 for the first time had nesting Sharpshins through 1996. In 1994 the male of the pair was in immature plumage. This nest woods had also been regularly surveyed since 1985.

I believe that the size of the survey area is large enough to adequately sample a regional population, and that the duration of the survey to date (22 years) is long enough to record population trends.

Although the numbers for Sharp-shinned Hawk nests are low and a trend may be difficult to see, it would appear that a rapid rise and then decline in the breeding population closely follows that of the Cooper's Hawk. Furthermore, population studies for the Northern Goshawk (*Accipiter gentilis*) in the study area show the same cycle: 2 pairs in the study area in the mid 1980s, rising to a maximum of 6 pairs in the early 1990s, the disappearance of all pairs, then a reestablishment of 2 pairs in the original sites. The cause of this cycle is unknown, but clearly the rise of one species does not cause the decline of another. The rise and fall of the populations for all three species of *Accipiter* appear to coincide. While there is some overlap of nest woods preference and prey, for the most part Cooper's Hawks and Sharp-shinned Hawks (also Goshawks) show different nest woods preference and rely on different segments of the avian population for the bulk of their food.

Finally, one further observation of a very curious nature. In the initial part of the population study Cooper's Hawks typically laid their eggs in late April. While a particular female began laying her eggs on or about the same day every year, as new females and new pairs become established in the study area, the egg-laying dates were getting later and later. In 2000, one pair laid eggs in late May even though they began nest building in early April as is typical. Four pairs of hawks didn't lay eggs until early June. 

Lawrence B. Fischer, a self-employed state-licensed remodeling contractor specializing in custom woodwork and cabinetry, is also a Federally-licensed raptor bander who has been banding birds since 1980. He has assisted with raptor and passerine bird banding throughout Connecticut, including a recent three-year MAPS (Monitoring Avian Productivity & Survivorship) Project at Devil's Den Preserve in Weston. In 1991, at the request of the MDC, he built a platform in the top of a white pine on Barkhamstead Reservoir, which was ultimately used by the "Barkhamstead Eagles" as a nest platform. He has received a certificate of appreciation from the Army Corps of Engineers for assisting in bird atlasing on the Hop Brook Flood Control Project; he helped locate and climbed to confirm the first Sharp-shinned Hawk nest in CT in the post-DDT years; with Gerald Mersereau he found the first ravens nest (1987) in CT at Barkhamstead Reservoir; and he has located nests of Long-Eared and Northern Saw-whet owls, two of the rarest nesting raptors in CT. Several times a year he speaks to bird clubs and conservation organizations about raptor biology and conservation (most recently for the Linnaean Society at the American Museum of Natural History.) He is currently on the Board of Directors of the Northeast Hawk Watch and has served as Chairman, Conference Chairman, and Conference Program Chairman. He has also been a member of the CT Bald Eagle Study Group since 1979.