

The food supply is highly unlikely to be a major issue because the species declines occurred in the late summer and fall, while one would expect a crash in the food supply to be a problem in winter. Second, while chickadees and nuthatches feed on similar food items, notably insects hidden on the surface of tree limbs and trunks, the CBC counts are strikingly different for the two species: the chickadee count was down while the number of nuthatches remained stable. Moreover, chickadees are heavy users of feeders, and if wild foods disappeared, one might expect them to use feeders more intensively. In fact one of the first signs of the chickadee decline was their disappearance from feeders in affected areas (D. Stotz, pers. comm.). Crows and jays have a diet that is quite different from chickadees (Tarvin and Woolfenden 1999, Verbeek and Caffrey 2002), so it would be difficult to imagine a food crash that would affect these three species that somehow did not cause a decline in other species.

As regards predation, there is no evidence of a sharp rise in the number of predatory hawks that consume birds. Furthermore, the idea that crows, jays, and chickadees would be disproportionately attacked by predators does not seem plausible given the behavior of predators that are known to be problems for birds in the Chicago area. Sharp-shinned Hawk (*Accipiter striatus*) and Cooper's Hawk (*A. cooperii*) are the two dominant Chicago area hawk species that eat avian prey. Jays are an important part of the diet of Cooper's Hawks, American Crows to a lesser extent. But Cooper's Hawks also consume a large number of other avian species present in the Chicago area whose numbers did not decline (Rosenfield and Bielefeldt 1993). Sharp-shinned Hawks consume a wide range of

birds, mainly passerines, but also representatives of other orders, including woodpeckers (Bildstein and Meyer 2000). There is therefore no reason to believe that these two raptors disproportionately consumed the three affected species.

Weather conditions vary from year to year, but 2002 was not significantly different from the average of the twenty prior years. The 37.3° Fahrenheit recorded in November 2002 was not significantly different than the November 20-year average of 39.7° Fahrenheit. Similarly, the 30.1° Fahrenheit recorded in December 2002 was higher than the December 20-year average of 27.9° Fahrenheit, but this is not a statistically significant difference (NOAA-National Climate Data Center).

Another possibility is that the toxins in pesticides designed to kill mosquitos worked their way into the food chain and killed some unknown number of these birds. There was heavy spraying by the affected communities in the summer of 2002. It is unlikely, however, that the pesticides were so selective that they killed crows, jays, and chickadees disproportionately. The study group includes other insectivores whose numbers were not similarly affected. The potential negative effects of pesticides on the bird community requires further study, and should be weighed against any demonstrated benefits when evaluating the success of the current pesticide spraying programs.

The migratory behavior of Chicago area breeding birds could potentially account for the decline in the CBC count. Winter numbers of Blue Jays are highly sensitive to oak masting, or the production of an abundance of acorns in some years with intervening years offering little fruit. Since there was a high yield in 2001, there was an expectation of a poor yield in 2002 and therefore one would anticipate that the Blue Jays

would migrate away from the area and the count would be lower. But Blue Jays were down in numbers that appear to be far more than would be expected even for a year of low acorn production (D. Stotz, pers. comm.). American Crows move around in the winter, but the study covered a fairly large geographic area and the decline is so strong, that is it unlikely that these movements are the reason for the decline. Black-capped Chickadees are not annual migrants. Young chickadees irregularly irrupt every two or more years with adults seldom part of these irruptions (Smith 1993). The other species are not affected by migration.

A final explanation is that WNV is implicated. WNV was initially identified in Illinois in September 2001 when it was found in two dead crows in the Chicago area. In 2002, the virus hit the state with full force. More than 800 people contracted the illness and 53 died, more than any other state in the country, and avian populations were also believed to have been heavily affected, with virtually every county reporting sick birds (Illinois Department of Public Health 2003). We know from studies in other states that crows, jays, and chickadees are markedly affected by WNV. American Crows were about one-third of the dead birds reported in New York State during the outbreak in the summer and fall of 1999 (Eidson et al. 2001). Blue Jay deaths from WNV have been prominent in such places as Louisiana and the Dallas, Texas area (Louisiana Dept. of Health and Hospitals 2001, Dallas County Dept. of Public Health 2003). Chickadee deaths from the virus have been reported from a variety of places in the U.S. (Centers for Disease Control and Prevention 2002). The Cornell Laboratory of Ornithology provided data suggesting the susceptibility of