

## SPECIES PROFILE

# Cooper's Hawk

*Accipiter cooperii*

**Federal Listing:** Not listed  
**State Listing:** Threatened  
**Global Rank:** G5  
**State Rank:** S2B  
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### ELEMENT 1: DISTRIBUTION AND HABITAT

#### 1.1 Habitat Description

Cooper's hawk breeds in various forest types (e.g., coniferous, deciduous, and mixed woods) ranging from extensive forests to woodlots of 4 to 8 ha (Rosenfield and Bielefeldt 1993). Recently, this raptor has been found nesting successfully in suburban areas and city parks in Pennsylvania, Wisconsin, and New York City (Bielefeldt et al. 1998, McConnell 2003) as well as urban areas in Arizona (Boal and Mannan 1998). Thus, Cooper's hawk may be tolerant of human disturbance and habitat fragmentation. Cooper's hawk nests in crotches, limb axils, and limb forks high off the ground in large hardwood and conifer tree species, often under a dense canopy (Titus and Mosher 1981, Bosakowski et al. 1992a, Rosenfield and Bielefeldt 1993, Trexel et al. 1999, McConnell 2003).

Although little research has been done on Cooper's hawk foraging habitat, breeding-season diet studies indicate that Cooper's hawk preys on small mammals such as squirrels and chipmunks as well as on birds (Bielefeldt et al. 1992, Bosakowski et al. 1992b, Estes and Mannan 2003). Open country birds such as starlings and grackles are also reported in diet studies (Bosakowski et al. 1992b) suggesting that Cooper's hawk forages in edge and open habitat as well as forested habitat. Cooper's hawk winter habitat is believed to be similar to breeding habitat (DeGraaf and Yamasaki 2001), though better quantitative data are needed. This raptor is frequently recorded in

small numbers at winter bird feeding stations in New Hampshire (NHA website, undated).

#### 1.2 Justification

Cooper's hawk is threatened in New Hampshire, though listing in several northeastern states may be a conservative response to limited data (Mosher 1989). Though data on historic abundance are equivocal, some posit large population declines of Cooper's hawk between the 1940s and 1970s due to DDT poisoning (Snyder et al. 1973). By these accounts, Cooper's hawk populations have partially recovered in some areas since the United States ban of DDT in 1972, but may remain below pre-DDT era levels throughout much of the east (Robbins et al. 1986). Variations in recovery may be due to DDT poisoning of neotropical migratory birds, a major component of the Cooper's hawk prey base (NatureServe 2005).

Cooper's hawk is also threatened in New Hampshire by habitat loss and parceling of forestland (Frieswyk and Widmann 2000), though recent work on nesting Cooper's hawk has noted successful breeding in smaller-sized pine plantations in Wisconsin (Rosenfield et al. 2000) and in urban/suburban areas in Arizona (Boal and Mannan 1998) and Pennsylvania (McConnell 2003).

#### 1.3 Protection and Regulatory Status

Cooper's hawk is protected under the Migratory Bird Treaty Act of 1918.

#### 1.4 Population and Habitat Distribution

Cooper's hawk was common in New Hampshire in the 1800s and 1900s (Elkins in Foss 1994). Pesticide poisoning probably contributed to a population decline throughout the eastern United States. Though

first detected during migration counts in the 1960s, it probably began before 1950 (Bednarz et al. 1990).

The Atlas of Breeding Birds in New Hampshire reports only 2 successful nests and 4 locations of territorial pairs from 1980 to 1987 (Elkins in Foss 1994). There are insufficient data on Cooper's hawk to accurately estimate its abundance and distribution in New Hampshire.

The latest Breeding Bird Survey (BBS) summary reports a non-significant positive trend (1.2 percent) for Cooper's hawk in New Hampshire from 1966 to 2003 (Sauer 2004). However, BBS data need to be interpreted with caution, as roadside surveys may fail to encounter some elusive raptor species. Cooper's hawk migration counts at Hawk Mountain in Pennsylvania generally show an increasing trend beginning in 1963 (Mosher 1989, Bednarz et al. 1990).

### 1.5 Town Distribution Map

There are insufficient data available to map current Cooper's hawk distribution in New Hampshire.

### 1.6 Habitat Map

There are insufficient data available to map Cooper's hawk habitat in New Hampshire, although suitable habitat may be available in forested stands and suburban/urban wooded areas throughout the state.

### 1.7 Sources of Information

Information on Cooper's hawk habitat, population distribution, and status was compiled from scientific literature and limited agency and non-government organization information.

### 1.8 Extent and Quality of Data

There are no systematic sampling efforts to assess Cooper's hawk demographics in New Hampshire.

### 1.9 Distribution Research

- Collect information on the demographics of Cooper's hawk throughout the state during the breeding season in extensive forested habitat, suburban, and urban areas
- Develop a regionally viable broadcast survey to

monitor areas for occupancy, detect changes in distribution and abundance, and determine nest locations. Broadcast surveys are time consuming and labor intensive and should be designed to be economical.

- Solicit information from the public on current and historic Cooper's hawk nest sites in the state. Potential sources include New Hampshire Bird list serve subscribers and spring turkey hunters.
- Develop a survey (or consult New Hampshire Bird list serve subscribers, Christmas Bird counts, and NHA feeder watch surveys) to determine Cooper's hawk winter demographics

## ELEMENT 2: SPECIES/HABITAT CONDITION

### 2.1 Scale

Cooper's hawk occurs across the state. Potential conservation planning units at the section (M212A, M212B, and 221A) or subsection level appear to be most appropriate (Avers et al. (1994).

### 2.2 Relative Health of Populations

There are no data available to describe the relative abundance of Cooper's hawk in New Hampshire.

### 2.3 Population Management Status

There are no population management efforts for Cooper's hawk in New Hampshire.

### 2.4 Relative Quality of Habitat Patches

There are no data available for meaningful analysis.

### 2.5 Habitat Patch Protection Status

Cooper's hawk nesting areas on the WMNF and other conservation lands in New Hampshire will retain their nesting potential. Nesting potential on non-conservation lands and in urban/suburban areas will depend on whether these lands remain forested.

### 2.6 Habitat Management Status

There are no habitat management or restoration efforts for Cooper's hawk in New Hampshire.

## 2.7 Sources of Information

There are no statewide or regional data upon which to assess the condition of Cooper's hawk.

## 2.8 Extent and Quality of Data

There are no data available with which to make this assessment.

## 2.9 Condition Ranking

There are no data in New Hampshire with which to attempt condition ranking.

## 2.10 Condition Assessment Research

- Characterize breeding and foraging habitat at landscape, stand, and within-stand scales
- Determine how changes in forest structure and landscape patterns affect Cooper's hawk reproductive success, survival rates, territory fidelity, juvenile dispersal, and breeding dispersal
- Determine important prey species of Cooper's hawk and their response to fluctuations in prey availability across differently managed landscapes
- Continue long-term migration counts in order to detect changes in regional abundance patterns
- Characterize Cooper's hawk winter habitat

## ELEMENT 3: SPECIES AND HABITAT THREAT ASSESSMENT

### 3.1.1 Development (Habitat Loss and Conversion)

#### (A) Exposure Pathway

Land conversion—such as commercial and residential development—can compromise Cooper's hawk by reducing the number and distribution of available nest sites, foraging habitat, and important prey species. Outside of New Hampshire, Cooper's hawk successfully breeds in small isolated woodlots and in urban areas. Raptors nesting in these types of landscapes are exposed to additional environmental threats such as electrocutions, poisonings, exotic diseases, and col-

lisions with windows and vehicles (Boal and Mannan 1999). Development can also increase populations of Cooper's hawk predators such as raccoons and great horned owls.

#### (B) Evidence

Forestland in New Hampshire has been declining at an annual rate of 2.7% since 1983 (Frieswyk and Widmann 2000). Development and changing ownership divide forest into smaller parcels and can introduce new sources of injury and mortality (e.g., collisions with windows and vehicles, electrocutions, poisonings, exotic diseases, and subsidized predators).

### 3.1.2 Non-Point Source Pollution (Chemical Contaminants)

#### (A) Exposure pathway

The use of chlorinated hydrocarbons such as DDT has been correlated with eggshell thinning in raptors, which leads to lowered reproductive success. Several studies implicate DDT and DDE as the contaminant that once threatened Cooper's hawk (Snyder et al. 1973, Pattee et al. 1985). Acutely toxic organophosphate pesticides may pose a more severe threat in urban areas and agricultural areas (Boal and Mannan 1999, Henny et al. 1985), but there have been minimal efforts to monitor poisonings in dead raptors (NatureServe 2005).

#### (B) Evidence

The use of DDT is linked to the decline of the Cooper's hawk between the 1940s and the 1970s. Although DDT has been banned in the U.S. since 1972, it is still used on the wintering grounds of many prey species of Cooper's hawk (NatureServe 2005). Effects of this are still unclear. Limited mortality monitoring occurs for most raptor species, so there is much speculation and little evidence of pesticide and contaminant threat.

### 3.1.3. Disease

#### (A) Exposure pathway

West Nile Virus (WNV) is carried in birds and is spread through the bite of infected mosquitoes, often causing encephalitis and/or meningitis. It was first detected in the United States in 1999 and is now

found in all of the lower 48 states. Corvids and, more recently, raptors appear to be particularly susceptible to the disease (Gancz et al. 2002).

#### (B) Evidence

The Raptor Center at the University of Minnesota positively demonstrated WNV in a sample of *Buteo jamaicensis* and Cooper's hawk (Wünschmann et al. 2004). The Raptor Center had admitted 71 raptors with the virus in 2002, of which 60 succumbed to WNV. *Bubo virginianus*, *B. jamaicensis*, and Cooper's hawk, have been hardest hit in Minnesota. The New Hampshire Department of Health and Human Services has limited their collection of dead birds for WNV testing to crows and blue jays, so it is difficult to determine whether raptors in New Hampshire have yet been exposed to WNV.

### 3.2 Sources of Information

Information on threats to Cooper's hawk came mainly from a review of research conducted outside of the northeastern United States.

### 3.3 Extent and Quality of Data

Most data on threats to *Cooper's hawk* come from areas outside of the northeastern United States and may not apply to the New Hampshire population. Little is known of *Cooper's hawk* tolerance to habitat fragmentation, human disturbance, various forest management practices, or pesticide use in the United States and Central America.

### 3.4 Threat Assessment Research

- Compare productivity between Cooper's hawk populations in suburban/urban areas and within extensive forested areas
- Measure impacts of human disturbance (e.g., recreation, logging, urban/suburban obstacles [windows, powerlines, vehicles]) on Cooper's hawk productivity
- Identify effects of various forest management practices on reproductive success, nest site fidelity, and prey availability
- Determine if DDT and contaminants are still harming Cooper's hawk productivity
- Determine what effects West Nile Virus may be

having on Cooper's hawk populations in New Hampshire.

## ELEMENT 4: CONSERVATION ACTIONS

Habitat use, abundance, and distribution data necessary for Cooper's hawk conservation do not exist.

### 4.1.1 Developing occurrence, habitat and distribution data, Restoration and Management.

#### (A) Habitat Loss

#### (B) Justification

Statewide surveys will provide distribution and habitat data upon which population analyses can be conducted. Investigations that increase knowledge of Cooper's hawk demographics and habitat allow for better management.

#### (C) Conservation Performance Objective

Census surveys will test hypotheses of habitat conversion effects and will better determine the status of this state threatened species. Successful survey protocols will help correctly identify Cooper's hawk habitat and will offer the opportunity to sample live birds for contaminants and WNV exposure.

#### (D) Performance Monitoring

There is no statewide or regional monitoring of Cooper's hawk.

#### (E) Ecological Response Objective

There are no data available with which to formulate an ecological response objective.

#### (F) Response Monitoring

There is no monitoring of Cooper's hawk. Before conservation can occur, surveys of potential habitat must be conducted.

#### (G) Implementation

There are opportunities to partner with USDA Forest Service, UNH, United States Department of the Interior Fish and Wildlife Service, industrial forestry concerns, New Hampshire Division of Forest and Lands, NHHNB, local land trusts, and NHA to test any systematic survey protocol state-wide, and to further extend population and habitat research being

conducted by USDA Forest Service, Northeastern Research Station state-wide.

#### (H) Feasibility

Much cooperation and coordination would be required to accomplish a more systematic approach statewide, but it could be accomplished with adequate funding and commitment of personnel and resources.

### 4.2 Conservation Action Research

Continue monitoring forest raptor populations and habitat in the White Mountains region. Expanding these efforts state-wide would allow the direct testing of the habitat conversion/alteration hypothesis, as well as provide the opportunity to survey for WNV in live raptor populations. Such surveys and habitat assessments are needed to better describe the status of Cooper's hawk and its critical habitats and threats.

## ELEMENT 5: REFERENCES

### 5.1 Literature

Bednarz, J.C., Klem, D. Goodrich, L.J. and S.E. Senner. 1990. Migration counts of raptors at Hawk Mountain, Pennsylvania, as indicators of population trends, 1934-1986. *Auk* 107:96-109.

Bielefeldt, J., R.N. Rosenfield, J.M. Papp. 1992. Unfounded assumptions about the diet of the Cooper's hawk. *Condor* 94:427-436.

Bielefeldt, J., R.N. Rosenfield, W.E. Stout, and S.M. Vos. 1998. The Cooper's hawk in Wisconsin: A review of its breeding biology and status. *Passenger Pigeon* 60:111-121.

Boal, C.W., and R.W. Mannan. 1998. Nest site selection by Cooper's Hawks in an urban landscape. *Journal of Wildlife Management* 62:864-871.

Boal, C.W., and R.W. Mannan. 1999. Comparative breeding ecology of Cooper's hawks in urban and exurban areas of southeastern Arizona. *Journal of Wildlife Management* 63(1): 77-83.

Bosakowski, T., D.G. Smith, and R. Speiser. 1992a. Nest sites and habitat selected by Cooper's hawks, *Accipiter cooperii*, in northern New Jersey and southeastern New York. *Canadian Field-Naturalist* 106: 474-479.

Bosakowski, T.D., D.G. Smith, and R. Speiser.

1992b. Niche overlap of two sympatric-nesting hawks in the New Jersey-New York highlands. *Ecography* 15: 358-372.

DeGraaf, R.M., and M. Yamasaki. 2001. New England wildlife: habitat, natural history, and distribution. University Press of New England, Hanover, New Hampshire, USA. 482 pp.

Elkins, K.C. 1994. Pages 48-49 in C.R. Foss (editor). Atlas of breeding birds in New Hampshire. New Hampshire Audubon, Concord, New Hampshire, USA. 414 pp.

Estes, W.A., and R.W. Mannan. 2003. Feeding behavior of Cooper's hawks at urban and rural nests in southeastern Arizona. *Condor* 105:107-116.

Foss, C.R. 1994. Atlas of breeding birds in New Hampshire. New Hampshire Audubon, Concord, New Hampshire, USA. 414 pp.

Frieswyk, T.S., and R.H. Widmann. 2000. Forest Statistics for New Hampshire, 1983 and 1997. USDA Forest Service, Research Bulletin NE-146. Newtown Square, Pennsylvania, USA.

Gancz, A.Y. I. K. Barker, R. Lindsay, A. Dibernardo, K. McKeever, and B. Hunter. West Nile virus outbreak in North American owls, Ontario, 2002. *Emerging Infectious Diseases* [serial on the Internet]. 2004 Dec [12 April 2005]. Available from: <<http://www.cdc.gov/ncidod/EID/vol10no12/04-0167.htm>>.

Henny, C.J., L.J. Blus, E.J. Kolbe, and R.E. Fitzner. 1985. Organophosphate insecticide (FAMPHUR) topically applied to cattle kills magpies and hawks. *Journal of Wildlife Management* 49:648-658.

McConnell, S. 2003. Nest Site vegetation characteristics of cooper's hawk in Pennsylvania. *Journal of the Pennsylvania Academy of Science* 76(2): 72-76.

Mosher, J.A. 1989. Accipiters. Pages 47-52 in B.G. Pendleton, (editor). Proceedings of the northeast raptor management symposium and workshop held 16-18 May 1988, Syracuse, NY. Institute for Wildlife Research, National Wildlife Federation, Scientific and Technical Series No. 13.

Mosher, J.A., M.R. Fuller, and M. Kopeny. 1990. Surveying woodland raptors by broadcast of conspecific vocalizations. *Journal of Field Ornithology* 61:453-461.

Pattee, O.H., M.R. Fuller, and T.E. Kaiser. 1985. Environmental contaminants in eastern Cooper's hawk eggs. *Journal of Wildlife Management* 49: 1040-1044.

- Robbins, C.S., D. Bystrak, and P.H. Geissler. 1986. The breeding bird survey: its first fifteen years, 1965-1979. Resource Publication 157. U.S. Fish and Wildlife Service, Washington, DC. 196 p.
- Rosenfield, R.N., J. Bielefeldt, S.A. Sonsthagen, and T.L. Booms. 2000. Comparable Reproductive success at conifer plantation and non-plantation nest sites for cooper's hawks in Wisconsin. *Wilson Bulletin* 112:417-421.
- Rosenfield, R.N., and J. Bielefeldt. 1993. Cooper's Hawk; The Birds of North America. Vol. 2, No. 75. American Ornithologists' Union. The Academy of Natural Sciences of Philadelphia.
- Snyder, N.C.N., H.A. Snyder, J.L. Lincer, and R.T. Reynolds. 1973. Organochlorines, heavy metals, and the biology of North American accipiters. *Bio-science* 23:300-305.
- Titus, K., and J.A. Mosher. 1981. Nest site habitat selected by woodland hawks in the central Appalachians. *Auk* 98:270-281.
- Trexel, D.R., R.N. Rosenfield, J. Bielefeldt, and E.A. Jacobs. 1999. Comparative nest site habitats in sharp-shinned and Cooper's hawks in Wisconsin. *Wilson Bulletin* 111:7-14.
- Wünschmann, A., J. Shivers, J. Bender, L. Carroll, S. Fuller, M. Saggese, A. van Wettere, and P. Redig. 2004. Pathologic Findings in Red-Tailed Hawks (*Buteo jamaicensis*) and Cooper's Hawks (*Accipiter cooperi*) Naturally Infected with West Nile Virus. *Avian Diseases* 48:570-580.
- New Hampshire Natural Heritage Bureau. 2005. Animal Tracking List. <[http://www.nhdfi.org/formgt/nhiweb/Documents/w\\_animal.pdf](http://www.nhdfi.org/formgt/nhiweb/Documents/w_animal.pdf)> Accessed on January 26, 2005
- Sauer, J. R., J. E. Hines, and J. Fallon. 2004. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2003. Version 2004.* US Geological Survey, Patuxent Wildlife Research Center, Laurel, MD website at: <<http://www.mbr-pwrc.usgs.gov/bbs/bbs.html>>. Accessed on January 19, 2005.
- USDI Fish and Wildlife Service. 1999. Endangered and Threatened Wildlife and Plants List. 50 CFR 17.11. <[http://www.fws.gov/endangered/50cfr\\_animals.pdf](http://www.fws.gov/endangered/50cfr_animals.pdf)>. Accessed on April 15, 2005.

## 5.2 Data Sources

- New Hampshire Audubon. undated. Backyard Winter Bird Surveys: Tabular Results for 1999-2002. New Hampshire Audubon website document at: <<http://www.nhaidubon.org/BWBSresults2.htm>>. Accessed on January 18, 2005.
- NatureServe. 2005. NatureServe Explorer. An online encyclopedia of life. Version 4.4. NatureServe, Arlington, Virginia. Available at: <<http://www.natureserve.org/explorer/servlet/NatureServe>>. Accessed on January 12, 2005.
- New Hampshire Fish and Game Department. no date. Endangered and Threatened Species List. <[http://www.wildlife.state.nh.us/Wildlife/Nongame/endangered\\_list.htm](http://www.wildlife.state.nh.us/Wildlife/Nongame/endangered_list.htm)>. Accessed on April 15, 2005.