

SPECIES PROFILE

Northern Harrier

Circus cyaneus

Federal Listing: Not listed

State Listing: Endangered

Global Rank: G5

State Rank: S2B

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ELEMENT 1: DISTRIBUTION AND HABITAT

1.1 Habitat Description

Northern harriers use a variety of open and semi-open habitat throughout the year, including grassland, cattail marsh, salt marsh, shrub-steppe, and agricultural land (MacWhirter and Bildstein 1996). In the Northeast, the species may nest in wetter habitat, although birds still forage extensively in upland areas (Serrentino 1992). The species also frequents bogs and fens with open foraging areas and a brushy border for nesting. Important features of nesting areas in northern New Hampshire include dense stands of low woody plants (*Spirea*, *Alnus*, *Cornus*, heaths) near open grassland areas for foraging (Serrentino 1992, 1998).

In northern Coos County, key habitats included hayfield, pasture, early successional field, late successional field, and shrub wetland (Serrentino 1998). Collectively, open and partially open upland habitats in this study comprised 59-75% of total habitat in each focal area. In west-central New Hampshire, historic sites in Danbury and Sutton are large wetlands bordered by shrubs and cattails.

Winter records of harriers in New Hampshire are almost entirely from the Seacoast (NHBR), where the species is found in salt marsh and associated upland brushy edges. There are also a few breeding records from salt marsh and nearby open areas.

Limited data suggest that harriers prefer larger fields. In Massachusetts, harriers only used fields over

11 ha (27.5 ac) (Serrentino 1992), whereas blueberry barrens in Maine needed to be at least 100 ha (250 ac) (Vickery et al. 1994). Wetlands used for foraging need not be as large, with areas as small as 1 ha (2.5 ac) being used in Maine (Gibbs et al. 1991).

1.2 Justification

Harriers were believed common in New Hampshire following extensive forest clearing in the 1800s. Beginning in the early 1900s, however, populations began to decline, probably a result of reforestation, wetland loss, persecution, and pesticide contamination (Foss 1994). By the 1970s, the species had become restricted to its current range and abundance in New Hampshire.

Harrier populations over the entire North American breeding range are declining at a rate of 1% per year (Sauer et al. 2004). In the East and Northeast, harriers are infrequently detected during the Breeding Bird Survey. According to detailed statewide accounts, the species has declined in New York (Andrle and Carroll 1988), Vermont (Laughlin and Kibbe 1985), Connecticut (Zeransky and Baptist 1990), and Massachusetts (Viet and Petersen 1993), and is of conservation concern in most northeastern states (Serrentino 1992). In 2001 and 2002, harriers nested in Essex County, Massachusetts for the first time in over 30 years (Berry 2003). These records, in conjunction with increased breeding season sightings in southern New Hampshire (NHBR), suggest the possibility of a partial recovery of coastal populations in the Gulf of Maine.

1.3 Protection and Regulatory Status

This species is protected at the federal level by the Migratory Bird Treaty Act, which prevents the killing of most non-game birds and collection of their nests

or eggs. In New Hampshire it is protected by the New Hampshire Endangered Species Conservation Act (RSA 212).

1.4 Population and Habitat Distribution

Scant data exist on the distribution of northern harriers in New Hampshire prior to the 1800s. Historically, the species was probably restricted to bogs, fens, and similar wetlands (e.g., beaver meadows), and perhaps isolated agricultural clearings along major river valleys. The species may have benefited from extensive forest clearing in the 1800s, and by the early 1900s it was nesting in small numbers over most of the state, with the possible exception of the southwest (Foss 1994).

By the 1960s, Coos County was the stronghold for New Hampshire's harrier population (NHBR). This distribution was largely unchanged during The Breeding Bird Atlas surveys in the early 1980s (figure 1a), documented roughly 16 territories in the state (Foss 1994, NHBR), not all of which were breeding territories. Over the next 15 years, there were between 19 and 21 territories, of which 8 to 13 were active breeding territories. Recent data are scarce because the annual "harrier day" surveys in northern Coos County were discontinued in 1997. Between 1998 and 2003, breeding season harriers were reported at 15 locations, and only 6 of these were in the species' traditional stronghold in the northern Connecticut River valley (NHBR).

Statewide, harrier distributions did not change appreciably from the 1980s to the 1990s (figure 1). The range included 3 areas: Coos County, the Connecticut River valley between Piermont and Lyman, and a complex of wetlands (Danbury Bog) in west-central New Hampshire. Except for Danbury Bog, no site supported harriers for more than 2 years between 1981 and 2003. Harriers bred at Danbury Bog 3 times between 1985 and 1991, and a single individual was observed in June 2001.

The Coos County portion of the range can be further divided into the upper Connecticut valley from Columbia north, the Androscoggin valley between Errol and Shelburne, and the Lancaster/Whitefield/Jefferson area. Harrier activity has been traditionally concentrated in the former, which contains 58% (11 of 19) of the regularly occupied territories in the county (and 50% of the entire state). All but one of the Con-

necticut Valley territories (91%) were occupied for at least 7 years between 1981 and 2000, while only 3 territories in the Androscoggin Valley or Lancaster/Whitefield/Jefferson area met this same criteria.

Harriers are rare during the breeding season away of the core areas discussed above (figure 1b). Since 1990, reports have come from Tamworth, Dover, Derry, and Brookline. In addition, from 1998 to 2001, single harriers were seen during August in the Hampton/Seabrook salt marshes. Because of the later dates of these sightings, the birds in question could be early southbound migrants or dispersers from the new breeding location in northeast Massachusetts (see section 1.2). However, the regularity of coastal sightings indicates the potential for current or future nesting in this portion of New Hampshire.

1.5 Town Distribution Map

Not completed for this species.

1.6 Habitat Map

Harrier habitat modeling is complicated by the fact that the species can use 2 very different habitats (grassland and emergent marsh). Given that extensive grasslands and wetland complexes have already been identified as part of this strategy, a first step would be to identify all large parcels of these habitats. Although data on habitat size needs are sparse, there is some indication that harriers are more likely to use a site if it is over 100 ha (Vickery et al. 1994). A model with such a cut-off, though it would overlook some suitable areas, would be guaranteed to recognize the better habitat. In addition, sites north of the White Mountains should have greater weight than those south of the mountains, based on historic and current use. The resulting model is perhaps simplistic, but no data on landscape features exist that would allow for finer resolution.

1.7 Sources of Information

Basic natural history information in this profile was largely gathered from the literature cited in element 5. Habitat modeling was informed by the Gulf of Maine Program (Banner and Schaller 2001). Data on harrier distribution in New Hampshire were compiled from NHBR and observations collected during NHA's "harrier days" between 1983 and 1997.

1.8 Extent and Quality of Data

Because harriers have not been consistently surveyed in northern Coos County since 1997, data are lacking on the species' current distribution in this former stronghold. Harriers continue in the Androscoggin and Lancaster/Jefferson areas, which are visited more frequently.

1.9 Distribution Research

If harrier distribution is to be understood, regular surveys in the northern Connecticut Valley must be reestablished. Likewise, searches of historic locations south of the White Mountains would determine if any breeding pairs persist in these peripheral areas. Given the coarse nature of the habitat model described above, research into patch size, landscape configuration, and habitat juxtaposition would be valuable in future efforts to identify suitable habitat.

ELEMENT 2: SPECIES CONDITION

2.1 Scale

As discussed in section 1.4, there are 5 appropriate planning units for harriers in New Hampshire:

1. Northern Connecticut River grasslands: This area includes the towns from Stratford north to Pittsburg.
2. Androscoggin Valley: This area includes marshes and agricultural lands from Lake Umbagog south to Shelburne, and extends west to the Upper Ammonoosuc valley in Stark.
3. Lancaster/Whitefield/Jefferson
4. Central Connecticut River valley: This area includes wetlands and agricultural lands from Lyman south to Haverhill and Benton.
5. West-central wetlands: This area includes sites from Enfield in the northwest to Danbury in the northeast, and south to Sutton and Newbury.

2.2 Relative Health of Populations

Of the 5 units outlined above, only the northern 3 have consistently supported harriers for the last 25

years (table 1). Sites in the central Connecticut River Valley appear to have been used primarily during the early 1980s (Breeding Bird Atlas), and recent records are scarce. There are also fewer sightings in the west-central wetlands. Collectively, data suggest that harriers have declined in areas peripheral to their core range in Coos County. Yet without recent data, it is difficult to evaluate the species' status in the north.

2.3 Population Management Status

Harrier populations are not managed in New Hampshire (but see section 2.6).

2.4 Relative Quality of Habitat Patches

Data are insufficient to evaluate the condition of harrier territories in New Hampshire. Anecdotal information suggests that agriculture continues to decline in the northern Connecticut River valley, which would imply that some harrier territories may be affected by habitat change through succession. Many areas that include harrier territories appear stable in the Androscoggin and Lancaster areas, and some are protected.

2.5 Habitat Patch Protection Status

In the northern and central Connecticut River valley, essentially no harrier habitat is currently protected. In the Androscoggin Valley, harrier territories at Lake Umbagog and Pontook Reservoir are protected, while potential areas (including foraging habitat) outside of Umbagog and Pontook are not. In the Lancaster area, habitat around the Whitefield Airport is protected in the Pondicherry Division of the Silvio Conte National Fish and Wildlife Refuge, but other grassland areas remain privately owned. To the south, most historic harrier areas (including Cascade Marsh and part of Danbury Bog) are protected as state wildlife management areas.

2.6 Habitat Management Status

Other than at the Whitefield Airport, habitat management is not occurring. The airport has a Memorandum of Agreement with NHFG that defines a Northern Harrier Management Area and requires the following:

- Brush removal only between 1 September and 30 March
- Consultation with NHFG prior to any brush removal
- No use of herbicides, insecticides, or rodenticides without prior approval
- If nesting habitat is modified because of airport activities, the equivalent amount of suitable habitat must be provided elsewhere on the property

2.7 Sources of Information

Data on habitat condition for northern harriers were compiled from the literature or through discussion with observers familiar with local conditions in New Hampshire.

2.8 Extent and Quality of Data

Because regular surveys of the state's primary harrier areas were discontinued in 1997, there is no information on the current condition of over half of the state's historic territories. More regular coverage in the Androscoggin and Lancaster areas suggests that the species' population has not changed in the central and southern portions of Coos County.

2.9 Condition Assessment Research:

A thorough assessment of northern harrier status in New Hampshire will require revisiting core habitat in northern Coos County and historic sites in west-central New Hampshire, including the central Connecticut Valley.

ELEMENT 5: REFERENCES

5.1 Literature

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- Banner, A., and S. Schaller. 2001. *USFWS Gulf of Maine Watershed Habitat Analysis*. USFWS Gulf of Maine Program, Falmouth, Maine, USA. (http://r5gomp.fws.gov/gom/habitatstudy/Gulf_of_Maine_Watershed_Habitat_Analysis.htm)
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- Serrentino, P. 1998. A survey and habitat evaluation of northern harriers (*Circus cyaneus*) in northwest Coos County, New Hampshire. Report to Silvio O. Conte National Fish and Wildlife Refuge (U.S. Fish and Wildlife Service).
- Veit, R.R., and W.R. Petersen. 1993. *Birds of Massachusetts*. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.
- Vickery, P.D., M.L. Hunter, Jr., and S.M. Melvin. 1994. Effects of habitat area on the distribution of grassland birds in Maine. *Conservation Biology* 8: 1087-1097.
- Zeranski, J.D., and T.R. Baptist. 1990. *Connecticut Birds*. University Press of New England, Hanover, New Hampshire, USA.

5.2 Data Sources

- NHBR. *New Hampshire Bird Records*, New Hampshire Audubon, Concord, New Hampshire, USA.

ELEMENT 6: LIST OF FIGURES

Figure 1. Distribution of breeding season records of northern harrier in New Hampshire 1981-2000. Towns are coded according to the number of years in each period when harriers were reported: yellow = 1, red = 2-5, black = > 5. Figure 1a does not include peripheral sightings outside of the three principal breeding areas discussed in the text.

Distribution of Northern Harrier in New Hampshire

Distribution

-  Known
-  Potential
-  Historic



0 10 20 40 Miles

Known = confirmed breeding observations as reported in the NH Natural Heritage Bureau's Element Occurrence Database and obtained from NH Bird Records and the NH Breeding Bird Atlas, Audubon Society of New Hampshire.
Potential = possible breeding and other observations from the same data sources.
Historic = observations greater than 20 years old.

