

SPECIES PROFILE

Common Nighthawk

Chordeiles minor

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

Common nighthawks nest on the ground in prairies, rock outcrops, beaches and dunes, forest openings, abandoned quarries, pine barrens, and flat gravel roofs (Poulin et al. 1996). In New Hampshire, nighthawks primarily use pine barrens, openings in Appalachian oak-pine forests, rocky ridges, and urban habitats. In urban areas, they nest on flat gravel rooftops and forage on insects attracted to streetlights. Nighthawks prefer buildings 5 to 15 m (16 to 48 ft) high (Grazma 1967) that are surrounded by a parapet and surfaced with small “pea” gravel (6 to 15 mm in diameter, Marzilli 1986, 1989, Wedgewood 1992). Roofs surfaced with larger crushed stone (more than 25 mm) are rarely used by nighthawks (Marzilli 1986, Wedgewood 1992).

Records from non-urban areas are much rarer, and include pine barrens in Concord and the Ossipee area and gravel pits in parts of Hillsborough and western Rockingham Counties. In both, the birds forage over forest openings and adjacent urban or agricultural areas, occasionally using rocky ridges interspersed with low shrubby vegetation and forbs.

1.2 Justification

Data from the Breeding Bird Survey (BBS) suggest that nighthawks are declining over much of their range (around 1.7% annually), particularly in the East (around 4.6% annually, Sauer et al. 2004).

Declines have been greater since 1980 than in the period 1966 to 1979. NHA data suggest declines in the lower Merrimack valley, northwest Merrimack County, and the Pemigewasset valley by 1994 (figures 1a and b). Although data from the late 1990s are limited, they indicate significant declines across most of the range (figure 1c). By this time, the species had largely disappeared from coastal New Hampshire, the North Country, upper Connecticut River valley, and much of the Merrimack Valley. Nighthawks were absent from Manchester and had declined in Concord (NHBR). The absence of nighthawks from historic urban sites in the lower Merrimack Valley was confirmed in 2001 and 2002, when surveys failed to locate the species in either Manchester or Nashua (table 1, see also Hunt 2003). These same surveys detected the species in only four urban areas: Woodsville, Franklin, Concord, and Keene (figure 1d). Reports to NHBR between 2000 and 2004 indicate that the species occasionally occurs in Manchester and Berlin, but there are no indications of persistent populations.

The status of nighthawks in rural areas is more difficult to evaluate over this same period, since potential habitats are less likely to be visited at night and because birds are likely to be more dispersed. The most consistently occupied rural area during the last 20 years appears to encompass the pine barrens and other open habitats of the Ossipee area, including the towns of Sandwich, Tamworth, Madison, Ossipee, and Freedom. Other towns where nighthawks were documented in natural habitats (including gravel pits) since 1990 include Auburn, Concord, Croydon, New Boston, Orange (Mt. Cardigan), and Warner (Mt. Kearsarge).

1.3 Protection and Regulatory Status

This species is protected under 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

The distribution of the common nighthawk in New Hampshire prior to European settlement is unknown, but was presumably limited to pine barrens, heaths, bald mountaintops, and small openings created by fire, wind, or indigenous agriculture. Creation and expansion of urban areas in the nineteenth and twentieth centuries probably allowed the species to expand its range considerably (Andrle and Carroll 1988), although by the 1980s it appears to have declined considerably, especially in natural habitats.

During the Breeding Bird Atlas in the early 1980s, nighthawks were believed to occur almost exclusively in urban habitats (Foss 1994). Although distributed statewide, atlas records were concentrated in the lower Connecticut and Merrimack River valleys and parts of Strafford County. Isolated urban sites included Groveton, Berlin/Gorham, and Conway. Known or suspected nesting in natural areas occurred in the Ossipee area and northwestern Merrimack County.

1.5 Town Distribution Map

Not completed for this species.

1.6 Habitat Map

N/A

1.7 Sources of Information

Basic natural history information in this profile was largely gathered from the literature cited in element 5. Data on common nighthawk distribution in New Hampshire were compiled from NHBR, a database maintained by NHA.

1.8 Extent and Quality of Data

Because nighthawks are largely nocturnal, there are limited data on their overall distribution and abundance in New Hampshire. When surveys of urban areas were conducted, there were good estimates of local abundance, but such surveys have not been conducted recently. Information on nighthawks in

natural habitat is even more sparse, although recent surveys in the Ossipee Pine Barrens may provide data for this part of the state. There are no consistent surveys of potential habitat at mountaintop balds.

1.9 Distribution Research

Given ongoing declines throughout the Northeast, common nighthawks are included in a list of species identified by Partners in Flight as in need of comprehensive monitoring efforts, including in urban areas. Northeast Partners in Flight is currently developing a monitoring template for nightjars, which will include a section on urban nighthawks.

Monitoring of nighthawks in rural areas is problematic because of their sparse distribution. Whip-poor-will surveys in the Ossipee Pine Barrens may also record nighthawks. In the absence of a rural monitoring program, an effort should be made to visit known and potential sites and search for this species. This effort could use volunteers or be part of a larger statewide distributional assessment, such as a breeding bird atlas.

ELEMENT 2: SPECIES/HABITAT CONDITION

2.1 Scale

For the purposes of this profile, nighthawk sites are divided into 4 categories:

- **Ossipee Pine Barrens:** Available data suggest that this is the largest remaining natural population in the state. It can be defined as areas of Effingham, Freedom, Ossipee, Madison, and Tamworth where appropriate habitat remains.
- **Mountaintop Balds:** These are represented by historic sites such as Mts. Cardigan and Kearsarge. Undoubtedly other balds are suitable, although data on nighthawk use are lacking.
- **Other natural habitats:** This unit includes pine barrens and similar habitats in the Merrimack River Valley, as well as any other areas where the species may occur away from urban centers
- **Urban rooftops:** Tall buildings have historically supported nighthawks or have the potential to be used by the species.

2.2 Relative Health of Populations

Declines in almost all of the state's larger urban nighthawk populations (table 1) are indirect evidence of poor population health. If declines result from deteriorating local habitat quality, then the appropriate conservation unit may need to be identified as an individual city. If declines are more pervasive, then larger regional populations could be considered in poor health. There are insufficient data with which to evaluate population health in any of the non-urban areas used by nighthawks in New Hampshire.

2.3 Population Management Status

Nighthawks are not managed in New Hampshire.

2.4 Relative Quality of Habitat Patches

Given increased conservation interest in the Ossipee Pine Barrens by TNC and its partners, this area may be of relatively high quality. Although loss of habitat to development is still a factor, there are plans to reintroduce fire to the ecosystem, which would create additional openings that nighthawks could use. The same is true to a lesser extent for the pine barrens around the Concord Airport (Fuller et al. 2003). There are insufficient data on other pine barrens or sand plain forests to evaluate their current suitability for nighthawks. Mountaintop balds may remain suitable habitats, although data are lacking. For urban areas, habitat evaluation would require data on rooftop construction and configuration.

2.5 Habitat Patch Protection Status

Portions of both the Ossipee and Concord pine barrens have been preserved by easement or fee ownership. At least two mountaintops used by this species historically are protected as part of state parks (Mts. Cardigan and Kearsarge).

2.6 Habitat Management Status

At the Ossipee Pine Barrens, The Nature Conservancy is in the process of developing a habitat management plan to implement prescribed burning and other disturbances to maintain the habitat in a more open condition. Intensive restoration and manage-

ment began in Concord in 2002, and a management plan was finalized in 2003. Management prescriptions, including burning, forestry, and plant propagation, are targeted at restoring native grass, heath, and shrubland components of the pitch pine-scrub oak woodland community. No management is in place at any of the other areas occupied or potentially occupied by nighthawks in New Hampshire.

2.7 Sources of Information

Data on population trends for common nighthawks were obtained from NHBR and summaries of annual nighthawk surveys between 1982 and 1991 and 2001 and 2002. Information on management activity at specific sites was obtained through discussions with pertinent parties or from existing management plans or agreements.

2.8 Extent and Quality of Data

In the absence of comprehensive surveys, it is difficult to evaluate variation in habitat condition for this species in New Hampshire. There are no data on the specific characteristics of rooftops that could be used to determine the availability of nesting habitat in urban areas.

2.9 Condition Assessment Research

To the extent that urban rooftops once supported the majority of New Hampshire's nighthawk population, research into this habitat and how it has changed is sorely needed. Important data to collect could include the number and area of flat graveled roofs, roof height, and presence/absence of parapets or similar surrounding structures. Such data, when collected in a consistent manner across the primary known or potential urban breeding areas in the state, would be invaluable in assessing the potential for such areas to support or attract healthy common nighthawk populations.

ELEMENT 3: SPECIES AND HABITAT THREAT ASSESSMENT

3.1.1 Development (Habitat Loss and Conversion)

See Pine Barrens habitat profile

3.1.2 Development (Habitat Conversion)

(A) Exposure Pathway

The decline of common nighthawks in urban areas over much of its range has been attributed to changes in roof surface materials: from small gravel to large gravel (Wedgewood 1992) or a smooth rubberized surface (Poulin et al. 1996). Smooth rubberized roofs may not provide appropriate camouflage or thermal environment for nighthawk eggs or chicks, and they may allow eggs to roll (Marzilli 1989).

(B) Evidence

Gravel patches were placed on rubber roofs in Orono, Maine in 1986 and 1987 in locations where nighthawks were unlikely to nest. In 3 of 14 cases, nighthawks used these patches for nesting (Marzilli 1989), and they preferred patches placed near parapets, avoiding patches in the center of roofs.

3.1.3 Predation and Herbivory

(A) Exposure Pathway

Several authors (e.g., Laughlin and Kibbe 1985, Petersen and Meserve 2003) have speculated that declines in the closely related whip-poor-will (*Caprimulgus vociferus*) are related to a decline in prey populations. In particular, it has been proposed that saturnid and sphingid moth populations over much of the Northeast were severely depressed following widespread spraying for the introduced gypsy moth (*Lymantria dispar*) from roughly 1950 to 1970. Recovery is believed to have been hampered by a parasitoid fly (*Compsilura concinnata*), which was introduced to combat gypsy moths (Schweitzer 2004). An alternate hypothesis is that moth declines are the result of atmospheric pollution (Andrele and Carroll 1988).

(B) Evidence

There are limited data on the nature and extent of moth declines in eastern North America where most gypsy moth control has historically occurred. In addition, available evidence suggests that moths are a relatively unimportant part of nighthawk diets (Poulin et al 1996). Thus, any connection between large moth populations and nighthawk populations is speculative.

3.1.4 Altered Natural Disturbance (Fire Suppression)

See *Pine Barrens habitat profile*

3.1.5 Non-Point Source Pollution (Chemical Contaminants)

(A) Exposure pathway

Direct contact with some classes of pesticides is known to cause mortality in birds. Given that nighthawks routinely forage over agricultural areas in both the breeding and non-breeding seasons, the potential exists for them to become contaminated either through their prey or through direct contact.

(B) Evidence

Anecdotal data suggest a link between pesticide spraying and local disappearance of nighthawks (Wedgewood 1992, Foss 1994, Poulin et al. 1996). However, the lack of population recovery following such spraying suggests that additional factors have acted to prevent numbers from increasing once pesticide use was discontinued.

Like several other large aerial insectivores (whip-poor-will, purple martin), nighthawks are potentially affected by events on the winter grounds. Pesticide spraying continues in agricultural areas of southern South America, where the bulk of the population appears to winter (Poulin et al. 1996). Pesticide application during the non-breeding season has been directly implicated in mortality of Swainson's Hawks (*Buteo swainsoni*, Goldstein et al. 1996), and has been suggested for purple martin (Brown 1997) and upland sandpiper (Houston and Bowen 2001).

3.2 Sources of Information

Information used in this section was obtained primarily through a literature review.

3.3 Extent and Quality of Data

Few data are available on listed threats, and data on roof construction and use are highly variable (Bingham 1989). Data are similarly lacking on the effects of pesticides and the nature and extent of changes in the species' prey base.

3.4 Threat Assessment Research

Data are largely lacking on the suitability of urban rooftops for the species, and where they are available there is no way to assess any impact on local nighthawk populations. Data on prey populations and pesticide effects are even more rare. Potential research projects related to threats to nighthawk populations thus include, collection of data on rooftop construction and comparison to historic patterns of nighthawk occupancy, study of nighthawk diets in natural habitats to allow assessment of impacts of presumed moth declines, and study of nighthawk exposure to agricultural pesticides in South America.

ELEMENT 4: CONSERVATION ACTIONS

4.1.1 Target Gravel Rooftop Nesting Pads under Backyard Habitat Program, Restoration and Management (see also Strategies, Landowner Incentives Program)

(A) Change in rooftop construction

(B) Justification

- Installation of rooftop gravel nesting pads will replicate nesting substrates that have historically been suitable for nighthawks.
- At the University of Maine in Orono, nighthawks successfully colonized gravel nesting pads (Marzilli 1989).
- Given the rapid rate of decline, immediate action is appropriate. Recolonization attempts are expected to begin upon migration through focal areas.
- Modified rooftops can be monitored for nesting success to inform location and construction of nesting pads.

(C) Conservation Performance Objective

The objective is an increase in the proportion of an urban area's total rooftop space that provides suitable substrate for nesting by common nighthawks. The actual magnitude of change cannot be determined until baseline conditions, and possibly historic conditions, have been assessed as discussed in element 3.

(D) Performance Monitoring

Once current conditions are determined, areas where

this action is implemented should be reassessed every 2 to 3 years to determine if the amount of suitable habitat is increasing. Such assessment could include some combination of site visits and review of construction or maintenance records for target buildings.

(E) Ecological Response Objective

The desired ecological response is increased local nighthawk populations in focal areas. There are currently no data on the ability of nighthawk populations to respond to habitat management, so it is impossible to specify a time frame in which this objective should be attained. Until better demographic information is available, nesting success in colonized nest pads may serve as an indicator of response.

(F) Response Monitoring

Responses of local nighthawk populations should be monitored in conjunction with ongoing distribution/trend monitoring proposed under section 1.9. Nesting success in rooftop pads should be monitored (see section 1.9) annually.

(G) Implementation

Potential sites can be identified based on the criteria outlined in section 1.1 (building height, surrounding structures, etc.). If such roofs are surfaced with unsuitable rubber or larger gravel, a gravel patch can be placed on the roof. Gravel patches used in Maine were triangular and 3-m² in area, and were placed in the corners of roofs with parapets (Marzilli 1989). Patches should be placed to allow shading by parapets of other roof structures. If these are not available, additional shelter should be provided with the gravel pad. Once in place, such patches may require regular maintenance, although data on patch resiliency are currently unavailable. A program to educate building owners about choices in roof construction would be required to supplement this action.

(H) Feasibility: 1.00

Pending approval of funding for New Hampshire's Landowner Incentive Program proposal, this action can be implemented under the existing Backyard Habitat Program. Implementation will require cooperation with multiple parties that are not traditionally involved with wildlife conservation in New Hampshire, including building managers, construction

companies, and downtown associations. The presence of breeding peregrine falcons in Manchester has made nighthawk conservation more feasible by raising the profile of urban wildlife, and as a result Manchester might be a good place to test this action.

Modifying rooftops using gravel pads is certainly more feasible than any attempt to affect overall roof surfacing guidelines on a statewide basis. However, the option of resurfacing an entire roof with suitable substrate should not be ignored if such an opportunity presents itself. If stakeholder support can be obtained, the primary remaining obstacle to implementation would probably be the costs of materials and labor, and the nature of such costs cannot be determined at this time.

4.1.2 Develop an Urban Wildlife Management Plan, Restoration, and Management (see Strategies, Habitat Management)

4.1.3 Stipulate Roofing Materials on Site Specific Permits, Regulation, and Policy (see Strategies, Environmental Review)

4.1.4 Restore Openings in Pitch Pine-Scrub Oak Woodlands, Restoration and Management (see Pitch Pine-Scrub Oak Woodlands Habitat Profile, see also Strategies, Habitat Management)

4.1.5 Identify Critical Habitats and Focal Populations, Conservation Planning (see Strategies, Conservation Planning)

4.1.6 Advise Town Conservation Commissions on Roof Construction Guidelines, Regulation and Policy (see Strategies, Local Regulation and Policy)

4.2 Conservation Action Research

Evidence in favor of the efficacy of this action is adequate to support implementation.

ELEMENT 5: REFERENCES

5.1 Literature

Andrle, R.F., and J.R. Carroll. 1988. The Atlas of Breeding Birds in New York State. Cornell Univer-

sity Press, Ithaca, New York, USA.

Brigham, R.M. 1989. Roost and nest sites of common nighthawks: are gravel roofs important? *Condor* 91: 722-724.

Brown, C.R. 1997. Purple martin (*Progne subis*). In *The Birds of North America*, No. 287 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, DC.

Foss, C.R. 1994. Atlas of Breeding Birds of New Hampshire. New Hampshire Audubon, Concord, New Hampshire, USA.

Fuller, S., C. Goulet, and D. Hayward. 2003. Habitat management and monitoring plan for Concord Municipal Airport. Final Draft: April 21, 2003. New Hampshire Fish and Game Department.

Goldstein, M.I., B. Woodbridge, M.E. Zaccagnini, S.B. Canavelli, and A. Lanusse. 1996. An assessment of mortality of Swainson's hawks on wintering grounds in Argentina. *Journal of Raptor Research* 30(2):106-107.

Gramza, A.F. 1967. Response of brooding nighthawks to a disturbance stimulus. *Auk* 84: 72-86.

Houston, C.S., and D.E. Bowen, Jr. 2001. Upland Sandpiper (*Bartramia longicauda*). In *The Birds of North America*, No. 580 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, DC.

Hunt, P. 2003. Summary of 2002 common nighthawk surveys in New Hampshire. Report to the New Hampshire Fish and Game Department, Nongame and Endangered Species Program. New Hampshire Audubon, Concord, New Hampshire, USA.

Marzilli, V. 1986. Common nighthawks at the University of Maine, Orono. Report to Endangered and Nongame Wildlife Grants Program, Maine Department of Inland Fisheries and Wildlife, Bangor.

Marzilli, V. 1989. Up on the roof. *Maine Fish and Wildlife* 31(2): 25-29.

New York State Department of Environmental Conservation (NYSDEC). 2005. NYS Breeding Bird Atlas Website. www.dec.state.ny.us/apps/bba/results.

Petersen, W.R., and W.R. Meservey. 2003. Massachusetts Breeding Bird Atlas. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Poulin, R.G., S.D. Grindal, and R.M. Brigham.

1996. Common Nighthawk (*Chordeiles minor*). In The Birds of North America, No. 213 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pennsylvania, USA.
- Robinson, S., and J. Robinson. 2001. The Pittsfield nighthawk watch: 1993-2001. Bird Observer 29: 446-447.
- Sauer, J.R., J.E. Hines, and J. Fallon. 2004. The North American Breeding Bird Survey, Results and Analysis 1966-2003. Version 2004.1, USGS Patuxent Wildlife Research Center, Laurel, Maryland, USA.
- Wedgewood, J. 1992. Common nighthawks in Saskatchewan. Blue Jay 50: 211-217.
- 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 common nighthawks in New Hampshire, 1985-2004. Color coding indicates the maximum number of nighthawks observed in a given town during the five-year period: yellow = 1-4, red = 5-9, black = 10 or more. During the 20-year period, systematic nighthawk surveys were conducted in 1985-91 and 2001-02.

Distribution of Common Nighthawk in New Hampshire

Distribution
■ Known
■ Potential



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.

