

## Appendix A: Birds

### Peregrine Falcon

*Falco peregrinus* [E]

Federal Listing	N/A
State Listing	T
Global Rank	G4
State Rank	S2
Regional Status	Very High



Photo by Len Medlock

#### Justification (Reason for Concern in NH)

Historically Peregrine falcons established breeding territories in relatively low densities in suitable cliff habitats throughout the United States. Starting in the late 1940s, extensive reproductive failure caused by increasing levels of persistent synthetic chlorinated hydrocarbons (DDT and others) in their avian prey caused a dramatic population decline and range reduction. This decline continued through 1970 (Hickey 1969, Enderson et al. 1995). In New Hampshire, peregrine falcons ceased to breed productively by the late 1950s and all known nesting areas in the state became vacant by the mid-1960s (Spofford 1975). In the wake of the banning of DDT (1973) and extensive reintroduction efforts, falcons gradually recovered and re-occupied vacant historical territories in New Hampshire and across the United States starting in the early 1980s and continuing to the present day (Cade and Burnham 2003). Although largely recovered across the Northeast, the Peregrine Falcon is still considered a SGCN due to historic extirpation, need for ongoing management at many nesting sites, and the potential for emerging threats.

#### Distribution

The Peregrine Falcon is cosmopolitan in distribution, with breeding documented on all continents except Antarctica. In North America it breeds primarily in tundra and montane habitats where cliffs are present, although it is increasingly common in urban areas and along major river valleys where man-made nesting substrate is available. Non-breeding and wintering birds can occur anywhere with suitable prey populations.

In New Hampshire, Peregrine Falcons historically nested entirely on cliffs, primarily from the White Mountains north. Following extirpation and subsequent recovery, most of this former range has been re-occupied, and falcons have also begun nesting in urban settings in the southeastern portion of the state. Band encounter data for 986 individually marked peregrine falcon fledglings from across New England clearly show that individuals breeding in New Hampshire are not isolated from those breeding in other New England states, but instead are part of an interconnected regional population (Faccio et al. 2013).

#### Habitat

The peregrine falcon is a wide-ranging species that uses many different habitats across the United States for breeding, wintering, and migration (White et al. 2002). Nests sites are almost entirely on vertical cliffs or man-made structures that possess physical characteristics similar to cliffs. Open landscapes and air spaces, where peregrine falcons can locate and attack their prey in the air, are important components of most habitat types. Preferred habitats include mountainous terrain,

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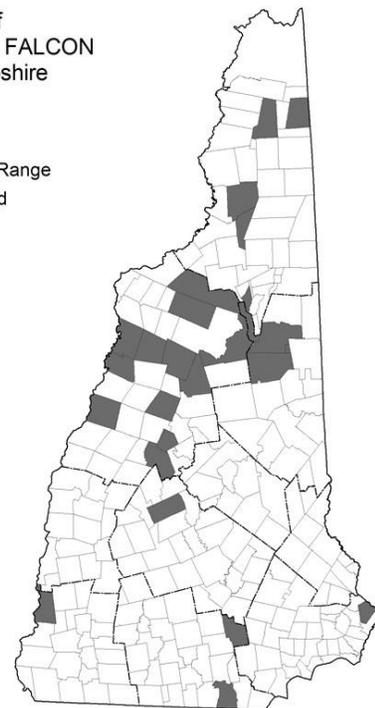
agricultural land, wide river valleys, lake shorelines, ocean coastlines, and islands. The urban environment, with high-rise buildings, major bridges, and tall smokestacks, has become an increasingly important habitat for peregrine falcons within the past quarter century (Cade et al. 1996b). The home range of a territorial individual can be relatively small (100 km<sup>2</sup>) when prey populations are abundant, but may be much larger (350 to 1,500 km<sup>2</sup>) when prey populations are more dispersed (White et al. 2002). Peregrine falcons can potentially establish breeding territories anywhere in the United States provided that areas with suitable nest sites and sufficient prey base occur in close proximity. Cliffs are abundant in New Hampshire, and suitable nesting substrate does not appear to be a limiting factor in peregrine falcon distribution.

### NH Wildlife Action Plan Habitats

- Rocky Ridge, Cliff, and Talus
- Developed Habitats

Distribution of  
PEREGRINE FALCON  
in New Hampshire

■ Current Range  
▨ Localized



Distribution Map

### Current Species and Habitat Condition in New Hampshire

Following extirpation, Peregrine Falcons did not nest in New Hampshire until 1981, when a single pair occupied a historic site in Franconia Notch. During the 10-year period from 1985 to 1994, the breeding population expanded at an annual rate of 15.9%. From 1995 to 2004, the population continued to expand, but at a less vigorous annual rate of 3.6%. In the most recent decade (2005-2014), the number of occupied territories and active nests have increased by 4-5% per year, and productivity (number of young fledged) grew by 120% (8% per year). In 2014 there were 22 pairs (of 23 occupied territories), and 17 of these pairs attempted to nest, ultimately fledging 33 young from 14 successful nests. Average annual productivity for New Hampshire peregrines has increased from 1.60 fledged/year for 24 seasons from 1981-2004 to 1.64 fledged/year for 34 seasons from 1981-2014. Six additional historical NH eyries that were still unoccupied in 2004 have since been occupied by new pairs (Mt. Kilburn, Peaked Mtn., Pond Ledge, Ragged Mtn. Bulkhead, Sugarloaf (aka Bear Mtn.), and Moat Mtn. (aka Woodchuck Ledge)). Recovery in neighboring Vermont has been

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considerably more vigorous, with a total of 41 territorial pairs monitored and minimum of 50 fledged young reported in 2014.

### **Population Management Status**

Volunteers from NHA conduct minimal productivity monitoring and presence/absence surveys of approximately 30 potential peregrine falcon breeding sites. Other activities include salvage of eggs and chicks, evaluation and management of human (i.e., recreational) influences, internet broadcasting of nesting activity, and extensive outreach and education to the public and rock-climbing community.

### **Regulatory Protection (for explanations, see Appendix I)**

- CITES - Convention on International Trade of Endangered Species of Wild Fauna and Flora
- Federal Endangered Species Act
- Federal Insecticide/Fungicide/Rodenticide Act
- National Forest Management Act
- Federal Land Management and Policy Act
- Endangered Species Conservation Act (RSA 212-A)
- Migratory Bird Treaty Act (1918)

### **Quality of Habitat**

Roughly 80% of Peregrine Falcon breeding sites in New Hampshire are on cliffs, with the remainder on man-made structures (bridges and buildings). In either case, suitable sites must have small horizontal shelves on otherwise vertical faces, minimal access for mammalian predators, and abundant avian prey within several miles. The greatest concern for habitat quality at cliff sites is the growing popularity of recreational climbing and its potential to suppress nesting success and productivity. The most serious habitat quality concerns at urban sites are pigeon abundance, the potential risk of secondary poisoning due to pigeon control efforts, the limited availability of suitable nesting substrates, and the highly variable maintenance schedules of urban structures.

### **Habitat Protection Status**

Of 23 occupied peregrine falcon breeding territories in New Hampshire in 2014, 11 sites (48%) were on public land, 11 (48%) were on private land, and one (4%) was on a mix of public and private land. Of the 11 sites on public land, 5 sites were managed by the United States Forest Service, 4 were on state land managed by the New Hampshire Division of Resources and Economic Development, one was on property managed by NH Department of Transportation, and one was on municipal land managed by the Town of Woodstock. Of the 11 sites on private land, 3 were protected by conservation easements, while 8 were not. Eighteen sites were cliff habitat, and 5 were urban habitat.

### **Habitat Management Status**

Cliff habitats in New Hampshire are subject to very little direct habitat management. There are no efforts to promote or discourage any particular vegetation type or density on cliffs. Establishing temporary restrictions for the recreational use of cliffs is the only current management action. Urban habitat management consists of voluntary adjustments in building maintenance to avoid potentially disruptive activities, and eliminating access to structural entrapment risks during the breeding season.

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### Threats to this Species or Habitat in NH

*Threat rankings were calculated by groups of taxonomic or habitat experts using a multistep process (details in Chapter 4). Each threat was ranked for these factors: Spatial Extent, Severity, Immediacy, Certainty, and Reversibility (ability to address the threat). These combined scores produced one overall threat score. Only threats that received a “medium” or “high” score have accompanying text in this profile. Threats that have a low spatial extent, are unlikely to occur in the next ten years, or there is uncertainty in the data will be ranked lower due to these factors.*

#### **Disturbance from increased spring storms that impact reproduction (Threat Rank: Medium)**

More intense or more frequent storm events (late-season snow accumulation and heavy rain) are anticipated due to climate change. If these occur during more vulnerable stages of the nesting cycle they may interfere with incubation and/or subject vulnerable young to increased risk of exposure.

#### **Disturbance to nests during building and bridge maintenance (Threat Rank: Medium)**

Potentially a more intense version of climber/hiker disturbance issue listed above since disturbance associated with building/bridge maintenance more likely to be longer duration at closer distance with more barriers/obstacles for peregrines to overcome (Cade et al. 1996b, Gahbauer et al. 2015).

#### **Disturbance by climbers and hikers (Threat Rank: Medium)**

Increasing peregrine population and growing outdoor recreation industry coupled with diminishing monitoring can increase exposure to this disturbance. Repetitive defense of nest, eggs, and young may reduce food provisioning, expose young to elements and predators, or displace adults from primary nest locations (Lanier et al. 1989, Pyke 1997).

#### **Mortality and disturbance from subsidized or introduced predators (Threat Rank: Medium)**

Principally concern about raccoon predation which can increase with urbanization of landscape, particularly in situations where peregrines are using sub-optimal nest sites.

#### **Disturbance from persistent organic compounds (Threat Rank: Medium)**

An emerging concern is presence of increasing levels of flame-retardant bromines in peregrines and their prey, as demonstrated in 114 peregrine falcon eggs collected at New England nest sites from 1990-2006 (Chen et al. 2008). It is still unclear whether there is any reduction in productivity associated with increased levels of organic contaminants in prey species.

#### **List of Lower Ranking Threats:**

Disturbance from mercury toxicity

Disturbance from the harvest for falconry

Habitat degradation from timber harvesting that removes trees at the top of cliffs

Disturbance during research activities

Mortality related to intentional or unintentional shooting and trapping

Disturbance of nests by aircraft

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Mortality from wind tower and turbine development  
Habitat conversion from mountaintop removal mining  
Habitat degradation from wind tower and turbine development  
Habitat degradation due to residential ridgetop development

### **Actions to benefit this Species or Habitat in NH**

#### **Temporary cliff closures**

**Primary Threat Addressed:** Disturbance by climbers and hikers

**Specific Threat (IUCN Threat Levels):** Human intrusions & disturbance

**Objective:**

Minimize disturbance of nesting Peregrine Falcons by recreational climbers

**General Strategy:**

Several more specific actions are nested within this larger one. Most important are a) conduct outreach to climbing community on the need for closures, and encourage volunteer stewardship on its part, b) advise land managers on how to mitigate potential climbing impacts within their jurisdictions, and c) actually post (and remove) cliff closure signage at sites with active Peregrine Falcon nesting attempts. This latter action is strongly informed by data collected by ongoing monitoring.

**Political Location:**

Statewide

**Watershed Location:**

Statewide

#### **Wind Power Mitigation**

**Primary Threat Addressed:** Mortality from wind tower and turbine development

**Specific Threat (IUCN Threat Levels):** Energy production & mining

**Objective:**

Minimize threat to Peregrine Falcons from wind power development.

**General Strategy:**

Develop and implement BMPS for siting and operation of wind facilities that minimize disturbance and mortality. Includes research that might guide siting and guidelines for operation during falcon nesting season.

**Political Location:**

Statewide

**Watershed Location:**

Statewide

#### **Peregrine Falcon monitoring**

**Objective:**

Track population status of Peregrine Falcons in NH

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### **General Strategy:**

Ongoing monitoring of both cliff and mad-made nest sites is needed to inform site management (e.g., cliff closures, timing of building maintenance, etc.). Spring surveys of recently active and potential breeding sites should be used to monitor the distribution and abundance of peregrine falcons in New Hampshire. Recently active sites should be checked annually to determine occupancy status and reproductive outcome. Surveys of potential sites should be conducted on a rotating basis, with annual survey intensity determined by funding and available human resources. For example, sites could be checked on a 3-year rotation covering 33% of sites annually, on a 5-year rotation covering 20% annually, or on a 10-year rotation covering 10% annually.

### **Political Location:**

Statewide

### **Watershed Location:**

Statewide

## **Contaminants Research**

### **Objective:**

Assess levels of known and emerging contaminants in Peregrine Falcons

### **General Strategy:**

Participate in collaborative regional sampling for contaminants as a means of assessing their overall prevalence in northeastern Peregrine Falcons. Includes taking tissue samples (eggs, blood, feathers) and having these analyzed for contaminant loads.

### **Political Location:**

Statewide

### **Watershed Location:**

Statewide

## **References, Data Sources and Authors**

### **Data Sources**

Unless otherwise noted, the source for New Hampshire species data is field monitoring and management activities conducted by the New Hampshire Audubon (NHA) from 1983 through 2015 under annual contracts and/or grants received from the New Hampshire Fish and Game Department (NHFG) and/or the USFWS (e.g., Martin 2007).

### **Data Quality**

Since the early 1980s, the peregrine falcon has been one of the most intensively monitored and managed species in New Hampshire. Breeding site data are derived from three decades of field monitoring by NHA staff and trained volunteers. These observers employ standardized monitoring techniques at historical, active, and other potential sites throughout the state (see Cade et al. 1996a). Both remote sites and sites located close to roads and trails are surveyed, although remote sites are visited less frequently.

### **2015 Authors:**

Pamela Hunt, NHA, Christian Martin, NHA

### **2005 Authors:**

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