Appendix A: Birds

Northern Goshawk

*Accipiter gentilis*

<table>
<thead>
<tr>
<th>Federal Listing</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Listing</td>
<td>G5</td>
</tr>
<tr>
<td>Global Rank</td>
<td>G5</td>
</tr>
<tr>
<td>State Rank</td>
<td>S3</td>
</tr>
<tr>
<td>Regional Status</td>
<td>Very High</td>
</tr>
</tbody>
</table>

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

Northern Goshawk is generally considered an SGCN because of its association with large tracts of forest. Rapid population growth in New Hampshire has resulted in extensive losses of forest, particularly in the southern portion of the state. Development and changes in ownership divide forest into smaller parcels, compromising goshawks by reducing the availability of nest sites and prey species. Fragmented landscapes may also increase competition with other raptors such as Great Horned Owls and Red-tailed Hawks, which are better adapted to foraging and nesting in these areas (Crocker-Bedford 1990).

**Distribution**

The Northern Goshawk breeds across northern and western North America, including the mountains of western Mexico (Squires and Reynolds 1997). It also occurs throughout Europe and in Asia north of the Himalayas. Most individuals winter within the breeding range, although some occur in areas immediately to the south. In some areas, goshawk populations track those of prey species (e.g., Snowshoe Hares), and in irruption years may occur in larger than usual numbers south of breeding areas. The species nests throughout New Hampshire (Foss 1994), although it is rare near the coast, and data on population dynamics are lacking.

**Habitat**

Northern Goshawk breeding home range consists of nesting areas, post-fledgling family areas, and foraging areas (Reynolds et al. 1992). All goshawk breeding activity, from courtship to fledging, centers around the nesting area, which includes the nest tree and surrounding stands that contain prey handling areas, perches, and roosts. In New Hampshire, white pine (*Pinus strobus*), paper birch (*Betula papyrifera*), yellow birch (*Betula alleghaniensis*), Big-toothed aspen (*Populus grandidentata*), and red maple (*Acer rubrum*) are common nesting trees. Among nest trees evaluated from southern Maine and New Hampshire, 48% were white pines (n=56) (Karedes 2012). These stands tend to be mature, containing some large diameter trees, and have relatively dense canopies and open understories. Most have been somewhat disturbed. Nest sites are generally situated close to the bottom of gentle slopes, most below 1,500 ft. In New Hampshire breeding Northern Goshawks appear to have an affinity for sites with pine cover in core areas (162 hectares centered on nest trees), yet appear to avoid grasslands in core areas (Karedes 2012).

Nests are constructed in large trees with dominant and co-dominant positions in the canopy, but are...
Appendix A: Birds

not necessarily the largest trees in the stand. A nest tree must contain a branching structure suitable for holding a large bulky stick nest. Goshawks will often maintain 1 to 8 alternate nests within their nesting areas (Yamasaki and Costello, unpublished data, Speiser and Bosakowski 1987, Reynolds et al. 1994). Nest trees are often situated close to some type of forest opening (e.g., small breaks in the canopy, trails, forest roads, and upland openings).

The post-fledgling-family area is the area surrounding the nest site used by both adults and juveniles after fledging and until juvenile independence (Reynolds et al. 1992). This area is similar to nesting habitat and is believed to be critical in providing extra cover and abundant prey for unskilled juveniles. Research from the western United States suggests that the post-fledgling-family area varies in size from 121 to 243 hectares (300 to 600 acres), probably due to variation in food availability (Reynolds et al. 1992, Kennedy et al. 1994, Daw and DeStefano 2001).

Goshawk foraging areas consist of large tracts of forestland containing a variety of forest age classes and openings that can support the diverse habitat requirements of important goshawk prey species (Reynolds et al. 1992). These species include ground and tree squirrels, game birds, medium to large-sized songbirds, corvids, rabbits, and hares (Reynolds et al. 1992, Bosakowski et al. 1992, Boal and Mannan 1994, Doyle and Smith 1994). Much research suggests that goshawks forage in closed canopy forests with open understories where prey is accessible, but that younger stands and openings are important for prey production. Karedes’s (2012) analysis of landcover data revealed a significantly greater presence of birch/aspen stands within Northern Goshawk breeding areas compared to available habitat. Critical winter goshawk habitat in eastern North America is unknown.

NH Wildlife Action Plan Habitats

- Appalachian Oak Pine Forest
- Hemlock Hardwood Pine Forest
- Lowland Spruce-Fir Forest
- Northern Hardwood-Conifer Forest

Distribution Map
Appendix A: Birds

Current Species and Habitat Condition in New Hampshire

Karedes (2012) provides the most comprehensive evaluation of known nest sites for Northern Goshawk in New Hampshire. The study focused on nests sites in and around the White Mountain National Forest but included additional sites throughout the state.

Population Management Status

Management is not currently in place for this species.

Regulatory Protection (for explanations, see Appendix I)

● Migratory Bird Treaty Act (1918)

Quality of Habitat

Unknown.

Habitat Protection Status

Karedes (2012) analyzed the location of 44 nest locations in New Hampshire and determined that 70.5% (n=31) were on conservation lands (private and public) and 29.5% (n=13) were locate on private land without conservation protection.

Habitat Management Status

Habitat is not specifically managed for this species in NH.

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.

Habitat conversion due to development (Threat Rank: Medium)

Development reduces the number and distribution of available nest sites and foraging habitat. Additionally, these activities can increase populations of goshawk predators such as raccoons and Great Horned Owls.

Analysis of landscape composition in New Hampshire’s White Mountain Region demonstrates that Northern Goshawk territories are found in areas domintated by forest cover (table provided by Yamasaki in 2015 email correspondence).
Appendix A: Birds

**List of Lower Ranking Threats:**
- Disturbance from recreational activity
- Habitat degradation from forestry practices

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

<table>
<thead>
<tr>
<th>Develop and collect occurrence, habitat, and distribution data</th>
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<tbody>
<tr>
<td><strong>Primary Threat Addressed:</strong> Habitat conversion due to development</td>
</tr>
<tr>
<td><strong>Specific Threat (IUCN Threat Levels):</strong> Residential &amp; commercial development</td>
</tr>
<tr>
<td><strong>Objective:</strong> Census surveys in likely habitat will provide more information on a poorly understood species and will allow testing of habitat alteration hypotheses. Ecological studies will help determine the urgency of threats to the goshawk.</td>
</tr>
<tr>
<td><strong>General Strategy:</strong> State-wide surveys will provide distribution and habitat survey data upon which population analyses can be conducted. Statewide surveys can be followed by closer investigation of hemlock-hardwood-pine, northern hard-wood-conifer, Appalachian oak-pine, and lowland spruce-fir types. Investigations that increase knowledge of goshawk demographics and habitat availability (or degradation) will allow for better management.</td>
</tr>
<tr>
<td>Continuing support for ongoing goshawk population and habitat work in the White Mountains region and expanding these efforts state-wide would allow the direct testing of the habitat alteration hypothesis. Such surveys and habitat assessments are needed to better describe the status of goshawk and the characteristics of those habitats where goshawk occurs (e.g., associated vegetative communities, habitat condition indicators, any positive or negative forest management and recreational threats to habitat).</td>
</tr>
<tr>
<td><strong>Political Location:</strong> Statewide</td>
</tr>
<tr>
<td><strong>Watershed Location:</strong> Statewide</td>
</tr>
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**Research a range of factors that may impact goshawk populations in NH**

| **Objective:** Develop survey methods or use existing surveys to further understand winter abundance and distribution of goshawks, and initiate research of impacts to goshawks in NH. |
| **General Strategy:** Develop a survey method or make use of existing surveys (e.g., Christmas Bird Counts, Feeder Watches) to obtain an index of winter abundance and distribution in the state. Determine home range sizes and characterize breeding and foraging habitat at landscape, stand, and within-stand scales this was done. Determine how changes in forest structure and landscape patterns affect reproductive success, survival rates, territory fidelity, juvenile dispersal, and breeding dispersal. Determine important prey species of goshawk in this region and determine how the abundance and
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availability of prey is influenced by forest structure, management practices, landscape patterns, and natural cycles. Determine migratory status of goshawks breeding in New Hampshire and winter survival rates of adults and juveniles. Determine if West Nile Virus is affecting goshawk populations in New Hampshire. Identify effects of various forest management practices on goshawk habitat, nest site fidelity, productivity, and prey availability.

<table>
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<tr>
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<th>Watershed Location:</th>
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<tbody>
<tr>
<td>Statewide</td>
<td>Statewide</td>
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</table>

**Use different methods of evaluating goshawk populations and characterizing habitat use**

**Objective:**
Develop a statewide broadcast monitoring program and test a rapid assessment process to collect data on distribution.

**General Strategy:**
Develop a statewide broadcast monitoring program for goshawk that will be regionally viable. Although time consuming and labor intensive, broadcast surveys are the best method available and can be used to monitor areas for occupancy, changes in distribution and abundance, and nest location. Data on distribution are most essential in areas expected to experience the most severe habitat loss.

Characterize goshawk winter habitat.

<table>
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<tr>
<th>Political Location:</th>
<th>Watershed Location:</th>
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</table>

**References, Data Sources and Authors**

**Data Sources**
Information on goshawk habitat, population distribution, and status was compiled from unpublished data from on-going research, scientific literature, limited agency data, surveillance of the New Hampshire bird list-serve, as well as from direct searches. There are no statewide or regional data upon which to assess the condition of goshawk.

**Data Quality**
There are no systematic goshawk sampling efforts in New Hampshire. Breeding bird surveys, hawk watches, and Christmas bird counts do not adequately survey for the seasonal and elusive goshawk. The objectives of current research efforts focused in the White Mountain region by the Northeastern Research Station are to locate breeding territories and describe nesting habitat and do not address demographics. Minimal funding results in inconsistent surveying and monitoring. There are no data available to make this assessment.

**2015 Authors:**
Pamela Hunt, NHA, John Kanter, NHFG

**2005 Authors:**
Mariko Yamasaki, USFS; Christine Costello, USFS
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Literature


