

SPECIES PROFILE

Three-Toed Woodpecker

Picoides dorsalis

Federal Listing: Not listed

State Listing: Threatened

Global Rank: G5

State Rank: S1

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ELEMENT 1: DISTRIBUTION AND HABITAT

1.1 Habitat Description

The three-toed woodpecker inhabits boreal and montane coniferous forests of Canada and the northern United States, from Alaska to California in the west, and northern Wisconsin east to northern New York and northern New England. This species is a year round resident throughout its range, where it occurs in sites with abundant dead and dying trees caused by disease, fire, flooding, insects, wind, and pollution. In the east, they occur at elevations from 360 to 1,250 m (1,180 to 4,100 ft) (Winkler et al. 1995).

Although three-toed woodpeckers are closely associated with spruce forests, the composition of occupied habitats varies across its range. In eastern North America, this species has been found in moist coniferous habitats, such as bogs and spruce-fir swamps. Three-toed woodpeckers in Michigan and Vermont commonly occur in black spruce, tamarack, and balsam fir swamps (Van't Hof and Van't Hof 1983, Oatman 1985). In New York, breeding pairs often choose nest sites in spruce-larch forests with stands of dead trees surrounding open bogs, or black spruce bogs among the Adirondack High Peaks (Leonard 2001, Peterson 1988). In New Hampshire, three-toed woodpeckers inhabit spruce-fir forests, bogs, and logged areas with standing dead conifers in the North Country and above 3,000 ft (910 m) in the White Mountains (Foss 1994). In northern Maine, they have been found in mixed hardwood old

growth forests (Gunn and Hagan in Leonard 2001). In Canada, they may be found in mixed conifer and riparian willow habitats, and they have been observed occasionally in isolated hardwood-dominated stands in St. Lawrence lowlands (Leonard 2001). Nests may be dug in dead or dying coniferous or deciduous trees, or in hard or soft snags or stumps with diameters of at least 12 in (31 cm) (Foss 1994). Nest trees are often near water.

1.2 Justification

The three-toed woodpecker is locally common in the western part of its range and rare in eastern North America. Its quiet, reclusive nature and relatively inaccessible habitat contribute to this species being under-recorded by most surveys. Historic observations indicate that this species is less common than the black-backed woodpecker, which shares its habitat throughout North America.

Three-toed woodpeckers feed primarily on bark beetles, which are most abundant on dead and dying trees with shedding bark, and therefore require standing dead trees for foraging. Suitable habitats with abundant dead and dying trees are created through natural disturbances such as fire, wind, disease, insect outbreaks, flooding, and human activities such as logging. However, extensive logging of coniferous forests has reduced the amount of standing dead and dying timber over the past 150 years. In addition, beaver activity, insect outbreaks, salvage logging of affected stands, and suppression of forest fires, have reduced and degraded former three-toed woodpecker habitats.

Three-toed woodpeckers have been studied very little in North America, so there are too few data to determine significant changes in population distribution or abundance. However, long-term studies in northern Europe have correlated Eurasian woodpecker

er decline there with activities common here (beavers, salvage logging, fire suppression, habitat fragmentation, etc.). North American Breeding Bird Survey (BBS) data indicate significant annual declines of 15.0% for the United States and 13.4% across North America. However, these results are based on a very small sample size (just 12 survey routes for the United States, and 18 for all of North America), and very low abundances of three-toed woodpeckers on each route (J. Sauer personal communication in Leonard 2001).

Despite relatively low abundance and lack of data, several observers have noted declines in this species over the past century. Forbush (1927 in Oatman 1985) noted that their numbers in Vermont had likely been reduced by extensive logging of spruce forests in the eighteenth and nineteenth centuries, and both Saunders (1929) and Bull (1974) indicated three-toed woodpeckers had become scarcer in New York. In Maine, declines in this species were attributed to timber harvesting (Hagan et al. 1997). The few observations in New Hampshire since 1884 indicate that three-toed woodpeckers occupy a small number of historic sites (Foss 1994).

1.3 Protection and Regulatory Status

The three-toed woodpecker is protected in the United States under the Migratory Bird Treaty Act of 1918 and in Canada under the Migratory Birds convention Act of 1994. It is considered a Sensitive Species by the United States Bureau of Land Management and Region 4 of the United States Forest Service (USFS), and is a Watch Species by the United States Fish and Wildlife Service (USFWS). It is listed as a Species of Special Concern in Idaho, a Sensitive Species in Utah, a Species of Concern in Washington, A Sensitive Species in Oregon, and a Rare and Uncommon Native Species in Vermont.

In New Hampshire, three-toed woodpeckers are listed as Threatened. This designation makes it unlawful to kill, possess, process, sell or offer for sale, deliver, carry, transport or ship such species within the state or export them from the state. Three-toed woodpeckers have also been identified as species of conservation concern by the New Hampshire Living Legacy Project, New Hampshire Important Bird Areas Program, the New Hampshire Forest Resources Plan Ecological Assessment, the White Mountain National Forest (WMNF), and

by the New Hampshire Natural Heritage Bureau.

1.4 Population and Habitat Distribution

In New Hampshire, three-toed woodpeckers have been documented in the North Country and in the White Mountains, with Mt. Passaconaway (Waterville Valley) being the southern-most location documented in the state (Foss 1994). The earliest documentation of three-toed woodpeckers in New Hampshire was in August 1884, of a female and young bird shot below Hermit Lake in Tuckerman's Ravine. The second documented record was in July 1886, of a bird observed in the Great Gulf Wilderness (Chadbourne 1887 in Foss 1994). A few reports of three-toed woodpecker sightings followed until the 1950s, when sightings became more frequent. Since 1884, sightings have been documented in at least 12 towns, from Waterville Valley to Pittsburg (table 1). All but 2 of these reports were of observations during the breeding season. Two reports were of birds seen in October, one at an unknown location in Bethlehem (where the reporter indicated he had seen them there previously) in 1981, and one on the Isreal Ridge Trail on Mt. Adams in 1996. Both of these locations are areas where three-toed woodpeckers have been seen during the breeding season.

1.5 Town Distribution Map

See figure 1.

1.6 Habitat Model

Zapisocki et al. (2000) developed a Habitat Suitability Index Model for three-toed woodpeckers in west-central Alberta that includes the following within-stand features:

- Average diameter at breast height (dbh) of canopy trees
- Average top height of 100 coniferous trees/ha that have the largest dbh
- Total density of standing dead trees or stubs greater than or equal to 16 cm (6.3 in) dbh per hectare
- Percent composition of pine, spruce, fir, and larch species in the tree canopy
- Percent of ground covered by a vertical projection of tree crown areas on to the ground

- Includes trees greater than or equal to 8 cm (3.2 in) dbh

These features describe the year-round requirements for foraging, nesting, and cover. Based on studies of three-toed woodpeckers in the northwest, values associated with these features are as follows:

- Trees greater than 8 cm (3.15 in) are suitable for foraging or nesting, and trees greater than or equal to 20 cm (7.9 in) are optimal
- Tree heights greater than 4 m (13 ft) are suitable, and trees greater than or equal to 8 m (26 ft) are optimal
- Stands with numerous snags have more food and potential nests, and stands with greater than or equal to 1.2 snags/ha are optimal
- Conifer-dominated stands (more than 50% conifer) are preferred, and stands with more than 20% conifers are unsuitable
- Tree canopy closure must be more than 6% for a stand to be suitable for three-toed woodpeckers, and stands with closure greater than 50% are optimal

These habitat features may be applicable to New Hampshire and the rest of the Northeast, but use in this region should be done in conjunction with model testing and verification procedures (Zapisocki et al. 2000).

Information on average dbh, tree height, and snag density is generally unavailable on a wide scale in New Hampshire. Measures of percent of coniferous species coverage and percent canopy cover may be derived from aerial photos or from existing land cover analyses of aerial photos. Potential three-toed woodpecker habitat might be identified on a landscape scale by mapping currently and potentially disturbed habitats within conifer-dominated forests from the White Mountains north. Data needed for this landscape model might include:

- Land cover data to identify conifer-dominated stands
- Aerial photos of conifer dominated stands to determine % canopy closure and possibly % conifer cover. Aerial photos might also show disturbed habitats, especially standing dead trees
- Hydrology and National Wetland Inventory (NWI)

maps to show wetlands and waterbodies, where this species is often found

- Current and potential beaver flowages, to show where flooding could cause tree mortality
- Topography and digital elevation models to show high wind areas where tree mortality may be caused by wind throw

1.7 Sources of Information

Information on historic and recent three-toed woodpecker distribution and habitat was found in breeding bird atlases from New York, Vermont, and New Hampshire, and from the three-toed woodpecker account of the Bird of North America series. Data on three-toed woodpecker observations were derived from the New Hampshire Audubon's New Hampshire Bird Records (NHBR) database. Other information was found in literature on three-toed woodpecker studies.

1.8 Extent and Quality of Data

There are very few data on three-toed woodpeckers in New Hampshire and in the Northeast in general. Their habitat is often remote and difficult to survey, and this species' relatively quiet behavior makes them challenging to detect.

1.9 Distribution Research

Surveys of historic sites and high-potential habitats would establish a baseline of information on current distribution and relative abundance of this species. Since this species occurs at all elevations, surveys could be coordinated with wetland bird surveys and high elevation bird surveys.

ELEMENT 2: SPECIES/HABITAT CONDITION

2.1 Scale

Three-toed woodpeckers have been documented the White Mountains, Lake Umbagog, and Pittsburg.

2.2 Relative Health of Populations

There are too few data to determine the relative quality of these sites, or the relative health of populations

of this species. The most recent observations have occurred at East Inlet (Pittsburg) in 1998, Whaleback Ponds near Lake Umbagog (Errol) in 2004, and in the Presidential Range of the White Mountains in 2000. All of these areas are currently protected as either state or federal lands.

2.3 Population Management Status

Three-toed woodpeckers are not currently managed in New Hampshire.

2.4 Relative Quality of Habitat Patches

As mentioned in section 2.2, there is too little information on three-toed woodpeckers and their habitats to assess relative quality of sites. The conservation status of all known sites increases the probability that coniferous forest habitats will be managed to maintain or enhance habitat for this species.

2.5 Habitat Patch Protection Status

All of the known recent sites are protected. Two state agencies—the Department of Resource and Economic Development (DRED) and New Hampshire Fish and Game (NHFG)—own most of the town of Pittsburg, and East Inlet is within a large territory owned by the NHFG. Whaleback Ponds are within the Lake Umbagog National Wildlife Refuge, and the White Mountains are entirely within the White Mountains National Forest. Most of these areas will be exempt from logging activities and will eventually provide mature and old growth spruce stands suitable for three-toed woodpecker habitat.

High elevation spruce-fir habitats are almost completely protected in New Hampshire through a suite of regulations and agreements, including a no-cut zone above 2,700 ft on state, federal, and private conservation lands (the Bunnell tract and The Nature Conservancy). They are additionally protected by zoning ordinances (PD6 zones) in unincorporated towns, the cooperative High Elevation memorandum of understanding (MOU)OU for large landowners developed by NHFG and DRED, a conservation easement held by DRED, and an MOU between the WMNF and NHFG related to wildlife habitat management (J. Kelly in press).

These measures effectively protect most high eleva-

tion spruce-fir habitat. However, there is montane black spruce-red spruce habitat (2,500 to 3,000 ft) below 2,700 ft that may not be protected, as well as northern hardwood-spruce-fir forests from 2,100 to 2,800 ft that may still undergo timber harvests.

2.6 Habitat Management Status

None of these sites is being managed specifically for three-toed woodpeckers.

2.7 Sources of Information

Known sites were derived from NHBR, and conservation and management status was obtained from NHFG, the Umbagog National Wildlife Refuge, and the WMNF.

2.8 Extent and Quality of Data

There are few data on distribution and abundance of three-toed woodpeckers and no information on the availability and condition of suitable habitat for them.

2.9 Condition Ranking

2.10 Condition Assessment Research

Because three-toed woodpeckers are at the southern edge of their range in New Hampshire and occur in such scattered locations throughout the northern half of the state, it is probable that many suitable habitats are unoccupied simply because this species has not colonized them, or that they have not been detected. An assessment of the condition of known and potential habitat should incorporate data on spruce-fir patch size, stand age, tree dbh and height, canopy closure, and information on availability of large (greater than 25 cm (9.8 in) dbh) dead trees and snags.

ELEMENT 3: SPECIES AND HABITAT THREAT ASSESSMENT

3.1 Threats

See form 1: Threat Identification; form 2: Threat Ranking; and form 3: Local Threat Weighting (attached). Form 4 (Feasibility Ranking) for three-toed

woodpecker will be the same as those for High Elevation Spruce Fir and Acadian Spruce Fir Forests. See the High Elevation Spruce Fir Forest and Acadian Spruce Fir Forest habitat profiles for a complete list of threats

3.1.1 Unsustainable Harvest (Forestry Operations and Management)

Timber harvesting is the most serious threat for high elevation and lowland spruce fir forests, and past and logging has reduced and degraded spruce-fir habitats throughout the state. Logging is a minimal threat to high elevation habitats today, but past harvesting activity will continue to affect the availability and condition of high elevation spruce-fir forests for many years.

Harvesting of lowland spruce-fir is still a threat, as stands are cut on relatively short rotations, eliminating the opportunity for forests to develop mature and over-mature stands on which three-toed woodpeckers depend. Increased fragmentation of forests, as well as more intensive management, has reduced the role of natural disturbances, such as fire, flooding, and insect outbreaks on forest structure and composition. Dead and dying timber is not marketable, and is often salvaged to clear a site for new growth. The loss of habitat for bark beetles and other insects results in a landscape that can not support three-toed woodpeckers or other species associated with mature and over-mature stands.

3.1.2 Mercury

Terrestrial and aquatic ecosystems are vulnerable to air-borne pollutants such as mercury and other heavy metals. High levels of mercury have been found in blood and tissues of many species of fish, mammals, birds and salamanders, all of which live in or are associated with wetlands, streams and other waterbodies. More recent research on forest songbirds in Vermont, however, indicates that insectivorous songbirds from high elevation spruce-fir forests to lower elevation deciduous woodlands are also accumulating high levels of mercury (Evers 2005). Deposition of mercury may be highest in certain high elevation sites, and mercury may accumulate in wetland habitats. Three-toed woodpeckers are often found in such areas and may therefore be vulnerable to mercury toxicity.

3.2 Sources of Information

Threats information for three-toed woodpeckers was derived from the literature and discussions with experts and colleagues during threat identification and ranking meetings. Habitat profiles and threat rankings for both high elevation and lowland spruce-fir habitats were used for the three-toed woodpecker threats analysis and were modified appropriately.

3.3 Extent and Quality of Data

Several studies on the effects of timber harvesting on three-toed woodpeckers have been conducted in Europe and the western United States and Canada. Although fewer studies have been done in the east, the results parallel those of research conducted elsewhere. There is very little information on the effects of development or human recreation on this species. Many observers suggest that three-toed woodpeckers are relatively unfazed by human presence, but there is virtually no information on the impacts of ski area development, hiking, timber harvesting, recreational vehicles, hunting, or other activities on this species.

3.4 Threat Assessment Research

Since there are few observations of three-toed woodpeckers in New Hampshire, priority research should focus on determining presence of this species at historic and recent breeding territories, followed by searches in likely potential habitats. This would provide baseline information on distribution and habitat selection, as well as breeding success and life history data.

ELEMENT 4: CONSERVATION ACTIONS

Three-toed woodpeckers are especially dependent on disturbed habitats within spruce-fir forests. Therefore, in order to provide sufficient habitat for this species, conifer-dominated stands in the White Mountains and northward should be managed to accommodate natural disturbances and patches of mature and over mature timber. Areas likely to be subject to high winds or beaver activity should be either left unmanaged or managed to leave large areas of standing dead trees. Sites affected by fire, insect outbreaks,

or other disturbances should be managed similarly. Finally, sites that were originally spruce-fir and have grown back as hardwood-dominated stands should be managed to encourage conifer species.

ELEMENT 5: REFERENCES

5.1 Literature

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5.2 Data Sources

NHBR. New Hampshire Bird Records, New Hampshire Audubon, Concord, NH.

ELEMENT 6: LIST OF FIGURES

Table 1 (data from Foss 1994 and New Hampshire Bird Records (NHBR)).

| Location (Town) | Date (s) |
|---|-------------------------|
| Tuckerman's Ravine (Sargent's Purchase) | 1884, 1960s & 70s |
| Great Gulf Wilderness, Caps Ridge Trail, Jefferson Notch, Mt. Adams (Thompson & Meserve's Purchase) | 1886, 1960s & 70s, 2000 |
| Mt. Passaconaway (Waterville Valley) | 1893 |
| Umbagog Lake (Errol) | 1890-1940, 2004 |
| Mt. Starr King (Jefferson) | 1890-1940 |
| Carter Range (Bean's Purchase/Shelburne) | 1890-1940 |
| Greeley Ponds, Nancy Pond (Livermore) | 1927, 1960-1981 |
| East Inlet, Indian Stream (Pittsburg) | 1952, 1954, 1980-1998 |
| Mt. Webster (Hart's Location) | 1960s & 70s |
| Kancamagus Pass (Livermore/Lincoln) | 1960s & 70s |
| Mt. Clinton (Bean's Grant) | 1960s & 70s |
| Avalon Trail (Bethlehem) | 1981 |
| Atlas block bog (Success) | 1986 |
| Isreal Ridge Trail, Mt. Adams (Low & Burbank's Grant) | 1996 |