

Investigating Rusty Blackbird Breeding Habitat in New Hampshire



A report to the Nuttall Ornithological Club's Charles Blake Fund
November 5, 2009

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Executive Summary

Populations of Rusty Blackbirds (*Euphagus carolinus*) have been declining steadily for nearly a century, with the steepest declines occurring over the past few decades. Potential causes of these declines include habitat loss and degradation on breeding grounds, migration stop-over sites, and wintering areas; competition with other blackbird species, increased nest mortality associated with timber harvesting; and impacts of parasites and contaminants. In New Hampshire, Rusty Blackbirds have disappeared from several historic breeding sites. However, surveys conducted in 2006 and 2008 confirmed that this species still breeds in several sites throughout the historic breeding range, from the White Mountains to the Canadian border.

Surveys in 2009 focused on sites in the White Mountain National Forest, where Rusty Blackbirds were documented at seven of 47 survey points, located in five different sites. Four of these sites were historic breeding areas, and one was documented for the first time this year. Habitat characteristics of occupied sites in the White Mountain National Forest were similar to other occupied sites throughout the state. However, occupied wetlands were well below 2500 ft. in elevation, and therefore situated in primarily mixed and deciduous forests, rather than spruce-fir dominated landscapes. Future surveys will focus on wetlands above 2500 ft. to determine if Rusty Blackbirds still inhabit historic breeding sites in spruce-fir habitat.

Introduction

Rusty Blackbirds (*Euphagus carolinus*) inhabit wetlands throughout boreal and sub-boreal forests of North America. Their breeding range extends from Alaska to Newfoundland, as far north as the limit of tree growth, and south to the limit of spruce-fir habitat in northern New York, Vermont, New Hampshire, Maine, and the very northern regions of Michigan and Minnesota. Within this broad range, they occupy beaver flowages, bogs, fens, streams, and ponds in areas dominated by spruce-fir forest. Rusty Blackbirds winter in bottomland hardwood forests of the southeastern United States.

Historical accounts and recent studies across North America indicate that Rusty Blackbird populations have been declining steadily since about 1920. North American Breeding Bird Survey (BBS) data from Canada, Alaska, and Maine show that this species' decline has accelerated to about 12% per year since the mid-1960's, resulting in an estimated loss of at least 95% of the population over the past 40 years (Greenberg and Droege 1999, Sauer et al. 2004). Christmas Bird Count data from the same time period indicate an 85% decline (Niven et al. 2004). Based on these analyses, biologists believe that the Rusty Blackbird is declining faster than any other songbird in North America.

Likely causes of this decline include land use changes and blackbird control programs. Extensive habitat loss and degradation have occurred on the wintering grounds, breeding grounds, and along migration routes. Rusty Blackbirds historically wintered in huge flocks with other blackbird species, foraging on small acorns of riparian oaks, as well as invertebrates and fish in shallow floodplain wetlands. Since European colonization, at least 80% of bottomland forests in the southeastern United States have been converted to agriculture and other uses. The remaining patches of natural habitat cannot sustain wintering blackbird flocks. Because of extensive habitat loss, Rusty Blackbirds may forage in more open habitats, where competition with Red-winged Blackbirds and Common Grackles might reduce overall fitness and survival. In addition, blackbird control programs during the 1960s and 1970s aimed at reducing crop depredation by Red-winged Blackbirds, Common Grackles, and Brown-headed Cowbirds may have killed large numbers of Rusty Blackbirds.

Problems also exist on the breeding grounds, where wetlands are drying in response to climate change and some forest practices reduce the availability of suitable breeding habitat. Acid deposition reduces the pH of wetlands, affecting invertebrates that Rusty Blackbirds depend on for food. In addition, mercury deposited into wetlands is transformed by bacteria into methyl mercury, a neurotoxin that can accumulate in tissues and may decrease reproductive success. The Rusty Blackbird's dependence on aquatic macroinvertebrates may make the species especially vulnerable to bioaccumulation of mercury.

In New Hampshire, Rusty Blackbirds historically occupied wetlands and ponds throughout the White Mountains and the northern part of the state, with a few pairs further south in the low mountains of west-central New Hampshire. Rusty Blackbird families were documented at Lake Solitude on Mount Sunapee from 1953 through 1956,

and at a beaver pond in Dublin from 1962 to 1963 (Richards 1995). The White Mountains of New Hampshire and Maine, and the southern range of the Green Mountains in Vermont, represent the southern-most limit of the species' breeding range in North America.

Breeding season sightings of Rusty Blackbirds from NH Bird Records and the White Mountain National Forest Wildlife Survey database include 53 locations statewide from 1990 to 2005. Many of these sightings were of single adults, so the number of these sites that supported breeding pairs is unknown. Breeding season reports of Rusty Blackbirds have diminished over the past few decades, with several formerly occupied sites losing active pairs. A lack of comprehensive surveys until very recently has prevented any statistical analysis of population trends. The scarcity of data for this species in New Hampshire, as well as evidence of precipitous declines range-wide, make Rusty Blackbirds a priority species for conservation in New Hampshire's Wildlife Action Plan.

In 2006, New Hampshire Audubon initiated surveys of documented Rusty Blackbird breeding sites in Pittsburg, the State's northernmost township, where the highest density of documented breeding sites occurred. This effort documented Rusty Blackbirds at only three (13%) of the 23 historic sites surveyed. Birders observed the species at four additional locations in the State that year, for a total of seven occupied sites. In 2008, surveys in the White Mountains yielded two additional occupied sites.

The objectives of this study were to:

1. Conduct surveys of historic and potential Rusty Blackbird breeding habitat in the White Mountain National Forest;
2. Document habitat characteristics of each site surveyed; and
3. Develop a model of high elevation breeding habitat for Rusty Blackbirds

Study Area

The study area encompassed the White Mountain National Forest, including all or part of the towns of Berlin, Bethlehem, Lincoln, Benton, Woodstock, Livermore, Albany, and Sandwich in Coos, Grafton and Carroll counties (Figure 1.). The White Mountain National Forest lies within the New England Acadian Forest, a forested ecoregion extending from the Maritime Provinces to northwestern Massachusetts and extreme northwestern Connecticut. As a transition zone between the boreal spruce-fir forest to the north and the deciduous forest to the south, this region contains a number of forest types, but northern hardwoods and spruce forests comprise roughly half of the forested landscape.

The White Mountains are the highest mountains within this Ecoregion, with 48 peaks above 4000 ft. in elevation, and one exceeding 6000 ft. in elevation. Forests above 2500 ft. are predominantly red-spruce and balsam-fir, which reach elevations of about 4500 ft. in the stunted krummholz zone. Wetlands found in this rugged terrain include small,

isolated ponds in shallow basins to extensive beaver ponds along stream gradients. Many ponds have wetland habitats along their shorelines or outlet streams.

Methods

Project personnel surveyed remote and roadside wetland habitats that included both historic sites and other wetlands with suitable Rusty Blackbird breeding habitat. Survey points at large wetlands or wetland complexes were located at least 200 m apart to minimize double-counting of individual birds.

Surveys took place from early May through early July (to encompass the most active period of Rusty Blackbird courtship, nest building, and fledging) on days with no precipitation and little or no wind. Because Rusty Blackbirds are active throughout the day, surveys were conducted from early morning until late afternoon.

Point surveys were conducted according to a methodology developed for a long-term regional monitoring program (Hodgman and Hermann 2003, Powell 2008). At each point, observers conducted either a short 2.5-minute or long (8.5-minute) survey based on the presence of three habitat features (puddles isolated from the main body of the wetland; exposed mud; adjacent forests that are more than 70% coniferous) identified as components of optimal breeding habitat for Rusty Blackbirds (Powell 2008). Each survey involved both passive listening periods and broadcasts of Rusty Blackbird vocalizations to improve detection of any birds present.

Observers documented the sex, age, behavior, and location of all Rusty Blackbirds seen or heard; habitat characteristics (both wetland and upland); date; time; weather conditions; presence of potentially competitive blackbird species (Red-winged Blackbirds or Common Grackles); and additional bird species detected. All point locations were recorded with handheld GPS units.

Results and Discussion

Surveys of Historic and Potential Breeding Habitat

Project personnel conducted 47 point surveys throughout the northern and western White Mountain National Forest during 10 days between 13 May and 1 July, 2009. Of these 47 points, 30 (64%) were in historic breeding sites for Rusty Blackbirds, and 17 were in sites identified as potential Rusty Blackbird habitat. A few surveyed wetlands required multiple survey points due to their size. Observers documented territorial Rusty Blackbirds at seven (15 %) points in five separate wetlands (Table 1.). Rusty Blackbirds were detected from two survey points each at Elbow Pond and Guinea Pond.

Table 1. White Mountain National Forest survey sites with Rusty Blackbird detections, May – July, 2009.

Survey Sites	Historic	Number of Rusty Blackbirds
Church Ponds	Y	2
Elbow Pond	Y	3, possibly 4
Guinea Pond Trail	Y	2
York Pond	Y	2
Zealand Beaver Pond	N	3

Of the five occupied sites, four were historic breeding locations for Rusty Blackbirds. The newly documented site along Zealand Pond Trail is an extensive beaver complex that had been surveyed annually from 1992 through 2000 with no reported Rusty Blackbird activity. Historic sites were more likely to be occupied than non-historic sites, with four (13 %) of the 30 previously documented sites and just one of the 17 non-historic sites having Rusty Blackbirds. The 30 historic sites on the White Mountain National Forest represent about half of the approximately 65 sites documented in New Hampshire from 1990 to 2005.

Results for site occupancy in New Hampshire are similar to others in northern New England. A 2007 survey of Rusty Blackbird habitat in northeastern Vermont found eight (16 %) of 50 potential breeding sites occupied (Fisher 2007). In Maine, researchers detected Rusty Blackbirds in just 18 (9 %) of 200 wetland sites in the northwestern part of the state during 2001 and 2002 (Hodgman and Hermann 2003). A subsequent survey of the entire Maine breeding range during 2006 and 2007 documented the species at 48 (9%) of 550 wetlands (Powell 2007).

Determining the presence of Rusty Blackbirds is complicated by both habitat characteristics and the species' breeding season behavior. Breeding habitat is invariably wet, with extremely dense vegetation, which often limit visibility and mobility. Territorial pairs may be very cryptic, even when responding to potential threats, such as competing male birds or broadcasts of vocalizations. Many detections of the species are auditory only, and distinguishing among vocalizing individuals may be challenging. It is very possible that some male Rusty Blackbirds are not paired, but behave territorially, so unless a female is observed visually, it is not clear that an occupied site actually supports a breeding pair. Of the 12, and possibly 13 individual birds detected, eight were identified as males and one was identified as a possible female. The remaining three birds were not identified to sex.

The scarcity of females compared to males may be due to their relatively quiet behavior during the nesting season. Because male birds of most species are the primary defenders of territorial boundaries, broadcasts of Rusty Blackbird vocalizations were expected to illicit territorial responses from males more than from females.

Breeding Habitat Characteristics

Rusty Blackbirds breed in wetland habitats along streams and pond edges within spruce-fir dominated forests. This species has been found to breed in bogs, fens, alder swales, beaver-influenced streams, swampy woodlands, and high elevation ponds. Features that all of these sites have in common include thick, shrubby vegetation for nesting and cover near open wetland areas for foraging. Powell (2008) concluded that the habitat variables that best predicted Rusty Blackbird presence in Maine wetlands were: puddles (shallow, isolated from flowing water, and often ephemeral); wetland area greater than 0.5 ha (1.24 ac); coniferous forest in adjacent uplands; and coniferous trees less than 5 m (16.4 ft) tall within 1 km (0.62 mi) of the wetland. Regenerating clearcuts less than 20 years old were closely associated with Rusty Blackbird nest mortality.

In order to characterize the suitability of each wetland for Rusty Blackbirds, project personnel documented the presence of the following features at each survey point: small, isolated puddles, exposed mud, uplands with more than 70% coniferous cover, evidence and age of forest harvesting, width of wetland buffer (in harvested areas), nesting habitat (dense spruce-fir less than 5 m tall), and evidence of beaver activity (e.g., dams, lodges, flooding, chewed sticks, gnawed stumps). A summary of these features is listed in Table 2.

Table 2. Features of Survey Points in Historic and Potential Breeding Habitats in the White Mountain National Forest, 2009.

Habitat Features	Number of Survey Points	
	All Survey Points	Occupied Points
Number of points	47	8
Elevation range (ft.)	1200 – 2463	1307 - 2462
Puddles	24 (51%)	4 (50%)
Exposed mud	22 (45%)	5 (62%)
Uplands with >70% conifers	34 (72%)	5 (62%)
Harvest within 25 years	1 (21%)	0
Dense young conifers	25 (53%)	5 (62%)
Beaver evidence	19 (40%)	5 (62%)

Habitat features were documented from observation points, which were often surrounded by thick vegetation. Therefore, it was not always possible to see puddles, mud, and other features within the wetland. However, the table above shows that most of the surveyed and occupied sites had visible characteristics that predict the presence of Rusty Blackbirds. Not surprisingly, evidence of harvesting near wetland areas and in coniferous forests was scarce throughout much of the White Mountain National Forest.

The sample size of eight occupied points is too small to statistically assess habitat differences with overall survey points. However, the percentages listed indicate that occupied points may be somewhat more likely to have features important for Rusty Blackbirds than do unoccupied points. The one exception is the coniferous forest upland, which appears to be more prevalent in sites overall than in occupied sites. This may be

due to five of the eight occupied points being at elevations ranging from 1307 ft. to 1495 ft., which is well below the elevational range for spruce-fir forests.

These sites are typical of Rusty Blackbird breeding habitats documented over the past few decades. However, historic breeding sites in New Hampshire once included permanent mountain ponds with limited vegetated wetland habitat (Richards 1995). Several of these sites, such as Lily Pond, Greeley Ponds, and Guinea Pond, apparently no longer support Rusty Blackbirds.

There have also been shifts in the species' breeding range in the State. At the turn of the 20th century, Rusty Blackbirds were known to nest only in extreme northern New Hampshire, but in the 1930's, birders documented the first breeding activity in the White Mountains. Breeding pairs were observed in June and early July at Lost River in Kinsman Notch, Flat Mountain Pond in Waterville Valley, and Long Pond in Benton from 1934 to 1939. Since the 1930's, this species has occurred regularly at about 30 sites throughout the White Mountains, as well as at least two sites further south.

In 1953, a Rusty Blackbird nest with 4 recently hatched young was found at Lonesome Lake near the summit of Mt. Sunapee. Pairs were observed at this site for the next three summers, and then never again. In 1962 and 1963, Rusty Blackbird families were found at a beaver pond in Dublin, New Hampshire, but have not been documented there since. Currently, the southern-most breeding site in the state is the beaver-influenced stream along Guinea Pond Trail in Sandwich.

The northward shift of the Rusty Blackbird's breeding range may be partly due to the effects of climate change. Researchers in Maine have concluded that the species' range in that state has contracted approximately 160 km (99 mi) since 1983, which represents a loss of 26,414 km² (10,198 mi²), or 46% of the species' range in 1983 (Powell 2008). However, it is not clear why this species was apparently absent from the White Mountains before the 1930's, nor why they became relatively widespread in this region during the decades since.

High Elevation Breeding Habitat Model

One of the objectives of this project was to develop a model of Rusty Blackbird breeding habitat at high elevations to complement the model developed for roadside surveys in Maine. Historic and potential breeding sites surveyed in 2009 were below 2500 ft., which is the lower extent of spruce-fir forests in the White Mountains. It is not possible to develop the high elevation model without habitat information from sites above 2500 ft. Future surveys will focus on historic sites at high elevations, such as Norcross Pond (3100 ft.), Nancy Pond (3100 ft.), and Lonesome Lake (2700 ft.)

Recommendations

Survey historic Rusty Blackbird breeding sites not visited in 2009;

Survey historic and potential sites above 2500 ft.;

Analyze habitat variables at local and landscape scales to compare occupied vs. unoccupied sites and enable comparisons to Rusty Blackbird breeding habitats in other regions;

Investigate potential causes of Rusty Blackbird abandonment of open water wetlands (e.g., Lily Pond, Guinea Pond).

Acknowledgements

This project was funded by a grant from the Nuttall Ornithological Club's Charles Blake Fund. Previous studies on Rusty Blackbirds have been funded by the N.H. Fish and Game Department. The White Mountain National Forest gave permission to conduct surveys, facilitated access to remote sites, and provided overnight accommodations at the Bartlett Experimental Forest.

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Legend

-  Surveied Towns
-  White Mountain National Forest
-  New Hampshire

0 5 10 20 Miles



Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of Energy and Planning (OEP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. OEP, CSRC, and the cooperating agencies make no claim as to the validity or reliability or to any implied uses of these data.

Map created by V.Jones, NH Audubon, October 2009

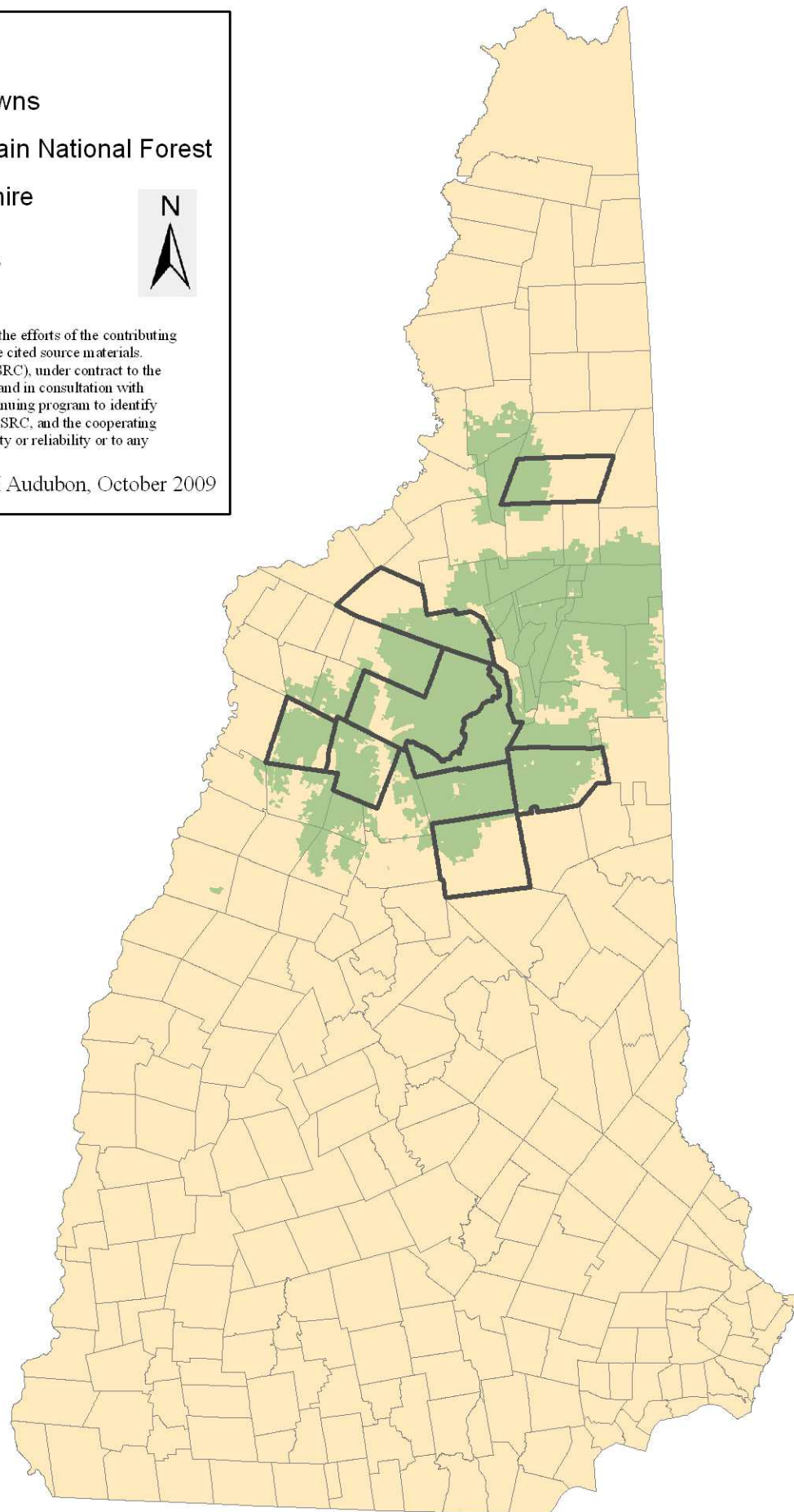


Figure 1: 2009 Rusty Blackbird Survey Area

Legend

 Historic Sites

Survey Sites

 2009 Occupied Historic Sites

 2009 Occupied New Sites

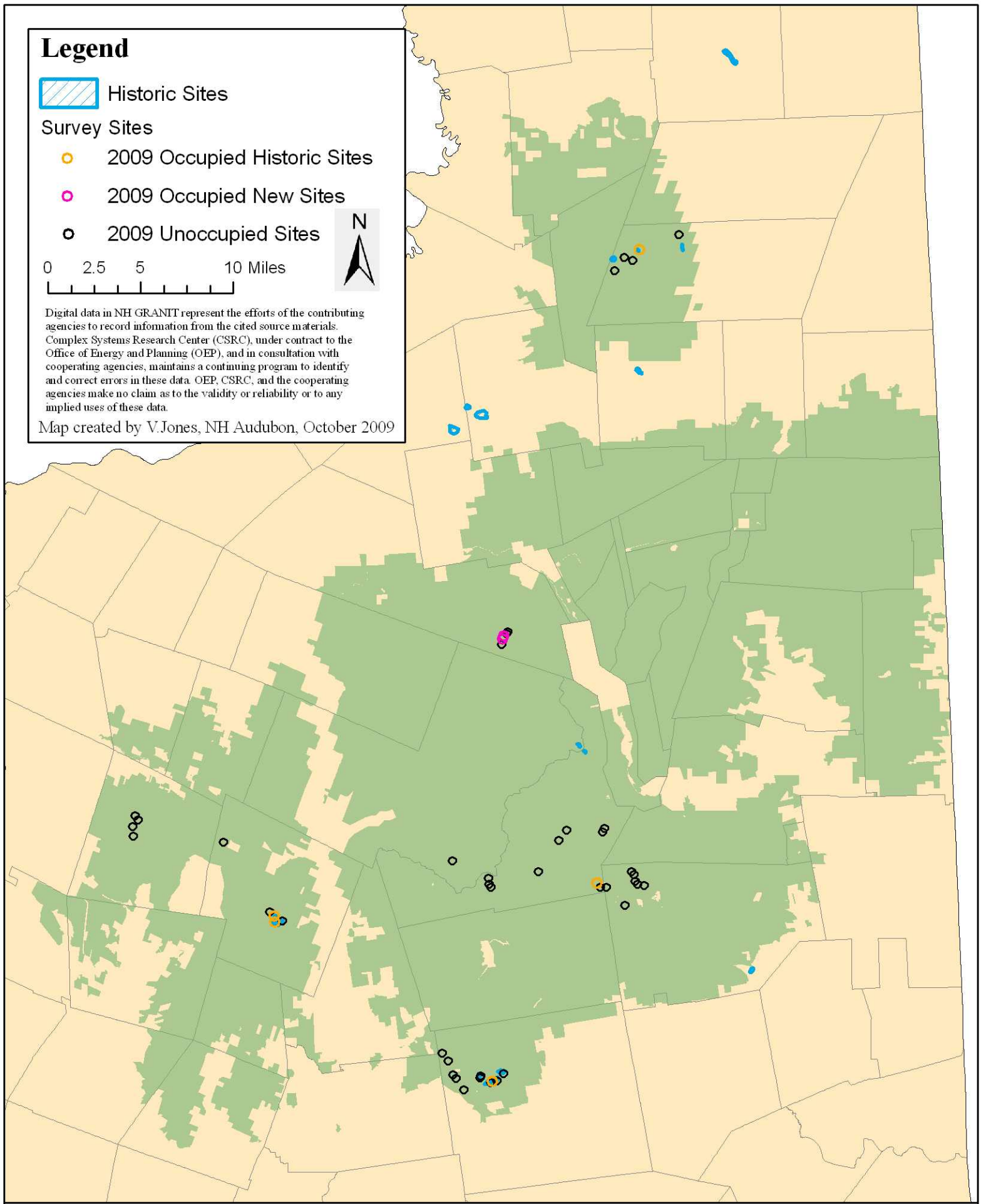
 2009 Unoccupied Sites

0 2.5 5 10 Miles



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Map created by V.Jones, NH Audubon, October 2009



**Figure 2: 2009 Rusty Blackbird Survey Points
White Mountain National Forest**