Rusty Blackbirds 2012:
Building Connections for a Declining Species

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Introduction

Rusty Blackbirds, once-common breeders in boreal wetlands across NY, VT, NH, and ME, have experienced chronic long-term and severe short-term population declines. Recent estimates suggest that Rusty Blackbird populations have declined by 85-99% over the past 40 years; Breeding Bird Survey data document a 10% decline per year for the last 30 years of the 20th century (Greenberg and Droege, 1999). In a recent study of boreal forest-breeding birds, Rusty Blackbirds experienced the steepest declines, leading scientists to state that the Rusty Blackbird is "one of the most precipitously declining species in North America" (Niven et al., 2004). Until 1999, these alarming losses went unrecognized; only for the last decade have scientists finally struggled to understand the roots of this decline.

Rusty Blackbirds breed in boreal forest wetlands from northern New England throughout Canada to Alaska. While the eastern portion of the breeding range may have once contained the highest densities of breeding birds (Erskine, 1977), this region also may have experienced the steepest population declines (IRBTG, 2009). Surveys of wetlands throughout Maine between 2001 and 2007 documented a range contraction of 160 km since 1983 (Powell, 2008), and data from Vermont's second-generation Breeding Bird Atlas suggest that the Rusty Blackbird breeding range is shrinking in this state (Fisher and Powell, 2013). The Rusty Blackbird is listed as a Species of Special Concern in NY, VT, NH, and ME, and the IUCN Red List denotes this species as globally Vulnerable. Despite recent research, however, scientists lack a clear understanding of the driving forces behind these declines or the requirements for this species to persist. This information is critical in forming effective management plans for the conservation of this vulnerable species.

Rusty Blackbird declines may reflect a broader crisis across a sensitive ecosystem. Rusty Blackbirds, the avian species most closely tied to boreal forest wetlands (Niven et al, 2004), are considered a "poster child" for boreal forest conservation (IRBTG, 2009). Boreal forests suffer from wetland drying, logging, acidic precipitation, and mercury accumulation, and several diverse species that also breed in these forested wetlands, such as the Horned Grebe (*Podiceps auritus*), Lesser Scaup (*Aythya affinis*), and Lesser Yellowlegs (*Tringa*

flavipes), are suffering similar severe and alarming declines (Greenberg and Matsuoka, 2010). Understanding factors that influence Rusty Blackbird declines in the boreal forests of North America may advance the conservation of this potentially threatened ecosystem.

To determine the current status of Rusty Blackbirds in the Northeastern U.S. and to evaluate the current distribution of this species, we conducted surveys at locations in ME and VT in 2012. Our study had four objectives.

1. **Evaluate site consistency in Rusty Blackbirds**. If Rusty Blackbirds breed at the same sites across multiple years, identifying "hotspots" can focus conservation actions on sites with consistent Rusty Blackbird use.
2. **Assess this species' current distribution in northern Vermont and Maine**. With a documented historical range contraction at the edge of this species' range, boundary assessment can provide up-to-date information about habitat that currently supports this species.
3. **Refine survey methodology to increase detection probability**. Surveys of Rusty Blackbirds in the Northeast in 2006-7 detected this species at only 8.7% of survey areas. The present study aimed to improve survey methods in order to increase our sample size to better evaluate habitat requirements for these birds. In addition, by targeting sites with known historical Rusty Blackbird detections, we aimed to increase our sample size of occupied sites.
4. **Engage landowners in Rusty Blackbird conservation**. Since much of the Rusty Blackbird habitat in the United States falls within large private landholdings, our study aimed to engage and educate private landowners about Rusty Blackbirds and their conservation requirements.

Methods

Between January and March of 2012, VCE contacted 17 landowners or land managers by email, phone, or letter. Initial contact explained the purpose of our study and requested permission to conduct Rusty Blackbird surveys on their lands. Fifteen land owners or land managers explicitly granted permission for VCE to conduct surveys. In addition, project leader Judith Scarl held a landowner meeting in April 2012; six representatives from four major Maine, New Hampshire, and Vermont landowners attended to learn about Rusty Blackbird biology, ask questions about the proposed surveys, and provide suggestions on what data would be valuable to large landowners when making conservation decisions.

Between 15 May 2012 and 21 June 2012, technicians surveyed 221 sites in Maine and 49 sites in Vermont. Sites were selected based on historical surveys conducted by the Maine Department of Inland Fisheries and Wildlife (MDIFW) in order to compare the pattern of Rusty Blackbird habitat use over time; each 2012 survey site had been surveyed by MDIFW at least once for Rusty Blackbirds in 2001-2 or 2006-7. To maximize the likelihood of detecting Rusty Blackbirds, sites at which Rusty Blackbirds had been detected historically were prioritized. At each site, technicians conducted a point count survey and a habitat survey. In addition, to further assess detection probability (the likelihood that a bird that is present will be detected during a survey), 20 sites with pre-2012 Rusty Blackbird detections were surveyed twice in 2012. We surveyed these sites 3-4 weeks apart- once towards the end of May, and once in the third week of June.

Point Counts (Bird Surveys)

Point count surveys were conducted during all daylight hours (approximately 6 a.m. to 8 p.m.) in periods of good weather, with wind no greater than 18 miles per hour and no steady rain. The primary target species was the Rusty Blackbird (RUBL); however, we also collected data on 10 other species that may occur in similar habitats: Common Grackle (COGR), Red-winged Blackbird (RWBL), Brown-headed Cowbird (BHCO), Blue Jay (BLJA), Gray Jay (GRJA), American Robin (AMRO), Olive-sided Flycatcher (OSFL), Northern Waterthrush (NOWA), Tennessee Warbler (TEWA), and Red Squirrel (RESQ).

Each point count was 14 minutes and 18 seconds long and was broken into three periods. Observers conducted repeated simple counts for all target species during each period:

Period 1:	0-2:59, passive observation
Period 2:	3:00-3:38; 38-second playback
	3:39- 8:38, 5 minutes of passive observation
Period 3:	8:39-9:17, 38-second playback
	9:18 to 14:18, 5 minutes of passive observation

During the first two periods, each individual Rusty Blackbird was tracked minute-by-minute. Information about wind, cloud, and insect conditions were noted at the start of each survey.

Playbacks consisted of Rusty Blackbird calls and were broadcast on either a Western Rivers Predation or Apache game caller.

Habitat Measurements

We developed habitat measurements based on previous knowledge about Rusty Blackbird breeding habitat, features hypothesized to be important to Rusty Blackbirds, and landowner feedback on habitat metrics.

Observers collected the following habitat information at each survey station:

Distance that view is unobstructed in each cardinal direction- how far away are trees/other features that prevent the observer from seeing the entire wetland or upland?

Wetland Habitat (within the bounds of the wetland)

1. **Wetland Categorization**: percentage of wetland that is Palustrine Forested (PFO), Palustrine Scrub-Shrub (PSS), Palustrine Emergent (PEM), and Palustrine Unconsolidated Bottom (UB).
2. **Count of Visible Puddles**- areas of standing (stagnant) water unconnected to the wetland center and independent of wetland water.
3. **% Mud**- estimate of the percentage of the wetland covered by exposed mud visible from survey location.
4. **Number of snags**- dead standing trees in the wetland area. Estimates were appropriate for numbers greater than 50.
5. **Tussocks**: a count of the number of vegetation tussocks in the wetland area. Estimates were appropriate for numbers greater than 50.
6. **Beaver Dam Stage**: If there was a beaver dam, observers noted the STAGE of the dam (active, old, relict, or none) (Woo and Waddington 1980).
7. **Flow**: For beaver dams, observers noted the primary course/flow of water across the dam (Woo and Waddington 1980). If there was no flow, "no flow" was indicated. If no dam, "no dam" indicated.
8. **Alder Thicket Percent**: If there was an alder thicket present, observers estimated what percentage of the visible wetland was covered by alder thicket.
9. **Sphagnum**: percent of the wetland covered in sphagnum ("peat moss").

10. **Open Water**: Estimate of the approximate percentage of the wetland visible from the survey location that was open water.

Upland Habitat (visible uphill from the wetland)

1. **Percent Forested**: Estimate of the percent of the upland that was forested (has trees).
2. **Percent Softwood and Hardwood**: Estimate of the percent of the forested upland that was softwood and the percent of the forested upland that was hardwood.
3. **Tree Height**: Observers used a clinometer to measure to the top and bottom of a tree of average height. Observers also measured the distance to the tree. These measurements can be used to calculate tree height.
4. **Size Class**: Average size class of trees in the upland (seedling, sapling, pole, small, medium/large, multi-layered; derived from http://www.fs.fed.us/r5/rsl/projects/frdb/tables/table114b.html).
5. **Buffer**: Estimate of the width of the buffer (uncut trees) around the wetland.
6. **Snags**: Number of snags in the upland.
7. **Road Class**: Unimproved Dirt, Improved Dirt, Paved, or Remote ("remote" is any wetland >100 meters from a road; generally these were not surveyed).
8. **Nesting Habitat**: Observers noted whether there was a dense thicket of spruce or fir that is less than 5 meters tall.

In particular, based on Powell (2008)'s previous analyses on Rusty Blackbird habitat use and additional discussions on RUBL foraging behavior (C. Foss, personal communication), we developed the following hypotheses:

1. Shallow water is important foraging habitat for RUBL, and puddles indicate presence of shallow water, so sites with RUBL will have more puddles than sites without.

2. Presence of vegetation tussocks is important to Rusty Blackbirds as these features might provide concentrated habitat for prey or cover for RUBL as they forage; sites with RUBL detections will have more tussocks than sites without.

3. Since beaver activity can flood new areas and create extensive shallow water, sites with beaver activity will have a higher number of Rusty Blackbird detections than sites with no visible beaver activity.

Results

Perceived Site Consistency

Observers conducted surveys at 49 sites in Vermont and 221 sites in Maine in 2012. Rusty Blackbirds were detected at 25 survey sites (8.9%); 19 sites in Maine (8.5%) and 5 in Vermont (10.2%). These detection rates were similar to historical Rusty Blackbird detection rates in Maine in 2006-7, despite our efforts to increase detection rates.

Perceived site consistency was low between years. Of the 218 sites surveyed in both 2006-7 and 2012, at only six of these were Rusty Blackbirds detected during both time periods (Figure 1). 104 sites in Maine were surveyed at three time periods (2001-2, 2006-7, and 2012). Of these 104 sites, observers detected Rusty Blackbird at 24 sites in one of three time periods, 2 sites at 2 out of 3 time periods, and one site during all three time periods. These patterns were not simply the result of an overall population decline- birds were detected at a roughly equal numbers of new sites in each time period.

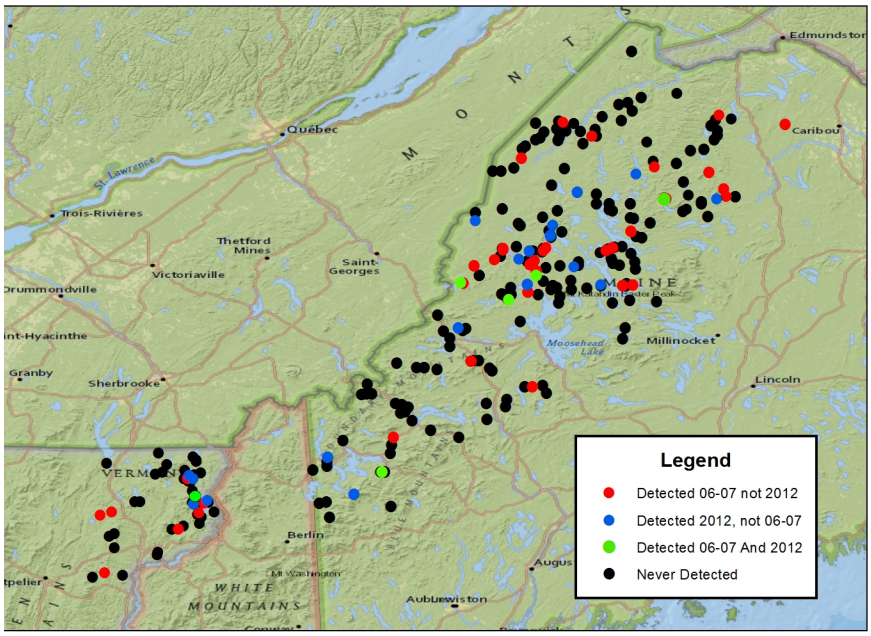

Figure 1: Sites surveyed in 2006-7 and again in 2012. Only six sites had detections in both time periods.

Repeated Surveys

Of the 20 sites surveyed twice in 2012, Rusty Blackbirds were detected during both surveys at two sites, and were not detected at the other 18 sites during either survey (Figure 2). Thus, although detection consistency at sites between years was quite low, detection consistency between surveys within a year was 100% in this small subsample.

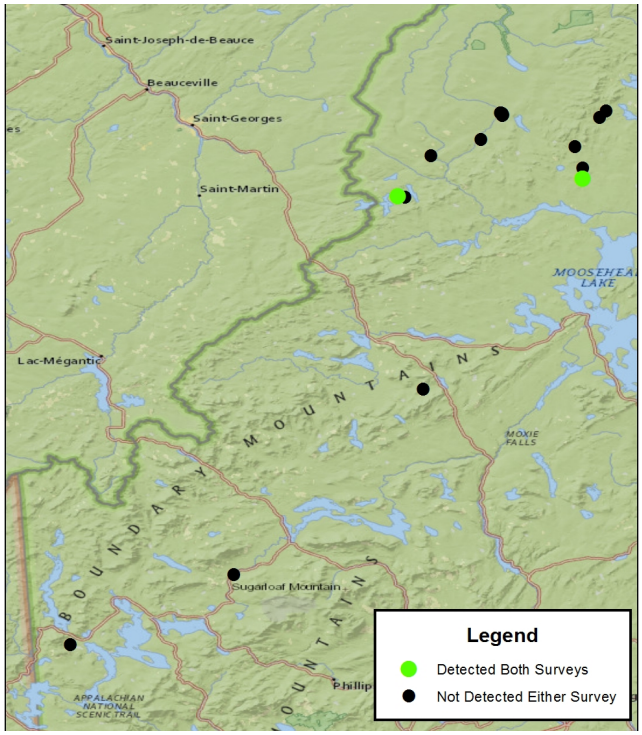

Figure 2: Twenty sites with historical (pre-2012) Rusty Blackbird detections were surveyed twice in 2012.

Habitat Use

Although we attempted to increase our percentage of detections above that of previous studies, we were only able to detect Rusty Blackbirds at 25 out of 270 sites. With such low detection numbers, it is difficult to draw conclusions about preferred habitat characteristics in this species. An occupancy modeling attempt aimed at linking habitat occupancy with habitat characteristics was unsuccessful due to small sample size.

To explore specific hypotheses, we examined some key habitat variables individually to assess the relationship between Rusty Blackbird detections and habitat characteristics.

Hypothesis 1: *Puddles*- Shallow water is important foraging habitat for RUBL, and puddles indicate presence of shallow water, so sites with RUBL will have more puddles than sites without.

Results: On average, sites at which RUBL was detected had more puddles than sites at which RUBL was not detected (Figure 3); this supports data from Powell et al. (2008) that suggests that shallow water and puddles serve as important foraging habitat for Rusty Blackbirds. However, there is a large variance in the number of puddles documented at sites with Rusty Blackbirds, and in fact a single site in Vermont with an unusually large number of puddles may drive this result. Thus, based on this study, the importance of puddles to Rusty Blackbird foraging is unclear.

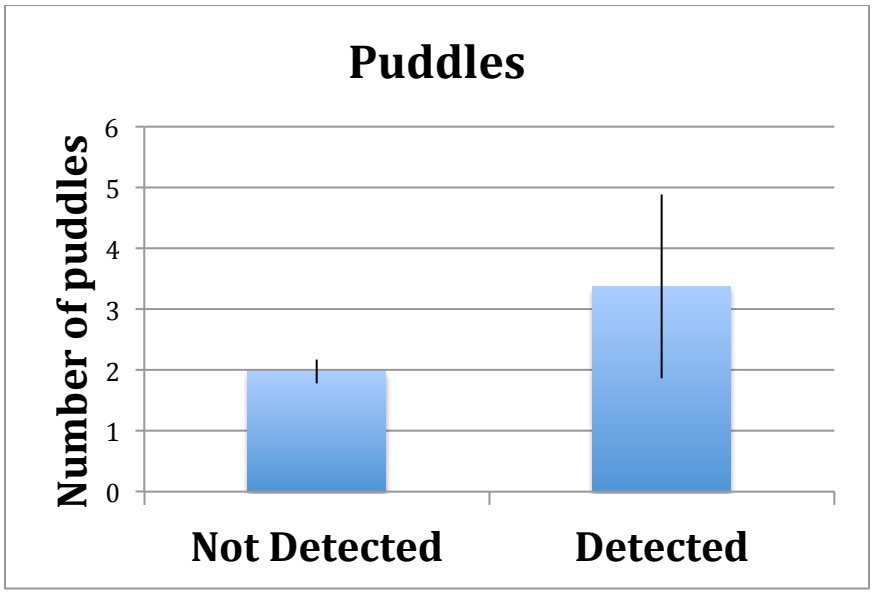

Figure 3: Although sites with Rusty Blackbird detections had a greater average number of puddles, this result may be driven by a single site with an unusually large number of puddles. Error bars represent standard error.

Hypothesis 2: *Tussocks*- We hypothesized that the presence of vegetation tussocks may provide concentrated habitat for prey or cover for RUBL as they forage. We predicted that sites with RUBL detections would have higher numbers of tussocks than sites without RUBL.

Results: Sites with Rusty Blackbird detections contained more vegetation tussocks than sites without Rusty Blackbird detections (Figure 4). This can be interpreted in multiple ways; first, tussocks may provide cover or foraging opportunities for Rusty Blackbirds. It is also possible that tussocks are associated with another habitat feature that is important for Rusty Blackbirds, such as shallow water. Regardless, the number of vegetation tussocks may be one factor that represents the suitability of habitat for Rusty Blackbirds.

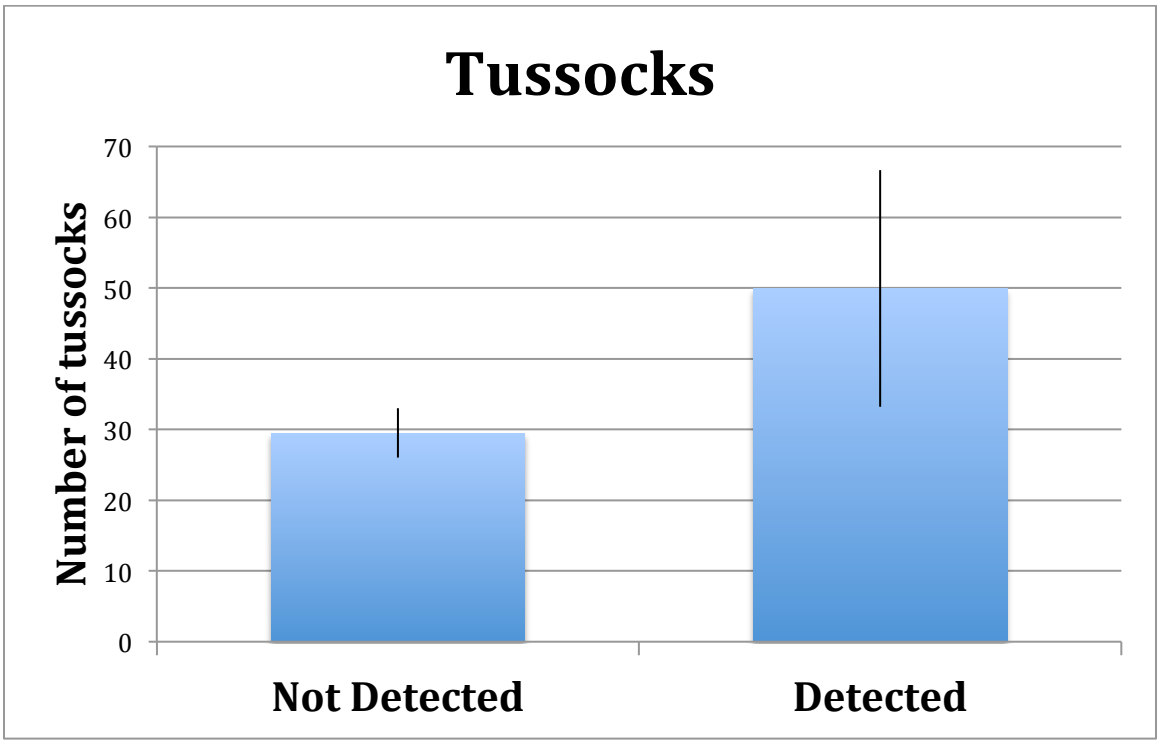

Figure 4: Sites at which Rusty Blackbirds were detected had more tussocks than sites at which Rusty Blackbirds were not detected. Bars represent standard error.

Hypothesis 3: *Beaver Activity*- Since beaver activity can flood habitat and create extensive shallow water areas, which Rusty Blackbirds use for foraging, sites with beaver activity will have a higher number of Rusty Blackbird detections than sites with no visible beaver activity.

Results: Technicians detected Rusty Blackbirds at a higher percentage of sites with current or historic beaver activity compared with sites with no beaver activity (Figure 5).

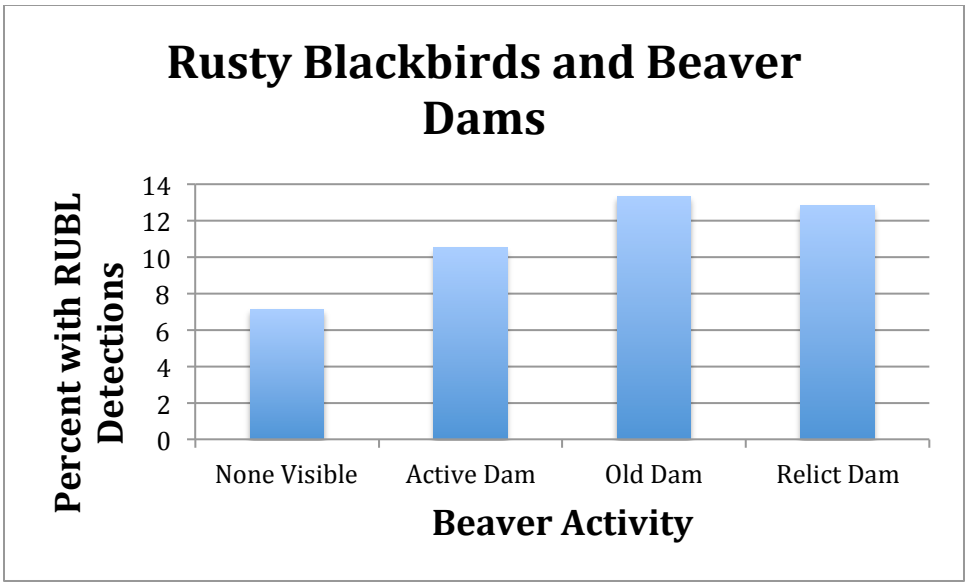

Figure 5: A greater percentage of sites with historical beaver activity had Rusty Blackbird detections than sites with no visible beaver activity.

Due to the small number of sites with Rusty Blackbird detections, conventional modeling methods failed to yield strong conclusions about habitat factors related to Rusty Blackbird presence. These summaries and graphs are not meant to substitute for strong statistical analyses. Rather, in the absence of enough data to support statistical models, exploring each variable graphically can give us clues as to factors that are worth exploring in more depth. In addition, in combination with other Rusty Blackbird data, these data explorations may suggest avenues for recommended management practices that could benefit this species.

Discussion

Although our study made great efforts to increase Rusty Blackbird detection rates, we detected Rusty Blackbirds at less than 10% of sites surveyed, a number comparable to previous detection rates in this region. With a focus on surveying sites with historical detections and increasing survey length and playback duration, these low detection rates suggest two issues. First, all existing evidence points to a continued Rusty Blackbird decline in Vermont and Maine; both historic (Powell, 2008; Fisher and Powell 2013) and current data suggest that this once-common species now breeds at very low densities in

the northeastern United States. Accordingly, short, broad-scale point count surveys across perceived habitat in Maine and Vermont may not be an efficient method of assessing this species; targeted studies at sites with higher densities and more reliable sightings may be suitable for more intensive studies on a smaller scale.

Not only were Rusty Blackbirds detected at a surprisingly small percentage of sites, it was rare to observe Rusties at the same sites across years. Several factors may explain the low perceived site consistency in this study. First, in the northeastern United States, Rusty Blackbirds breed in habitat that can be highly transient. Beaver activity may be an important factor in the creation and maintenance of suitable Rusty Blackbird habitat (Foss, 2006; http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5200564.pdf), and an initiation of beaver activity or beaver exclusion can cause rapid habitat changes in boreal forest wetlands (Woo and Waddington, 1990). In addition, logging in the boreal forest creates a changing mosaic of forest habitat, shifting the pattern of suitable breeding and foraging habitat across potentially short time scales. Thus, significant habitat changes over 5 and 10 years may substantially shift the pattern of suitable local habitat across the landscape between surveys. Second, with dramatic Rusty Blackbird population declines and low population densities in the Northeast, Maine and Vermont may host an excess of available Rusty Blackbird habitat. Returning second years or even adults may be able to choose from among a wide expanse of unoccupied sites.

A third possibility, of course, is that our study simply failed to detect Rusty Blackbirds at a substantial percentage of occupied sites. In Maine, much of the suitable Rusty Blackbird breeding habitat consists of interconnected chains of wetlands, and Rusty Blackbird home ranges in Maine have an estimated size of 37.5 hectares during the breeding season (Powell et al, 2010). Our broadcast playbacks may not reach Rusty Blackbirds at distal edges of their habitat, or Rusty Blackbirds may be unmotivated to respond to a territorial intruder along remote edges of their core area. However, in the 20 sites surveyed twice in 2012, we found 100% consistency between surveys; Rusty Blackbirds were detected at the same two sites in both surveys, and not detected at 18 sites in both surveys. Although we cannot interpret this to mean that our surveys detected Rusty Blackbirds at 100% of occupied

breeding sites, this does offer some evidence that our low number of detections and low perceived site consistency was not exclusively caused by a failure to detect birds.

Despite the low Rusty Blackbird detection rates, these surveys and the accompanying landowner outreach served as a building block to engage landowners and land managers in Rusty Blackbird awareness and conservation. A meeting between Vermont Center for Ecostudies biologists and representatives from four major Maine, New Hampshire, and Vermont landowners influenced collection of data that would have on-the-ground utility. In addition, three representatives from two of these major landowners attended an October 2012 meeting of the International Rusty Blackbird Working Group- the first time private landowners had been represented in this international conservation group. Uniting landowners, policymakers, and scientists will encourage the development of realistic and effective conservation strategies for this dramatically declining species.

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