

An Investigation of Rusty Blackbird Foraging Sites: Does Timber Harvesting Influence Site Selection?

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Completion date: May 30, 2014

We conducted 60 minute surveys of Rusty Blackbirds at 22 boreal beaver-influenced wetlands and surveyed vegetation surrounding each wetland. We also characterized the invertebrate communities of these wetlands in northern New Hampshire.

Funding support for this project was provided by the Northeastern States Research Cooperative (NSRC), a partnership of Northern Forest states (New Hampshire, Vermont, Maine, and New York), in coordination with the USDA Forest Service.

<http://www.nsrcforest.org>

Project Summary

Although the Rusty Blackbird (RUBL) was once common, the species has declined by an estimated 90% since the 1960s (Greenberg et al. 2010). It has since been listed as Vulnerable on the IUCN Red List and the US Fish and Wildlife Service has listed the RUBL as a Focal Species of Birds of Management Concern. This study is the first research to focus specifically on foraging habitat suitability in areas used by breeding RUBLs, which primarily prey on aquatic invertebrates during the summer (Avery 1995). In recent years, research has been conducted on RUBL nest success, predation and habitat but information on the species' foraging ecology is scant. Understanding wetland prey availability during the breeding season will enable land managers to identify high-quality foraging sites and in the future potentially determine mechanisms behind the RUBL decline and potential for recovery.

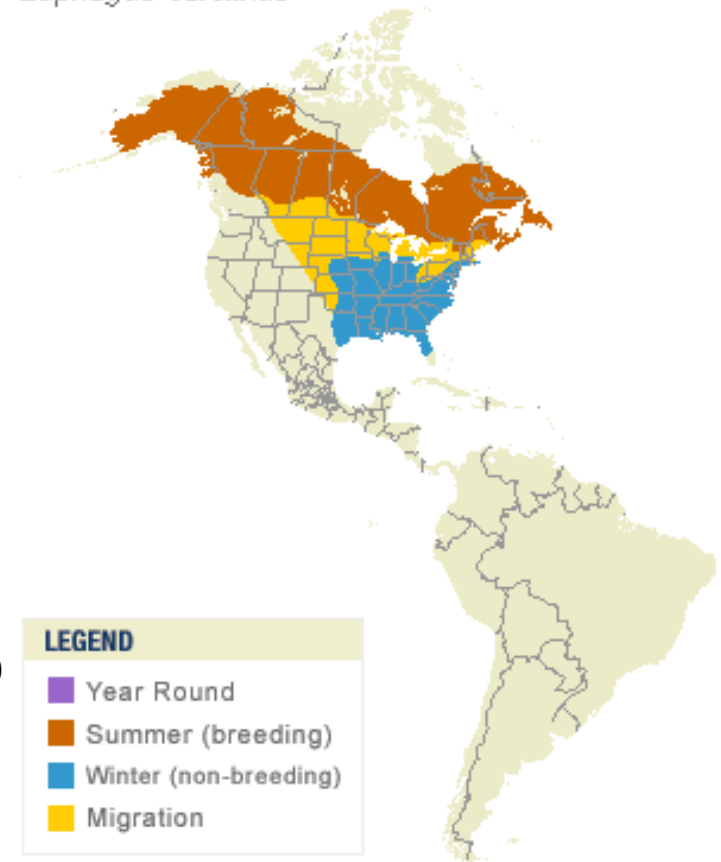
Our primary study objectives were: 1) to study the relationship of forestry practices to foraging site selection using multi-scale habitat characteristics; and 2) determine the relationship between aquatic invertebrate composition and abundance to foraging site selection. This study took place within a 1,253.5 km² area within Coos County, NH. Sites were located both within Umbagog National Wildlife Refuge and land privately managed by Wagner Forest Management Ltd. To capture potential changes in foraging activity and invertebrate availability we surveyed 22 beaver-influenced wetlands throughout different stages of the RUBL breeding season. We visited each site every two weeks, for a total of four site visits per wetland. During each visit we recorded RUBL detections and behavior for one hour. Then, we collected an aquatic invertebrate sample using a dip net.

We recommend 30 minutes as an optimal survey length for land managers who want to monitor RUBL populations. Previous research found that detectability peaked in the early morning and at four o'clock in the afternoon, with lulls in activity in between (Powell 2008). However, our data suggests that for Rusty Blackbirds in New Hampshire, detectability is not dependent on time of day. Also, we observed very low detection rates following the two weeks after chicks fledged, or June 16-30. Umbagog National Wildlife Refuge will use our data to develop a RUBL habitat assessment and monitoring plan. Our final objective is to characterize wetland habitat and insect communities for boreal wetlands, a critical habitat in the Northern Forest for multiple species.

Background and Justification

- The Rusty Blackbird (RUBL) breeds in and near boreal wetlands and winters in forested wetlands
- RUBLs typically nest in live spruce or fir trees surrounded by regenerating conifer stands
- The species has declined by an estimated 90% since the 1960s (Greenberg et al. 2010)
- The cause of this decline is not known. Possible factors include:
 - Climate change (McClure et al. 2012)
 - Timber harvesting patterns (Powell et al. 2010)
 - Mercury contamination (Edmonds et al. 2010)
- The RUBL's breeding range has retreated northward and inland coincident with population decline (McClure et al. 2012)

Rusty Blackbird
Euphagus carolinus



Map by Cornell Lab of Ornithology
Range data by NatureServe

Background and Justification

- Breeding RUBLs forage primarily for aquatic macroinvertebrates (Avery 1995)
- Information on RUBL foraging ecology is scant
- Need to understand the extent to which wetland prey availability drives site selection
- Clarifying foraging habitat will help land managers target potential high-quality sites for population monitoring and conservation planning
- Powell et al. (2010) suggested Common Grackles and Red-winged Blackbirds as site competitors
- Powell et al. (2010) suggested regenerating forest on previously harvested land exposes RUBLs to heavy predation pressure and results in lower nesting success
 - However, forest management and beaver activity may promote patchy habitat preferred by RUBLs (Buckley 2013)
 - Ephemeral impoundment of water by beavers creates patches of shallow wetlands used for foraging; both inundation and logging can create perches used by RUBLs



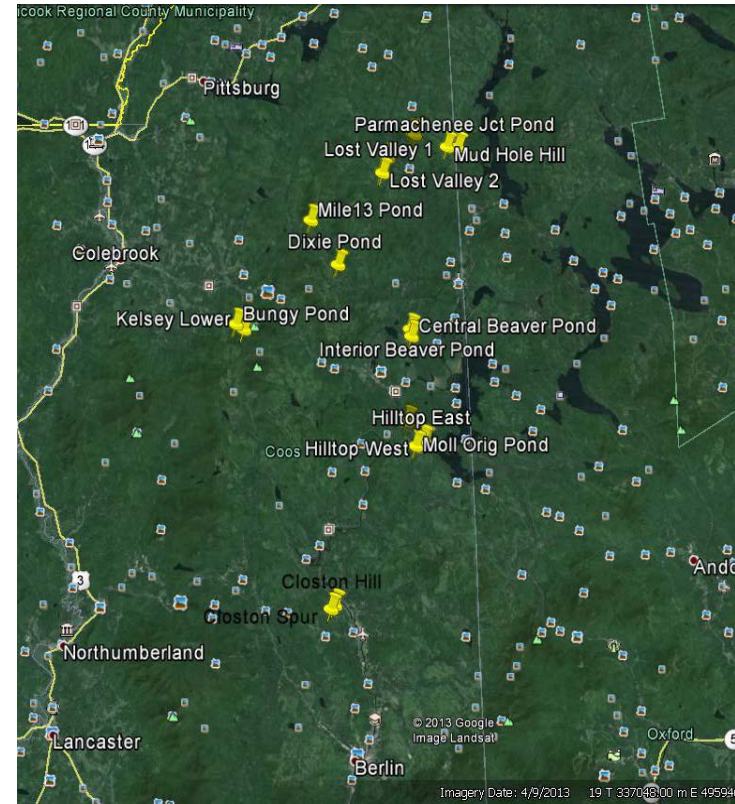
Male RUBL foraging . Photo by Devon Cote

Background and Justification

- The preferred open-water/young, dense conifer conditions may not persist on the landscape for long periods, necessitating repeated visits over time to document RUBL population trends.
- Detectability is low in the Northern Forest region (Glennon 2010)
 - Due to early arrival on remote breeding territories, cryptic behavior, and tendency to travel a larger area post-fledging
- Traditional avian point-counts and roadside surveys are not adequate (most studies resulted in <10% detection rates).
- Need to optimize efficiency and accuracy of occupancy surveys
- Powell et al. (2010) were able to increase detectability through the use of audio playback of RUBL calls
- However, we chose to use passive surveys (without playback) (Luscier et al. 2010) for our surveys to minimize human effects on RUBL behavior.

Methods

- This study took place within a 1,253.5 km² area within Coos County, NH in 2013
- Sites were located both within Umbagog National Wildlife Refuge and land privately managed by Wagner Forest Management Ltd.
- We detected RUBLs at 22 of 43 scouted beaver-influenced wetlands, and chose these 22 sites for our surveys
- We assessed sites for current beaver activity
- To capture potential changes in RUBL foraging activity throughout different stages of the breeding season, each site was sampled four times
 - Once during incubation (May 11-24)
 - Once during nesting (May 25- June 7)
 - Twice after chicks fledged (June 8-July 4).



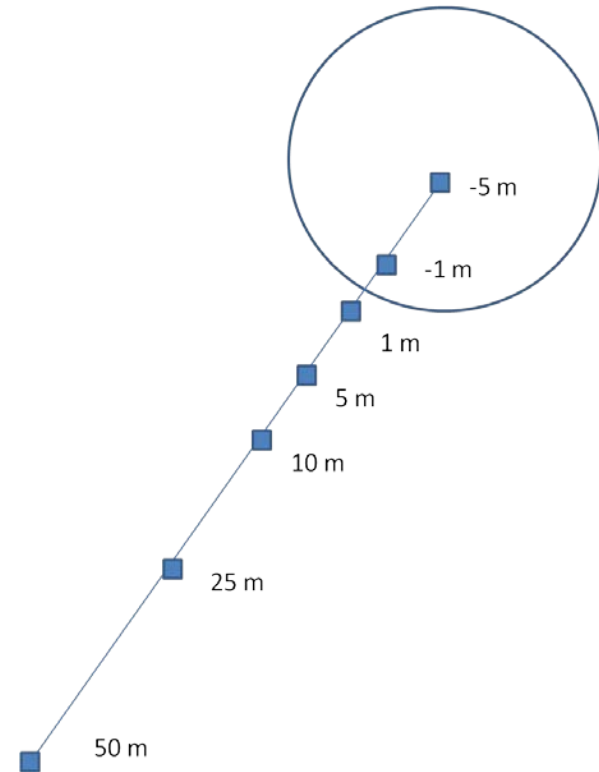
Study site locations indicated by yellow pins.

Methods

- During each site visit we conducted 60 minute surveys for RUBLS
 - We recorded time to first RUBL detection
 - During the first 9 minutes we recorded all RUBL, Red-winged Blackbird, and Common Grackle vocalizations and sightings
 - We recorded all Red Squirrel, Gray Jay, and Blue Jay vocalizations and sightings throughout the 60 minutes
 - We recorded all RUBL behavior observed in 60 minutes (e.g., foraging)
- We recorded air temperature, weather, and water depth at a fixed point
- For the first site visit we placed a marked pole at due South, 1 meter away from the edge of standing water, heading North towards the center of the pond
- For subsequent visits we measured distance from the edge to the pole to detect temporal changes in wetland size
- During each site visit we collected an aquatic macroinvertebrate sample using ten sweeps of a D-frame net
 - Macroinvertebrates preserved in ethanol are being identified to Family level

Methods

- From July 8-30 we surveyed vegetation in the lowland-upland interface within and surrounding each pond
- We surveyed vegetation along two 50 m transects, heading from the pond's edge to the upland forest
- Within each transect we estimated percent cover for plants within 1m² plots, placed along the transect at 1 m, 5 m, 10 m, 25 m, and 50 m intervals as well as aquatic vegetation at -1 m and -5 m into the open water of the ponds



Vegetation transect near and within a beaver pond (circle) (not to scale).

Results/Project Outcomes

- During 60 minute surveys of RUBL-occupied sites, first detections occurred after > 20 minutes on numerous occasions
 - Thus, we recommend that future researchers conduct RUBL surveys for at least 30 minutes
- Previous research found that RUBL detectability peaked in the early morning and at four o'clock in the afternoon, with lulls in activity in between (Powell 2008)
 - However, our data suggests that for RUBLs in New Hampshire, detectability is not dependent on time of day
 - Thus, we recommend that future researchers survey throughout the day to maximize efficiency in accessing as many remote wetlands as possible
 - We observed very low detection rates following the two weeks after chicks fledged, or after June 16, which was likely because RUBL families often leave nest sites post-fledging.

Results/Project Outcomes

- DeLeon (2012) found that wintering RUBLS in Louisiana preferred sites with presence of saturated soil and shallow water but were less likely to be found at sites with deep/extensive water cover
 - In contrast, we anecdotally observed Northern Forest RUBLS using floating debris and tree stumps as perches to forage in deep (>1m) wetlands
 - Thus, DeLeon's findings may not apply to breeding habitat in NH and we encourage researchers to survey even deep/large boreal wetlands for RUBLS
- We collected and are currently identifying aquatic invertebrate samples from 22 boreal wetlands and combining with a similar dataset from summer 2014.
 - Once completed, these samples will provide a characterization of northern NH boreal wetland invertebrate communities
 - We will analyze invertebrate diversity and abundance to detect similarities/differences between sites
 - We will correlate invertebrate communities to site characteristics

Results/Project Outcomes

- We will use GIS tools and tree harvest data to characterize nearest distance to road, wetland size, and harvest history for each site
 - Using regression analysis, we will quantify the relationship between stand age, wetland size, and time spent foraging as well as distance to road and nest success
 - Results from these surveys will shed light on the effect of forest management practices on RUBL site use.
- During our surveys we unexpectedly came across an emaciated, recently deceased, previously banded RUBL
 - A UNH necropsy revealed that the specimen likely died of a *Yersinia pseudotuberculosis* bacterial infection
- A graduate student and an undergraduate student were trained in field data collection and organization.

Results/Project Outcomes

- The 2013 field season produced data which will better inform wildlife biologists, foresters, and land managers of the habitat suitability requirements of RUBLs
- As we are still surveying RUBLs for our 2014 field season and analyzing data, we have not yet had the opportunity to conduct outreach efforts
- However, in September, 2014 we plan to present our research results at the 84th annual meeting of the Cooper Ornithological Society and the 132nd annual meeting of the American Ornithologists' Union
 - Conference coordinators expect approximately 900 people to attend the event, including representatives from the Society of Canadian Ornithologists
- Furthermore, we will give a poster presentation at the SUNY College for Environmental Science and Forestry's 2015 Spotlight on Student Research
- Lastly, our research will help Umbagog National Wildlife Refuge achieve its goal of assessing RUBL habitat use as well as creating and implementing a RUBL habitat management plan, as stated in the Refuge's 2009 Comprehensive Conservation Plan.

Implications and Applications in the Northern Forest Region

- Our boreal wetland habitat characterization will serve as a resource for managers of both private and protected public lands in the Northern Forest
- Our invertebrate database may afford other researchers the opportunity to further investigate habitat relationships and change over time as well as mercury bioaccumulation in Northern Forest species and ecosystems
 - Researchers recently published an NSRC-funded study of mercury movement through the food web and found mercury levels that may impair reproductive success of birds (Evers et al. 2012).
 - Our catalog of the insect assemblages and habitat characteristics of Northern Forest wetlands may expedite future research on mercury cycling and impacts on native species.
- Our study will provide information to guide researchers and land managers in the vast boreal forest to better monitor breeding RUBLs in the face of threats from resource extraction and climate change

Future Directions

- More detailed understanding of how wetland hydrology and macroinvertebrate communities relate to RUBL population trends is needed
 - How does macroinvertebrate abundance and diversity vary within a wetland?
 - Do RUBLs prefer sites with standing vs. flowing water? Deep or shallow water?
 - How do wetlands previously occupied and currently occupied by beaver vary?
- More effort is needed to survey the vast North American boreal landscape for breeding Rusty Blackbirds
- Future researchers could collect blood samples from live RUBLs to test for *Yersinia pseudotuberculosis* bacterial infection



Perched male RUBL. Photo by Amanda Pachomski.

List of Products

- Peer-reviewed publications
 - n/a
- Other publications (proceedings, abstracts, technical reports, and theses)
 - Foraging habitat characteristics, prey diversity and detectability of Rusty Blackbirds: implications for land and wildlife management in the Northern Forest. A. Pachomski, MS Thesis, SUNY ESF, expected date May 2015
- Conference presentations (including workshops and posters)
 - A. Pachomski S . McNulty and C. Foss, presentation accepted at American Field Ornithologists/Cooper Ornithological Society, Estes Park, CO, September 2014
 - Poster planned for 2015 SUNY ESF Spotlight on Student Research, April 2015
- Other tangible products (websites, databases, etc.).
 - Under development
- Grants received with NSRC fund leveraging
 - SUNY ESF Graduate Student Award for Travel
 - SUNY ESF Spring 2014 Graduate Student Association Research Grant

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