

# Long-term Monitoring Plan for Rusty Blackbirds in the Atlantic Northern Forest



Version 1.8 (2009)

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## Table of Contents

<b>SECTION 1: PROTOCOL NARRATIVE .....</b>	<b>3</b>
<b>I. Background and Objectives .....</b>	<b>3</b>
Introduction.....	3
Goals and Measurable Objectives.....	3
Status of Partnerships and Implementation Funding .....	5
<b>II. Sampling Design.....</b>	<b>5</b>
Rationale for Protocol.....	5
Sample Frame .....	6
Sample Size.....	6
Selecting Sites and Locating Sampling Stations.....	6
Timing of Surveys.....	7
<b>III. Field Methods .....</b>	<b>7</b>
Field Season Preparations .....	7
Documenting Survey Locations.....	7
Selecting Short Surveys vs. Long Surveys .....	8
Collecting Data .....	9
<b>IV. Data Handling, Analysis, and Reporting.....</b>	<b>9</b>
Overview of Database Design .....	9
Metadata Procedures .....	10
Data Transcription, Entry, and Verification .....	10
Recommendations for Statistical Analyses.....	10
Data Archival Procedures .....	11
<b>V. Roles and Responsibilities .....</b>	<b>12</b>
Program Manager.....	12
Sub-regional representatives:.....	13
Field Technicians:.....	14
Biometrician:.....	14
<b>VI. Schedule for Pilot Year .....</b>	<b>14</b>
<b>VII. Acknowledgments .....</b>	<b>15</b>
<b>VIII. References .....</b>	<b>16</b>
<b>SECTION 2: ORIENTATION PACKET FOR FIELD TECHNICIANS.....</b>	<b>17</b>
<b>I. Background.....</b>	<b>17</b>
<b>II. Responsibilities of Technicians .....</b>	<b>17</b>
End-of-Season Procedures .....	18
<b>III. Survey Protocol .....</b>	<b>18</b>
Documenting Survey Locations.....	18
Conducting the Bird Survey.....	19
<b>APPENDIX: Field Form, ID Guide and Equipment List .....</b>	<b>21</b>
<b>I. Datasheet: Rusty Blackbird (RUBL) Survey Form - 2009.....</b>	<b>22</b>
<b>II. Target Species ID Guide.....</b>	<b>23</b>
<b>III. Equipment List .....</b>	<b>24</b>
<b>IV. Modifications Log.....</b>	<b>25</b>

## SECTION 1: PROTOCOL NARRATIVE

### I. Background and Objectives

#### Introduction

The Rusty Blackbird (*Euphagus carolinus*) has experienced perhaps the steepest decline recorded for a North American songbird (> 90% since 1966, Christmas Bird Count [CBC]; Greenberg and Droege 1999, Niven 2004, Sauer et al. 2004) and is now too rare to determine population trend from the Breeding Bird Survey. Partners in Flight (PIF) has determined that even the CBC has low precision for detecting population trends in Rusty Blackbird populations, and recommends that a boreal bird survey may help address monitoring needs for several species (Dunn et al. 2005). However, we question: 1) if or when such an ambitious survey will be implemented; 2) whether a multi-species survey will adequately address the Rusty Blackbirds' specialized wetland habitat; and 3) whether a "true" boreal survey would include the northeastern United States. Therefore, we present this long-term monitoring plan designed specifically to address the widespread yet sparse distribution of Rusty Blackbirds in the Atlantic Northern Forest (Bird Conservation Region [BCR] 14).

This plan addresses conservation needs at several scales. The Rusty Blackbird is a Focal Species of the USFWS Migratory Bird program, is on the Region 5 Birds of Conservation Concern list, the priority species list for BCR 14, the Partners in Flight Continental Watch List, the National Audubon Society Watch List, and is listed as a Species of Special Concern in Canada. In the Northeast, the species is listed as a species of concern *and* as a State Wildlife Action Plan Species of Greatest Conservation Need in New York, Vermont, New Hampshire, and Maine. This project also addresses a need identified by the Northeast Coordinated Bird Monitoring Partnership: development of a robust monitoring framework that will provide the mechanism for a public-private partnership to implement a coordinated monitoring program and provide meaningful information about the status of this species.

Given the Rusty Blackbird's range-wide decline, its 150 km northwestward range contraction in Maine from 1983-2007, and the finding that regenerating clear cuts may be an ecological trap for nesting pairs (Powell 2008), there is a critical need for more information on status, population trend, and management issues affecting the species. Pilot efforts in Maine and Vermont have allowed us to establish the species' current range in these states, obtain preliminary estimates of occupancy and detectability, and model habitat use. Based on these efforts, and on the results of recent and ongoing Breeding Bird Atlases in Vermont, New York and the Canadian Maritime provinces, this plan outlines an efficient yet statistically powerful monitoring plan for Rusty Blackbirds in the Atlantic Northern Forest.

#### Goals and Measurable Objectives

*(In order of Importance)*

*Goal 1: To measure changes in population and distribution of Rusty Blackbirds over a 15 to 30 year time frame.*

#### Measurable Objectives

- A. To implement a pilot season (see section II - Sampling Design) that will gather data enabling us:

- i. to calculate baseline estimates of Rusty Blackbird wetland occupancy (the proportion of wetlands occupied by the species) and detectability (the probability of detecting the species, given that it is present; MacKenzie et al. 2006) in BCR 14 and within each “sub-region” :1) New York’s Adirondack region, 2) northern Vermont and northern New Hampshire, 3) northwestern Maine and, 4) New Brunswick
  - ii. to determine sample size and sampling frequency necessary for a robust estimate (precision addressed below) of population trend (i.e. change in occupancy over time) in BCR 14, and within each sub-region.
- B. To achieve 90% power to detect a 15% change in Rusty Blackbird wetland occupancy within each sub-region over five-year intervals at a significance level of 0.05. Note: these values are based on criteria for warranting state/provincial protection [e.g. ME: 25% decline over 5 years (Maine Department of Inland Fisheries and Wildlife 1993); NB: 20% decline over 10 years (Scott Makepeace, pers. comm.)] and can be modified if those criteria are altered.
- C. To use site colonization and extinction rates to produce an estimate of change in wetland occupancy within each sub-region with a 90% CI  $\leq 6\%$

*Goal 2: To investigate the influence of biotic and abiotic factors on the occupancy and distribution of the Rusty Blackbirds. Areas of interest, in order of priority, include forestry practices, landscape characteristics, wetland-scale habitat characteristics (e.g. availability of shallow water for foraging), climate change, abundance of potential nest predators (e.g. Blue Jays, Red Squirrels) and abundance of potential foraging competitors (e.g. Red-winged Blackbird).*

#### Measurable Objectives

- A) To use multivariate statistical models (e.g. Akaike’s Information Criterion) to determine which covariates best explain variations in the Rusty Blackbird’s wetland occupancy and detectability through space and time.
- B) To produce estimates of occupancy with 95% confidence intervals  $\leq 0.2$  (e.g., 95% CI of 0.2–0.4 on an occupancy estimate of 0.3)
- C) To assess the goodness of fit of occupancy models using standard statistical methods.

*Goal 3: To share data that will support conservation decision-making in Rusty Blackbird habitat.*

#### Measurable Objectives

- A) To make observational data (date, location, count, etc.) and associated metadata publicly available for visualization and download through the Avian Knowledge Network within one year of collection.
- B) To identify “Rusty Blackbird hotspots” (areas of high Rusty Blackbird concentration) and make the information available to the International Rusty Blackbird Technical Working

Group and the public. This will encourage concurrent studies (i.e. nest success, juvenile survival etc.) in that specifically address how forest and wetland management practices could increase fitness of the species (e.g. nest success under different forest management schemes).

*Goal 4: To collect data on conspecific birds of conservation concern such that population trend and habitat selection can be estimated.*

- A) To produce estimates of occupancy or abundance with 95% confidence intervals  $\leq 0.5$
- B) To use multivariate statistical models (e.g. Akaike's Information Criterion) to determine which covariates best explain variations in the occupancy or abundance and detectability through space and time.

#### Status of Partnerships and Implementation Funding

For each “sub-region”, we have identified a state wildlife biologist and/or non-governmental organization biologist (see “collaborators” on title page) willing to serve as “subregional collaborator” (see Section V, “Roles and Responsibilities). We still seek collaborators in Nova Scotia, Prince Edward Island and Quebec's Gaspé Peninsula.

In a special session at the 2008 International Rusty Blackbird Technical Working Group Workshop, we will specifically discuss the long-term objectives of monitoring on the breeding grounds and we will discuss funding opportunities. Furthermore, we will discuss this plan and seek implementation funding and additional collaborators at the 2008 Northeast Coordinated Bird Monitoring Workshop. The Polistes Foundation has agreed to handle distribute funding to the sub-regions and the project manager. They request only a 5% overhead, much preferable to overhead charged by state wildlife agencies.

## **II. Sampling Design**

#### Rationale for Protocol

The sampling design and survey protocols described in this plan are designed for a pilot season. After the pilot season, our biometrician will calculate baseline estimates of occupancy and detectability in each sub-region. These will allow us to determine the sampling frequency and the number of sites necessary to obtain robust estimates of change in occupancy at our desired level of precision (i.e. perform a power analysis). A report produced after the field season will summarize the power analysis and describe any recommendations for protocol adjustments.

Considering the widespread yet sparse distribution of the species in the study region (Powell 2008), occupancy estimates that use presence/absence surveys are likely to be a more efficient and cost-effective way to describe population changes than traditional approaches (e.g. trend in absolute abundance) that rely on counts (Thompson 2004). However, although biometricians increasingly hail occupancy modeling as the ideal statistical approach for monitoring rare species, we severely lack survey protocols that can efficiently collect the data for such modeling exercises (Andy Royle, personal communication). In traditional sampling designs (e.g. stratified random), the distribution of samples must be unbiased and maintain an element of

randomness. When the target species is rare but widely distributed however, traditional protocols “waste” considerable effort on relatively poor habitat, especially if sites need to be revisited to estimate occupancy. Given high fuel costs, rare and widely distributed species are particularly challenging to monitor, thus we present this novel sampling design that efficiently targets high-quality habitat for rare species while statistically accounting for unequal sampling effort. Though we have identified presence absence counts as our method of survey protocol of choice, technicians will also be collecting abundance data for each species. After the pilot season, the biometrician will determine whether abundance data are necessary for long-term monitoring.

### Sample Frame

Our monitoring efforts will target wetlands visible from and no more than 50 m from roads in landscapes most likely to contain Rusty Blackbirds in BCR 14. Each sub-regional representative will select sampling routes, and technicians will select wetlands as described in “Selecting Sites and Locating Sampling Stations”. We have established partnerships in 4 sub-regions (New York, Vermont/New Hampshire, Maine and New Brunswick) are actively seeking to create new sub-regions in other parts of BCR 14 including Nova Scotia, Prince Edward Island, Quebec’s Gaspé Peninsula.

### Sample Size

After we collect baseline data during the pilot season, our biometrician will calculate minimum sample sizes for each of the survey objectives and we will use the highest value as the sample size for the monitoring program. Although MacKenzie and Royle (2005) outlined methods for determining the sample size necessary to meet a given precision goal, their methods do not apply to our survey because of the novel sampling design (Andy Royle, personal communication). Therefore, our biometrician will write new code for UNMARKED, a script designed specifically for occupancy modeling in Program R (R Development Core Team 2008), in order to perform a power analysis. The power analyses will determine the number of wetlands and the sampling frequency needed to meet the measurable objectives above.

### Selecting Sites and Locating Sampling Stations

Sub-regional representatives will first identify fifty 20-30 mile-long stretches of road (hereafter referred to as “routes”) in landscapes most likely to contain Rusty Blackbirds, of which 25 will be randomly selected for survey work in a given season. Sub-regional representatives will select routes using the best available data on Rusty Blackbird distribution in their sub-region including pilot studies, breeding bird atlas data, breeding bird survey data and/or local knowledge. Along each given route, survey personnel will stop and conduct a point count at all wetlands within 50 m of the road. These wetlands can be pre-selected using GIS (e.g., National Wetlands Inventory data) or selected in the field. In either case, all routes within a sub-region should follow the same point selection protocol, and these points will be used in all subsequent years. To avoid sampling individual Rusty Blackbirds twice, if wetlands are closer than 1km to each other, only one will be randomly selected for survey.

### Timing of Surveys

As occupancy studies assume that the sampling period is closed to changes in occupancy (MacKenzie et al. 2006), technicians will survey from May 6<sup>th</sup> to June 17<sup>th</sup>. This time frame begins after most individuals have migrated and encompasses egg-laying through fledgling periods for most individuals (Avery 1995, L. Powell, unpublished data). Although Powell (2008) found detectability lower at mid-day, further analysis did not detect a significant effect of time-of-day in any of the models tests (I. Fiske, unpubl. data). As a result, technicians are not constrained in the times when surveys are conducted, although it is recommended that start times vary over the course of the day. The route length is designed so that technicians can survey two or three routes over the course of a day, while still allowing for travel between routes. On approximately May 12<sup>th</sup>, all technicians will make a telephone call to the program manager to address any questions and to confirm that they are performing survey protocol correctly.

To account for imperfect detection probability (MacKenzie et al. 2005), technicians will record detections of Rusty Blackbirds on a minute-by-minute basis. After technicians survey all the wetlands in each route once, they will return to all routes where Rusty Blackbirds were detected and perform two additional surveys at each wetland. At the wetlands where Rusty Blackbird(s) were originally detected, technicians will perform long surveys. At all other wetlands, technicians will perform the same survey type that they originally used (e.g. if they performed the short survey on the first visit, they will use the short survey on the second and third visit). Repeat surveys to the same wetland must at least be separated by at least four hours. Statistical models we develop with UNMARKED after the pilot season will account for both the unequal sampling approach and the unequal distribution of repeatedly surveyed wetlands.

## **III. Field Methods**

### Field Season Preparations

Sub-regional collaborators will first arrange a vehicle for technicians in their sub-region and stock it with the necessary field gear (i.e. a clipboard, datasheets, GPS etc.; see equipment list). Furthermore, they will identify “routes” in their subregion (as described in sampling design) and explain the logistics of the region to the technician prior to his/her departure. To control for auditory interference bias, routes will exclude roads with regular traffic (>2 cars per minute). The technicians will thoroughly review the “Orientation Packet for Field Technicians” (Section 2) prior to their first day. At the start of the season, the program manager will train the technicians on survey protocol (Described in Section V: Roles and Responsibilities).

### Documenting Survey Locations

As technicians drive along the survey routes, they will watch for wetlands either adjacent or near the road. All wetlands within 50 m of the road are eligible for surveys, except as noted below. Technicians should thus be able to estimate a distance of 50 meters and apply this to all wetlands detected along the route. Wetlands LESS THAN 0.1 HECTARE should NOT be surveyed, as these are rarely occupied by Rusty Blackbirds. One tenth of a hectare is an area roughly 20x50 m or 33x33 m. At all wetlands that meet both the distance and size criteria,

technicians will walk from the road to the edge of the wetland. Technicians will record the location of their survey point in a GPS unit, and record the GPS coordinates on the datasheet (coordinate system: decimal degrees, datum: NAD 83). To aid technicians when they return to wetlands, they will record on their map: 1) the wetland number in the approximate location of the wetland and 2) which survey they performed (S=Short, L=Long). Each wetland will be assigned a unique record number as described in Table 1 and Table 2. For example, the first wetland surveyed on route # 1 in Maine in 2009 will be numbered 09|3|01|01. The fifteenth wetland surveyed on route #42 in New Brunswick in 2011 will be numbered 11|4|42|15. Technicians will make a note on the datasheet if a wetland is obviously not suitable for survey (e.g. < 2 cars per minute, roadside ditch, no wetland visible).

Table 1. Explanation of fields used in creating record numbers.

Year	Last two digits of the year the survey was performed
Sub-region #	NY=1, NH/VT=2, ME=3, NB=4
Route #	Route number. Each sub-region has their own set.
Wetland #	Starts with #1 each time a new route is started

Table 2. Example of wetland record number.

Year	Sub-region #	Route #	Wetland #
12	3	45	15

### Selecting Short Surveys vs. Long Surveys

When they arrive at a wetland, technicians will quickly answer three yes/no questions based on three binary wetland variables that were good predictors of Rusty Blackbird occupancy in Maine and Vermont (Powell 2008): 1) *are there puddles?* 2) *Is there exposed mud?* 3) *Is the upland >70% coniferous?* All surveys include a 30-second recording of a Rusty Blackbird vocalization, which technicians will broadcast from a ©Western Rivers game caller with the volume set at “20”. Technicians will then select a random number from the random number table on the datasheet and consult Table 3 to determine whether they will perform a short survey or long survey. The short survey is a one-minute passive observation followed by a 30-second broadcast and one minute of post-broadcast observation. The long survey is three minutes of passive observation, a 30-second broadcast, then five minutes of post-broadcast observation (modified from Powell 2008). For example, if a given wetland has puddles, has exposed mud, and is surrounded by mostly hardwoods, technicians will answer “yes” to two of the three questions. They will then select a number from the random numbers table (on the datasheet). If, for example, the technician randomly selects a six, he/she would perform the short survey rather than a long survey (Table 3). With this approach, technicians will spend more time surveying the particularly suitable wetlands (Table 3), and would then in theory increase detections of Rusty Blackbirds, which would thus increase the precision of occupancy estimation (MacKenzie et al. 2006). Though they are spending more time at particularly suitable wetlands, technicians are still

sampling the entire range of wetlands on the landscape, which would allow for the broader applicability of our conclusions.

Table 3. Whether technician performs short survey or long survey based on responses to three habitat questions.

<b>Nbr of "yes" responses to habitat questions</b>	<b>Long survey if random number is a . . .</b>	<b>Probability of performing a long survey</b>
0	1	0.17
1	1 or 2	0.33
2	1, 2, 3, or 4	0.67
3	1,2,3,4,or 5	0.83

### Collecting Data

During the survey, technicians will record minute-by-minute detections and abundance of Rusty Blackbirds, as well as performing counts of other species. They will map locations of target species to facilitate the tracking of individuals, and then record the total number of individuals of each species seen. (See Appendix for list of target species). Technicians may optionally record observations non-target species on the back of the datasheet. Over the course of the season, technicians will perform two additional surveys at each wetland along each route where Rusty Blackbird(s) are detected as explained above in “Timing of Surveys”.

*After* performing the bird survey, technicians will fill out those portions of the datasheet containing information on weather and habitat variables. As noted on the datasheet, if the wind is averaging a “5”, or there is “steady rain” falling, technicians should not perform surveys; rather, they should wait to see if the weather abates before resuming the surveys. In the “Dominant Harvest Type” category, a “Clear Cut” results in no standing timber, a “Seed Cut” leaves scattered mature trees in an area that is otherwise clear cut, and a “Partial Cut” selectively removes a variable number of trees (here distinguished between greater and less than 50%). If a harvest is present, the technician should estimate the buffer width between the wetland and the harvest. Additional environmental data (e.g. forest cover in landscape, temperature) will be gathered with the aid of GIS and the Avian Knowledge Network.

## **IV. Data Handling, Analysis, and Reporting**

### Overview of Database Design

Upon finalization of field protocols and data forms, we will build a geographically referenced database to archive and manage survey results, with standardized fields aligned with the Avian Knowledge Network (AKN). The AKN ([www.avianknowledge.net](http://www.avianknowledge.net)) is the data management system for the Northeast Coordinated Bird Monitoring Partnership. It features a secure, persistent data archive with owner-specified access and innovative data display capabilities (spreadsheets, tables, charts and maps). The AKN is also building tools for exploratory analysis of observational data via data mining and machine-learning techniques. These tools reveal spatial and temporal patterns of avian distribution and abundance based on the query of millions of bird records and hundreds of environmental, climatic, and human

demographic variables. The opportunity to retrieve and explore the data will enable land stewards to make informed decisions.

### Metadata Procedures

Metadata will be created for the database in compliance with standards of the USGS National Biological Information Infrastructure and AKN. This detailed explanation of program goals, scope, and methodology will be available through the AKN website.

### Data Transcription, Entry, and Verification

Technicians will check datasheets for completeness immediately following the field survey. Technicians will review the field records and enter observations into the data entry template (provided as an electronic supplement to this plan) as close to the date of survey as is possible. The database entry template incorporates features that reduce data entry errors, such as dropdown menus for categorical variables, and error messages when numerical values are entered outside the acceptable range. If technicians do not have their own computer, they will enter data at the local library or at their sub-regional representative's office. Technicians will systematically error check *each* datasheet to make sure that each variable has been entered correctly in the database. When it is possible, technicians will back up data during the season by photocopying completed datasheets and by emailing electronic data to their sub-regional representative and the program manager. Photocopies will be made by the sub-regional representatives and stored at his/her office. The project manager will be responsible for quality control after each season after the data are compiled. At the minimum, he/she will perform standard queries for unacceptable values for each variable.

### Recommendations for Statistical Analyses

The biometrician will write new code for UNMARKED, a script designed specifically for occupancy modeling in Program R (R Development Core Team 2008), in order to analyze the data and perform a power analysis after the pilot season. This new script will adjust for our novel sampling design, a modification that is not possible in program ©PRESENCE (Ian Fiske personal communication; Hines 2006). A power analysis will determine the number of wetlands and the sampling frequency needed to meet the measurable objectives (Section I).

Though the protocol calls for analyses of Rusty Blackbird data using single-species, multiple-season occupancy models (using estimates of colonization, and extinction; MacKenzie et al. 2006), we acknowledge that occupancy is not always the ideal state variable. Therefore, during our pilot season, for each species we will collect presence/absence data on abundance. The biometrician will determine if it is necessary for technicians to collect abundance data beyond the pilot season.

Specifically, the biometrician will perform statistical analyses such that the measurable objectives of this plan (Section I) are addressed. The biometrician will use multi-model inference (i.e. AIC; Burnham and Anderson 2002) to determine the relative contribution of covariates in explaining the variability of occupancy and detectability of Rusty Blackbirds. He/she will then calculate the change in wetland occupancy by Rusty Blackbirds over time for BCR 14, and for each sub-region. A conceptual model of the system is shown in Figure 1. Please note that

measures of survival, though they undoubtedly affect change in occupancy over time, are not specifically addressed in this plan. However, we anticipate that we will encounter study areas suitable for studies of the effect of forest/wetland management on nest success and/or juvenile survival. We will actively encourage satellite studies to pursue this important question (See Section I, Goal 4).

Furthermore, as the availability of remotely sensed land cover data is constantly evolving (Scott Makepeace, personal communication), prior to each statistical analysis, our project manager will research the availability new remotely sensed data layers (e.g. new releases of the National Land Cover Dataset). Before each analysis, the project manager will use GIS to summarize the landscape around survey locations into multiple landscape covariates (e.g. a variable for area of clearcut < 20 years old within 1 km of each survey point). The biometrician will then use multi-model inference to evaluate the effect of those landscape covariates on change in Rusty Blackbird occupancy.

#### Data Archival Procedures

As data is entered by technicians, it will be backed up by the sub-regional representatives on a regular basis during the season as described above. All sub-regional datasets will be combined by the Program Manager and the entire BCR 14 dataset will be uploaded to the Avian Knowledge Network after each year of field work. Habitat data and other information that does not conform with existing AKN fields will be archived with the Northeast Avian Data Center, the AKN's Northeast regional node. The data will be publically available as "open access" (Level 5) on the AKN website.

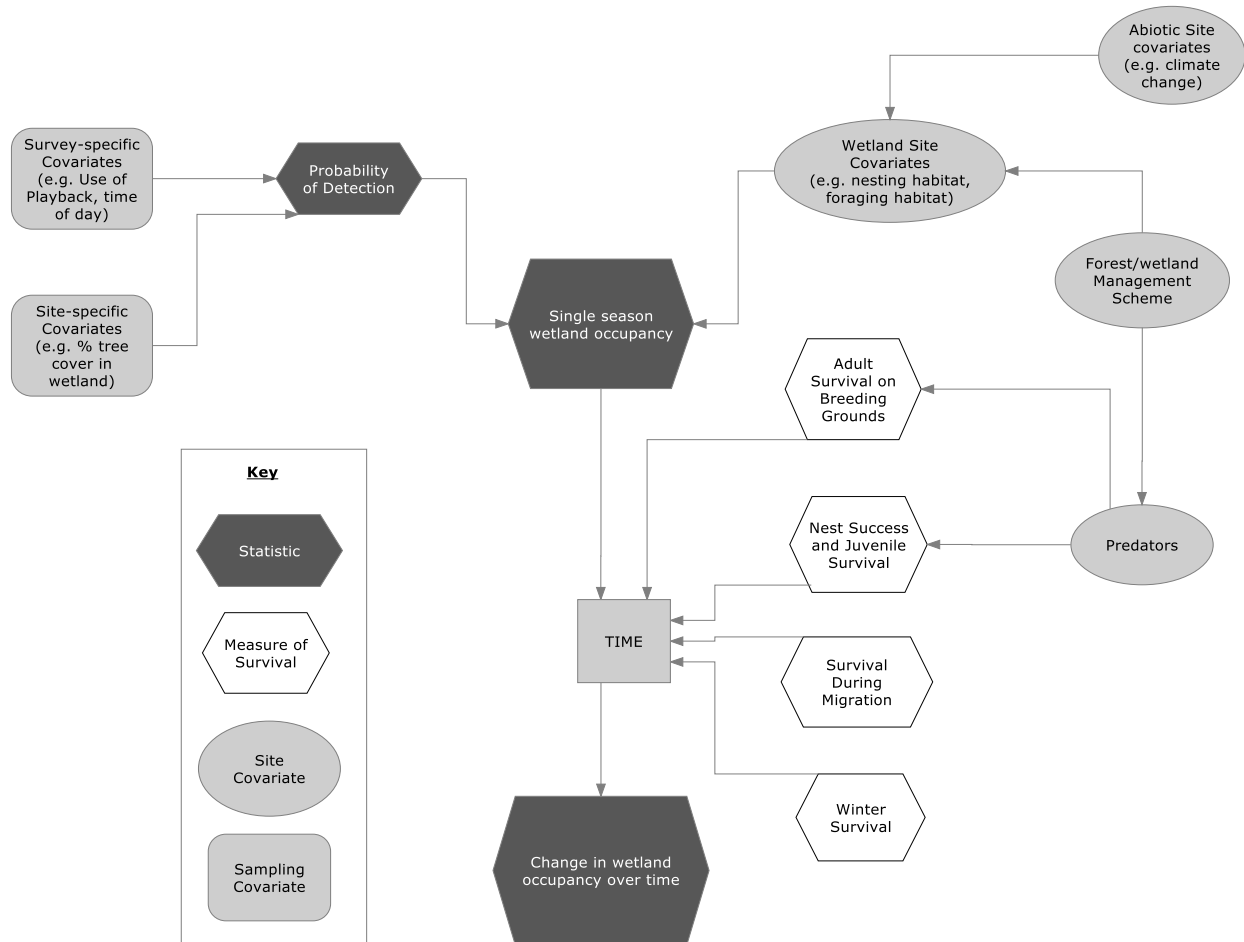


Figure 1. Conceptual model of factors affecting change in wetland occupancy by Rusty Blackbirds.

## V. Roles and Responsibilities

### Program Manager

The program manager must be prepared to: (1) Create a CD intended to orient technicians to the songs and calls of target species, (2) hire, train, and supervise paid technicians, (3) use GIS to identify wetlands along survey routes, (4) coordinate logistics with sub-regional representatives and technicians, (5) conduct quality control on the data, (6) ensure that data are stored and are accessible online via the Avian Knowledge Network, (7) use GIS to summarize the landscape near data points, (8) interpret the biometrician's statistical analyses, (9) write a final report summarizing findings and providing recommendations for long-term monitoring, (10) pursue any grant opportunities to fund the implementation of long-term monitoring.

The most important preparation is to ensure that skilled observers are hired and trained to conduct the field surveys. By mid-April each year, the program manager will prepare a mailing to all technicians that will include the following items:

- A cover letter thanking them for participating in the monitoring program, reminding them of the monitoring window dates and starting times, and encouraging them to review the protocol prior to the field season.
- Copies of the Birds of North America account for the Rusty Blackbird (Avery 1995, but preferably the updated version, currently in prep.)
- Sample datasheets (filled out as examples)
- A sunrise/sunset chart for their sub-region
- The orientation packet for field technicians (Section 2) and the training CD;
- A map of the observer's routes obtained from sub-regional representatives
- A list of wetlands to sample, including lat/longs

At the beginning of the season, the Program Manager will distribute field materials (including wildlife callers and GPS units with sampling locations pre-loaded) and organize a training session to introduce the protocol to the technicians and/or sub-regional representatives, as needed. At this training session, the program manager will provide technicians with 300 datasheets, 100 of which will be printed on ©Rite in the Rain paper. The program manager will give a talk about Rusty Blackbird ecology and conservation, followed by simulated field surveys. Emphasis will be placed on bird identification, procedures for recording data in the field, and post-survey data handling. On approximately May 12<sup>th</sup>, the program manager will speak to each field technician on the telephone to address any questions and confirm that technicians are performing the surveys correctly. The program manager will design a questionnaire intended to help in the sampling design and logistics of the next field season; he/she will have technicians fill out the questionnaire just prior to the end of the season.

#### Sub-regional representatives:

Sub-regional representatives are responsible for defining the “routes” to be conducted by the technician in their sub-region. Routes will be selected using the best available data on Rusty Blackbird distribution and abundance (e.g. Breeding Bird Atlases, Breeding Bird Survey Data, previous surveys, local knowledge) along with knowledge of road condition and camping and cabin locations. Sub-regional collaborators should consult with the program manager to provide recommendations for hiring field technicians in their sub-region. Sub-regional collaborators will determine if it is feasible to use volunteers as technicians in their sub-region. If he/she determines that volunteers are feasible, he/she should be prepared to assist with volunteer recruitment and training.

As needed, sub-regional representatives will assist with logistics (e.g. arranging stays at state cabins), supply miscellaneous equipment to technicians (see Appendix for equipment list), and arrange a vehicle for the technician. If necessary, Sub-regional collaborators will provide or arrange for a computer where technicians can perform data entry. If technicians enter data at the sub-regional representatives office, the sub-regional representative will regularly back-up data by making photocopies of datasheets. After the pilot season, sub-regional representatives will assist with the editing of the final report and provide recommendations for adjusting survey protocols and re-evaluating the objectives of long-term monitoring.

Field Technicians:

Field technicians are expected to collect baseline bird data, document survey locations in the field, enter and error-check data. Technicians must be able and willing to spend extended periods camping in remote areas. Technicians should be comfortable working in extreme conditions and are expected to supply their own equipment to protect from rain and, black flies and mosquitoes (see Appendix for equipment list). They must be able to identify the target species by sight and sound and should be able to navigate with a GPS, map, and compass. Technicians should also be able to record field observations accurately and legibly. Technicians are expected to work at least 25 days per season. They will visually inspect datasheets for completeness in the field, and enter and error-check data into a Microsoft Excel spreadsheet (Appendix A) as soon as possible. The technician's final payment will be withheld until data entry is completed and approved by the program manager, and a questionnaire has been filled out and returned.

Biometrician:

The biometrician will perform statistical analyses after the pilot season is complete (See section IV, Statistical Analyses). He/she will calculate baseline estimates of occupancy and detectability in each sub-region. These will allow him/her to determine the sampling frequency and the number of sites necessary to obtain robust estimates of change in occupancy at our desired level of precision (see Section I, Goals and Measurable Objectives). He/she will provide written statistical analyses to the program manager in an easily interpreted format. The biometrician will review the pilot season final report to ensure that presentation and interpretation of his/her analyses are appropriate. As part of the analysis of pilot data, the biometrician will work with the program manager to outline any sampling design or survey protocol modifications necessary for monitoring beyond the pilot season. Along with the project manager, the biometrician will decide how frequently statistical analyses will be performed over the long term (e.g. every five years, after each field season etc.).

**VI. Schedule for Pilot Year**

Oct. 9, 2009:	Discuss monitoring efforts at the International Rusty Blackbird Technical Working Group meeting in Powdermill, PA
Dec.15, 2008:	Sub-regional representatives post a job announcement for program manager
Jan 15, 2009:	Sub-regional representatives hire a program manager
Jan 16, 2009:	Program manager posts Job announcement for technician positions
March 12, 2008:	CD of Target species vocalizations completed by program manager
March 15, 2009:	Data entry template completed by program manager and approved by AKN technicians
March 20, 2009:	Program manager finalizes protocols, prints out datasheets and orientation packets

March 21, 2009:	Sub-regional representatives submit routes to program manager
April 1, 2009:	Program manager technicians and secure vehicle for each state/province
April 7, 2009	Program manager uses GPS to remotely select wetlands to survey
April 15, 2009:	Program manager mails all necessary information to technicians
May 6, 2009:	Program manager trains technicians; technicians begin surveys
June 17, 2009:	Last day of surveys
June 20, 2009:	All data entered to database by technicians
July 1, 2009:	Program manager compiles data from all sub-regions and performs quality control
July 7, 2009:	Program manager completes GIS landscape summary and incorporates those covariates into the dataset
Sept. 1, 2009:	Biometrician completes statistical analyses
February 1, 2010:	Program manager submits draft report to sub-regional representatives for comment
March 1, 2010:	Program manager submits final report and recommendations for long-term monitoring

## VII. Acknowledgments

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## **SECTION 2: ORIENTATION PACKET FOR FIELD TECHNICIANS**

**Version 1.0  
September 2008**

### **I. Background**

The Rusty Blackbird (*Euphagus carolinus*) has experienced perhaps the steepest decline recorded for a North American songbird (> 90% since 1966, Christmas Bird Count [CBC])(Greenberg and Droege 1999, Niven 2004, Sauer et al. 2004). In the Northeast, the species is now too rare to determine population trend from the Breeding Bird Survey, so we have no way to tell if the northeastern population is still in decline. The Rusty Blackbird breeds from Alaska to Maine (Avery 1995) and is listed as a species of concern in New York, New Brunswick, Vermont, New Hampshire, and Maine. Given the species' range-wide decline, its 150 km northwestward range contraction in Maine from 1983-2007, and the finding that forest management practices around wetlands may affect nest success (Powell 2008), there is a critical need for more information about the status of the Rusty Blackbird in the Northeast.

### **II. Responsibilities of Technicians**

Technicians are responsible for collecting baseline bird data, documenting survey locations in the field, collecting habitat measurements, and entering and error-checking data prior to submission to the program manager. Prior to starting field work, technicians must be able to identify the target species (see datasheet and Target Species ID Guide, Appendix) by sight and sound. Technicians should be comfortable navigating with a map and GPS unit in remote areas. Furthermore, technicians should be comfortable working in extreme conditions and are expected to supply their own sleeping bag, clothing, binoculars, and equipment to tolerate swarms of black flies (see equip list, Appendix).

#### Prior to the season

Prior to the start of field work, all technicians must learn to identify the target species (Appendix A) by sight and sound. An audio training CD, prepared by the program manager prior to the season, will contain a training session intended to introduce technicians to the vocalizations of the target species. Technicians will use the Target Species ID Guide (Appendix) along with a published field guide to familiarize themselves with the physical characteristics of the target species, particularly the four blackbirds. Technicians should also be familiar with the Target Species Identification Guide (Appendix), which summarizes the key diagnostic physical and vocal characteristics for each target species. Finally, technicians should familiarize themselves with the survey protocol and prepare a list of questions for the Program Manager. The best way to do this is to perform a "mock" survey, and fill out the datasheet using other species as surrogates for the target species (e.g. Northern Cardinal is Rusty Blackbird etc). Technicians can refer to the filled-out datasheets provided by the program manager as examples.

### During the Season

Technicians must be able to navigate with a GPS, map, and compass. They should be comfortable camping alone in remote locations and able to identify the target species by sight and sound. Technicians must record field observations accurately and legibly. They are expected to work 10 days of each 14-day period (e.g. ten days on, four days off, *or* the standard 5 day on, 2 day off) for a total of 25 days per season. Technicians must visually inspect datasheets for completeness in the field. Technicians must supply basic equipment for remote living, bird observation and insect avoidance (see equip list for breakdown), although the program manager and sub-regional representatives will also provide gear. Stormy or windy days when field work is not possible can be spent doing data entry and will count as work days. In order to address any questions and ensure that surveys are being performed correctly, all technicians should call the project manager on or around May 12.

### End-of-Season Procedures

Technicians will enter observations into the database as close to the date of receipt as possible. The database is a Microsoft Excel file pre-formatted and distributed by the Program Manager. As extra incentive to enter the data in a timely manner, the technicians' final pay check will be withheld until data entry is completed, data are error-checked, and the data are approved by the program manager. The technician will return all equipment to the program manager and/or sub-regional representative for safe storage until the next field season. At the end of the season, the technician will fill out a questionnaire designed by the program manager intended to help us make adjustments to survey protocols etc.

## **III. Survey Protocol**

Each sub-regional representative will supply the technician with a map that has 50 survey "routes" highlighted. Each season, 25 of these routes will be randomly selected for survey by the technician. Over the first half of the season, the technician will plan logistics such that he/she efficiently covers each 20-30 mile-long route once. Keep in mind that, during the second half of the season, technicians must also return twice more to resurvey all roadside wetlands in all routes where Rusty Blackbirds were detected. Along each route, technicians will stop at every wetland detected within 50 m of the route. For the purposes of this survey, we define roadside wetlands as palustrine (non-river, non-lake) water bodies less than 50 m from roads with a reasonable concentration of wetland vegetation (e.g. alder, cedar, sphagnum). If the wetland is obviously not suitable (e.g. non-existent, a road-side ditch, has >2 cars pass by per minute), technicians will perform the survey as described below and note this lack of suitability (and why) on the datasheet. On approximately May 12<sup>th</sup>, all technicians will make a telephone call to the program manager to address any questions and to confirm that they are performing survey protocol correctly.

### Documenting Survey Locations

Before performing the survey, technicians will walk from the road to the edge of the wetland. Although sampling locations were selected remotely by the project manager, to validate

their location in the field, technicians will record each wetland by digitally marking the location in a GPS unit, *and* recording the GPS coordinates on the datasheet (coordinate system: decimal degrees, datum: NAD 83). Technicians will also save each “GPS track” created when driving each route. These tracks will be saved as the track number, for example, the GPS track for route 5 will be named “rt5”. To aid technicians when they return to wetlands, they will record on their map: 1) the wetland number in the approximate location of the wetland, 2) which survey they performed (S=Short, L=Long), and 3) whether the route was surveyed in the morning or afternoon (AM: morning shift, PM: evening shift). Each wetland will be assigned a unique record number as described on the datasheet and in Tables 1 and 2 and on the datasheet. For example, the first wetland surveyed on route # 1 in Maine in 2009 will be numbered 09|3|01|001. The ninety-ninth wetland surveyed in the Canadian Maritime provinces in 2011, which happens to be on route #42, will be numbered 11|4|42|099.

Table 1. Explanation of fields used in creating record numbers.

Year	Last two digits of the year the survey was performed
Sub-region #	NY=1, NH/VT=2, ME=3, NB=4
Route #	Route number. Each sub-region has their own set.
Wetland #	Starts #1 each time a new route is started

Table 2. Example of wetland record number.

Year	Sub-region #	Route #	Wetland #
12	3	45	15

### Conducting the Bird Survey

Upon the first arrival at a wetland, technicians will first calculate a simple “habitat suitability index” based on wetland characteristics that were strong predictors of Rusty Blackbird occupancy in Maine and Vermont (Powell 2008, unpubl. data). Technicians will then perform either an 8-min, 30-second “long survey” at highly suitable wetlands or a 2-min, 30-second “short survey” at relatively unsuitable wetlands. The short survey is a one-minute passive observation followed by a 30-second broadcast and one minute of post-broadcast observation. The long survey is three minutes of passive observation, a 30-second broadcast, then five minutes of post-broadcast observation. The volume will be set at “20” for each broadcast. Note that on the data form, the column headings for both the short and long surveys are indicated by the minute *at the start* of each one-minute period. Thus “Min0” refers to the period from starting the survey to 1:00 on a stopwatch, “Min1” equals 1:00-1:59, and so forth. For the broadcast segment, the technician can either pause the stopwatch for the 30 seconds of Rusty Blackbird song, or adjust all further break points by 30 seconds. To calculate the “habitat suitability index”, technicians will quickly answer three yes/no questions based on three binary wetland variables that were good predictors of Rusty Blackbird occupancy in Maine and Vermont: 1) *are there puddles?* 2) *is there exposed mud?* 3) *is the upland >70% coniferous* (see datasheet)? For

example, if a given wetland has puddles, has exposed mud, and is surrounded by mostly hardwoods, technicians will answer “yes” to two of the three questions. The technician will then select a number from the random numbers table (on the datasheet). If, for example the technician randomly selects a six, he/she would perform the short survey rather than a long survey (Table 3).

Table 3. Whether technician performs short survey or long survey based on responses to three habitat questions

<b>Nbr of "yes" responses to habitat questions</b>	<b>Perform the long survey if random number is:</b>	<b>Perform the short survey if random number is:</b>
0	1	2, 3, 4, 5 or 6
1	1 or 2	3, 4, 5 or 6
2	1, 2, 3, or 4	5 or 6
3	1,2,3,4,or 5	6

During each survey, technicians will record minute-by-minute detections and counts of Rusty Blackbirds as indicated on the datasheet. Technicians will also record counts of the other target species as indicated on the datasheet. Note that the circles are only provided so that technicians can keep track of individuals’ movements; the species counts in the box at right (tallied after the survey) are more important. In both cases, technicians will be expected to keep track of individual birds and record their movements on the datasheet as explained on the pre-filled-out sample datasheet. They may optionally record any additional species seen on the back of the datasheet. If there is any question of whether a give blackbird was a Rusty Blackbird, technicians should remain at or in the wetland after the survey until they can confirm the identification, or until 15 minutes has passed after the survey, whichever comes first. If the technician detects a Rusty Blackbird, he/she will select one of three categories that describe the “quality of sighting” (“poor = unconfirmed detection, not able to confirm post-survey; good= 80-95% certainty that individual is a Rusty Blackbird; excellent = song heard or other confirmation, >95% certainty). Technicians will check datasheets for completeness immediately following the field survey. If a technician happens to detect a Rusty Blackbirds outside survey routes or outside the time of day to sample, he/she will fill out a datasheet (wetland number left blank), write “DRIVEBY RUBL” across the top and report the observation to the project manager separately from the formal surveys. *After* the bird survey, technicians will also record information on weather and habitat variables (e.g. age of last cut, buffer width etc.). Technicians will make a large bold circle on the map around all wetlands where Rusty Blackbirds were detected.

After technicians survey all the wetlands in each route once, they will return to all routes where Rusty Blackbirds were detected and perform two additional surveys at each wetland. At the wetlands where Rusty Blackbird(s) were originally detected, technicians will perform long surveys. At all other wetlands, technicians will perform the same survey type that they originally used (e.g. if they performed the short survey on the first visit, they will use the short survey on the second and third visit). Repeat surveys to the same wetland must be separated by at least four hours (i.e. at least separated by the midday break), but the separation may be as long as a five weeks. During repeat surveys, technicians are encouraged to survey all the wetlands they originally surveyed along the route.

**APPENDIX: Field Form, ID Guide, Equipment List, and Modifications Log**

fore  
cast:

Year	Sub-region	Route #	Wetland #
0	9		

# I. Datasheet: Rusty Blackbird (RUBL) Survey Form - 2009

point number

50m (for sub-region: NY=1, NH/VT=2, ME=3, Maritimes=4)

Target Sp. Totals:

Before During/  
B-Cast After

## SAMPLING DATA:

GPS lat/long (in decimal degrees):

Month: May June

Day:

Start Hour (on 24hr scale):

Blackflies/Mosquitoes:

none

<10

10-50

>50

Mean Wind during survey:

0 - calm, smoke rises vertically

1 - (1-3 mph) Light Air; rising smoke drifts

2 - (4-7 mph) Light Breeze; leaves rustle, can feel wind on face

3 - (8-12 mph) Gentle Breeze; leaves & twigs move

4 - (13-18 mph) Moderate Breeze; moves thin branches, raises loose paper

5 - (>18 mph) Fresh Breeze; trees sway; **Don't survey!**

Weather (circle only ONE)

0=clear or a few clouds

1=partly cloudy/variable

2=cloudy/overcast

3=fog

4=drizzle

5=showers

6=steady rain; **Don't survey!**

Observer: COGR

Start Min: KWBL

BHCO

BLJA

GRAJ

AMRO

OSFL

NOWA

TEWA

RESQ

1	6	1	1	5	6	2	1	6	6
1	1	3	1	6	5	2	1	2	1
6	4	4	6	2	5	2	3	4	4
4	2	5	4	5	3	4	3	5	2
3	3	2	5	5	2	6	1	2	2
4	4	2	1	1	5	4	2	4	6
4	2	6	4	5	6	2	2	6	3
6	2	6	3	3	4	5	3	3	1
5	5	5	4	3	3	6	2	1	4

## "WETLAND SUITABILITY INDEX:"

Are there any "puddles" (small and unconnected to wetland center)?

Yes

No

Is exposed mud visible in the wetland?

Yes

No

Is the upland >70% conifers?

Yes

No

Survey Type:

Long

Short

# of "yes" responses to habitat questions	Perform the long survey if random # is a . . .	Perform the short survey if random # is a . . .
0	1	2, 3, 4, 5 or 6
1	1 or 2	3, 4, 5 or 6
2	1, 2, 3, or 4	5 or 6
3	1,2,3,4,or 5	6

## HABITAT DATA

Dominant Harvest Type:

NoEvidence

ClearCut

SeedCut

LtPartial(<50%cut)

HvyPartial(>50%cut)

Age of Dominant Harvest (yrs):

0-5

6-10

11-15

15-20

21-25

>25

Wetland Buffer:

NoBuffer

0-25m

26-50m

51-100m

>100m

MatureForest(N/A)

Road class:

Unimproved Dirt

Improved Dirt

Paved

Nesting Habitat (dense spruce or fir <5m tall):

Yes

No

Fresh Beaver evidence (e.g. scat/chewed sticks/dam/hut):

Yes

No

Intact beaver dam:

Yes

No

RUBL DATA: For each minute, if you detected any RUBLS, circle the letter H(heard) and/or V(visual) indicating how it was detected (e.g. for long survey, Min0 is 0:00 to 59 sec, Min 3 is 3:30 to 4:30), and write in the number of RUBL you detected in the space below. Don't forget to PLAY THE 30 second BROADCAST after 3min for the long survey, or after 1min for the short survey.

Short Survey:

Min0

30 sec B'cast

Min1

Long Survey:

Min0

Min1

Min2

30 sec B'cast

Min3

Min4

Min5

Min6

Min7

RUBL Detectability:

H V

H V

H V

H V

H V

H V

H V

H V

H V

# RUBL detected <50m away/ minute:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# RUBL detected >50m away/minute:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Total #Male RUBL(s):

Total#Female RUBL(s):

Total#Juvenile RUBL(s):

RUBL Breeding evidence:

SingingMale

Pair

RUBL\_W/Food

RUBL\_W/NestMaterial

Nest

Fledglings

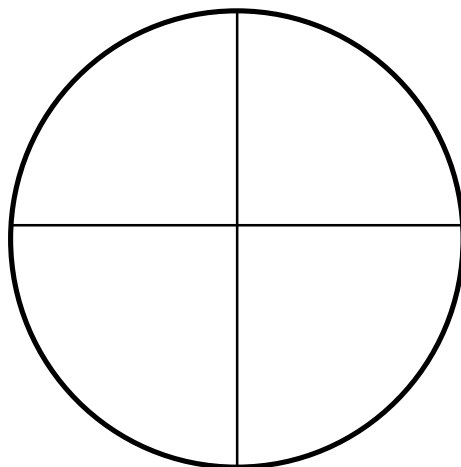
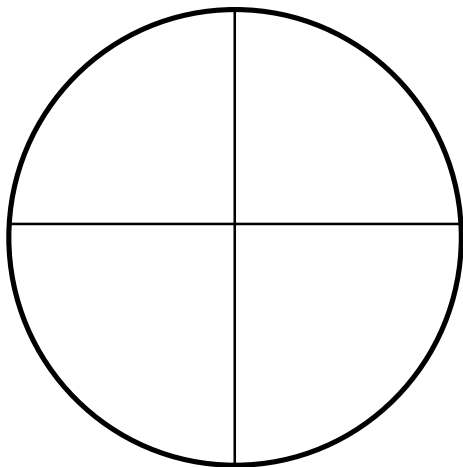
Quality of RUBL Sighting:

Poor

Good

Excellent

TARGET SPECIES: During the survey, use the circles below to map movements of individuals of target species. After the survey, tally the total # of individuals of each target species in the box at right:



--

Notes/non target species on back?

Yes

No

Did you circle all the necessary categories and filled in all the blanks?

Yes

No

## II. Target Species ID Guide

*-Supplement this with a field guide and the training CD*

- RUBL (Rusty Blackbird, *Euphagus carolinus*)
  - Visual: A slender blackbird with a yellow eye, thin bill and uniform black (male) or slate grey (female) appearance
  - Song: a short gurgle followed by a high, thin whistled note: “ktlr-teeeeeeeeeee”. *Similar cadence to that of RWBL.* Very little variation.
  - Call: a low “tyuk”. Call can overlap with call of RWBL. Not a diagnostic method of identification. If unsure, remain at the wetland after the survey to confirm.
- COGR (Common Grackle, *Quiscalus quiscula*)
  - Visual: A large blackbird with a thick bill, keel-shaped tail and yellow eye. Male is black with blue/purple iridescence on head. Female is less black (more brownish) with a shorter tail than the male, but still longer than that of the Rusty Blackbird.
  - Song: an unmusical harsh “kh-shee” or “khr-reezzh”. Highly variable.
  - Call a hoarse sounding “kek”, deeper and harsher than that of other blackbirds
- RWBL (Red-winged Blackbird, *Agelaius phoeniceus*)
  - Visual: Male a medium-sized blackbird with similar body shape to RUBL, but with red and yellow patch on the shoulder and a black eye. Female is significantly smaller than male and sparrow-like, brown and streaky.
  - Song: a short series of liquid notes followed by a harsh, gurgling trill, “kon-ka-reeee”. Little variation. Also make a clean, down-slurred whistle and other noises.
  - Call: A low, dry “chek”. Usually, but not always weaker than that of RUBL.
- BHCO (Brown-headed Cowbird, *Molothrus ater*)
  - Visual: Male a smallish blackbird with a stout bill, black body, brown head and a dark eye. Female sparrow-like.
  - Song: a series of low gurgling notes followed by thin, sliding whistles: “bubble-zee”
  - Call: hard rising rattle
- BLJA (Blue Jay, *Cyanocitta cristata*)
  - Visual: Unmistakable large, bright blue songbird with crest on head
  - Song: Varied; most common a shrill, harsh, descending scream “jaaaay”; also several insect-like noises
- GRAJ (Gray Jay, *Perisoreus canadensis*)
  - Visual: Medium-large gray songbird reminiscent of a large chickadee. Short bill and white cheek. No crest.
  - Calls: Relatively quiet for a jay. Noises variable: clear whistled “Iweeeoo” to a husky “chuf-chuf-weef” or a rough “kreh kreh kreh kreh.”
- AMRO (American Robin, *Turdus migratorius*)
  - Visual: Uniform dark gray underside with darker head and rusty-orange breast. Dark tail with white corners. From behind, could be mistaken for female RUBL, but white corners of tail distinctive.
  - Song: usually a repeated series of two or three phrases of up-and-down whistles.
  - Call: Variable: clucking “pup” or “piik” and a high, descending “sheerr”.
- OSFL (Olive-sided Flycatcher, *Contopus cooperi*)
  - Visual: a relatively large-headed, short-tailed flycatcher with dark head and flanks.
  - Song: a distinctive sharp, penetrating “whip WEEDEEER” (“quick, THREE BEERS”)
  - Call: a low, hard “pep pep pep”
- NOWA (Northern Waterthrush, *Seiurus noveboracensis*)
  - Visual: A large, brown warbler with dark brown on upperside, and streaks on underside, and pale “eyebrow”
  - Song: Loud, *three parted* series of *accelerating* chirping notes: “chewie, chewie chewie, sweet sweet sweet, deet deet deet”. \*\*\*carefully listen to recording as both NOWA and TEWA have 3-parted songs.
  - Call: a loud, hard, “spwik”
- TEWA (Tennessee Warbler, *Vermivora peregrina*)
  - Visual: A small, short-tailed warbler with a *thin pale* “eyebrow” and un-streaked underparts
  - Song: A *three parted* trill of *sharp high chips*: ”tip tip tip tip teepit teepit teepit teepit te te te te” \*\*\*carefully listen to recording as both NOWA and TEWA have 3-parted songs.
  - Call: a sharp “stik”. Flight call a high “tseet”
- RESQ (Red Squirrel, *Tamiasciurus hudsonicus*)
  - Visual: a small, *rust-red* squirrel
  - Vocalization: a loud, slightly descending, drawn-out, non-musical trill with a chatter of notes and chucks

Bird descriptions from Sibley (2003) and L. Powell (personal Observations). RESQ description from Whitaker (1996)

**III. Equipment List****Supplied by Program Manager:**

<u>Item</u>	<u>Quantity</u>
GPS (w/ sampling locations uploaded)	2 (one backup)
Broadcast Device	2 (one backup)
Orientation Packet	2 (one backup)
Datasheets (30% on ©Rite in the Rain paper)	300+

**Supplied by Sub-regional Representative:**

<u>Item</u>	<u>Quantity</u>
Clipboard	1
Pencils	10
Vehicle	1
Map with highlighted routes	1

**Supplied by Technician:**

<u>Item</u>	<u>Quantity</u>
Insect protection (gloves, nets, bug spray)	plenty
Bird guide	1
Sleeping bag (may get down to 30°F)	1
Food	enough
Waterproof binoculars	1
Watch w/ second hand	1
Rain Gear (coat and pants)	1
Rubber boots	1
Tent	1
Camp stove and fuel	1
Head lamp/flashlight	1
First-aid kit	1
Container for water or water filter	1

#### **IV. Modifications Log: Long-term Monitoring Plan for Rusty Blackbirds in the Atlantic Northern Forest**

##### January 2009 (Pam Hunt, Luke Powell) – Version 1.5

- 1) Removed stipulation that surveys occur only in morning and evening. Detectability model indicated that time of day had no significant effect on detection of RUBL. Instructions to technicians modified accordingly
- 2) Minor edits to species codes

##### April 2009 (Pam Hunt, Luke Powell) – Version 1.7

- 1) Based on habitat model, added “presence of mud” to the “Wetland Suitability Index” and removed consideration of wetland size. The three yes/no questions are now as follows: 1) are there puddles?, 2) is there mud?, and 3) is the upland >70% conifer?
- 2) The same habitat model showed that Rusty Blackbirds avoid the smallest class of wetlands: those < 0.1 hectares. The survey instructions have been modified to reflect this, and surveys should not occur in these smallest wetlands. The survey instructions now include rough approximations of how to visualize 0.1 ha to aid technicians.
- 3) Based on further discussion, wetlands will no longer be pre-selected for each route, and instead technicians will stop at all wetlands they detect, evaluate their size, and determine whether they are suitable for surveying (e.g., greater than 0.1 ha). It is thus critical for technicians to take a GPS point at each wetland, since wetland locations will not have been pre-determined. If a sub-region wishes to pre-select routes, such a practice is still acceptable, since the end result of either approach is the same: a set of wetlands within 50 m of the survey route.
- 4) Instructions for timing the long and short surveys were added to the survey protocol for clarification.
- 5) Minor edits to text and data sheet

##### May 2009 (Luke Powell, Pam Hunt) – Version 1.8

- 1) Adjusted all the dates to reflect start/end of surveys as May 6<sup>th</sup> to June 17<sup>th</sup>.
- 2) Adjusted the data sheet to record target species totals, and moved non-target species to the back of the sheet.
- 3) Changed language to reflect that target species (other than RUBL) will be counted, and that the circles are on the datasheet are only provided so that technicians can keep track of individuals.
- 4) Clarified language on RUBL detections. Technicians should record presence/absence of RUBLs within each minute, plus the count of RUBLs detected within each minute (<50m and >50 m separately) in the space below on the datasheet.