

<i>Title:</i> TOS Protocol and Procedure: Breeding Landbird Abundance and Diversity		<i>Date:</i> 08/11/2015
<i>NEON Doc. #:</i> NEON.DOC.014041	<i>Author:</i> K. Thibault	<i>Revision:</i> G

TOS PROTOCOL AND PROCEDURE: BREEDING LANDBIRD ABUNDANCE AND DIVERSITY

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See configuration management system for approval history.

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Change Record

REVISION	DATE	ECO #	DESCRIPTION OF CHANGE
A_DRAFT	10/03/2011	ECO-00280	Initial Draft Release
B_DRAFT	01/13/2014	ECO-01140	Draft release. Will be finalized in next rev.
C	03/17/2014	ECO-01667	Production release, template change, and other changes as detailed in Appendix C (rev C only)
D	04/10/2014	ECO-01792	Updated Appendix F with site-specific information
E	12/15/2014	ECO-02535	Migration to new protocol template
F	03/16/2015	ECO-02653	Added site-specific appendices for new sites
G	08/11/2015	ECO-03048	Added site-specific appendices for new sites; Modified sampling window timing; Added descriptions of habitat codes used on datasheet; Removed identification qualifier information; Corrected Maximo number for handheld weather station.

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1 OVERVIEW

1.1 Background

Breeding landbirds were chosen to be a component of NEON’s suite of biodiversity measurements (Kao et al. 2012), because breeding birds (a) have proven useful in large-scale modeling of climate change impacts (Stralberg et al. 2009, Tingley et al. 2012); (b) are consumers of other NEON taxa (i.e., insects, plants); (c) serve as reservoirs for mosquito-borne diseases of interest to NEON (e.g., West Nile Virus; LaDeau et al. 2007, McKenzie and Goulet 2010); (d) can be impacted by nest predation by small mammals (also a NEON target taxon; Schmidt et al. 2008); (e) are vulnerable to climate change (Gardali et al. 2012); and (f) respond strongly to land-use change (Luther et al. 2008, Newbold et al. 2012, Jongsomjit et al. 2012). Moreover, the long history of data collection at the regional and national scales allows for the integration of NEON sampling into larger datasets to examine regional and continental-scale and decadal-scale trends (e.g., Bart et al. 1995, Saracco et al. 2008).

In North America, there are over 650 species of breeding birds, and many approaches have been developed to sample them, given their diversity of habits and habitats (Bibby et al. 2000, Fancy and Sauer 2000). As a result of this diversity, no single sampling method can be used with equal efficacy on songbirds, seabirds, waterfowl, and raptors (e.g., Ralph et al. 1993, Fancy and Sauer 2000). The breeding bird component of the NEON TOS is designed to sample songbirds and other birds that are diurnal and resident in or migrating through terrestrial habitats, commonly referred to as landbirds. The most common methods for sampling breeding birds are spot mapping of territories, area searches of specific sites, strip transects along predetermined routes, nest searches, and point counts (Ralph et al. 1993, Nur et al. 1999), as well as mist-netting for marking and recapture.

Of these, point counts are the most commonly used method of sampling birds (Bibby et al. 2000, Rosenstock et al. 2002), and they have been described as ‘the most efficient and data rich method of counting birds’ (Ralph et al. 1993). Point counts involve an observer standing at a point for a predetermined amount of time (typically 3-20 minutes), typically during the peak of singing activity that occurs in the early morning, and recording all of the individuals seen or heard (Ralph et al. 1995; Figure 1). The original design for NEON bird sampling formulated by the group of experts known as the Tiger team included point counts as the method of choice (Hansen 2008). Acoustic monitoring is being considered as a complementary method to collect data on bird diversity and phenology (e.g., Celis-Murillo et al. 2009, Blumstein et al. 2011), but is contingent on additional funding and advances in machine learning algorithms to automate species identification of bird songs and calls.

The advantages of point counts include (1) minimal disturbance to the birds; (2) provides data on a diversity of species (Hutto and Young 2002); and (3) provides comparability with many other datasets. The major disadvantages of point counts are (1) the need for highly skilled observers for only a limited portion of the year; (2) the challenges associated with even highly skilled observers to process all of the necessary data in a 3 – 20 minute count; and (3) the fact that the detectability of birds is not constant

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across space, time, and species (Rosenstock et al. 2002). Detectability is significantly affected by (1) observers who significantly vary in visual and auditory acuity and experience (Sauer et al. 1994); (2) environmental variables such as weather, light conditions, vegetation, and topography; and (3) the physical and behavioral variation within and among species (Rosenstock et al. 2002). Variation in detectability is ameliorated by the use of statistical methods that have been developed to account for this issue (e.g., distance sampling - Box 1).

The objective of the NEON breeding landbird sampling is to provide robust estimates of species diversity, abundance and density. To that end, point counts that are randomly distributed in the areas of interest (i.e., not along roadsides) and that use techniques that account for variation in detectability are the recommended sampling methods (e.g., Nur et al. 1999, Bibby et al. 2000, Fancy and Sauer 2000, Rosenstock et al. 2002). Distance sampling is one such technique, and it involves recording distance from the observer to the bird. Distance data are then used in statistical analyses designed to adjust the count of birds that were present but undetected (Box 1).

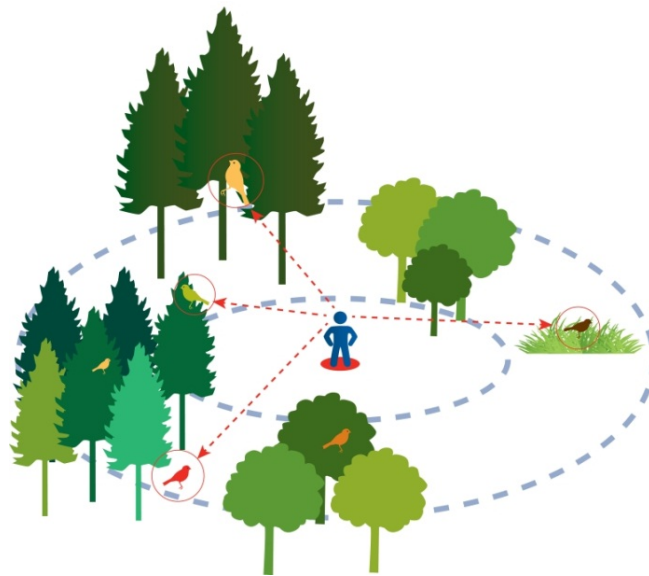


Figure 1. Schematic depicting the point count method of sampling birds. In distance sampling, the distances from the observer to each bird (represented by dashed red lines in Figure 1), as well as the species, sex, and age, are recorded.

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Box 1. Overview of Distance Sampling (Excerpted from White et al. 2012)

Distance sampling theory was developed to account for the decreasing probability of detecting an object of interest (e.g., a bird) with increasing distance from the observer to the object (Buckland et al. 2001). The detection probability is used to adjust the count of birds to account for birds that were present but undetected. Application of distance theory requires that three critical assumptions be met: 1) all birds at and near the sampling location (distance = 0) are detected; 2) distances of birds are measured accurately; and 3) birds do not move in response to the observer’s presence (Buckland et al. 2001, Thomas et al. 2010).

1.2 Scope

This document provides a change-controlled version of Observatory protocols and procedures. Documentation of content changes (i.e. changes in particular tasks or safety practices) will occur via this change-controlled document, not through field manuals or training materials.

1.2.1 NEON Science Requirements and Data Products

This protocol fulfills Observatory science requirements that reside in NEON’s Dynamic Object-Oriented Requirements System (DOORS). Copies of approved science requirements have been exported from DOORS and are available in NEON’s document repository, or upon request.

Execution of this protocol procures samples and/or generates raw data satisfying NEON Observatory scientific requirements. These data and samples are used to create NEON data products, and are documented in the NEON Scientific Data Products Catalog (RD[03]).

1.3 Acknowledgments

My thanks to Richard Podolsky, Courtney Meier, and Dave Schimel who wrote the first versions of this protocol. The method is heavily adapted from the Rocky Mountain Bird Observatory 2010 field protocol for spatially balanced sampling of landbird populations (Hanni et al. 2010), in combination with the Integrated Monitoring for Bird Conservation Regions (IMBCR) program (White et al. 2012). The protocol was also informed by the breeding landbird abundance and diversity working group (Richard Chandler, Tom Gardali, Allen Hurlbert, Ken Pollock, Kathryn Purcell, Ted Simons, Susan Skagen).

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2 RELATED DOCUMENTS AND ACRONYMS

2.1 Applicable Documents

Applicable documents contain higher-level information that is implemented in the current document. Examples include designs, plans, or standards.

AD[01]	NEON.DOC.004300	EHS Safety Policy and Program Manual
AD[02]	NEON.DOC.004316	Operations Field Safety and Security Plan
AD[03]	NEON.DOC.000724	Domain Chemical Hygiene Plan and Biosafety Manual
AD[04]	NEON.DOC.050005	Field Operations Job Instruction Training Plan
AD[05]	NEON.DOC.000916	TOS Science Design for Breeding Landbird Abundance and Diversity
AD[06]	NEON.DOC.014051	Field Audit Plan

2.2 Reference Documents

Reference documents contain information that supports or complements the current document. Examples include related protocols, datasheets, or general-information references.

RD[01]	NEON.DOC.000008	NEON Acronym List
RD[02]	NEON.DOC.000243	NEON Glossary of Terms
RD[03]	NEON.DOC.005003	NEON Scientific Data Products Catalog
RD[04]	NEON.DOC.001271	NEON Protocol and Procedure: Manual Data Transcription
RD[05]	NEON.DOC.001584	Datasheets for TOS Protocol and Procedure: Breeding Landbird Abundance & Diversity
RD[06]	NEON.DOC.001407	Raw Data Ingest Workbook for Breeding Landbird Abundance & Diversity
RD[07]	NEON.DOC.001245	NEON Algorithm Theoretical Basis Document for TOS Breeding Landbird Abundance and Diversity: QA/QC of Raw Field and Lab Data

2.3 Acronyms

All acronyms used in this document are defined in RD[01].

2.4 Definitions

Landbird: (According to Ralph et al. 1993) “the general term used for the generally smaller birds (usually exclusive of raptors and upland game birds) not usually associated with aquatic habitats.” Landbirds are typically censused during the first half of the breeding season, when birds are “most active, paired, on territories, and vocal” (Ralph et al. 1993). For the purposes of this document, ‘bird’ and ‘breeding landbird’ are used interchangeably.

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3 METHOD

3.1 Point count method

Breeding landbirds will be sampled using the point count method. Point counting entails one or more observers going to pre-established points and recording all the birds heard and/or seen during a set period of time (Figure 1). The NEON point count method is adapted from the Rocky Mountain Bird Observatory 2010 field protocol for spatially balanced sampling of landbird populations (Hanni et al. 2010; <http://bit.ly/17ekDNB>). Point counts are six minutes long, with each minute tracked by the observer, following a two-minute settling-in period. All birds shall be recorded to species and sex, whenever possible, and the distance to each individual or flock shall be measured with a laser rangefinder, except in the case of flyovers.

3.2 Spatial distribution of point counts

As a guiding principle, bird sampling is stratified such that grid positions achieve representative coverage of important bird breeding vegetation types. The grids will be collocated with a subset of the TOS Distributed Plots (see AD[05] for additional details). To increase efficiency, point counts will be distributed in 9 point 0.56 km² grids, in a 3 x 3 array, with 250m spacing between points (Figure 2).

This differs from the grid size used in the IMBCR protocol (4 x 4, 1 km² grids) in order to accommodate sample sizes of 5-15 grids at most NEON sites. At sites that cannot accommodate a minimum of 5 grids, points will be distributed randomly throughout the site (collocated with Distributed plots; minimum distance of 250m between points) to achieve these sample sizes. These sample sizes are minimum requirements to characterize spatial variability across the site. These deviations from the IMBCR design will still allow for comparable estimates of density across all sites.

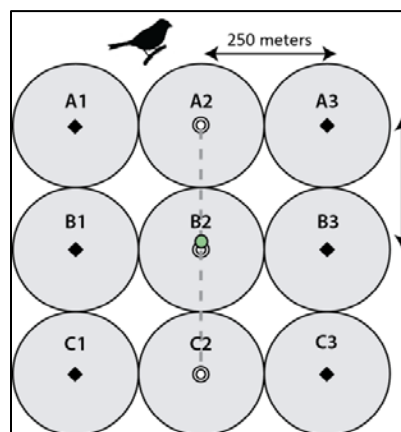


Figure 2. Design of the point count grid, consisting of 9 points separated by a minimum of 250 m. The center of the grid is just offset from a Distributed plot (green circle), where plants, soils, microbes, and insects may also be sampled.

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3.3 Timing of point counts

The sampling window for breeding birds for each site corresponds to when most of the birds encountered will likely be resident, breeding birds, rather than species that either over-winter or migrate through during the spring or fall. Timing is therefore critical and varies across environmental gradients. The initiation of breeding activity also varies among species, so it is best to spread the sampling effort out evenly over the sampling window. This approach allows for greater spatial replication; repeat sampling will be used primarily at small sites in order to increase the number of detections at that site, in order to fit detection functions.

Table 1. Summary of temporal and spatial sampling design

Relative site area	Point arrays	Number of arrays	Repeated sampling	Sampling Window
Large	9-pt grids	5 - 15	No	≥ 2 days, ≤ 14 days
Small	Single points	5 - 25	Yes – 2x per season	≥ 2 days, ≤ 21 days

Breeding season dates will be informed by local experts and by eBird data (ebird.org), which is known to provide large amounts of data pertaining to the arrival of spring migrants, particularly in well-populated regions of the U.S. (Hurlbert and Liang 2012). For example, RMBO recommends that breeding bird sampling in Colorado should occur between May 10 and June 15 for sites below 7,500 feet in elevation, and from June 5 to June 30 for 7,500 – 9,300 feet (N. Van Lanen, pers. comm.). Sampling windows of 2-3 weeks for all sites can be found in the site-specific appendices.

Standard Operating Procedures (SOPs), in Section 7 of this document, provide detailed step-by-step directions, contingency plans, sampling tips, and best practices for implementing this sampling procedure. To properly collect and process samples, field technicians **must** follow the protocol and associated SOPs.

The value of NEON data hinges on consistent implementation of this protocol across all NEON domains, for the life of the project. It is therefore essential that field personnel carry out this protocol as outlined in this document. In the event that local conditions create uncertainty about carrying out these steps, it is critical that technicians document the problem and communicate it to NEON Headquarters.

The procedures described in this protocol will be audited according to the Field Audit Plan (AD[06]). Additional quality assurance will be performed on data collected via these procedures according to the [NEON Algorithm Theoretical Basis Document for TOS Breeding Landbird Abundance and Diversity: QA/QC of Raw Field and Lab Data \(RD\[07\]\)](#).

The QA/QC plan for Breeding Landbird Abundance and Diversity Sampling includes:

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- Double-review of at least 10% of the entered data, if data are transcribed from paper datasheets, with error rates reported to the FSU Staff Scientist.
- Cold checks of field data collection (sensu USFS Forest Inventory Analysis; <http://1.usa.gov/HTBWK2>), if funding is made available.
- Regular bird identification quizzes for field technicians, with the expectation that technicians will consistently successfully identify more than 90% of the tested species. Bird identification quizzes will be administered and scored throughout the season to assess and confirm the skills of each observer, with a minimum of 3 quizzes per observer (i.e., beginning, middle, and end of breeding season). The individual quiz scores for each observer may be published as metadata, using anonymized IDs for the observers, rather than names.
- Scanned copies of the paper datasheets will be provided to the NEON Vertebrate Ecologist within 7 days after the first week of sampling per breeding season. The datasheets will be checked for errors and missing data. This cold check shall be repeated throughout the sampling season, if necessary, providing an iterative process to improve error detection and assess error resolution.
- Equipment and task checklists are provided in Appendix B and Appendix C.

4 SAMPLING SCHEDULE

4.1 Sampling Frequency and Timing

Sampling will occur once or twice per breeding season at each point at a site, depending on the size of the site (i.e., sites with grids will be sampled once; small sites will be sampled twice; see site-specific appendices for guidelines).

At sites that can accommodate the minimum of five 9-point grids, points within each grid are sampled once per season. At these sites, the sampling window must span a minimum of 2 days (i.e., all grids at a site should not be sampled on the same day) and a maximum of 14 days. For example, at a site with 15 grids, three grids could be sampled on each of 5 consecutive days or eight grids could be sampled on day 1 and the remaining seven on day 2 or day 14, etc.

At sites that cannot accommodate the minimum of five 9-point grids, points are sampled twice within a season. At these smaller sites, points should be sampled with a minimum of 1 day between sampling bouts and no longer than 21 days (see Table 1 above).

Point counts will be conducted only during the early morning, from 30 minutes before sunrise to 3-4 hours after sunrise, depending on the weather and other ambient conditions (see site-specific appendices for daily sampling guidelines). Audible detection of birds can be limited because of vegetation, as well as high ambient noise from such sources as the wind or from other species such as insects or frogs. Similarly, visual detection of birds can be hampered from dust, low clouds, flying snow, fog, or rain. Handheld weather stations should be used at every point by technicians to keep track of

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weather conditions that can inhibit detection, particularly wind speed. When ambient conditions significantly inhibit detectability, sampling should not be conducted.

4.2 Criteria for Determining Onset and Cessation of Sampling

Breeding season dates will be informed by local experts and by eBird data (ebird.org), which can provide large amounts of data pertaining to the arrival of spring migrants, particularly in well-populated regions of the U.S. (Hurlbert and Liang 2012). Sampling timing will be provided by Science Operations in the site-specific appendices to this protocol. All sampling must occur within the window provided.

4.3 Timing for Laboratory Processing and Analysis

There is no lab work or processing associated with this protocol, so no timing details are provided.

4.4 Sampling Timing Contingencies

The procedures associated with this protocol will be audited according to the Field Audit Plan (AD[06]). Additional quality assurance will be performed on data collected via these procedures according to the *NEON Algorithm Theoretical Basis Document for TOS Breeding Landbird Abundance and Diversity: QA/QC of Raw Field and Lab Data* (RD[07]).

Audible detection of birds can be limited because of vegetation, as well as high ambient noise from such sources as the wind or from other species such as insects or frogs. Similarly, visual detection of birds can be hampered from dust, low clouds, flying snow, fog, or rain. When ambient conditions significantly inhibit detectability, sampling should not be conducted.

- No landbird sampling shall occur during precipitation events or in dense fog.
- No landbird sampling shall occur in winds greater than 25 mph (40 kph), as determined with a handheld anemometer.

Sampling can be resumed as soon as conditions allow for effective detections, as long as sampling occurs within the morning sampling window within the specified breeding season window. All points on a grid do not have to be sampled on the same day, but it is preferable to complete sampling for a single grid within a window of 7 days.

When unexpected field conditions require deviations from this protocol, the following field implementation guidance must be followed to ensure quality standards are met:

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Table 2. Contingent decisions

Delay/Situation	Action	Outcome for Data Products
Hours	Continue with sampling if there is still time in the sampling window around dawn. Otherwise, skip sampling for the day. An additional sampling day should be added within 7 days.	Fewer sampling points could result in less precise estimation of breeding bird species richness, diversity, or density.
1-7 days	Add additional days of sampling as soon as possible to sample all points.	
8 or more days	Contact NEON Vertebrate Ecologist for guidance.	<ul style="list-style-type: none"> Species richness due to changes in seasonal phenology could be influenced by significant changes in temporal sampling window. Not completing all plots impacts diversity metrics and target sample size.

5 SAFETY

This document identifies procedure-specific safety hazards and associated safety requirements. It does not describe general safety practices or site-specific safety practices.

Personnel working at a NEON site must be compliant with safe field work practices as outlined in the Operations Field Safety and Security Plan (AD[02]) and EHS Safety Policy and Program Manual (AD[01]). Additional safety issues associated with this field procedure are outlined below. The Field Operations Manager and the Lead Field Technician have primary authority to stop work activities based on unsafe field conditions; however, all employees have the responsibility and right to stop their work in unsafe conditions.

As the bird sampling protocol involves no extraordinary procedures, general safe field work practices should suffice. These include the use of insect repellent in areas with ticks and fleas and ready availability of a field first aid kit.

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6 PERSONNEL AND EQUIPMENT

6.1 Equipment

The following equipment is needed to implement the procedures in this document. Equipment lists are organized by task. They do not include standard field and laboratory supplies such as charging stations, first aid kits, drying ovens, ultra-low refrigerators, etc.

Table 3. Equipment list – Field sampling

Item No.	R/S	Description	Purpose	Quantity	Special Handling
Durable items					
MX104816	R	Handheld weather meter (maximum, average, and current temperature; +- 1 degree F, humidity +- 3%, and wind speed +- 3%)	Measure temperature, RH, and wind speed	1	N
MX102191	R	Binoculars, 10 x 42, Field of View 264 ft. @ 1000 yd	Aid in visual identification of birds	1	N
MX100523	R	Stopwatch, with notification chime every minute	Time minutes of point count	1	N
MX104742	R	Laser Rangefinder, 1 yard accuracy	Measure distances to observed bird	1	N
	R	The Sibley Guide to Birds	Aid in visual identification of birds	1	N
MX100696	R	Digital camera, 12 megapixel	Capture images of rare or unknown birds	1	N
MX100703	R	GPS receiver, recreational accuracy	Navigate to points	1	N

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Item No.	R/S	Description	Purpose	Quantity	Special Handling
MX100320	S	Compass with mirror and declination adjustment	Navigate between points	1	N
Consumable items					
(None)					

R/S=Required/Suggested

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6.2 Training Requirements

All technicians must complete required safety training and protocol-specific training for safety and implementation of this protocol as required in Field Operations Job Instruction Training Plan (AD[04]). Training for all technicians should minimally include the following components:

1. Technicians who have been identified to conduct bird sampling will be provided with study materials, including field guides and song recordings, as soon as possible after hiring.
2. A workshop including lectures and field work will be conducted for 1-5 days (depending on the experience of the technicians) prior to the onset of field sampling to provide an overview of the procedures and the goals of the sampling. Hands-on work with the sampling equipment and review of common bird species for a domain will be included. A quiz of the technicians' knowledge of birds by sight and song will be administered and scored at the end of the workshop. Only technicians that score >90% on the final test will be deemed sampling-ready.
3. During the field-based training, technicians that need additional training will shadow experienced ornithologists, followed by the experienced ornithologists performing hot checks on the technicians.
4. All technicians will practice measuring known distances to objects with the laser rangefinders until they can reliably measure distances up to 150 meters to an accuracy of ± 5 meters.

6.3 Specialized Skills

All field ornithologists should have the following expertise:

- Demonstrated knowledge and experience identifying the species of birds that occur at a particular site both visually and aurally.
- Prior experience conducting avian field surveys, with preference given for technicians with experience conducting breeding bird surveys, particularly in a similar region.

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6.4 Estimated Time

The time required to implement a protocol will vary depending on a number of factors, such as skill level, system diversity, environmental conditions, and distance between sample plots. The timeframe provided below is an estimate based on completion of a task by a skilled two-person team (i.e., not the time it takes at the beginning of the field season). Use this estimate as framework for assessing progress. If a task is taking significantly longer than the estimated time, a problem ticket should be submitted.

Each point count will last for 6 minutes plus an additional 2-minute settling-in period. Travel time between points will likely average 15 minutes (250 m). If an experienced two-person team travels together to one grid, and then each samples approximately half of the points in the grid:

- Technician 1 – 5 points = within grid travel time of 60 minutes and 40 minutes of sampling
- Technician 2 – 4 points = within grid travel time of 45 minutes and 32 minutes of sampling
- Total time per grid per team of 2 = 100 minutes
- Estimate with inter-grid travel time = 2 grids completed per 2 person team per sampling morning

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7 STANDARD OPERATING PROCEDURES

SOP A Preparing for Sampling

See Appendix B and Appendix C for equipment and task checklists.

1. Familiarize yourself with the species codes before going into the field.



Species that often cause problems include:

- **Bank Swallow** (BANS not BASW)
 - **Barn Owl** (BNOW not BAOW)
 - **Barn Swallow** (BARS not BASW)
 - **Barred Owl** (BDOW not BAOW)
 - **Black-throated Gray Warbler** (BTYW not BTGW)
 - **Broad-tailed Hummingbird** (BTLH not BTHU)
 - **Cackling Goose** (CACG not CAGO)
 - **Cactus Wren** (CACW not CAWR)
 - **Canada Goose** (CANG not CAGO)
 - **Canyon Towhee** (CANT not CATO)
 - **Canyon Wren** (CANW not CAWR)
 - **Cedar Waxwing** (CEDW not CEWA)
 - **Gray Jay** (GRAJ not GRJA)
 - **Lark Bunting** (LARB not LABU)
 - **Lazuli Bunting** (LAZB not LABU)
 - **MacGillivray's Warbler** (MGWA not MAWA)
 - **Northern Shoveler** (NSHO not NOSH)
 - **Red-winged Blackbird** (RWBL not RWBB).
 - **Ring-necked Pheasant** (RINP not RNPH)
 - **Sage Sparrow** (SAGS not SASP)
 - **Savannah Sparrow** (SAVS not SASP)
 - **Tree Swallow** (TRES not TRSW)
 - **Western Wood-Pewee** (WEWP not WWPE)
 - **Yellow Warbler** (YWAR not YEWA)
2. Clean and check binoculars to make sure they are in good working condition.
 3. Check, charge, or replace batteries for the laser rangefinder, camera, handheld weather station, stopwatch, and GPS unit.
 4. Upload background images, layers, and waypoints associated with bird grids to the GPS unit.
 5. Print and organize data sheets.
 6. Set appropriate declination on the compasses.

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SOP B Field Sampling

The method is heavily adapted from the Rocky Mountain Bird Observatory 2010 field protocol for spatially balanced sampling of landbird populations (Hanni et al. 2010). The bird point count datasheet is provided separately (RD[05]), but a key to the datasheet can be found in Appendix B.

1. Record the date, plot ID, start cloud cover, and start relative humidity on the Bird point count datasheet (RD[05]).
 - a. Date (YYYY-MM-DD) and plot ID (SITE_XXX) should be filled out on every datasheet.
 - b. Start and ending cloud cover (%) and relative humidity (%) need to be completed only once per plot ID per date.
 - c. Cloud cover is estimated visually, while relative humidity should be measured with handheld weather station (if model with capability is available).
2. Upon reaching each point on the grid, wait 2 minutes in order to allow the local birds to become accustomed to your presence (the 'settling in period'). While waiting, fill in the required metadata (i.e., point ID (XX), start-time (XX:XX), habitat code, temperature (degrees Celcius), and average wind speed (kilometers per hour) on the Bird point count datasheet (RD[05]). These metadata are filled out once for each point at all sites.
 - a. DO NOT begin counting until the 2 minutes have passed.
 - b. DO identify and note the locations of any birds flushed from around the point upon approach. These data should be recorded when the counting period begins.
3. Set the timer for the point count duration (i.e., 6 minutes), with a chime to indicate the passing of each minute within the counting period. Begin the count-down, and begin recording the birds you see and/or hear onto the Bird point count datasheet (RD[05]).
4. For each independently detected bird, record the following information:
 - The **species**, using the appropriate 4-letter code (Pyle and DeSante 2012).
 - Use the digital camera to take pictures of (a) species for which the identification is uncertain (except in very common cases), (b) species that are very rare or has state or federal status, or (c) if there is something unusual or noteworthy about a particular individual.
 - The horizontal distance to the bird (measured with the rangefinder).
 - Distance to birds is recorded radially in 2-dimensions from the observer; only the horizontal distance is recorded. That is, a bird 10 meters up in a tree directly overhead is recorded as zero meters from the observer.
 - If you cannot get a direct line of sight to a bird, estimate the distance the bird is from a visible point and use the rangefinder to measure to that point. Then add or subtract the estimated distance between that point and the bird to obtain the best possible distance estimate. **Estimate the distance from the visible point to the bird BEFORE using the**



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rangefinder. Distance-sampling assumes that you measure all distances accurately, so be sure to use your rangefinders as much as possible.

- Always measure distances to where you first detected the bird, not to where you first identified it. For birds that are vocalizing but not seen, try to determine their locations relative to a landmark, such as a tree or shrub, then measure the distance to that landmark. If you are unable to pin-point its location, then estimate the distance to the nearest meter. **Do not round distances to 5 or 10 m intervals**, as this causes heaping at particular values and complicates data analysis.



- Flyovers do not require distance measurements.



- This method uses distance-sampling techniques and analyses; bird data recorded without associated distances (with the exception of flyovers) can **not** be used in the analysis.

- **How** the bird was detected:
 - V=visual, C=calling, S=singing, D=drumming, F=Flyover, or O=other aural (e.g., wing beats).
 - Enter the code for how you **first** detected each individual (only one entry per field). Remember that how you detect a bird is different from how you identify it.
- The **sex** of the bird (F = Female; M = Male; U = Unknown; J = Juvenile). The **cluster size** and **cluster ID code** for **any birds** observed as part of a cluster (i.e. non-independent detections). See Appendix F for more information on how to distinguish and record clusters.

5. **Record the passing of each minute** in the appropriate column of the datasheet (RD[05]).
6. Before moving to the next sample point, **review the datasheet** to ensure that all required data have been recorded.
7. **Skip a line** on the datasheet between sampling points within a grid.

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B.1 Tips and Tricks (from Hanni et al. 2010)

1. The following are a few **general guidelines** for collecting high-quality data :
 - If you do not detect any birds, record “NOBI” (No Birds).
 - If you see a rare or unexpected bird after the count period has elapsed, you may record this species on the datasheet, entering ‘88’ as the point ID.
 - If you detect a bird that was flushed from the survey point upon your arrival, record the bird’s original distance from the survey point. We assume that these birds would have remained at their original locations were it not for the disturbance created by the observer.
 - Focus primarily on birds that are close to the observation point. Missing distant birds has only a small effect on density estimates, but missing birds that are close by has a much larger effect on density estimates.
 - Look and listen in all directions – **including UP**.
 - Note that distance to birds is recorded radially in 2-dimensions from the observer. That is, a bird 10 meters up in a tree directly overhead is recorded as zero meters from the observer.
 - Do not move from the observation point. That said, it is acceptable to take a step or two away from the point to identify a bird spotted from the point, but **ALWAYS** return ASAP to the point to continue observations.
 - Do NOT chase birds before or during the count. After the observation period has elapsed, you may chase down a bird to identify it, if you couldn’t identify it from the point.

2. There are **several potential issues** that can lead to problems in the data:
 - Window species – these are species that you see or listen through, because they are common. For example, Mourning Dove is a common window species. This can result in the observer failing to count individuals of these species. The goal is to get an accurate count of all species, so be aware of this issue and strive to count all individuals seen and heard. Look and listen everywhere – Look up regularly, and do not wear hats that obscure hearing (including wide-brimmed hats that deflect sound), or sunglasses that obscure vision.
 - Stand at observation points – do not sit or kneel. Altering your position will affect your ability to consistently and repeatably see and hear birds.
 - No “pishing” – do not make noises that can attract birds to you and alter the density estimation.
 - Airplanes and other external noises – If audibility of birds is reduced by mechanical noise, then interrupt the count and resume when the noise abates. The total time spent counting should still equal 6 minutes.
 - Never guess the identity of a bird – If the bird species is unknown, use the table of unknown species codes in Appendix E.

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SOP C Equipment Maintenance: Cleaning and Storage

Conducting the same list of equipment-related activities after a sampling event as done prior to a sampling event is also recommended (see Appendix C for checklist), and so they are reproduced here.

1. Clean and check binoculars to make sure they are in good working condition.
2. Check, and charge or replace batteries for the laser rangefinder, camera, handheld weather station, stopwatch, and GPS unit.
3. Check that the appropriate declination is set on the compasses.

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SOP D Data Entry and Verification

The importance of thorough, accurate data transcription cannot be overstated; the value of the efforts in the field is only manifested once the data are properly entered for delivery to NEON’s end users.

As a best practice, field data collected on paper datasheets should be digitally transcribed within 7 days of collection or the end of a sampling bout (where applicable). However, given logistical constraints, the maximum timeline for entering data is within 14 days of collection or the end of a sampling bout (where applicable). Decreasing the time between data collection and transcription increases the possibility that the observer will notice errors based on her/his memory of the sampling. Another staff member must review the transcribed data to reveal transcription errors. Double-review of at least 10% of the entered data is required, if data are transcribed from paper datasheets, with transcription error rates reported to the NEON Vertebrate Ecologist.

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APPENDIX A DATASHEETS

The following datasheets are associated with this protocol:

Table 4. Datasheets associated with this protocol

NEON Doc. #	Title
NEON.DOC.001584	Datasheets for TOS Protocol and Procedure: Breeding Landbird Abundance & Diversity

These datasheets can be found in Agile or the NEON Document Warehouse.

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APPENDIX B QUICK REFERENCES

B.1 Breeding Bird Point Sampling Datasheet

Data Field	Description/What to Enter
date	Date that sampling was conducted (YYYYMMDD)
plotID	Plot identifier (4-character site code _XXX)
recordedBy	Full name of personnel conducting the point count(s) (First name Last name)
cloudsStart	Estimate of % cloud cover, at the start of sampling of the plotID
cloudsEnd	Estimate of % cloud cover, at the end of sampling of the plotID
rhStart	Relative humidity (%), as measured by handheld weather station (if available), at the start of sampling of the plotID on a given date
rhEnd	Relative humidity (%) at the end of sampling of the plotID (if available)
pointID	Relative coordinate of the point within the given plotID (A1 – C3)
habitatCode	The dominant habitat surrounding the point; see codes and descriptions below
startTime	24-hr format (hhmm; e.g., 0812 or 1432)
temperature	The air temperature measured at beginning of each point count with a handheld weather station, in degrees Celsius
wind	The average wind speed measured at beginning of each point count with a handheld weather station, in kilometers per hour
minute	The minute of sampling within the 6-minute point count sampling period
taxonID	Unique 4 character species code, following AOU conventions
radial distance	Radial distance between the observer and the bird(s), in meters
how	How the bird(s) is (are) first detected by the observer
visual	Whether the bird(s) was (were) seen after the initial detection (Y or N)
sex	M = male; F = Female; U = Unknown; J = Juvenile (if readily apparent)
clusterSize	Clusters consist of either flocks or paired birds of the same species observed together; the size of the cluster is simply the count of individuals.
clusterCode	Clusters consist of either flocks or paired birds of the same species observed together; alphabetic codes (A:Z) are used to link clusters that span multiple records.
remarks	Technician notes; free-form

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Habitat Codes and Descriptions

From Rocky Mountain Bird Observatory:

Agricultural/Rural (AR): “vegetation has been planted by humans for food production or ornamental purposes in sparsely developed areas. Examples include a farmed field with wheat, corn, millet, etc., a fallow field, a rural home site with planted non-native species, or a park planted with non-native species. Please make note of crop spp., if fallow, etc.”

Riparian (RI): “stands or strips of trees or shrubs near a permanent or seasonal water source. Typical tree and shrub species include cottonwood, box elder, maple, aspen, alder and willows. Riparian areas are typically discrete habitats, often surrounded by coniferous forest, grassland, shrubland or sagebrush habitat. If riparian habitat is present within the 50m radius, this should be the primary habitat type.”

Not Listed (XX): use if primary habitat type is not included in the list. Be sure to provide additional details in the remarks field.

From National Land Cover Database (NLCD) classifications (<http://www.epa.gov/mrlc/definitions.html>; accessed 5 May 2015):

Barren (BA) – “Areas characterized by bare rock, gravel, sand, silt, clay, or other earthen material, with little or no "green" vegetation present regardless of its inherent ability to support life. Vegetation, if present, is more widely spaced and scrubby than that in the "green" vegetated categories; lichen cover may be extensive.” Includes Barren Land (Rock/Sand/Clay) – “Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.”

Developed (DE) - Areas characterized by a high percentage (30 percent or greater) of constructed materials (e.g. asphalt, concrete, buildings, etc).

Deciduous Forest (DF): A subtype of NLCD Forested Upland – “Areas characterized by tree cover (natural or semi-natural woody vegetation, generally greater than 6 meters tall); tree canopy accounts for 25-100 percent of the cover.” Equivalent to NLCD Deciduous Forest – “Areas dominated by trees where 75 percent or more of the tree species shed foliage simultaneously in response to seasonal change.”

Evergreen Forest (EF) - A subtype of NLCD Forested Upland – “Areas characterized by tree cover (natural or semi-natural woody vegetation, generally greater than 6 meters tall); tree canopy accounts for 25-100 percent of the cover.” Equivalent to NLCD Evergreen Forest – “Areas dominated by trees where 75 percent or more of the tree species` maintain their leaves all year. Canopy is never without green foliage. “

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Mixed Forest (MX): A subtype of NLCD Forested Upland – “Areas characterized by tree cover (natural or semi-natural woody vegetation, generally greater than 6 meters tall); tree canopy accounts for 25-100 percent of the cover.” - “Areas dominated by trees where neither deciduous nor evergreen species represent more than 75 percent of the cover present.”

Grassland (GR): Equivalent to NLCD Herbaceous Upland – “Upland areas characterized by natural or semi-natural herbaceous vegetation; herbaceous vegetation accounts for 75-100 percent of the cover. Grasslands/Herbaceous - Areas dominated by upland grasses and forbs. In rare cases, herbaceous cover is less than 25 percent, but exceeds the combined cover of the woody species present. These areas are not subject to intensive management, but they are often utilized for grazing.” Includes Grassland/Herbaceous – “Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation;” Sedge/Herbaceous – “Alaska only areas dominated by sedges and forbs, generally greater than 80% of total vegetation;” Lichens – “Alaska only areas dominated by fruticose or foliose lichens generally greater than 80% of total vegetation;” and Moss – “Alaska only areas dominated by mosses, generally greater than 80% of total vegetation.”

Shrubland (SH): Equivalent to NLCD Shrubland – “Areas dominated by shrubs; shrub canopy accounts for 25-100 percent of the cover. Shrub cover is generally greater than 25 percent when tree cover is less than 25 percent. Shrub cover may be less than 25 percent in cases when the cover of other life forms (e.g. herbaceous or tree) is less than 25 percent and shrubs cover exceeds the cover of the other life forms.” Includes Dwarf Scrub – “Alaska only areas dominated by shrubs less than 20 centimeters tall with shrub canopy typically greater than 20% of total vegetation. “ and Shrub/Scrub – “Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.”

Wetland (WE): Equivalent to NLCD Emergent Herbaceous Wetlands – “Areas where perennial herbaceous vegetation accounts for 75-100 percent of the cover and the soil or substrate is periodically saturated with or covered with water. “ Also should be used for areas that were previously wetland and include standing dead wetland vegetation.

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APPENDIX C REMINDERS

C.1 Required task checklist before and after conducting bird surveys

Complete this checklist before and after EACH field sampling event.

Binoculars cleaned and checked to make sure they are in good working condition

Batteries for the laser rangefinder checked and charged if necessary

Batteries for the GPS unit checked and charged if necessary

Appropriate declination is set on the compasses

Print datasheets for next sampling event

Double-check completed datasheets to ensure thoroughness

File completed datasheets in designated safe place for subsequent scanning and data entry

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C.2 Equipment for conducting bird surveys

Complete this checklist for each team member prior to EACH field sampling event.

Item Description	Crew #1	Crew #2	Crew #3	Crew #4
10 × 40 binoculars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GPS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laser rangefinder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sibley Field Guide to Birds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Datasheets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Declination adjustable compass w/ mirror sight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Countdown timer w/ chime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Master list of 4-letter species codes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kestrel (temp & wind measurements)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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APPENDIX D SITE-SPECIFIC INFORMATION

D.1 D01 – CORE - HARV (Harvard Forest)

Recommended Sampling Window: June 1 - June 30

Recommended Daily Sampling Period: 20 minutes after official sunrise - 10:30 AM

Source: Rocky Mountain Bird Observatory

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the route that passes east of Petersham, MA (Route 900 – Ware River) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Ovenbird	<i>Seiurus aurocapilla</i>	0.105	1993	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.073	1993	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.051	1993	2011	TRUE
Veery	<i>Catharus fuscescens</i>	0.042	1993	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.041	1993	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.036	1993	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.035	1993	2011	TRUE
Blue-headed Vireo	<i>Vireo solitarius</i>	0.031	1993	2011	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.03	1993	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.028	1993	2011	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.027	1993	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.026	1993	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.024	1993	2011	TRUE
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	0.024	1993	2011	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.021	1993	2011	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.02	1993	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.019	1993	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.019	1993	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.017	1993	2011	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.016	1993	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.016	1994	2005	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.016	1993	2008	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.015	1993	2011	TRUE
Hermit Thrush	<i>Catharus guttatus</i>	0.014	1993	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Barn Swallow	<i>Hirundo rustica</i>	0.014	1993	2011	TRUE
Least Flycatcher	<i>Empidonax minimus</i>	0.013	1993	2010	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.013	1993	2010	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.012	1993	2011	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.012	1993	2011	TRUE
Black-throated Green Warbler	<i>Setophaga virens</i>	0.012	1993	2011	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.011	1993	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.011	1993	2011	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.011	1993	2011	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.01	1993	2011	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.01	1993	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.01	1993	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.009	1993	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.008	1993	2011	TRUE
Bank Swallow	<i>Riparia riparia</i>	0.008	1993	1999	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.008	1993	2011	TRUE
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.008	1993	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.008	1993	2010	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.007	1994	2005	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.007	1993	2011	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.007	1993	2011	TRUE
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.007	1993	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.006	1993	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.006	1994	2011	TRUE
Bobolink	<i>Dolichonyx oryzivorus</i>	0.006	1993	2011	TRUE
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	0.006	1993	2010	TRUE
Winter Wren	<i>Troglodytes hiemalis</i>	0.006	1993	2005	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.005	1995	2009	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.005	1993	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.005	1993	2011	TRUE
House Wren	<i>Troglodytes aedon</i>	0.005	1993	2011	TRUE
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	0.005	1993	2011	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.004	1993	2011	TRUE
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.004	1995	2002	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1993	2005	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.004	1993	1993	TRUE
House Sparrow	<i>Passer domesticus</i>	0.004	1993	2008	TRUE
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	0.004	1997	2002	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Prairie Warbler	<i>Setophaga discolor</i>	0.004	1993	2010	TRUE
Blackburnian Warbler	<i>Setophaga fusca</i>	0.004	1994	2011	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.004	1993	2011	TRUE
White-throated Sparrow	<i>Zonotrichia albicollis</i>	0.004	1993	2010	TRUE
Canada Warbler	<i>Cardellina canadensis</i>	0.003	1996	2009	TRUE
Brown Creeper	<i>Certhia americana</i>	0.003	1993	2008	TRUE
Rock Pigeon	<i>Columba livia</i>	0.003	1997	1997	TRUE
Alder Flycatcher	<i>Empidonax alnorum</i>	0.003	1993	2006	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.003	1998	1998	TRUE
Northern Waterthrush	<i>Parkesia noveboracensis</i>	0.003	1993	2006	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.003	1993	2011	TRUE
Magnolia Warbler	<i>Setophaga magnolia</i>	0.003	1994	2004	TRUE
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	0.003	2003	2011	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.003	1993	2008	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.003	1995	2004	TRUE
Willow Flycatcher	<i>Empidonax traillii</i>	0.002	1993	1993	TRUE
Dark-eyed Junco	<i>Junco hyemalis</i>	0.002	1995	1995	TRUE
Swamp Sparrow	<i>Melospiza georgiana</i>	0.002	1993	2009	TRUE
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	0.002	1993	1993	TRUE
Canada Goose	<i>Branta canadensis</i>	0.027	1994	2011	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.008	1995	2011	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.006	1993	2010	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.004	1994	2011	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.004	1996	2011	FALSE
Barred Owl	<i>Strix varia</i>	0.004	1993	2010	FALSE
Wood Duck	<i>Aix sponsa</i>	0.003	1999	2003	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.003	1994	2010	FALSE
Ruffed Grouse	<i>Bonasa umbellus</i>	0.003	1994	2010	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.003	1993	2009	FALSE
American Woodcock	<i>Scolopax minor</i>	0.003	2003	2003	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.002	1995	2003	FALSE
American Bittern	<i>Botaurus lentiginosus</i>	0.002	1994	1994	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.002	1993	1998	FALSE
American Kestrel	<i>Falco sparverius</i>	0.002	1995	1995	FALSE
Herring Gull	<i>Larus argentatus</i>	0.002	1995	1995	FALSE

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D.2 D01 – RELOCATABLE - BART (Barlett Experimental Forest)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the JEFFERS NTCH route (New Hampshire Route 116) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.135	1993	2011	TRUE
Black-throated Green Warbler	<i>Setophaga virens</i>	0.071	1993	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.071	1993	2011	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.051	1993	2011	TRUE
Winter Wren	<i>Troglodytes hiemalis</i>	0.045	1993	2011	TRUE
Hermit Thrush	<i>Catharus guttatus</i>	0.042	1993	2011	TRUE
White-throated Sparrow	<i>Zonotrichia albicollis</i>	0.04	1993	2011	TRUE
Swainson's Thrush	<i>Catharus ustulatus</i>	0.039	1993	2011	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.038	1993	2011	TRUE
Blue-headed Vireo	<i>Vireo solitarius</i>	0.036	1993	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.032	1993	2011	TRUE
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	0.028	1993	2011	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.027	1993	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.026	1993	2011	TRUE
Dark-eyed Junco	<i>Junco hyemalis</i>	0.025	1993	2011	TRUE
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.025	1993	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.024	1993	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.021	1993	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.019	1994	2003	TRUE
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	0.018	1993	2011	TRUE
Veery	<i>Catharus fuscescens</i>	0.017	1993	2011	TRUE
Least Flycatcher	<i>Empidonax minimus</i>	0.016	1993	2011	TRUE
Magnolia Warbler	<i>Setophaga magnolia</i>	0.016	1993	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.015	1994	2011	TRUE
Blackburnian Warbler	<i>Setophaga fusca</i>	0.014	1993	2011	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.014	1993	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	0.011	1993	2011	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.01	1993	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.009	1993	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.008	1993	2011	TRUE
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	0.008	1993	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.008	1993	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.007	1994	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.007	1993	2011	TRUE
Northern Parula	<i>Setophaga americana</i>	0.007	1993	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.006	1993	2006	TRUE
Alder Flycatcher	<i>Empidonax alnorum</i>	0.006	1993	2011	TRUE
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	0.006	1993	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.006	1993	2010	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.006	1993	2009	TRUE
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.006	1993	2009	TRUE
Blackpoll Warbler	<i>Setophaga striata</i>	0.006	1994	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.005	1993	1999	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.005	1993	2009	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.005	2000	2000	TRUE
Swamp Sparrow	<i>Melospiza georgiana</i>	0.005	1998	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.005	1994	2011	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.005	1995	2009	TRUE
Ruby-crowned Kinglet	<i>Regulus calendula</i>	0.005	1993	2010	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.005	1993	2006	TRUE
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.005	1993	2011	TRUE
Mourning Dove	<i>Zenaidura macroura</i>	0.005	1993	2010	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.004	1994	2010	TRUE
Canada Warbler	<i>Cardellina canadensis</i>	0.004	1993	2005	TRUE
Brown Creeper	<i>Certhia americana</i>	0.004	1993	2009	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.004	1995	2010	TRUE
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.004	1993	2003	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1993	2011	TRUE
Mourning Warbler	<i>Geothlypis philadelphia</i>	0.004	1996	2010	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.004	1996	2005	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.004	1994	2003	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.004	1993	2011	TRUE
Pine Siskin	<i>Spinus pinus</i>	0.004	1998	2007	TRUE
House Wren	<i>Troglodytes aedon</i>	0.004	1993	2009	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.003	2003	2005	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.003	1997	1997	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.003	1994	2009	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.003	2006	2006	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.003	1998	1998	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.003	2006	2006	TRUE
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.003	2001	2007	TRUE
Black-backed Woodpecker	<i>Picoides arcticus</i>	0.003	1993	2009	TRUE
Boreal Chickadee	<i>Poecile hudsonicus</i>	0.003	2007	2007	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.003	1994	2002	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.003	1999	2008	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.003	1999	1999	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.003	1995	2010	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.003	2010	2010	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.003	1994	2002	TRUE
Philadelphia Vireo	<i>Vireo philadelphicus</i>	0.003	1994	2004	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.002	1993	2000	TRUE
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.002	1995	1995	TRUE
Northern Waterthrush	<i>Parkesia noveboracensis</i>	0.002	1994	1995	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.002	1993	2009	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.002	1993	1993	TRUE
Mallard	<i>Anas platyrhynchos</i>	0.017	2001	2011	FALSE
Barred Owl	<i>Strix varia</i>	0.005	2002	2009	FALSE
Canada Goose	<i>Branta canadensis</i>	0.004	2011	2011	FALSE
American Kestrel	<i>Falco sparverius</i>	0.004	1994	2002	FALSE
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.003	2004	2004	FALSE
American Black Duck	<i>Anas rubripes</i>	0.003	2010	2010	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.003	2003	2003	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.003	1996	2010	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.003	1998	1998	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.003	2007	2007	FALSE
American Woodcock	<i>Scolopax minor</i>	0.003	2009	2009	FALSE

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D.3 D02 – CORE – SCBI (Smithsonian Conservation Biology Institute)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the FRONT ROYAL route (Route 923) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Indigo Bunting	<i>Passerina cyanea</i>	0.1	1993	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.098	1993	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.087	1993	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.087	1993	2011	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.068	1993	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.048	1993	2011	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.048	1993	2011	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.044	1993	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.032	1993	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.027	1993	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.024	1993	2011	TRUE
Acadian Flycatcher	<i>Empidonax vireescens</i>	0.021	1993	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.021	1993	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.018	1993	2011	TRUE
Cerulean Warbler	<i>Setophaga cerulea</i>	0.017	1993	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.017	1993	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.016	1993	2011	TRUE
Veery	<i>Catharus fuscescens</i>	0.015	1993	2011	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.015	1993	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.013	1993	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.012	1993	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.012	1993	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.011	1993	2011	TRUE
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	0.011	1993	2011	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.011	1993	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.011	1993	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.01	1993	2010	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.009	1993	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.009	1993	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.009	1993	2010	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.008	1995	1998	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.008	1993	2010	TRUE
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	0.008	1993	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.008	1993	2010	TRUE
Blue-headed Vireo	<i>Vireo solitarius</i>	0.008	1993	2010	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.007	1995	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.007	1994	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.007	1993	2011	TRUE
Hooded Warbler	<i>Setophaga citrina</i>	0.007	1994	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.006	1993	2009	TRUE
Least Flycatcher	<i>Empidonax minimus</i>	0.006	1994	1998	TRUE
Dark-eyed Junco	<i>Junco hyemalis</i>	0.006	1993	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.006	1993	2011	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.005	1994	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.004	1993	2010	TRUE
Kentucky Warbler	<i>Geothlypis formosa</i>	0.004	1994	2005	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.004	1998	2009	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.004	1994	2007	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.004	1993	2008	TRUE
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	0.004	1993	2008	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.003	2006	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.003	1998	2011	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.003	2007	2011	TRUE
Louisiana Waterthrush	<i>Parkesia motacilla</i>	0.003	1994	2009	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.003	1996	2000	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.003	1995	2009	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.003	2005	2011	TRUE
Canada Warbler	<i>Cardellina canadensis</i>	0.002	2000	2002	TRUE
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	0.002	2002	2002	TRUE
Black-throated Green Warbler	<i>Setophaga virens</i>	0.002	1997	1997	TRUE
Eastern Screech-Owl	<i>Megascops asio</i>	0.007	2007	2007	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.005	2006	2008	FALSE
Barred Owl	<i>Strix varia</i>	0.004	1993	2006	FALSE
Ruffed Grouse	<i>Bonasa umbellus</i>	0.003	1994	2011	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Great Horned Owl	<i>Bubo virginianus</i>	0.003	2004	2008	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.003	1998	2010	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.003	1994	2009	FALSE
Wood Duck	<i>Aix sponsa</i>	0.002	2007	2007	FALSE
Northern Bobwhite	<i>Colinus virginianus</i>	0.002	2000	2000	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.002	1993	2004	FALSE

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D.4 D02 – RELOCATABLE – SERC (Smithsonian Environmental Research Center)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the DAVIDSNVILLE route (Route 123) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Common Grackle	<i>Quiscalus quiscula</i>	0.088	1982	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.062	1982	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.062	1982	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.057	1982	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.045	1982	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.042	1982	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.038	1982	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.038	1982	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.033	1982	2011	TRUE
Mourning Dove	<i>Zenaidura macroura</i>	0.032	1982	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.027	1982	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.025	1982	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.025	1982	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.023	1982	2011	TRUE
Acadian Flycatcher	<i>Empidonax vireescens</i>	0.021	1982	2011	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.019	1982	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.017	1982	2011	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.016	1982	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.016	1982	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.015	1982	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.013	1982	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.013	1982	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.013	1982	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.012	1982	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.012	1982	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.011	1982	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.011	1984	2011	TRUE
Northern Parula	<i>Setophaga americana</i>	0.01	1982	2011	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.01	1982	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.009	1982	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.009	1982	2011	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.009	1982	2011	TRUE
Bank Swallow	<i>Riparia riparia</i>	0.009	1983	2009	TRUE
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	0.008	1982	2011	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.007	1982	2011	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.006	1982	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.006	1982	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.006	1982	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.006	1983	2002	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.006	1985	2008	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.006	1982	2011	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.005	1982	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.005	1982	2001	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.005	1982	2011	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.005	1982	2011	TRUE
Hooded Warbler	<i>Setophaga citrina</i>	0.005	1982	2011	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.005	1982	2011	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.005	1982	2010	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.004	1984	2011	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.004	1982	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.003	1982	2011	TRUE
Kentucky Warbler	<i>Geothlypis formosa</i>	0.003	1982	2010	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.003	1982	2010	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.003	1982	2011	TRUE
Louisiana Waterthrush	<i>Parkesia motacilla</i>	0.003	1984	2011	TRUE
Prairie Warbler	<i>Setophaga discolor</i>	0.003	1982	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.003	1983	2011	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.002	1985	2010	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.002	1982	2011	TRUE
Fish Crow	<i>Corvus ossifragus</i>	0.002	1985	2011	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.002	1982	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.002	1988	2005	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.002	1987	2008	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Hairy Woodpecker	<i>Picoides villosus</i>	0.002	1982	2011	TRUE
Prothonotary Warbler	<i>Protonotaria citrea</i>	0.002	1993	2011	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.002	1985	2011	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.002	1982	2010	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.002	1982	2011	TRUE
Willow Flycatcher	<i>Empidonax traillii</i>	0.001	1988	2001	TRUE
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	0.001	1985	2011	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.001	1989	2006	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.001	1984	1984	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.001	1995	1995	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.001	1982	2006	TRUE
Yellow-throated Warbler	<i>Setophaga dominica</i>	0.001	1993	1993	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.001	1986	2009	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.001	1982	2010	TRUE
House Wren	<i>Troglodytes aedon</i>	0.001	1984	2009	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.001	1991	2004	TRUE
Canada Goose	<i>Branta canadensis</i>	0.016	1984	2011	FALSE
Northern Bobwhite	<i>Colinus virginianus</i>	0.016	1982	2004	FALSE
Cattle Egret	<i>Bubulcus ibis</i>	0.007	2008	2008	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.004	1983	2011	FALSE
Black Vulture	<i>Coragyps atratus</i>	0.003	1988	2010	FALSE
Osprey	<i>Pandion haliaetus</i>	0.003	1995	2009	FALSE
Ring-necked Pheasant	<i>Phasianus colchicus</i>	0.003	1985	1985	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.002	1985	2011	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.002	1982	2009	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.002	1993	2006	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.002	1982	2010	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.002	1982	2011	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.002	1985	2011	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.001	1996	2011	FALSE
Wood Duck	<i>Aix sponsa</i>	0.001	1983	2011	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.001	1983	1999	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.001	1982	1982	FALSE
Green Heron	<i>Butorides virescens</i>	0.001	1983	2011	FALSE
American Kestrel	<i>Falco sparverius</i>	0.001	1984	1997	FALSE
Eastern Screech-Owl	<i>Megascops asio</i>	0.001	1989	1992	FALSE
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	0.001	1983	1983	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Barred Owl	<i>Strix varia</i>	0.001	1991	2010	FALSE
Lesser Yellowlegs	<i>Tringa flavipes</i>	0.001	1992	1992	FALSE

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D.5 D02 – RELOCATABLE – BLAN (Blandy Experimental Farm)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the STAR TANNERY route (Route 001) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
European Starling	<i>Sturnus vulgaris</i>	0.096	1977	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.095	1977	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.061	1977	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.053	1977	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.052	1977	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.046	1977	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.042	1977	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.039	1977	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.034	1977	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.034	1977	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.03	1977	2011	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.029	1977	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.028	1977	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.026	1977	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.024	1977	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.023	1977	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.019	1977	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.018	1977	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.013	1977	2011	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.013	1977	2011	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.012	1977	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.012	1977	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.012	1977	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.011	1977	2011	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.009	1977	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.009	1977	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
House Wren	<i>Troglodytes aedon</i>	0.009	1977	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.008	1977	2011	TRUE
Fish Crow	<i>Corvus ossifragus</i>	0.007	1977	2000	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.007	1977	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.007	1977	2011	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.007	1977	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.006	1977	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.006	1977	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.006	1977	2011	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.006	1977	2000	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.006	1977	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.006	1977	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.006	1977	2011	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.006	1977	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.006	1977	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.005	1978	2011	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.005	1977	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.005	1977	2011	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.004	1977	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.004	1977	2011	TRUE
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	0.004	1977	2011	TRUE
Acadian Flycatcher	<i>Empidonax virescens</i>	0.003	1977	2007	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.003	1978	2007	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.003	1977	1983	TRUE
Purple Martin	<i>Progne subis</i>	0.003	1981	1994	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.003	1978	2011	TRUE
Prairie Warbler	<i>Setophaga discolor</i>	0.003	1978	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.003	1982	1994	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.003	1981	2004	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.002	1980	2005	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.002	1981	1988	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.002	1977	2006	TRUE
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	0.002	1977	2011	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.002	1977	2011	TRUE
Louisiana Waterthrush	<i>Parkesia motacilla</i>	0.002	1977	2011	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.002	1977	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Hairy Woodpecker	<i>Picoides villosus</i>	0.002	1977	2011	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.002	1977	2011	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.002	2005	2005	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.002	1977	1992	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.002	1977	2011	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.001	1980	2011	TRUE
Veery	<i>Catharus fuscescens</i>	0.001	1981	1981	TRUE
Brown Creeper	<i>Certhia americana</i>	0.001	2004	2004	TRUE
Kentucky Warbler	<i>Geothlypis formosa</i>	0.001	1994	1994	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.001	1980	1985	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.001	1977	2006	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.001	1981	1981	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.001	1993	1993	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.001	1977	1993	TRUE
Vesper Sparrow	<i>Poocetes gramineus</i>	0.001	1977	1994	TRUE
Northern Parula	<i>Setophaga americana</i>	0.001	1984	1984	TRUE
Hooded Warbler	<i>Setophaga citrina</i>	0.001	1977	1981	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.001	1978	1992	TRUE
Bewick's Wren	<i>Thryomanes bewickii</i>	0.001	1977	1977	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.001	1985	1985	TRUE
Northern Bobwhite	<i>Colinus virginianus</i>	0.02	1977	2007	FALSE
Canada Goose	<i>Branta canadensis</i>	0.012	2003	2006	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.007	1980	1988	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.006	1978	2002	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.006	1977	2011	FALSE
Ruffed Grouse	<i>Bonasa umbellus</i>	0.004	1985	1985	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.002	2011	2011	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.002	1978	2007	FALSE
Upland Sandpiper	<i>Bartramia longicauda</i>	0.002	1980	1984	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.002	1980	2011	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.002	1977	1981	FALSE
American Kestrel	<i>Falco sparverius</i>	0.002	1978	2006	FALSE
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.001	2002	2002	FALSE
Wood Duck	<i>Aix sponsa</i>	0.001	1981	1988	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.001	1982	2003	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.001	1985	1985	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.001	2011	2011	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.001	1977	1994	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Green Heron	<i>Butorides virescens</i>	0.001	1977	2011	FALSE
Black Vulture	<i>Coragyps atratus</i>	0.001	2011	2011	FALSE
Eastern Screech-Owl	<i>Megascops asio</i>	0.001	1982	1993	FALSE
Ring-necked Pheasant	<i>Phasianus colchicus</i>	0.001	1984	1992	FALSE
American Woodcock	<i>Scolopax minor</i>	0.001	1981	2011	FALSE

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D.6 D03 – CORE – OSBS (Ordway-Swisher Biological Station)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the BELMORE route (Route 21) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.137	1993	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.112	1993	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.102	1993	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.08	1993	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.076	1993	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.063	1993	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.06	1993	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.056	1993	2011	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.051	1993	2011	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.048	1993	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.043	1993	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.037	1993	2011	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.037	1993	2011	TRUE
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	0.028	1993	2011	TRUE
Northern Parula	<i>Setophaga americana</i>	0.024	1993	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.017	1993	2011	TRUE
Bachman's Sparrow	<i>Peucaea aestivalis</i>	0.015	1993	2008	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.014	1993	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.013	1993	2005	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.012	1993	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.011	1996	2005	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.01	1995	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.01	1993	2009	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.01	1993	2011	TRUE
Boat-tailed Grackle	<i>Quiscalus major</i>	0.009	1993	2009	TRUE
Fish Crow	<i>Corvus ossifragus</i>	0.008	1993	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.008	1993	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.008	1995	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.008	1993	2011	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.007	1993	2009	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.007	1993	2010	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.007	1993	2010	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.006	1993	2009	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.006	1993	2011	TRUE
Yellow-throated Warbler	<i>Setophaga dominica</i>	0.006	1993	1998	TRUE
Common Ground-Dove	<i>Columbina passerina</i>	0.005	1995	2009	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.005	1993	2011	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.005	1998	2009	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.005	1995	2009	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.005	1995	2011	TRUE
Acadian Flycatcher	<i>Empidonax virescens</i>	0.004	1993	1993	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.004	2003	2008	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	0.004	2001	2003	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.003	1998	2004	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.003	1996	1996	TRUE
Prothonotary Warbler	<i>Protonotaria citrea</i>	0.003	1993	1995	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.003	2000	2003	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.002	1994	2001	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.002	1995	1995	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.002	1993	1996	TRUE
Brown-headed Nuthatch	<i>Sitta pusilla</i>	0.002	1994	2002	TRUE
Cattle Egret	<i>Bubulcus ibis</i>	0.048	1993	2011	FALSE
Northern Bobwhite	<i>Colinus virginianus</i>	0.022	1993	2011	FALSE
Black Vulture	<i>Coragyps atratus</i>	0.014	1993	2010	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.013	1993	2011	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.01	1993	2011	FALSE
White Ibis	<i>Eudocimus albus</i>	0.009	1999	2007	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.008	1993	2011	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.008	1993	2011	FALSE
Sandhill Crane	<i>Grus canadensis</i>	0.007	1996	2007	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.007	1993	2008	FALSE
Wood Stork	<i>Mycteria americana</i>	0.006	2003	2003	FALSE
Osprey	<i>Pandion haliaetus</i>	0.005	2001	2009	FALSE
Barred Owl	<i>Strix varia</i>	0.005	1993	2009	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Wood Duck	<i>Aix sponsa</i>	0.004	1995	2011	FALSE
Swallow-tailed Kite	<i>Elanoides forficatus</i>	0.004	1995	2009	FALSE
Great Egret	<i>Ardea alba</i>	0.003	1994	2011	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.003	2001	2008	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.003	1994	2008	FALSE
Little Blue Heron	<i>Egretta caerulea</i>	0.003	2005	2005	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.002	1994	1994	FALSE
Limpkin	<i>Aramus guarauna</i>	0.002	2001	2001	FALSE

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D.7 D03 – RELOCATABLE – DISN (Disney Wilderness Preserve)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the KISSIMMEE route (Route 69) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Mockingbird	<i>Mimus polyglottos</i>	0.186	1993	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.144	1993	2011	TRUE
Boat-tailed Grackle	<i>Quiscalus major</i>	0.121	1993	2011	TRUE
Fish Crow	<i>Corvus ossifragus</i>	0.092	1993	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.088	1993	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.086	1993	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.067	1993	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.052	1994	2011	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	0.047	1999	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.043	1993	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.04	1993	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.039	1993	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.037	1993	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.029	1993	2011	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.022	1993	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.021	1993	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.019	1993	2010	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.019	1993	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.017	2001	2001	TRUE
House Sparrow	<i>Passer domesticus</i>	0.015	1993	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.013	1993	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.013	1993	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.011	1993	2010	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.01	1993	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.009	1993	2011	TRUE
Bachman's Sparrow	<i>Peucaea aestivalis</i>	0.009	1993	2008	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Brown-headed Cowbird	<i>Molothrus ater</i>	0.008	2002	2003	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.008	1994	2011	TRUE
Northern Parula	<i>Setophaga americana</i>	0.007	1993	2011	TRUE
White-winged Dove	<i>Zenaida asiatica</i>	0.007	2001	2007	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.006	1994	2009	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.006	1993	2009	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.006	1993	2003	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.006	1993	1999	TRUE
Common Ground-Dove	<i>Columbina passerina</i>	0.005	1993	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.005	1993	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1993	2009	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.004	1993	2009	TRUE
Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>	0.004	1993	2008	TRUE
Yellow-throated Warbler	<i>Setophaga dominica</i>	0.004	1993	2010	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.003	1994	2006	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.003	1994	2010	TRUE
Brown-headed Nuthatch	<i>Sitta pusilla</i>	0.003	1993	2002	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.002	1994	1994	TRUE
Cattle Egret	<i>Bubulcus ibis</i>	0.223	1993	2011	FALSE
White Ibis	<i>Eudocimus albus</i>	0.123	1993	2011	FALSE
Black Vulture	<i>Coragyps atratus</i>	0.081	1993	2011	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.064	1993	2011	FALSE
Sandhill Crane	<i>Grus canadensis</i>	0.027	1993	2011	FALSE
Great Egret	<i>Ardea alba</i>	0.026	1993	2011	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.018	1993	2006	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.016	1993	2011	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.015	2001	2010	FALSE
Mottled Duck	<i>Anas fulvigula</i>	0.014	1999	2011	FALSE
Glossy Ibis	<i>Plegadis falcinellus</i>	0.013	1999	2009	FALSE
Northern Bobwhite	<i>Colinus virginianus</i>	0.012	1993	2011	FALSE
Osprey	<i>Pandion haliaetus</i>	0.011	1995	2011	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.01	1993	2011	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.009	1993	2011	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.009	1993	2005	FALSE
Wood Stork	<i>Mycteria americana</i>	0.009	1993	2011	FALSE
Snowy Egret	<i>Egretta thula</i>	0.008	1999	2010	FALSE
Crested Caracara	<i>Caracara cheriway</i>	0.007	1999	2011	FALSE
Swallow-tailed Kite	<i>Elanoides forficatus</i>	0.007	1999	2010	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	0.007	1993	2011	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.005	2001	2011	FALSE
Wood Duck	<i>Aix sponsa</i>	0.005	1993	2010	FALSE
Green Heron	<i>Butorides virescens</i>	0.005	1993	2011	FALSE
Little Blue Heron	<i>Egretta caerulea</i>	0.005	1994	2011	FALSE
Tricolored Heron	<i>Egretta tricolor</i>	0.005	1999	2007	FALSE
Anhinga	<i>Anhinga anhinga</i>	0.004	1993	2011	FALSE
Limpkin	<i>Aramus guarauna</i>	0.004	2007	2011	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.004	1994	2010	FALSE
Bald Eagle	<i>Haliaeetus leucocephalus</i>	0.004	1993	2009	FALSE
Roseate Spoonbill	<i>Platalea ajaja</i>	0.004	2011	2011	FALSE
Common Gallinule	<i>Gallinula galeata</i>	0.003	1993	2008	FALSE
Black-necked Stilt	<i>Himantopus mexicanus</i>	0.003	2009	2009	FALSE

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D.8 D03 – RELOCATABLE – JERC (Jones Ecological Research Center)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the NEWTON route (Georgia Route 21) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Mourning Dove	<i>Zenaida macroura</i>	0.084	1975	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.083	1975	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.068	1975	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.058	1975	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.057	1975	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.044	1975	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.044	1975	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.039	1975	2011	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.031	1975	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.026	1975	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.022	1975	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.019	1975	2010	TRUE
Purple Martin	<i>Progne subis</i>	0.017	1975	2010	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.016	1975	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.016	1975	2011	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.015	1975	2011	TRUE
Common Ground-Dove	<i>Columbina passerina</i>	0.013	1975	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.013	1976	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.013	1975	2011	TRUE
Fish Crow	<i>Corvus ossifragus</i>	0.012	1975	2010	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.012	1975	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.011	1976	2011	TRUE
Northern Parula	<i>Setophaga americana</i>	0.011	1975	2011	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.009	1975	2011	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	0.009	2000	2011	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.009	1975	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.008	1975	2010	TRUE
House Sparrow	<i>Passer domesticus</i>	0.008	1975	2008	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.008	1975	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.007	1975	2010	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.007	1975	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.006	1975	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.006	1975	2000	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.006	1975	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.006	1975	2009	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.006	1977	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.006	1975	2006	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.006	1975	2011	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.005	1975	2008	TRUE
Brown-headed Nuthatch	<i>Sitta pusilla</i>	0.005	1975	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.004	1975	2011	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.004	1975	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.004	1976	2011	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.003	1975	2011	TRUE
Acadian Flycatcher	<i>Empidonax vireescens</i>	0.003	1975	2011	TRUE
Bachman's Sparrow	<i>Peucaea aestivalis</i>	0.003	1982	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.003	1975	2011	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.003	1975	2011	TRUE
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	0.003	1975	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.002	1975	2002	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.002	1975	2004	TRUE
Kentucky Warbler	<i>Geothlypis formosa</i>	0.002	1993	1993	TRUE
Prothonotary Warbler	<i>Protonotaria citrea</i>	0.002	1975	2001	TRUE
Prairie Warbler	<i>Setophaga discolor</i>	0.002	1975	1993	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.002	1983	2007	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.002	1975	2010	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.002	1975	2011	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.001	1981	2009	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.001	1975	2006	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.001	1983	1983	TRUE
Hooded Warbler	<i>Setophaga citrina</i>	0.001	1991	1991	TRUE
Yellow-throated Warbler	<i>Setophaga dominica</i>	0.001	1986	1995	TRUE
Northern Bobwhite	<i>Colinus virginianus</i>	0.055	1975	2011	FALSE
Cattle Egret	<i>Bubulcus ibis</i>	0.051	1975	2011	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
White Ibis	<i>Eudocimus albus</i>	0.017	1975	2011	FALSE
Wood Stork	<i>Mycteria americana</i>	0.016	1975	2011	FALSE
Great Egret	<i>Ardea alba</i>	0.011	1975	2011	FALSE
Little Blue Heron	<i>Egretta caerulea</i>	0.011	1975	2011	FALSE
Black Vulture	<i>Coragyps atratus</i>	0.01	1975	2011	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.006	1975	2011	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.004	1985	2011	FALSE
Common Gallinule	<i>Gallinula galeata</i>	0.004	1976	2010	FALSE
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	0.004	1988	1988	FALSE
Wood Duck	<i>Aix sponsa</i>	0.003	1975	2011	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.003	1976	2010	FALSE
Canada Goose	<i>Branta canadensis</i>	0.003	2006	2006	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.003	1975	2011	FALSE
Mississippi Kite	<i>Ictinia mississippiensis</i>	0.003	2010	2010	FALSE
Pied-billed Grebe	<i>Podilymbus podiceps</i>	0.003	1976	2009	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.002	2006	2006	FALSE
Anhinga	<i>Anhinga anhinga</i>	0.002	1977	2007	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.002	1975	2004	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.002	1976	2010	FALSE
Green Heron	<i>Butorides virescens</i>	0.002	1975	2010	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.002	1975	1989	FALSE
Snowy Egret	<i>Egretta thula</i>	0.002	1975	2011	FALSE
Osprey	<i>Pandion haliaetus</i>	0.002	2008	2010	FALSE
Barred Owl	<i>Strix varia</i>	0.002	1981	2004	FALSE
Eastern Screech-Owl	<i>Megascops asio</i>	0.001	2009	2009	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.001	1991	1993	FALSE
Barn Owl	<i>Tyto alba</i>	0.001	1975	1975	FALSE

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D.9 D04 – CORE – GUAN (Guanica Forest)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

The species list below is based on observations reported to eBird for the Bosque Estatal de Guánica (<http://ebird.org/ebird/hotspot/L323786?yr=all&m=&rank=mrec>, downloaded on 23 Jan 2015).

commonName	scientificName	observationYear	landbird
Adelaide's Warbler	<i>Setophaga adelaidae</i>	2015	TRUE
African Collared-Dove	<i>Streptopelia roseogrisea</i>	2014	TRUE
American Kestrel	<i>Falco sparverius</i>	2015	FALSE
American Oystercatcher	<i>Haematopus palliatus</i>	2010	FALSE
American Redstart	<i>Setophaga ruticilla</i>	2014	TRUE
Antillean Crested Hummingbird	<i>Orthorhyncus cristatus</i>	2010	TRUE
Antillean Euphonia	<i>Euphonia musica</i>	2014	TRUE
Antillean Mango	<i>Anthracothorax dominicus</i>	2014	TRUE
Antillean Nighthawk	<i>Chordeiles gundlachii</i>	2014	FALSE
Bananaquit	<i>Coereba flaveola</i>	2015	TRUE
Bank Swallow	<i>Riparia riparia</i>	2005	TRUE
Barn Swallow	<i>Hirundo rustica</i>	2013	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	2006	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	2015	TRUE
Black-bellied Plover	<i>Pluvialis squatarola</i>	2014	FALSE
Black-faced Grassquit	<i>Tiaris bicolor</i>	2015	TRUE
Black-necked Stilt	<i>Himantopus mexicanus</i>	2014	FALSE
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	2010	TRUE
Black-whiskered Vireo	<i>Vireo altiloquus</i>	2014	TRUE
Black Swift	<i>Cypseloides niger</i>	2009	TRUE
Blue-winged Teal	<i>Anas discors</i>	2013	FALSE
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	2009	TRUE
Bronze Mannikin	<i>Spermestes cucullata</i>	2009	TRUE
Brown Booby	<i>Sula leucogaster</i>	2009	FALSE
Brown Pelican	<i>Pelecanus occidentalis</i>	2015	FALSE
Cape May Warbler	<i>Setophaga tigrina</i>	2004	TRUE
Caribbean Elaenia	<i>Elaenia martinica</i>	2014	TRUE

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Caribbean Martin	<i>Progne dominicensis</i>	2014	TRUE
Cattle Egret	<i>Bubulcus ibis</i>	2014	FALSE
Cave Swallow	<i>Petrochelidon fulva</i>	2013	TRUE
Clapper Rail	<i>Rallus longirostris</i>	2014	FALSE
Common Gallinule	<i>Gallinula galeata</i>	2010	FALSE
Common Ground-Dove	<i>Columbina passerina</i>	2014	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	2013	TRUE
Gray Kingbird	<i>Tyrannus dominicensis</i>	2015	TRUE
Great Blue Heron	<i>Ardea herodias</i>	1996	FALSE
Great Egret	<i>Ardea alba</i>	2014	FALSE
Greater Antillean Grackle	<i>Quiscalus niger</i>	2014	TRUE
Greater Yellowlegs	<i>Tringa melanoleuca</i>	2008	FALSE
Green-throated Carib	<i>Eulampis holosericeus</i>	2012	TRUE
Green Heron	<i>Butorides virescens</i>	2014	FALSE
Green Mango	<i>Anthracothorax viridis</i>	2014	TRUE
Gull-billed Tern	<i>Gelochelidon nilotica</i>	1983	FALSE
Hooded Warbler	<i>Setophaga citrina</i>	2009	TRUE
House Sparrow	<i>Passer domesticus</i>	2014	TRUE
hummingbird sp.	<i>Trochilidae sp.</i>	2014	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	2004	TRUE
Key West Quail-Dove	<i>Geotrygon chrysia</i>	2014	TRUE
Killdeer	<i>Charadrius vociferus</i>	2014	FALSE
Laughing Gull	<i>Leucophaeus atricilla</i>	2012	FALSE
Least Sandpiper	<i>Calidris minutilla</i>	2013	FALSE
Least Tern	<i>Sternula antillarum</i>	2012	FALSE
Lesser Antillean Pewee	<i>Contopus latirostris</i>	2014	TRUE
Lesser Yellowlegs	<i>Tringa flavipes</i>	2014	FALSE
Little Blue Heron	<i>Egretta caerulea</i>	2014	FALSE
Loggerhead Kingbird	<i>Tyrannus caudifasciatus</i>	2014	TRUE
Magnificent Frigatebird	<i>Fregata magnificens</i>	2015	FALSE
Mangrove Cuckoo	<i>Coccyzus minor</i>	2014	TRUE
Merlin	<i>Falco columbarius</i>	2011	FALSE
Mourning Dove	<i>Zenaid macroura</i>	2013	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	2015	TRUE
Northern Parula	<i>Setophaga americana</i>	2014	TRUE
Northern Waterthrush	<i>Parkesia noveboracensis</i>	2014	TRUE
Orange-cheeked Waxbill	<i>Estrilda melpoda</i>	2012	TRUE
Osprey	<i>Pandion haliaetus</i>	2014	FALSE
Ovenbird	<i>Seiurus aurocapilla</i>	2013	TRUE

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Palm Warbler	<i>Setophaga palmarum</i>	2010	TRUE
Pearly-eyed Thrasher	<i>Margarops fuscatus</i>	2015	TRUE
peep sp.	<i>Calidris sp. (peep sp.)</i>	2013	FALSE
Peregrine Falcon	<i>Falco peregrinus</i>	2009	FALSE
Pin-tailed Whydah	<i>Vidua macroura</i>	2013	TRUE
Prairie Warbler	<i>Setophaga discolor</i>	2014	TRUE
Puerto Rican Bullfinch	<i>Loxigilla portoricensis</i>	2014	TRUE
Puerto Rican Emerald	<i>Chlorostilbon maugaeus</i>	2014	TRUE
Puerto Rican Flycatcher	<i>Myiarchus antillarum</i>	2014	TRUE
Puerto Rican Lizard-Cuckoo	<i>Coccyzus vieilloti</i>	2015	TRUE
Puerto Rican Nightjar	<i>Antrostomus noctitherus</i>	2014	FALSE
Puerto Rican Oriole	<i>Icterus portoricensis</i>	2014	TRUE
Puerto Rican Screech-Owl	<i>Megascops nudipes</i>	2014	FALSE
Puerto Rican Spindalis	<i>Spindalis portoricensis</i>	2014	TRUE
Puerto Rican Tanager	<i>Nesospingus speculiferus</i>	2014	TRUE
Puerto Rican Tody	<i>Todus mexicanus</i>	2015	TRUE
Puerto Rican Vireo	<i>Vireo latimeri</i>	2014	TRUE
Puerto Rican Woodpecker	<i>Melanerpes portoricensis</i>	2014	TRUE
Red-footed Booby	<i>Sula sula</i>	2008	FALSE
Red-legged Thrush	<i>Turdus plumbeus</i>	2014	TRUE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	2014	FALSE
Red Junglefowl	<i>Gallus gallus</i>	2014	FALSE
Reddish Egret	<i>Egretta rufescens</i>	1992	FALSE
Rock Pigeon	<i>Columba livia</i>	2015	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	2004	TRUE
Royal Tern	<i>Thalasseus maximus</i>	2014	FALSE
Ruddy Quail-Dove	<i>Geotrygon montana</i>	2014	TRUE
Ruddy Turnstone	<i>Arenaria interpres</i>	2014	FALSE
Sanderling	<i>Calidris alba</i>	2008	FALSE
Sandwich Tern	<i>Thalasseus sandvicensis</i>	2012	FALSE
Scaly-naped Pigeon	<i>Patagioenas squamosa</i>	2014	TRUE
Semipalmated Plover	<i>Charadrius semipalmatus</i>	2014	FALSE
Semipalmated Sandpiper	<i>Calidris pusilla</i>	2014	FALSE
Shiny Cowbird	<i>Molothrus bonariensis</i>	2014	TRUE
Short-billed Dowitcher	<i>Limnodromus griseus</i>	2013	FALSE
Short-eared Owl	<i>Asio flammeus</i>	2009	FALSE
Smooth-billed Ani	<i>Crotophaga ani</i>	2015	TRUE
Snowy Egret	<i>Egretta thula</i>	2013	FALSE
Solitary Sandpiper	<i>Tringa solitaria</i>	2014	FALSE

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Spotted Sandpiper	<i>Actitis macularius</i>	2014	FALSE
Stilt Sandpiper	<i>Calidris himantopus</i>	2014	FALSE
Summer Tanager	<i>Piranga rubra</i>	2004	TRUE
Swainson's Warbler	<i>Limnothlypis swainsonii</i>	2004	TRUE
Tricolored Heron	<i>Egretta tricolor</i>	2004	FALSE
Turkey Vulture	<i>Cathartes aura</i>	2015	FALSE
Venezuelan Troupial	<i>Icterus icterus</i>	2014	TRUE
Western Sandpiper	<i>Calidris mauri</i>	2013	FALSE
White-cheeked Pintail	<i>Anas bahamensis</i>	2014	FALSE
White-eyed Vireo	<i>Vireo griseus</i>	2012	TRUE
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	2013	FALSE
White-tailed Tropicbird	<i>Phaethon lepturus</i>	2009	FALSE
White-winged Dove	<i>Zenaida asiatica</i>	2014	TRUE
White-winged Parakeet	<i>Brotogeris versicolurus</i>	2012	FALSE
Willet	<i>Tringa semipalmata</i>	2009	FALSE
Wilson's Plover	<i>Charadrius wilsonia</i>	2013	FALSE
Wilson's Snipe	<i>Gallinago delicata</i>	2004	FALSE
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	2009	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	1993	TRUE
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	2014	FALSE
Yellow-faced Grassquit	<i>Tiaris olivaceus</i>	2013	TRUE
Yellow-shouldered Blackbird	<i>Agelaius xanthomus</i>	2014	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	2012	TRUE
Zenaida Dove	<i>Zenaida aurita</i>	2014	TRUE

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D.10 D05 – CORE – UNDE (University of Notre Dame Environmental Research Center)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the LAND O LAKES route (Wisconsin Route 8) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.106	1967	2011	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.101	1967	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.058	1967	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.046	1967	2011	TRUE
Hermit Thrush	<i>Catharus guttatus</i>	0.045	1967	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.044	1967	2011	TRUE
White-throated Sparrow	<i>Zonotrichia albicollis</i>	0.036	1967	2011	TRUE
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	0.034	1967	2011	TRUE
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.03	1967	2011	TRUE
Black-throated Green Warbler	<i>Setophaga virens</i>	0.029	1967	2011	TRUE
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	0.028	1967	2011	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.027	1967	2011	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.02	1967	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.019	1967	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.018	1967	2011	TRUE
Least Flycatcher	<i>Empidonax minimus</i>	0.016	1967	2011	TRUE
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.015	1967	2011	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.015	1967	2009	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.014	1967	2008	TRUE
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	0.014	1967	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.013	1967	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.013	1967	2009	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.013	1967	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.012	1967	2010	TRUE
Common Raven	<i>Corvus corax</i>	0.011	1967	2010	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.011	1967	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Mourning Warbler	<i>Geothlypis philadelphia</i>	0.01	1967	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.01	1967	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.01	1967	2011	TRUE
Blackburnian Warbler	<i>Setophaga fusca</i>	0.009	1967	2011	TRUE
Winter Wren	<i>Troglodytes hiemalis</i>	0.009	1967	2011	TRUE
Veery	<i>Catharus fuscescens</i>	0.008	1967	2011	TRUE
Red Crossbill	<i>Loxia curvirostra</i>	0.008	1967	2008	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.008	1967	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.008	1967	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.007	1967	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.007	1967	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.007	1969	2009	TRUE
Purple Martin	<i>Progne subis</i>	0.007	1967	1980	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.007	1969	2011	TRUE
Northern Parula	<i>Setophaga americana</i>	0.007	1967	2011	TRUE
Magnolia Warbler	<i>Setophaga magnolia</i>	0.007	1970	2011	TRUE
Blue-headed Vireo	<i>Vireo solitarius</i>	0.007	1970	2011	TRUE
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.006	1969	2011	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.006	1981	2011	TRUE
Alder Flycatcher	<i>Empidonax alnorum</i>	0.006	1970	2011	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.006	1969	2007	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.006	1979	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.005	1967	2000	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.005	1967	2011	TRUE
Swamp Sparrow	<i>Melospiza georgiana</i>	0.005	1969	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.005	1970	1991	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.005	1967	2009	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.005	1969	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.005	1975	2011	TRUE
Pine Siskin	<i>Spinus pinus</i>	0.005	1969	2008	TRUE
Canada Warbler	<i>Cardellina canadensis</i>	0.004	1970	2009	TRUE
Brown Creeper	<i>Certhia americana</i>	0.004	1967	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.004	2001	2006	TRUE
Rock Pigeon	<i>Columba livia</i>	0.004	1967	2008	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.004	1967	2004	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.004	1967	2007	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.004	1967	2008	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.004	1974	1986	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.004	1967	2011	TRUE
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	0.004	1980	2011	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.004	1967	2010	TRUE
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	0.003	1977	2008	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.003	1967	2006	TRUE
Dark-eyed Junco	<i>Junco hyemalis</i>	0.003	1970	2009	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.003	1969	2011	TRUE
Gray Jay	<i>Perisoreus canadensis</i>	0.003	1969	2008	TRUE
Ruby-crowned Kinglet	<i>Regulus calendula</i>	0.003	1969	2007	TRUE
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.003	1974	2010	TRUE
Bank Swallow	<i>Riparia riparia</i>	0.003	1967	1996	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.003	1967	1999	TRUE
House Wren	<i>Troglodytes aedon</i>	0.003	1967	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.003	1967	2008	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.002	1976	2008	TRUE
Swainson's Thrush	<i>Catharus ustulatus</i>	0.002	1978	1987	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.002	1970	2007	TRUE
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.002	1979	2002	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.002	1970	2011	TRUE
White-winged Crossbill	<i>Loxia leucoptera</i>	0.002	2000	2009	TRUE
Lincoln's Sparrow	<i>Melospiza lincolni</i>	0.002	1974	2010	TRUE
Connecticut Warbler	<i>Oporornis agilis</i>	0.002	1981	2000	TRUE
Vesper Sparrow	<i>Poocetes gramineus</i>	0.002	1970	2006	TRUE
Palm Warbler	<i>Setophaga palmarum</i>	0.002	1990	2003	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.002	1967	2004	TRUE
Clay-colored Sparrow	<i>Spizella pallida</i>	0.002	1976	2011	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.002	1986	1986	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.002	1970	2007	TRUE
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	0.002	1974	1974	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.002	1970	2004	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.002	1970	1998	TRUE
Northern Waterthrush	<i>Parkesia noveboracensis</i>	0.001	2002	2002	TRUE
Cape May Warbler	<i>Setophaga tigrina</i>	0.001	1981	2011	TRUE
Canada Goose	<i>Branta canadensis</i>	0.019	1991	2002	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.007	1967	2009	FALSE
Common Loon	<i>Gavia immer</i>	0.007	1967	2011	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Black Tern	<i>Chlidonias niger</i>	0.005	1969	1981	FALSE
Wood Duck	<i>Aix sponsa</i>	0.004	1976	2008	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.003	1979	2011	FALSE
Ruffed Grouse	<i>Bonasa umbellus</i>	0.003	1967	2008	FALSE
Trumpeter Swan	<i>Cygnus buccinator</i>	0.003	2011	2011	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.002	2003	2003	FALSE
American Black Duck	<i>Anas rubripes</i>	0.002	1974	1974	FALSE
American Bittern	<i>Botaurus lentiginosus</i>	0.002	1979	2004	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.002	1970	1981	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.002	1967	2009	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.002	1967	2011	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.002	1977	1991	FALSE
Wilson's Snipe	<i>Gallinago delicata</i>	0.002	1974	1996	FALSE
Sandhill Crane	<i>Grus canadensis</i>	0.002	1991	2008	FALSE
Hooded Merganser	<i>Lophodytes cucullatus</i>	0.002	1993	2002	FALSE
Common Merganser	<i>Mergus merganser</i>	0.002	1967	2004	FALSE
Barred Owl	<i>Strix varia</i>	0.002	1974	2009	FALSE
Spotted Sandpiper	<i>Actitis macularius</i>	0.001	1997	1997	FALSE
Blue-winged Teal	<i>Anas discors</i>	0.001	1999	1999	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.001	1993	2001	FALSE
American Kestrel	<i>Falco sparverius</i>	0.001	1997	1997	FALSE
Bald Eagle	<i>Haliaeetus leucocephalus</i>	0.001	1992	2002	FALSE
Osprey	<i>Pandion haliaetus</i>	0.001	1988	1995	FALSE

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D.11 D05 – RELOCATABLE – STEI (Steigerwaldt Land Services)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the Irma route (Wisconsin Route 22) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.195	1967	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.052	1967	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.05	1967	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.047	1967	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.045	1967	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.044	1967	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.038	1967	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.034	1967	2011	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.033	1967	2011	TRUE
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	0.028	1967	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.025	1967	2011	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.023	1967	2011	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.022	1967	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.019	1967	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.019	1967	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.018	1967	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.015	1967	2011	TRUE
Bobolink	<i>Dolichonyx oryzivorus</i>	0.015	1967	2011	TRUE
Red Crossbill	<i>Loxia curvirostra</i>	0.015	1980	1997	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.015	1967	2011	TRUE
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.014	1967	2011	TRUE
White-throated Sparrow	<i>Zonotrichia albicollis</i>	0.014	1967	2011	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.013	1967	2010	TRUE
Mourning Warbler	<i>Geothlypis philadelphia</i>	0.012	1967	2011	TRUE
Mourning Dove	<i>Zenaid macroura</i>	0.012	1967	2011	TRUE
Least Flycatcher	<i>Empidonax minimus</i>	0.011	1967	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	0.009	1967	2011	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.009	1967	2011	TRUE
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.009	1967	2011	TRUE
Veery	<i>Catharus fuscescens</i>	0.008	1967	2011	TRUE
House Wren	<i>Troglodytes aedon</i>	0.008	1967	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.007	1967	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.007	1967	2011	TRUE
Clay-colored Sparrow	<i>Spizella pallida</i>	0.007	1967	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.007	1967	2010	TRUE
Alder Flycatcher	<i>Empidonax alnorum</i>	0.006	1967	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.006	1967	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.006	1967	2011	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.006	1967	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.006	1967	2011	TRUE
Hermit Thrush	<i>Catharus guttatus</i>	0.005	1968	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.005	1980	2011	TRUE
Bank Swallow	<i>Riparia riparia</i>	0.005	1974	2000	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.005	1967	2011	TRUE
Sedge Wren	<i>Cistothorus platensis</i>	0.004	1967	2009	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1967	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.004	1967	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.004	1967	2011	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.004	1967	2011	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.004	1967	2011	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.004	1967	2011	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.004	1969	2011	TRUE
Black-throated Green Warbler	<i>Setophaga virens</i>	0.004	1969	2010	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.003	1970	1970	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.003	1970	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.003	1974	2000	TRUE
Swamp Sparrow	<i>Melospiza georgiana</i>	0.003	1968	2011	TRUE
Vesper Sparrow	<i>Pooecetes gramineus</i>	0.003	1967	1998	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.003	1967	2011	TRUE
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.003	1967	2011	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.003	1967	2007	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.003	1967	2011	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.003	1967	2011	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.002	1969	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.002	1981	2011	TRUE
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.002	1989	2007	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.002	1967	2011	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.002	1980	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.002	1967	2011	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.002	1973	1988	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.002	1968	2011	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.002	1967	2010	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.002	1967	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.002	1968	1990	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.002	1967	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.002	1974	2009	TRUE
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	0.002	1967	2011	TRUE
Pine Siskin	<i>Spinus pinus</i>	0.002	1969	2009	TRUE
Dickcissel	<i>Spiza americana</i>	0.002	1968	1988	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.002	1967	2011	TRUE
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	0.002	1967	2010	TRUE
Blue-headed Vireo	<i>Vireo solitarius</i>	0.002	1976	2004	TRUE
Henslow's Sparrow	<i>Ammodramus henslowii</i>	0.001	1973	1984	TRUE
Le Conte's Sparrow	<i>Ammodramus leconteii</i>	0.001	1970	1994	TRUE
Canada Warbler	<i>Cardellina canadensis</i>	0.001	1967	2010	TRUE
Brown Creeper	<i>Certhia americana</i>	0.001	1973	1973	TRUE
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.001	2009	2009	TRUE
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	0.001	1981	2006	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.001	1970	2010	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.001	2006	2006	TRUE
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	0.001	1992	2006	TRUE
Connecticut Warbler	<i>Oporornis agilis</i>	0.001	1986	1989	TRUE
Northern Waterthrush	<i>Parkesia noveboracensis</i>	0.001	1984	2005	TRUE
Black-backed Woodpecker	<i>Picoides arcticus</i>	0.001	1986	1986	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.001	1967	2000	TRUE
Boreal Chickadee	<i>Poecile hudsonicus</i>	0.001	1980	1981	TRUE
Ruby-crowned Kinglet	<i>Regulus calendula</i>	0.001	1972	1985	TRUE
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.001	1968	2009	TRUE
Northern Parula	<i>Setophaga americana</i>	0.001	1971	2008	TRUE
Blackburnian Warbler	<i>Setophaga fusca</i>	0.001	1969	2005	TRUE
Magnolia Warbler	<i>Setophaga magnolia</i>	0.001	1969	2011	TRUE

Title: TOS Protocol and Procedure: Breeding Landbird Abundance and Diversity		Date: 08/11/2015
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commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.001	1981	2006	TRUE
Winter Wren	<i>Troglodytes hiemalis</i>	0.001	1971	2010	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.001	1967	1990	TRUE
Canada Goose	<i>Branta canadensis</i>	0.016	2000	2011	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.006	1971	2011	FALSE
Wood Duck	<i>Aix sponsa</i>	0.004	1974	2011	FALSE
Ruffed Grouse	<i>Bonasa umbellus</i>	0.004	1983	2011	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.004	2000	2010	FALSE
Blue-winged Teal	<i>Anas discors</i>	0.003	1973	2003	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.003	1968	2011	FALSE
Merlin	<i>Falco columbarius</i>	0.003	2010	2010	FALSE
Sandhill Crane	<i>Grus canadensis</i>	0.003	1994	2011	FALSE
American Black Duck	<i>Anas rubripes</i>	0.002	1968	1987	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.002	1967	2011	FALSE
Black Tern	<i>Chlidonias niger</i>	0.002	1968	1978	FALSE
American Kestrel	<i>Falco sparverius</i>	0.002	1967	2010	FALSE
Common Loon	<i>Gavia immer</i>	0.002	1967	2010	FALSE
Osprey	<i>Pandion haliaetus</i>	0.002	1968	2011	FALSE
Pied-billed Grebe	<i>Podilymbus podiceps</i>	0.002	1977	1977	FALSE
Sora	<i>Porzana carolina</i>	0.002	1973	1990	FALSE
Barred Owl	<i>Strix varia</i>	0.002	1974	1974	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.001	1995	1999	FALSE
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.001	1986	2011	FALSE
Spotted Sandpiper	<i>Actitis macularius</i>	0.001	1974	1986	FALSE
Upland Sandpiper	<i>Bartramia longicauda</i>	0.001	2000	2000	FALSE
American Bittern	<i>Botaurus lentiginosus</i>	0.001	1970	1989	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.001	1968	2010	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.001	1968	2011	FALSE
Green Heron	<i>Butorides virescens</i>	0.001	1973	2008	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.001	1974	2007	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.001	1969	2010	FALSE
Wilson's Snipe	<i>Gallinago delicata</i>	0.001	1968	2004	FALSE
Bald Eagle	<i>Haliaeetus leucocephalus</i>	0.001	1994	2010	FALSE
Hooded Merganser	<i>Lophodytes cucullatus</i>	0.001	1983	2008	FALSE
American Woodcock	<i>Scolopax minor</i>	0.001	1977	1994	FALSE

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D.12 D05 – RELOCATABLE – TREE (Treehaven)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the Irma route (Wisconsin Route 22) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.195	1967	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.052	1967	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.05	1967	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.047	1967	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.045	1967	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.044	1967	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.038	1967	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.034	1967	2011	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.033	1967	2011	TRUE
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	0.028	1967	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.025	1967	2011	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.023	1967	2011	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.022	1967	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.019	1967	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.019	1967	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.018	1967	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.015	1967	2011	TRUE
Bobolink	<i>Dolichonyx oryzivorus</i>	0.015	1967	2011	TRUE
Red Crossbill	<i>Loxia curvirostra</i>	0.015	1980	1997	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.015	1967	2011	TRUE
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.014	1967	2011	TRUE
White-throated Sparrow	<i>Zonotrichia albicollis</i>	0.014	1967	2011	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.013	1967	2010	TRUE
Mourning Warbler	<i>Geothlypis philadelphia</i>	0.012	1967	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.012	1967	2011	TRUE
Least Flycatcher	<i>Empidonax minimus</i>	0.011	1967	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	0.009	1967	2011	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.009	1967	2011	TRUE
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.009	1967	2011	TRUE
Veery	<i>Catharus fuscescens</i>	0.008	1967	2011	TRUE
House Wren	<i>Troglodytes aedon</i>	0.008	1967	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.007	1967	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.007	1967	2011	TRUE
Clay-colored Sparrow	<i>Spizella pallida</i>	0.007	1967	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.007	1967	2010	TRUE
Alder Flycatcher	<i>Empidonax alnorum</i>	0.006	1967	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.006	1967	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.006	1967	2011	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.006	1967	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.006	1967	2011	TRUE
Hermit Thrush	<i>Catharus guttatus</i>	0.005	1968	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.005	1980	2011	TRUE
Bank Swallow	<i>Riparia riparia</i>	0.005	1974	2000	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.005	1967	2011	TRUE
Sedge Wren	<i>Cistothorus platensis</i>	0.004	1967	2009	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1967	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.004	1967	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.004	1967	2011	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.004	1967	2011	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.004	1967	2011	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.004	1967	2011	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.004	1969	2011	TRUE
Black-throated Green Warbler	<i>Setophaga virens</i>	0.004	1969	2010	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.003	1970	1970	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.003	1970	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.003	1974	2000	TRUE
Swamp Sparrow	<i>Melospiza georgiana</i>	0.003	1968	2011	TRUE
Vesper Sparrow	<i>Poocetes gramineus</i>	0.003	1967	1998	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.003	1967	2011	TRUE
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.003	1967	2011	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.003	1967	2007	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.003	1967	2011	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.003	1967	2011	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.002	1969	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.002	1981	2011	TRUE
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.002	1989	2007	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.002	1967	2011	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.002	1980	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.002	1967	2011	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.002	1973	1988	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.002	1968	2011	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.002	1967	2010	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.002	1967	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.002	1968	1990	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.002	1967	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.002	1974	2009	TRUE
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	0.002	1967	2011	TRUE
Pine Siskin	<i>Spinus pinus</i>	0.002	1969	2009	TRUE
Dickcissel	<i>Spiza americana</i>	0.002	1968	1988	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.002	1967	2011	TRUE
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	0.002	1967	2010	TRUE
Blue-headed Vireo	<i>Vireo solitarius</i>	0.002	1976	2004	TRUE
Henslow's Sparrow	<i>Ammodramus henslowii</i>	0.001	1973	1984	TRUE
Le Conte's Sparrow	<i>Ammodramus leconteii</i>	0.001	1970	1994	TRUE
Canada Warbler	<i>Cardellina canadensis</i>	0.001	1967	2010	TRUE
Brown Creeper	<i>Certhia americana</i>	0.001	1973	1973	TRUE
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.001	2009	2009	TRUE
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	0.001	1981	2006	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.001	1970	2010	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.001	2006	2006	TRUE
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	0.001	1992	2006	TRUE
Connecticut Warbler	<i>Oporornis agilis</i>	0.001	1986	1989	TRUE
Northern Waterthrush	<i>Parkesia noveboracensis</i>	0.001	1984	2005	TRUE
Black-backed Woodpecker	<i>Picoides arcticus</i>	0.001	1986	1986	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.001	1967	2000	TRUE
Boreal Chickadee	<i>Poecile hudsonicus</i>	0.001	1980	1981	TRUE
Ruby-crowned Kinglet	<i>Regulus calendula</i>	0.001	1972	1985	TRUE
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.001	1968	2009	TRUE
Northern Parula	<i>Setophaga americana</i>	0.001	1971	2008	TRUE
Blackburnian Warbler	<i>Setophaga fusca</i>	0.001	1969	2005	TRUE
Magnolia Warbler	<i>Setophaga magnolia</i>	0.001	1969	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.001	1981	2006	TRUE
Winter Wren	<i>Troglodytes hiemalis</i>	0.001	1971	2010	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.001	1967	1990	TRUE
Canada Goose	<i>Branta canadensis</i>	0.016	2000	2011	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.006	1971	2011	FALSE
Wood Duck	<i>Aix sponsa</i>	0.004	1974	2011	FALSE
Ruffed Grouse	<i>Bonasa umbellus</i>	0.004	1983	2011	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.004	2000	2010	FALSE
Blue-winged Teal	<i>Anas discors</i>	0.003	1973	2003	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.003	1968	2011	FALSE
Merlin	<i>Falco columbarius</i>	0.003	2010	2010	FALSE
Sandhill Crane	<i>Grus canadensis</i>	0.003	1994	2011	FALSE
American Black Duck	<i>Anas rubripes</i>	0.002	1968	1987	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.002	1967	2011	FALSE
Black Tern	<i>Chlidonias niger</i>	0.002	1968	1978	FALSE
American Kestrel	<i>Falco sparverius</i>	0.002	1967	2010	FALSE
Common Loon	<i>Gavia immer</i>	0.002	1967	2010	FALSE
Osprey	<i>Pandion haliaetus</i>	0.002	1968	2011	FALSE
Pied-billed Grebe	<i>Podilymbus podiceps</i>	0.002	1977	1977	FALSE
Sora	<i>Porzana carolina</i>	0.002	1973	1990	FALSE
Barred Owl	<i>Strix varia</i>	0.002	1974	1974	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.001	1995	1999	FALSE
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.001	1986	2011	FALSE
Spotted Sandpiper	<i>Actitis macularius</i>	0.001	1974	1986	FALSE
Upland Sandpiper	<i>Bartramia longicauda</i>	0.001	2000	2000	FALSE
American Bittern	<i>Botaurus lentiginosus</i>	0.001	1970	1989	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.001	1968	2010	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.001	1968	2011	FALSE
Green Heron	<i>Butorides virescens</i>	0.001	1973	2008	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.001	1974	2007	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.001	1969	2010	FALSE
Wilson's Snipe	<i>Gallinago delicata</i>	0.001	1968	2004	FALSE
Bald Eagle	<i>Haliaeetus leucocephalus</i>	0.001	1994	2010	FALSE
Hooded Merganser	<i>Lophodytes cucullatus</i>	0.001	1983	2008	FALSE
American Woodcock	<i>Scolopax minor</i>	0.001	1977	1994	FALSE

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D.13 D06 – CORE – KONZ (Konza Prairie Biological Station)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the WREFORD route (Kansas Route 16) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Dickcissel	<i>Spiza americana</i>	0.095	1967	2011	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.08	1993	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.059	1967	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.059	1967	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.053	1967	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.051	1967	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.049	1967	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.046	1967	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.041	1967	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.04	1967	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.035	1967	2011	TRUE
Bank Swallow	<i>Riparia riparia</i>	0.026	1995	2001	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.026	1968	2011	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.021	1967	2011	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.019	1967	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.016	1967	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.016	1967	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.013	1967	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.013	1967	2011	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.013	1967	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.012	1967	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.011	1967	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.011	1967	2011	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.011	1967	2011	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.01	1967	2011	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.01	1967	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.01	1967	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.009	1967	2011	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.008	1967	2011	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.008	1967	2011	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.008	1967	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.007	2007	2010	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.007	1967	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.006	1967	2011	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.006	1967	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.006	1967	2010	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.006	1967	2010	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.006	1977	2011	TRUE
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	0.005	1967	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.005	1967	2010	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.005	1967	2011	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.005	1967	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.005	1967	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1967	2009	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.004	1967	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.004	1967	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.003	1967	2011	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.003	1969	2011	TRUE
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	0.003	1995	2010	TRUE
Bewick's Wren	<i>Thryomanes bewickii</i>	0.003	1967	2003	TRUE
House Wren	<i>Troglodytes aedon</i>	0.003	1968	2009	TRUE
Bell's Vireo	<i>Vireo bellii</i>	0.003	1967	2011	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.002	1968	2008	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.002	1968	2011	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.002	1967	2011	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.002	1967	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.002	1967	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.002	1973	2008	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.002	1967	2011	TRUE
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	0.002	1968	2010	TRUE
Henslow's Sparrow	<i>Ammodramus henslowii</i>	0.001	2005	2005	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.001	1969	2011	TRUE
Buff-breasted Flycatcher	<i>Empidonax fulvifrons</i>	0.001	2000	2000	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Acadian Flycatcher	<i>Empidonax vireescens</i>	0.001	1992	1992	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.001	1995	2011	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.001	1984	1988	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.001	1967	2010	TRUE
Louisiana Waterthrush	<i>Parkesia motacilla</i>	0.001	1997	2011	TRUE
Painted Bunting	<i>Passerina ciris</i>	0.001	1993	2011	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.001	1968	2007	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.001	1970	2009	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.001	1971	2010	TRUE
Prothonotary Warbler	<i>Protonotaria citrea</i>	0.001	1992	1992	TRUE
Northern Parula	<i>Setophaga americana</i>	0.001	1993	2011	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.001	1967	2008	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.001	1968	2009	TRUE
Northern Bobwhite	<i>Colinus virginianus</i>	0.048	1967	2011	FALSE
Upland Sandpiper	<i>Bartramia longicauda</i>	0.016	1967	2011	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.014	1968	2011	FALSE
Canada Goose	<i>Branta canadensis</i>	0.012	2005	2011	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.01	1967	2011	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.01	1988	2011	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.007	1967	2011	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.005	1967	2011	FALSE
Ring-necked Pheasant	<i>Phasianus colchicus</i>	0.005	1967	2011	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.003	1967	2011	FALSE
American Kestrel	<i>Falco sparverius</i>	0.003	1967	2011	FALSE
Wood Duck	<i>Aix sponsa</i>	0.002	1970	2011	FALSE
Blue-winged Teal	<i>Anas discors</i>	0.002	2007	2011	FALSE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.002	1972	1974	FALSE
Greater Prairie-Chicken	<i>Tympanuchus cupido</i>	0.002	1967	2008	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.001	1994	1997	FALSE
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.001	1974	2009	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.001	1998	2011	FALSE
Great Egret	<i>Ardea alba</i>	0.001	2006	2006	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.001	1969	2006	FALSE
Cattle Egret	<i>Bubulcus ibis</i>	0.001	1994	1994	FALSE
Green Heron	<i>Butorides virescens</i>	0.001	1969	2010	FALSE
Barred Owl	<i>Strix varia</i>	0.001	1977	2011	FALSE

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D.14 D06 – RELOCATABLE – UKFS (University of Kansas Field Station)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the OLATHE route (Kansas Route 13) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
House Sparrow	<i>Passer domesticus</i>	0.112	1967	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.088	1967	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.076	1967	2011	TRUE
Dickcissel	<i>Spiza americana</i>	0.071	1967	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.06	1967	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.049	1967	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.046	1967	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.037	1967	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.032	1967	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.028	1967	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.026	1967	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.026	1967	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.024	1967	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.02	1967	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.016	1967	2011	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.016	1967	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.015	1968	2007	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.014	1967	2011	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.014	1967	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.013	1967	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.013	1967	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.012	1967	2011	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.011	1967	2009	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.01	1967	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.01	1967	2011	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.01	1967	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	0.009	1991	2007	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.008	1977	2011	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.007	1967	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.007	1967	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.007	1968	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.007	1967	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.006	1993	2008	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.006	1967	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.006	1967	2011	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.006	1967	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.005	1969	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.005	1982	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.005	1967	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.004	1967	2008	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.004	1974	2008	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.004	1967	2005	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.004	1967	2002	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.004	1967	2004	TRUE
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	0.004	1967	2011	TRUE
Bank Swallow	<i>Riparia riparia</i>	0.004	1968	1974	TRUE
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	0.004	1968	2011	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.003	1967	2011	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.003	1970	1987	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.003	1967	2009	TRUE
Northern Parula	<i>Setophaga americana</i>	0.003	1972	2009	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.003	1982	2011	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.003	1967	2007	TRUE
House Wren	<i>Troglodytes aedon</i>	0.003	1970	2011	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.003	1967	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.003	1970	2011	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.002	1970	2009	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.002	1967	2008	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.002	1968	2007	TRUE
Willow Flycatcher	<i>Empidonax traillii</i>	0.002	1981	1993	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.002	1967	2009	TRUE
Louisiana Waterthrush	<i>Parkesia motacilla</i>	0.002	1971	2009	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.002	1967	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Painted Bunting	<i>Passerina ciris</i>	0.002	1970	1987	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.002	1970	1990	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.002	1967	2003	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.002	1971	2011	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.002	1988	2007	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.002	1968	2009	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.002	1968	1979	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.002	1967	2007	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.002	1981	2008	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.002	1973	2009	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.002	1968	1978	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.001	2004	2004	TRUE
Acadian Flycatcher	<i>Empidonax virescens</i>	0.001	1969	1997	TRUE
Kentucky Warbler	<i>Geothlypis formosa</i>	0.001	1969	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.001	1985	1986	TRUE
Prothonotary Warbler	<i>Protonotaria citrea</i>	0.001	2004	2008	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.001	1986	1986	TRUE
Bell's Vireo	<i>Vireo bellii</i>	0.001	1968	2000	TRUE
Northern Bobwhite	<i>Colinus virginianus</i>	0.035	1967	2011	FALSE
Canada Goose	<i>Branta canadensis</i>	0.01	1989	2005	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.008	1967	2011	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.004	1974	2011	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.003	1979	2008	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.003	1967	2011	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.003	1967	2011	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.003	2003	2009	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.002	2004	2011	FALSE
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.002	1968	2001	FALSE
Wood Duck	<i>Aix sponsa</i>	0.002	1981	2006	FALSE
Upland Sandpiper	<i>Bartramia longicauda</i>	0.002	1968	2004	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.002	1969	2004	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.002	2006	2011	FALSE
Green Heron	<i>Butorides virescens</i>	0.002	1967	2009	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.002	1979	2006	FALSE
American Kestrel	<i>Falco sparverius</i>	0.002	1967	2008	FALSE
Mississippi Kite	<i>Ictinia mississippiensis</i>	0.002	2008	2008	FALSE
Spotted Sandpiper	<i>Actitis macularius</i>	0.001	1993	1993	FALSE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.001	1967	1990	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	0.001	1990	1990	FALSE
Pied-billed Grebe	<i>Podilymbus podiceps</i>	0.001	1975	1975	FALSE
Barred Owl	<i>Strix varia</i>	0.001	1976	2004	FALSE

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D.15 D07 – CORE – ORNL (Oak Ridge National Laboratory)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the LOVELL route (Tennessee Route 33) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
European Starling	<i>Sturnus vulgaris</i>	0.152	1966	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.131	1966	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.054	1966	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.054	1966	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.052	1966	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.047	1966	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.042	1966	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.041	1966	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.037	1966	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.033	1966	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.026	1966	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.024	1966	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.023	1966	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.021	1966	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.02	1966	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.02	1966	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.019	1966	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.015	1966	2011	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.015	1966	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.014	1966	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.013	1966	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.011	1966	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.009	1966	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.008	1966	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.007	1968	2008	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.007	1966	2011	TRUE

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Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.006	1966	2011	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.006	1966	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.005	1966	2011	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.005	1966	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.005	1966	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.004	1966	2007	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1966	2011	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.004	1966	2011	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.004	1966	2011	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.004	2007	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.004	1966	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.003	1984	2007	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.003	1966	2004	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.003	1966	2008	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.003	1966	2007	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.003	1966	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.003	1982	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.003	1967	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.003	1967	2011	TRUE
House Wren	<i>Troglodytes aedon</i>	0.003	1973	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.003	1966	2011	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.002	1966	1981	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.002	1967	2011	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.002	1968	1993	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.002	1966	2008	TRUE
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	0.002	1966	2011	TRUE
Prairie Warbler	<i>Setophaga discolor</i>	0.002	1966	1988	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.002	1966	1978	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.002	1977	2003	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.002	1966	2008	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.001	1966	2004	TRUE
Willow Flycatcher	<i>Empidonax traillii</i>	0.001	1992	2007	TRUE
Kentucky Warbler	<i>Geothlypis formosa</i>	0.001	1967	1984	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.001	1966	2001	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.001	1967	1967	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.001	1981	1981	TRUE
Louisiana Waterthrush	<i>Parkesia motacilla</i>	0.001	1984	1984	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.001	1977	2006	TRUE

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Scarlet Tanager	<i>Piranga olivacea</i>	0.001	1976	2011	TRUE
Prothonotary Warbler	<i>Protonotaria citrea</i>	0.001	1979	1979	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.001	1966	1972	TRUE
Hooded Warbler	<i>Setophaga citrina</i>	0.001	1966	2000	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.001	1978	2008	TRUE
Bewick's Wren	<i>Thryomanes bewickii</i>	0.001	1969	1969	TRUE
Northern Bobwhite	<i>Colinus virginianus</i>	0.015	1966	2003	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.006	1967	2011	FALSE
Canada Goose	<i>Branta canadensis</i>	0.005	1988	2008	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.002	1993	1995	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.002	2002	2002	FALSE
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	0.002	1971	1985	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.001	1968	2003	FALSE
Wood Duck	<i>Aix sponsa</i>	0.001	1984	2004	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.001	1996	2005	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.001	1993	1993	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.001	1976	2011	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.001	1993	2011	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.001	1974	1999	FALSE
Green Heron	<i>Butorides virescens</i>	0.001	1966	2008	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.001	2000	2008	FALSE
American Kestrel	<i>Falco sparverius</i>	0.001	2006	2006	FALSE
Eastern Screech-Owl	<i>Megascops asio</i>	0.001	1978	1978	FALSE
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	0.001	2008	2008	FALSE
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	0.001	1998	1998	FALSE

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D.16 D07 – RELOCATABLE – GRSM (Great Smoky Mountains National Park)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the CADES COVE route (Tennessee Route 904) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
American Crow	<i>Corvus brachyrhynchos</i>	0.134	1989	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.074	1989	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.056	1989	2011	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.053	1989	2011	TRUE
Dark-eyed Junco	<i>Junco hyemalis</i>	0.04	1989	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.039	1989	2011	TRUE
Winter Wren	<i>Troglodytes hiemalis</i>	0.034	1989	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.031	1989	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.029	1989	2011	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.027	1989	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.027	1989	2011	TRUE
Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>	0.026	2004	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.025	1989	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.021	1989	2011	TRUE
Blue-headed Vireo	<i>Vireo solitarius</i>	0.02	1989	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.019	1989	2011	TRUE
Black-throated Green Warbler	<i>Setophaga virens</i>	0.018	1989	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.017	1989	2010	TRUE
American Robin	<i>Turdus migratorius</i>	0.017	1989	2011	TRUE
Acadian Flycatcher	<i>Empidonax vireescens</i>	0.016	1989	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.016	1989	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.015	1991	1991	TRUE
Pine Siskin	<i>Spinus pinus</i>	0.015	2005	2011	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.013	2005	2011	TRUE
Scarlet Tanager	<i>Piranga olivacea</i>	0.013	1989	2010	TRUE
Northern Parula	<i>Setophaga americana</i>	0.013	1989	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Hooded Warbler	<i>Setophaga citrina</i>	0.013	1990	2011	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.013	1989	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.012	1989	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.012	1989	2011	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.012	1989	2011	TRUE
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.012	1989	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.011	1990	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.01	1989	2006	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.01	2004	2010	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.01	1990	2011	TRUE
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.01	1989	2011	TRUE
Veery	<i>Catharus fuscescens</i>	0.009	1989	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.009	1990	2011	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.009	1989	2010	TRUE
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	0.009	1989	2011	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.008	2004	2006	TRUE
Canada Warbler	<i>Cardellina canadensis</i>	0.008	1989	2004	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.008	1989	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.008	1990	2011	TRUE
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	0.008	1989	2011	TRUE
Yellow-throated Warbler	<i>Setophaga dominica</i>	0.008	1989	2006	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.008	1989	2011	TRUE
Brown Creeper	<i>Certhia americana</i>	0.007	1989	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.007	1990	2010	TRUE
Red Crossbill	<i>Loxia curvirostra</i>	0.007	1991	2011	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.007	1990	1990	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.007	1989	2011	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.007	1989	2006	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.007	1990	1990	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.007	1990	2006	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.007	2004	2010	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.006	1990	2004	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.006	1989	2006	TRUE
Louisiana Waterthrush	<i>Parkesia motacilla</i>	0.006	1989	2011	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.006	2005	2011	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.006	2004	2006	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.005	1990	2006	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.005	2005	2006	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Brown Thrasher	<i>Toxostoma rufum</i>	0.005	1991	2010	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.005	2004	2006	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.004	1989	2010	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.004	1989	1990	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.003	1991	2011	TRUE
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	0.003	1989	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.003	2011	2011	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.003	2004	2004	TRUE
Purple Martin	<i>Progne subis</i>	0.003	2004	2004	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.002	2005	2005	TRUE
Northern Bobwhite	<i>Colinus virginianus</i>	0.012	1989	2011	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.009	1991	2011	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.004	1991	1991	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.004	2004	2010	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.004	2004	2006	FALSE
Canada Goose	<i>Branta canadensis</i>	0.002	2006	2006	FALSE
Peregrine Falcon	<i>Falco peregrinus</i>	0.002	2004	2004	FALSE
Barred Owl	<i>Strix varia</i>	0.002	2004	2011	FALSE

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D.17 D08 – CORE – TALL (Talladega National Forest)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the GREENSBORO route (Alabama Route 23) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.129	1993	2011	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.117	1993	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.081	1993	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.078	1993	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.075	1993	2011	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.066	1993	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.061	1993	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.06	1993	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.058	1993	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.055	1993	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.05	1993	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.046	1993	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.043	1993	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.039	1993	2011	TRUE
Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>	0.038	1993	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.033	1993	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.031	1993	2011	TRUE
Hooded Warbler	<i>Setophaga citrina</i>	0.029	1993	2011	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.028	1993	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.028	1993	2011	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.027	1993	2011	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.025	2005	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.023	1993	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.021	1993	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.02	1993	2011	TRUE
Prairie Warbler	<i>Setophaga discolor</i>	0.019	1993	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Orchard Oriole	<i>Icterus spurius</i>	0.018	1993	2011	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.018	1993	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.018	1993	2005	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.017	1993	2005	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.017	1993	2011	TRUE
Acadian Flycatcher	<i>Empidonax virescens</i>	0.017	1993	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.017	1993	2011	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.016	1993	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.015	1993	2011	TRUE
Northern Parula	<i>Setophaga americana</i>	0.013	1993	2011	TRUE
Kentucky Warbler	<i>Geothlypis formosa</i>	0.012	1993	2011	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.012	1993	2011	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.012	1993	2011	TRUE
Fish Crow	<i>Corvus ossifragus</i>	0.01	1993	2011	TRUE
Yellow-throated Warbler	<i>Setophaga dominica</i>	0.01	1993	2011	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.01	1993	2011	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.008	1994	2011	TRUE
Prothonotary Warbler	<i>Protonotaria citrea</i>	0.008	1993	2011	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.008	1993	2011	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.007	1994	2005	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.007	1993	2005	TRUE
Swainson's Warbler	<i>Limnothlypis swainsonii</i>	0.006	1993	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.006	1993	2009	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.006	1994	2011	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.006	1993	2011	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.005	1995	2011	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.005	1993	2011	TRUE
Louisiana Waterthrush	<i>Parkesia motacilla</i>	0.005	1993	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1994	2011	TRUE
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	0.004	1995	2011	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.004	1993	2004	TRUE
House Sparrow	<i>Passer domesticus</i>	0.004	1993	1993	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.004	2001	2011	TRUE
Brown-headed Nuthatch	<i>Sitta pusilla</i>	0.004	1994	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.004	1995	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.004	1995	2004	TRUE
American Robin	<i>Turdus migratorius</i>	0.004	1993	2011	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.003	1993	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.003	1997	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.002	1993	1993	TRUE
Northern Bobwhite	<i>Colinus virginianus</i>	0.029	1993	2011	FALSE
Canada Goose	<i>Branta canadensis</i>	0.026	1993	2005	FALSE
Cattle Egret	<i>Bubulcus ibis</i>	0.017	2003	2003	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.011	1993	2009	FALSE
American Coot	<i>Fulica americana</i>	0.01	1996	1996	FALSE
Black Vulture	<i>Coragyps atratus</i>	0.008	1993	2009	FALSE
Great Egret	<i>Ardea alba</i>	0.007	1994	2011	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.007	1993	2011	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.006	2003	2003	FALSE
Wood Duck	<i>Aix sponsa</i>	0.006	1994	2005	FALSE
Snowy Egret	<i>Egretta thula</i>	0.006	2005	2005	FALSE
Green Heron	<i>Butorides virescens</i>	0.005	1993	2004	FALSE
Little Blue Heron	<i>Egretta caerulea</i>	0.005	1994	2002	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.004	1993	2011	FALSE
Anhinga	<i>Anhinga anhinga</i>	0.003	2000	2000	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.003	1995	2011	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.003	1997	2005	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.003	1996	2005	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.003	1995	2005	FALSE
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	0.003	1996	1996	FALSE
Pied-billed Grebe	<i>Podilymbus podiceps</i>	0.003	1997	1997	FALSE
Barred Owl	<i>Strix varia</i>	0.003	1994	2002	FALSE

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D.18 D08 – RELOCATABLE – LENO (Lenoir Landing)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the MILLRY route (Alabama Route 39) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.09	1970	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.063	1970	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.056	1970	2011	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.049	1970	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.042	1970	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.041	1970	2011	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.037	1970	2011	TRUE
Purple Martin	<i>Progne subis</i>	0.036	1970	2011	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.035	1970	2011	TRUE
Wood Thrush	<i>Hylocichla mustelina</i>	0.027	1970	2011	TRUE
White-eyed Vireo	<i>Vireo griseus</i>	0.026	1970	2011	TRUE
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	0.025	1970	2011	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.022	1970	2011	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.022	1970	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.019	1972	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.018	1970	2011	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.018	1970	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.016	1970	2011	TRUE
Summer Tanager	<i>Piranga rubra</i>	0.016	1970	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.014	1970	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.014	1970	2011	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.014	1970	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.014	1970	2011	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.013	1970	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.013	1970	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.013	1970	2010	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Fish Crow	<i>Corvus ossifragus</i>	0.011	1972	2011	TRUE
Hooded Warbler	<i>Setophaga citrina</i>	0.011	1970	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.01	1970	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.01	1970	2009	TRUE
Pine Warbler	<i>Setophaga pinus</i>	0.01	1970	2010	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.01	1970	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.009	1970	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.008	1970	2011	TRUE
Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>	0.008	1970	2011	TRUE
Northern Parula	<i>Setophaga americana</i>	0.008	1970	2009	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.007	1970	2010	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.007	1975	2011	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.007	1970	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.006	1970	2011	TRUE
Kentucky Warbler	<i>Geothlypis formosa</i>	0.005	1972	2011	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	0.005	2009	2011	TRUE
Yellow-throated Vireo	<i>Vireo flavifrons</i>	0.005	1970	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.003	1970	1999	TRUE
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.003	1970	2011	TRUE
Acadian Flycatcher	<i>Empidonax virescens</i>	0.003	1974	2011	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.003	1970	2008	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.003	1970	2010	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.003	1970	2011	TRUE
Prothonotary Warbler	<i>Protonotaria citrea</i>	0.003	1970	2008	TRUE
Prairie Warbler	<i>Setophaga discolor</i>	0.003	1972	2010	TRUE
Brown-headed Nuthatch	<i>Sitta pusilla</i>	0.003	1973	2010	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.003	1970	2010	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.002	1970	2010	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.002	1981	1981	TRUE
Rock Pigeon	<i>Columba livia</i>	0.002	1972	2003	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.002	1973	2011	TRUE
Swainson's Warbler	<i>Limnothlypis swainsonii</i>	0.002	2007	2007	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.002	1974	1995	TRUE
Black-and-white Warbler	<i>Mniotilta varia</i>	0.002	1970	1992	TRUE
Louisiana Waterthrush	<i>Parkesia motacilla</i>	0.002	1975	2000	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.002	1970	1995	TRUE
Yellow-throated Warbler	<i>Setophaga dominica</i>	0.002	1973	2010	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.002	1972	1972	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	0.001	1970	1992	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.001	1999	1999	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.001	1972	1972	TRUE
American Redstart	<i>Setophaga ruticilla</i>	0.001	1970	1996	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.001	1977	2006	TRUE
American Robin	<i>Turdus migratorius</i>	0.001	1988	2003	TRUE
Cattle Egret	<i>Bubulcus ibis</i>	0.041	1972	2011	FALSE
Northern Bobwhite	<i>Colinus virginianus</i>	0.031	1970	2010	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.018	1970	2011	FALSE
Black Vulture	<i>Coragyps atratus</i>	0.014	1970	2011	FALSE
Wood Duck	<i>Aix sponsa</i>	0.003	1972	2011	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.003	1970	1970	FALSE
Little Blue Heron	<i>Egretta caerulea</i>	0.003	1972	2007	FALSE
Mississippi Kite	<i>Ictinia mississippiensis</i>	0.003	1978	2009	FALSE
Great Egret	<i>Ardea alba</i>	0.002	1996	2007	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.002	1970	2010	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.002	1982	2004	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.002	1972	2010	FALSE
Broad-winged Hawk	<i>Buteo platypterus</i>	0.002	1974	2011	FALSE
Green Heron	<i>Butorides virescens</i>	0.002	1970	2010	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.002	1970	2001	FALSE
American Kestrel	<i>Falco sparverius</i>	0.002	2004	2004	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.002	1972	2011	FALSE
Barred Owl	<i>Strix varia</i>	0.002	1977	2006	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.001	1993	1993	FALSE
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.001	1989	1989	FALSE
Anhinga	<i>Anhinga anhinga</i>	0.001	2001	2001	FALSE
White Ibis	<i>Eudocimus albus</i>	0.001	1978	1978	FALSE

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D.20 D09 – CORE – WOOD (Woodworth Field Station)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the BUCHANAN route (North Dakota Route 12) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.151	1967	2011	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.114	1967	2011	TRUE
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	0.105	1967	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.06	1967	2011	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.052	1967	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.036	1967	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.028	1967	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.022	1967	2011	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.014	1967	2011	TRUE
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.014	1967	2011	TRUE
Clay-colored Sparrow	<i>Spizella pallida</i>	0.014	1967	2011	TRUE
Bobolink	<i>Dolichonyx oryzivorus</i>	0.013	1967	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.013	1967	2011	TRUE
Vesper Sparrow	<i>Poocetes gramineus</i>	0.013	1967	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.012	1967	2011	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.011	1967	2011	TRUE
Lark Bunting	<i>Calamospiza melanocorys</i>	0.009	1967	1992	TRUE
Marsh Wren	<i>Cistothorus palustris</i>	0.009	1967	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.009	1967	2011	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.008	1967	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.008	1967	2011	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.006	1967	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.006	1967	2011	TRUE
Bank Swallow	<i>Riparia riparia</i>	0.006	1967	2010	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.006	1968	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Sedge Wren	<i>Cistothorus platensis</i>	0.005	1969	2011	TRUE
Willow Flycatcher	<i>Empidonax traillii</i>	0.005	1967	2011	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.005	1976	2011	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.005	1970	2011	TRUE
House Wren	<i>Troglodytes aedon</i>	0.005	1967	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.005	1969	2011	TRUE
Le Conte's Sparrow	<i>Ammodramus leconteii</i>	0.004	1976	2009	TRUE
Dickcissel	<i>Spiza americana</i>	0.004	1967	2006	TRUE
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	0.003	1967	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.003	1967	2011	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.003	1967	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.003	1967	2005	TRUE
Baird's Sparrow	<i>Ammodramus bairdii</i>	0.002	1968	2005	TRUE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.002	1980	2009	TRUE
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	0.002	1967	2009	TRUE
Rock Pigeon	<i>Columba livia</i>	0.002	1967	2009	TRUE
Least Flycatcher	<i>Empidonax minimus</i>	0.002	1967	2011	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.002	1967	2011	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.002	1967	2011	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.002	1967	2011	TRUE
Nelson's Sparrow	<i>Ammodramus nelsoni</i>	0.001	1970	2010	TRUE
Sprague's Pipit	<i>Anthus spragueii</i>	0.001	1982	1983	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.001	1977	2001	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.001	1967	2011	TRUE
Eastern Wood-Pewee	<i>Contopus virens</i>	0.001	1968	1998	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.001	1980	2010	TRUE
Gray Catbird	<i>Dumetella carolinensis</i>	0.001	1968	2011	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.001	1970	1992	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.001	1969	1992	TRUE
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	0.001	1980	2010	TRUE
Black-billed Magpie	<i>Pica hudsonia</i>	0.001	1989	1989	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.001	1974	2003	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.001	1989	2006	TRUE
Purple Martin	<i>Progne subis</i>	0.001	1979	1979	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.001	2005	2005	TRUE
Say's Phoebe	<i>Sayornis saya</i>	0.001	1977	2011	TRUE
Ovenbird	<i>Seiurus aurocapilla</i>	0.001	2002	2006	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Eastern Bluebird	<i>Sialia sialis</i>	0.001	2010	2010	TRUE
Pine Siskin	<i>Spinus pinus</i>	0.001	1982	1982	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.001	1978	2010	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.001	1988	1988	TRUE
Red-eyed Vireo	<i>Vireo olivaceus</i>	0.001	1976	2010	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0	2000	2000	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0	1981	2007	TRUE
Mallard	<i>Anas platyrhynchos</i>	0.035	1967	2011	FALSE
Canada Goose	<i>Branta canadensis</i>	0.026	1968	2011	FALSE
American Coot	<i>Fulica americana</i>	0.02	1967	2011	FALSE
Blue-winged Teal	<i>Anas discors</i>	0.018	1967	2011	FALSE
Gadwall	<i>Anas strepera</i>	0.017	1967	2011	FALSE
American White Pelican	<i>Pelecanus erythrorhynchos</i>	0.014	1968	2011	FALSE
Black Tern	<i>Chlidonias niger</i>	0.013	1967	2011	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.011	1967	2011	FALSE
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	0.011	1967	2011	FALSE
Ring-billed Gull	<i>Larus delawarensis</i>	0.01	1967	2011	FALSE
Franklin's Gull	<i>Leucophaeus pipixcan</i>	0.009	1968	2010	FALSE
Northern Pintail	<i>Anas acuta</i>	0.008	1967	2011	FALSE
Lesser Scaup	<i>Aythya affinis</i>	0.008	1968	2011	FALSE
Redhead	<i>Aythya americana</i>	0.007	1967	2011	FALSE
Ruddy Duck	<i>Oxyura jamaicensis</i>	0.007	1967	2011	FALSE
Northern Shoveler	<i>Anas clypeata</i>	0.005	1967	2011	FALSE
Pied-billed Grebe	<i>Podilymbus podiceps</i>	0.005	1967	2011	FALSE
Upland Sandpiper	<i>Bartramia longicauda</i>	0.004	1967	2011	FALSE
Wilson's Snipe	<i>Gallinago delicata</i>	0.004	1975	2011	FALSE
Marbled Godwit	<i>Limosa fedoa</i>	0.004	1967	2011	FALSE
Ring-necked Pheasant	<i>Phasianus colchicus</i>	0.004	1976	2011	FALSE
Canvasback	<i>Aythya valisineria</i>	0.003	1967	2011	FALSE
California Gull	<i>Larus californicus</i>	0.003	1975	2002	FALSE
Sora	<i>Porzana carolina</i>	0.003	1967	2011	FALSE
Forster's Tern	<i>Sterna forsteri</i>	0.003	2003	2003	FALSE
Wood Duck	<i>Aix sponsa</i>	0.002	1968	2011	FALSE
American Wigeon	<i>Anas americana</i>	0.002	1967	2011	FALSE
Ring-necked Duck	<i>Aythya collaris</i>	0.002	1967	2010	FALSE
American Bittern	<i>Botaurus lentiginosus</i>	0.002	1967	2011	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.002	1968	2011	FALSE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.002	1967	2011	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Gray Partridge	<i>Perdix perdix</i>	0.002	1967	2009	FALSE
Wilson's Phalarope	<i>Phalaropus tricolor</i>	0.002	1967	2011	FALSE
American Avocet	<i>Recurvirostra americana</i>	0.002	1968	2011	FALSE
Common Tern	<i>Sterna hirundo</i>	0.002	2004	2004	FALSE
Willet	<i>Tringa semipalmata</i>	0.002	1967	2011	FALSE
Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>	0.002	1983	2011	FALSE
Spotted Sandpiper	<i>Actitis macularius</i>	0.001	1974	2008	FALSE
Green-winged Teal	<i>Anas crecca</i>	0.001	1967	2010	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.001	1973	2000	FALSE
Short-eared Owl	<i>Asio flammeus</i>	0.001	1969	1972	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.001	1968	2009	FALSE
Cattle Egret	<i>Bubulcus ibis</i>	0.001	2005	2005	FALSE
Ferruginous Hawk	<i>Buteo regalis</i>	0.001	1981	2010	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.001	1974	2009	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.001	1969	2011	FALSE
American Kestrel	<i>Falco sparverius</i>	0.001	1998	2007	FALSE
Least Bittern	<i>Ixobrychus exilis</i>	0.001	2006	2007	FALSE
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	0.001	1967	2011	FALSE
Horned Grebe	<i>Podiceps auritus</i>	0.001	1969	2010	FALSE
Eared Grebe	<i>Podiceps nigricollis</i>	0.001	1967	2000	FALSE
Virginia Rail	<i>Rallus limicola</i>	0.001	1968	2010	FALSE
Western Grebe	<i>Aechmophorus occidentalis</i>	0	2011	2011	FALSE
Caspian Tern	<i>Hydroprogne caspia</i>	0	2008	2008	FALSE
Hooded Merganser	<i>Lophodytes cucullatus</i>	0	1968	2003	FALSE

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D.21 D10 – CORE – CPER (Central Plains Experimental Range)

Recommended Sampling Window: May 10 - June 15

Recommended Daily Sampling Period: official sunrise - 10:30 AM

Source: Rocky Mountain Bird Observatory

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the route that passes through CPER (Colorado Route 901 – Rockport) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Lark Bunting	<i>Calamospiza melanocorys</i>	0.348	1994	2010	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.187	1994	2010	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.17	1994	2010	TRUE
McCown's Longspur	<i>Rhynchophanes mccownii</i>	0.102	1994	2010	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.054	1994	2010	TRUE
Brewer's Sparrow	<i>Spizella breweri</i>	0.023	1994	2010	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.018	1994	2010	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.018	1994	2010	TRUE
Cassin's Sparrow	<i>Peucaea cassinii</i>	0.015	1996	2010	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.012	1995	2010	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.01	1999	2010	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.009	1994	2010	TRUE
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	0.006	1994	2010	TRUE
Say's Phoebe	<i>Sayornis saya</i>	0.005	1994	2010	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.004	1994	2004	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.004	2008	2008	TRUE
Rock Pigeon	<i>Columba livia</i>	0.004	2009	2009	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.004	1994	2010	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.003	1996	2010	TRUE
House Sparrow	<i>Passer domesticus</i>	0.003	1994	2008	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.003	1995	2010	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.003	2000	2008	TRUE
American Robin	<i>Turdus migratorius</i>	0.003	1996	2010	TRUE
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.002	1998	2007	TRUE
Bullock's Oriole	<i>Icterus bullockii</i>	0.002	2001	2010	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.002	1994	2009	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Sage Thrasher	<i>Oreoscoptes montanus</i>	0.002	1994	2004	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.002	1998	2009	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.001	2009	2009	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	0.001	2009	2009	TRUE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.01	1994	2010	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.008	1994	2010	FALSE
American Kestrel	<i>Falco sparverius</i>	0.006	2004	2005	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.005	1994	2009	FALSE
Ferruginous Hawk	<i>Buteo regalis</i>	0.004	1994	2010	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.003	1994	2009	FALSE
Northern Shoveler	<i>Anas clypeata</i>	0.002	2000	2000	FALSE
Golden Eagle	<i>Aquila chrysaetos</i>	0.002	1996	2010	FALSE
Burrowing Owl	<i>Athene cunicularia</i>	0.002	1994	2010	FALSE
Mountain Plover	<i>Charadrius montanus</i>	0.002	2002	2005	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.002	1996	2007	FALSE
American Avocet	<i>Recurvirostra americana</i>	0.002	2003	2005	FALSE
Prairie Falcon	<i>Falco mexicanus</i>	0.001	2000	2010	FALSE

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D.22 D10 – RELOCATABLE – STER (Sterling)

Recommended Sampling Window: May 10 - June 15

Recommended Daily Sampling Period: official sunrise - 10:30 AM

Source: Rocky Mountain Bird Observatory

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the route that passes approximately 15 miles north of the site (Colorado Route 7 – Fleming) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Horned Lark	<i>Eremophila alpestris</i>	0.195	1968	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.151	1968	2011	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.128	1968	2011	TRUE
Lark Bunting	<i>Calamospiza melanocorys</i>	0.099	1968	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.093	1968	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.059	1968	2011	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.04	1968	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.031	1968	2011	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.027	1968	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.016	1968	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.011	1968	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.009	1990	2011	TRUE
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	0.009	2005	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.009	1968	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.008	1968	1999	TRUE
Rock Pigeon	<i>Columba livia</i>	0.006	1968	2006	TRUE
Black-billed Magpie	<i>Pica hudsonia</i>	0.005	1968	2006	TRUE
Chimney Swift	<i>Chaetura pelagica</i>	0.004	1968	2011	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.004	1968	2011	TRUE
Lazuli Bunting	<i>Passerina amoena</i>	0.004	1980	2011	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	0.004	2005	2011	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.003	1968	2006	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.002	1968	2005	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.002	1980	2006	TRUE
Bullock's Oriole	<i>Icterus bullockii</i>	0.002	1980	2006	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.002	1970	2005	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Cassin's Sparrow	<i>Peucaea cassinii</i>	0.002	1990	1991	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.002	2006	2006	TRUE
Dickcissel	<i>Spiza americana</i>	0.002	1977	2011	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.001	1972	2011	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.001	1988	2005	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.001	2006	2006	TRUE
Say's Phoebe	<i>Sayornis saya</i>	0.001	1991	1991	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.001	1970	2003	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.001	1968	2005	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.001	2006	2006	TRUE
Ring-necked Pheasant	<i>Phasianus colchicus</i>	0.075	1968	2011	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.012	1968	2011	FALSE
Canada Goose	<i>Branta canadensis</i>	0.007	1975	2005	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.007	1968	2011	FALSE
Northern Bobwhite	<i>Colinus virginianus</i>	0.007	1973	2003	FALSE
Upland Sandpiper	<i>Bartramia longicauda</i>	0.006	2006	2006	FALSE
Burrowing Owl	<i>Athene cunicularia</i>	0.004	1968	2006	FALSE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.004	1973	2006	FALSE
Spotted Sandpiper	<i>Actitis macularius</i>	0.003	2006	2006	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.003	1968	2006	FALSE
Wood Duck	<i>Aix sponsa</i>	0.002	1977	2005	FALSE
Northern Pintail	<i>Anas acuta</i>	0.002	1977	2003	FALSE
Northern Shoveler	<i>Anas clypeata</i>	0.002	1973	1988	FALSE
Green-winged Teal	<i>Anas crecca</i>	0.002	1973	2003	FALSE
Blue-winged Teal	<i>Anas discors</i>	0.002	1973	2003	FALSE
Gadwall	<i>Anas strepera</i>	0.002	1968	1985	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.002	1992	2003	FALSE
Short-eared Owl	<i>Asio flammeus</i>	0.002	1980	2006	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.002	1968	2011	FALSE
Ferruginous Hawk	<i>Buteo regalis</i>	0.002	1999	2004	FALSE
Prairie Falcon	<i>Falco mexicanus</i>	0.002	1981	2003	FALSE
American Kestrel	<i>Falco sparverius</i>	0.002	1969	2011	FALSE
Ring-billed Gull	<i>Larus delawarensis</i>	0.002	1991	1991	FALSE
Long-billed Curlew	<i>Numenius americanus</i>	0.002	1977	1977	FALSE
Ruddy Duck	<i>Oxyura jamaicensis</i>	0.002	1977	1977	FALSE
Wilson's Phalarope	<i>Phalaropus tricolor</i>	0.002	1987	1987	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.001	1969	1969	FALSE
Redhead	<i>Aythya americana</i>	0.001	1977	1977	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Great Horned Owl	<i>Bubo virginianus</i>	0.001	1977	2005	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.001	1984	1988	FALSE
American Avocet	<i>Recurvirostra americana</i>	0.001	1973	1988	FALSE

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D.23 D10 – RELOCATABLE – RMNP (Rocky Mountain National Park)

Recommended Sampling Window: June 5 - June 30

Recommended Daily Sampling Period: official sunrise - 10:30 AM

Source: Rocky Mountain Bird Observatory

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the route that passes through RMNP (Colorado Route 904 – Trail Ridge Road) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Ruby-crowned Kinglet	<i>Regulus calendula</i>	0.09	2003	2011	TRUE
American Pipit	<i>Anthus rubescens</i>	0.073	2003	2011	TRUE
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	0.07	2003	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.068	2003	2011	TRUE
American Robin	<i>Turdus migratorius</i>	0.063	2003	2011	TRUE
Hermit Thrush	<i>Catharus guttatus</i>	0.053	2003	2011	TRUE
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.05	2003	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.043	2003	2011	TRUE
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.038	2003	2011	TRUE
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.038	2003	2011	TRUE
Dark-eyed Junco	<i>Junco hyemalis</i>	0.029	2003	2011	TRUE
Clark's Nutcracker	<i>Nucifraga columbiana</i>	0.028	2003	2011	TRUE
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0.027	2005	2011	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.026	2003	2011	TRUE
Black-billed Magpie	<i>Pica hudsonia</i>	0.025	2003	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.022	2004	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.018	2004	2011	TRUE
Steller's Jay	<i>Cyanocitta stelleri</i>	0.017	2003	2011	TRUE
Red Crossbill	<i>Loxia curvirostra</i>	0.017	2004	2011	TRUE
Lincoln's Sparrow	<i>Melospiza lincolni</i>	0.017	2003	2011	TRUE
Townsend's Solitaire	<i>Myadestes townsendi</i>	0.017	2003	2007	TRUE
Pine Grosbeak	<i>Pinicola enucleator</i>	0.017	2004	2011	TRUE
Pine Siskin	<i>Spinus pinus</i>	0.017	2006	2007	TRUE
Brown-capped Rosy-Finch	<i>Leucosticte australis</i>	0.016	2011	2011	TRUE
Mountain Chickadee	<i>Poecile gambeli</i>	0.016	2003	2011	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.015	2003	2007	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.015	2003	2003	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.015	2004	2006	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.014	2007	2007	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.013	2003	2011	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.012	2005	2007	TRUE
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.012	2003	2007	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.011	2004	2007	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.011	2003	2004	TRUE
Vesper Sparrow	<i>Pooecetes gramineus</i>	0.011	2011	2011	TRUE
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	0.01	2003	2011	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.01	2007	2007	TRUE
Gray Jay	<i>Perisoreus canadensis</i>	0.01	2004	2007	TRUE
Mountain Bluebird	<i>Sialia currucoides</i>	0.01	2003	2007	TRUE
House Wren	<i>Troglodytes aedon</i>	0.01	2003	2007	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.009	2004	2004	TRUE
Orange-crowned Warbler	<i>Oreothlypis celata</i>	0.009	2003	2004	TRUE
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	0.009	2004	2005	TRUE
Rock Pigeon	<i>Columba livia</i>	0.008	2006	2011	TRUE
Wilson's Warbler	<i>Cardellina pusilla</i>	0.007	2003	2007	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.007	2003	2007	TRUE
Rock Wren	<i>Salpinctes obsoletus</i>	0.007	2005	2007	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.007	2005	2005	TRUE
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.006	2003	2007	TRUE
Plumbeous Vireo	<i>Vireo plumbeus</i>	0.006	2003	2011	TRUE
American Dipper	<i>Cinclus mexicanus</i>	0.005	2003	2006	TRUE
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.005	2003	2007	TRUE
Hammond's Flycatcher	<i>Empidonax hammondii</i>	0.005	2003	2004	TRUE
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.005	2003	2004	TRUE
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>	0.005	2004	2005	TRUE
Western Tanager	<i>Piranga ludoviciana</i>	0.005	2003	2011	TRUE
Sapsucker sp.	<i>Sphyrapicus sp.</i>	0.005	2011	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.005	2007	2007	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.004	2004	2004	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.004	2004	2004	TRUE
Mallard	<i>Anas platyrhynchos</i>	0.013	2003	2006	FALSE
White-tailed Ptarmigan	<i>Lagopus leucura</i>	0.009	2003	2011	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.007	2005	2005	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Spotted Sandpiper	<i>Actitis macularius</i>	0.006	2003	2005	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.006	2005	2007	FALSE
Green-winged Teal	<i>Anas crecca</i>	0.005	2006	2006	FALSE
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	0.005	2006	2007	FALSE

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D.24 D11 – CORE – OAES (Klemme Range Research Station)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the ARAPAHO route (Oklahoma Route 62) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Mourning Dove	<i>Zenaida macroura</i>	0.096	1992	2011	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.075	1993	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.064	1992	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.057	1992	2011	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.044	1992	2011	TRUE
Dickcissel	<i>Spiza americana</i>	0.043	1992	2010	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.043	1992	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.042	1992	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.042	1992	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.039	1992	2011	TRUE
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	0.037	1992	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.036	1992	2011	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.031	1992	2011	TRUE
House Sparrow	<i>Passer domesticus</i>	0.029	1992	2011	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.027	1992	2011	TRUE
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.026	1992	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.019	1992	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.016	1999	2011	TRUE
Painted Bunting	<i>Passerina ciris</i>	0.013	1993	2011	TRUE
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	0.013	1992	2011	TRUE
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	0.012	1992	2011	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.012	1992	2011	TRUE
Carolina Chickadee	<i>Poecile carolinensis</i>	0.011	1992	2011	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.01	1992	2011	TRUE
Cassin's Sparrow	<i>Peucaea cassinii</i>	0.009	1998	2011	TRUE
Eastern Bluebird	<i>Sialia sialis</i>	0.009	1992	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Chimney Swift	<i>Chaetura pelagica</i>	0.006	1992	2011	TRUE
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	0.006	1992	2008	TRUE
Eastern Phoebe	<i>Sayornis phoebe</i>	0.006	1992	2011	TRUE
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	0.005	2009	2011	TRUE
Tufted Titmouse	<i>Baeolophus bicolor</i>	0.005	1997	2009	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.005	1992	2009	TRUE
Purple Martin	<i>Progne subis</i>	0.005	1992	2007	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.005	1992	2007	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	0.005	2005	2011	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.004	1992	2009	TRUE
Indigo Bunting	<i>Passerina cyanea</i>	0.004	1992	2011	TRUE
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	0.004	1993	2011	TRUE
Bewick's Wren	<i>Thryomanes bewickii</i>	0.004	1994	2008	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.003	1992	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.003	1994	2011	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.003	1993	2005	TRUE
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	0.003	1992	2010	TRUE
Carolina Wren	<i>Thryothorus ludovicianus</i>	0.003	1993	2008	TRUE
American Robin	<i>Turdus migratorius</i>	0.003	1992	2010	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.003	1992	2010	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.003	1993	1999	TRUE
Baltimore Oriole	<i>Icterus galbula</i>	0.002	1997	2009	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.002	1992	2008	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.002	1993	2006	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.002	1994	2010	TRUE
Field Sparrow	<i>Spizella pusilla</i>	0.002	1998	2011	TRUE
Brown Thrasher	<i>Toxostoma rufum</i>	0.002	1993	2009	TRUE
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	0.001	1992	2008	TRUE
Lark Bunting	<i>Calamospiza melanocorys</i>	0.001	1992	1998	TRUE
Greater Roadrunner	<i>Geococcyx californianus</i>	0.001	1999	2008	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.001	1998	1998	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.001	1998	2008	TRUE
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.001	2007	2007	TRUE
Northern Bobwhite	<i>Colinus virginianus</i>	0.05	1992	2011	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.025	1992	2011	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.015	1992	2011	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.009	1992	2011	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Cattle Egret	<i>Bubulcus ibis</i>	0.008	1997	2004	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.007	1997	2010	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.006	1992	1992	FALSE
Mississippi Kite	<i>Ictinia mississippiensis</i>	0.006	1992	2011	FALSE
Upland Sandpiper	<i>Bartramia longicauda</i>	0.005	1999	2009	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.005	1993	2011	FALSE
American Kestrel	<i>Falco sparverius</i>	0.004	1999	2010	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.003	1993	2004	FALSE
Great Egret	<i>Ardea alba</i>	0.003	1997	2005	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.003	1997	2009	FALSE
Wood Duck	<i>Aix sponsa</i>	0.002	1997	2009	FALSE
Canada Goose	<i>Branta canadensis</i>	0.002	1993	1994	FALSE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.002	1997	2011	FALSE
Barred Owl	<i>Strix varia</i>	0.002	1997	2011	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.001	2002	2002	FALSE
Blue-winged Teal	<i>Anas discors</i>	0.001	1997	2005	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.001	1997	2005	FALSE
Green Heron	<i>Butorides virescens</i>	0.001	1998	2010	FALSE
Little Blue Heron	<i>Egretta caerulea</i>	0.001	1994	2009	FALSE
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	0.001	2002	2002	FALSE

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D.25 D13 – CORE – NIWO (Niwot Ridge Mountain Research Station)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the GOLD HILL route (Colorado Route 354) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	0.088	1998	2009	TRUE
American Robin	<i>Turdus migratorius</i>	0.086	1998	2009	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.059	1998	2009	TRUE
Mountain Chickadee	<i>Poecile gambeli</i>	0.049	1998	2009	TRUE
House Wren	<i>Troglodytes aedon</i>	0.043	1998	2009	TRUE
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	0.042	1998	2009	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.037	1998	2009	TRUE
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.037	1998	2009	TRUE
Steller's Jay	<i>Cyanocitta stelleri</i>	0.035	1998	2009	TRUE
Dark-eyed Junco	<i>Junco hyemalis</i>	0.035	1998	2009	TRUE
Western Tanager	<i>Piranga ludoviciana</i>	0.032	1998	2009	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.032	1998	2009	TRUE
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.031	1998	2009	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.029	1998	2009	TRUE
Ruby-crowned Kinglet	<i>Regulus calendula</i>	0.027	1998	2009	TRUE
American Pipit	<i>Anthus rubescens</i>	0.025	1998	1998	TRUE
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.025	1998	2009	TRUE
Pine Siskin	<i>Spinus pinus</i>	0.025	1998	2009	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.021	1998	2009	TRUE
Hermit Thrush	<i>Catharus guttatus</i>	0.02	1998	2009	TRUE
Red Crossbill	<i>Loxia curvirostra</i>	0.019	1998	2009	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.017	1998	2009	TRUE
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.016	1998	2009	TRUE
Common Raven	<i>Corvus corax</i>	0.015	1998	2009	TRUE
Spotted Towhee	<i>Pipilo maculatus</i>	0.014	1998	2009	TRUE
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0.012	1998	2009	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Lesser Goldfinch	<i>Spinus psaltria</i>	0.012	2002	2009	TRUE
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	0.01	2008	2009	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.01	1998	2009	TRUE
Virginia's Warbler	<i>Oreothlypis virginiae</i>	0.009	1998	2009	TRUE
Plumbeous Vireo	<i>Vireo plumbeus</i>	0.009	1998	2009	TRUE
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.008	1998	2009	TRUE
Black-billed Magpie	<i>Pica hudsonia</i>	0.008	1998	2009	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.007	1998	2009	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.007	1998	2009	TRUE
Townsend's Solitaire	<i>Myadestes townsendi</i>	0.007	1998	2009	TRUE
Clark's Nutcracker	<i>Nucifraga columbiana</i>	0.007	2000	2009	TRUE
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>	0.006	1998	2009	TRUE
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.006	1998	2009	TRUE
Pygmy Nuthatch	<i>Sitta pygmaea</i>	0.006	1999	2009	TRUE
Wilson's Warbler	<i>Cardellina pusilla</i>	0.005	1998	1999	TRUE
Rock Pigeon	<i>Columba livia</i>	0.005	1998	1998	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.005	2001	2001	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.005	1998	2009	TRUE
Mountain Bluebird	<i>Sialia currucoides</i>	0.005	1998	2009	TRUE
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.005	1998	1998	TRUE
Lincoln's Sparrow	<i>Melospiza lincolni</i>	0.004	1998	2009	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.004	1998	2009	TRUE
Lazuli Bunting	<i>Passerina amoena</i>	0.004	1998	2005	TRUE
Common Grackle	<i>Quiscalus quiscula</i>	0.004	1998	2008	TRUE
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	0.004	2001	2009	TRUE
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.003	1999	2009	TRUE
Hammond's Flycatcher	<i>Empidonax hammondii</i>	0.003	1998	2006	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.003	1999	2009	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.003	1998	2006	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.003	1998	2009	TRUE
Vesper Sparrow	<i>Pooecetes gramineus</i>	0.003	2001	2007	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.003	2000	2009	TRUE
Western Bluebird	<i>Sialia mexicana</i>	0.003	2007	2009	TRUE
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	0.003	1998	2009	TRUE
Canyon Wren	<i>Catherpes mexicanus</i>	0.002	2002	2005	TRUE
Blue Jay	<i>Cyanocitta cristata</i>	0.002	1999	2001	TRUE
Rock Wren	<i>Salpinctes obsoletus</i>	0.002	1998	2006	TRUE
Canada Goose	<i>Branta canadensis</i>	0.01	1999	2008	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Common Nighthawk	<i>Chordeiles minor</i>	0.008	1999	2009	FALSE
Ring-necked Duck	<i>Aythya collaris</i>	0.006	2005	2005	FALSE
Common Merganser	<i>Mergus merganser</i>	0.006	2005	2008	FALSE
Wilson's Snipe	<i>Gallinago delicata</i>	0.004	1998	2002	FALSE
Spotted Sandpiper	<i>Actitis macularius</i>	0.003	1999	2008	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.003	1999	2006	FALSE
Osprey	<i>Pandion haliaetus</i>	0.003	1999	2006	FALSE
Western Grebe	<i>Aechmophorus occidentalis</i>	0.002	2001	2001	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.002	2001	2009	FALSE
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	0.002	2001	2001	FALSE
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	0.002	2006	2006	FALSE
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	0.002	1998	2006	FALSE

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D.26 D13 – RELOCATABLE – MOAB (Moab)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the CANYON RIMS route (Utah Route 318) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Horned Lark	<i>Eremophila alpestris</i>	0.383	1998	2011	TRUE
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	0.078	1999	2011	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.07	1998	2011	TRUE
Brewer's Sparrow	<i>Spizella breweri</i>	0.065	1998	2011	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.058	1998	2011	TRUE
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.046	1998	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.044	1998	2011	TRUE
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.039	1998	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.038	1998	2011	TRUE
Rock Wren	<i>Salpinctes obsoletus</i>	0.033	1998	2011	TRUE
Vesper Sparrow	<i>Pooecetes gramineus</i>	0.029	1998	2006	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.027	1998	2010	TRUE
White-throated Swift	<i>Aeronautes saxatalis</i>	0.023	2001	2002	TRUE
Black-throated Sparrow	<i>Amphispiza bilineata</i>	0.023	1998	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.021	1999	2009	TRUE
Sage Thrasher	<i>Oreoscoptes montanus</i>	0.019	1998	2011	TRUE
Bushtit	<i>Psaltriparus minimus</i>	0.018	2003	2003	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.016	2008	2009	TRUE
Mountain Bluebird	<i>Sialia currucoides</i>	0.014	2000	2010	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.014	1998	2010	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.012	2001	2010	TRUE
Orange-crowned Warbler	<i>Oreothlypis celata</i>	0.012	2005	2005	TRUE
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	0.012	1998	2010	TRUE
Say's Phoebe	<i>Sayornis saya</i>	0.011	1998	2010	TRUE
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	0.01	2007	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Western Scrub-Jay	<i>Aphelocoma californica</i>	0.009	1999	2010	TRUE
Eastern Kingbird	<i>Tyrannus tyrannus</i>	0.009	2002	2010	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.009	2007	2010	TRUE
Black-billed Magpie	<i>Pica hudsonia</i>	0.007	1998	2004	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.006	2000	2006	TRUE
Cassin's Kingbird	<i>Tyrannus vociferans</i>	0.006	2003	2011	TRUE
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	0.005	2009	2009	TRUE
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.005	2006	2006	TRUE
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.004	2000	2001	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.003	1998	1998	TRUE
American Robin	<i>Turdus migratorius</i>	0.003	1998	1998	TRUE
American Kestrel	<i>Falco sparverius</i>	0.009	2009	2009	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.007	1998	2007	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.005	2001	2006	FALSE
Ferruginous Hawk	<i>Buteo regalis</i>	0.004	1998	2004	FALSE

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D.27 D14 – CORE – SRER (Santa Rita Experimental Range)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the SAHUARITA route (Arizona Route 82) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Cactus Wren	<i>Campylorhynchus brunneicapillus</i>	0.135	1992	2011	TRUE
Lucy's Warbler	<i>Oreothlypis luciae</i>	0.078	1992	2011	TRUE
Black-throated Sparrow	<i>Amphispiza bilineata</i>	0.07	1992	2011	TRUE
Inca Dove	<i>Columbina inca</i>	0.068	1993	2006	TRUE
White-winged Dove	<i>Zenaida asiatica</i>	0.066	1992	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.055	1992	2011	TRUE
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.044	1992	2011	TRUE
Rufous-winged Sparrow	<i>Peucaea carpalis</i>	0.04	1995	2011	TRUE
Curve-billed Thrasher	<i>Toxostoma curvirostre</i>	0.04	1992	2011	TRUE
Verdin	<i>Auriparus flaviceps</i>	0.029	1992	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.029	1992	2011	TRUE
Northern Cardinal	<i>Cardinalis cardinalis</i>	0.025	1992	2011	TRUE
Botteri's Sparrow	<i>Peucaea botterii</i>	0.022	1992	2010	TRUE
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	0.021	1992	2011	TRUE
Bell's Vireo	<i>Vireo bellii</i>	0.021	1992	2011	TRUE
Canyon Towhee	<i>Melospiza fusca</i>	0.018	1992	2010	TRUE
Gilded Flicker	<i>Colaptes chrysoides</i>	0.013	1992	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.013	1992	2011	TRUE
Greater Roadrunner	<i>Geococcyx californianus</i>	0.013	1992	2011	TRUE
Gila Woodpecker	<i>Melanerpes uropygialis</i>	0.013	1992	2011	TRUE
Ladder-backed Woodpecker	<i>Picoides scalaris</i>	0.013	1992	2011	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.013	1992	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.012	1992	2011	TRUE
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	0.011	1992	2010	TRUE
House Sparrow	<i>Passer domesticus</i>	0.011	2001	2001	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Pyrrhuloxia	<i>Cardinalis sinuatus</i>	0.009	1992	2011	TRUE
Bullock's Oriole	<i>Icterus bullockii</i>	0.009	2009	2009	TRUE
Abert's Towhee	<i>Melospiza aberti</i>	0.009	1993	2001	TRUE
Purple Martin	<i>Progne subis</i>	0.009	1993	2011	TRUE
Hooded Oriole	<i>Icterus cucullatus</i>	0.008	2009	2011	TRUE
Scott's Oriole	<i>Icterus parisorum</i>	0.008	1992	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.008	1993	2007	TRUE
Cassin's Kingbird	<i>Tyrannus vociferans</i>	0.008	1992	2011	TRUE
Chihuahuan Raven	<i>Corvus cryptoleucus</i>	0.007	1994	2010	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.007	1993	2011	TRUE
Lesser Goldfinch	<i>Spinus psaltria</i>	0.007	2006	2011	TRUE
Bewick's Wren	<i>Thryomanes bewickii</i>	0.007	1992	2010	TRUE
Black-tailed Gnatcatcher	<i>Poliptila melanura</i>	0.006	1993	2011	TRUE
Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>	0.006	1993	2011	TRUE
White-throated Swift	<i>Aeronautes saxatalis</i>	0.005	1993	2009	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.005	1994	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1993	1993	TRUE
Bronzed Cowbird	<i>Molothrus aeneus</i>	0.004	1992	2007	TRUE
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.004	1993	1995	TRUE
Black-chinned Sparrow	<i>Spizella atrogularis</i>	0.004	1992	2006	TRUE
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	0.003	2007	2011	TRUE
Costa's Hummingbird	<i>Calypte costae</i>	0.003	2010	2010	TRUE
Northern Beardless-Tyrannulet	<i>Camptostoma imberbe</i>	0.003	1992	2001	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.003	2011	2011	TRUE
Dusky-capped Flycatcher	<i>Myiarchus tuberculifer</i>	0.003	2006	2011	TRUE
Varied Bunting	<i>Passerina versicolor</i>	0.003	2010	2010	TRUE
Cassin's Sparrow	<i>Peucaea cassinii</i>	0.003	1993	2006	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.003	2010	2010	TRUE
Plumbeous Vireo	<i>Vireo plumbeus</i>	0.003	2011	2011	TRUE
Canyon Wren	<i>Catherpes mexicanus</i>	0.002	1992	2009	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.002	2009	2009	TRUE
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	0.002	1995	1995	TRUE
Hepatic Tanager	<i>Piranga flava</i>	0.002	1992	2011	TRUE
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	0.002	2001	2007	TRUE
Rock Wren	<i>Salpinctes obsoletus</i>	0.002	1992	2006	TRUE
Say's Phoebe	<i>Sayornis saya</i>	0.002	2001	2001	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.002	1995	2010	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	0.002	2009	2009	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Gambel's Quail	<i>Callipepla gambelii</i>	0.077	1992	2011	FALSE
Scaled Quail	<i>Callipepla squamata</i>	0.012	1993	2011	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.011	1992	2011	FALSE
Western Screech-Owl	<i>Megascops kennicottii</i>	0.01	2008	2008	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.007	1992	2011	FALSE
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	0.007	1993	2011	FALSE
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	0.003	2008	2008	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.002	1993	1993	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.002	2009	2009	FALSE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.002	1993	2009	FALSE
American Kestrel	<i>Falco sparverius</i>	0.002	1993	2009	FALSE

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D.28 D14 – RELOCATABLE – JORN (Jornada Experimental Range)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the JORNADA route (New Mexico Route 27) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Black-throated Sparrow	<i>Amphispiza bilineata</i>	0.168	1974	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.111	1974	2011	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.099	1974	2011	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.097	1974	2011	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.07	1977	1977	TRUE
House Sparrow	<i>Passer domesticus</i>	0.052	1974	2011	TRUE
Cassin's Sparrow	<i>Peucaea cassinii</i>	0.037	1975	2010	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.035	1974	2011	TRUE
Eastern Meadowlark	<i>Sturnella magna</i>	0.031	1974	2011	TRUE
Cactus Wren	<i>Campylorhynchus brunneicapillus</i>	0.029	1974	2011	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.025	1974	2011	TRUE
Chihuahuan Raven	<i>Corvus cryptoleucus</i>	0.022	1974	2011	TRUE
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.018	1974	2011	TRUE
Scott's Oriole	<i>Icterus parisorum</i>	0.017	1974	2011	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.017	1974	2011	TRUE
Verdin	<i>Auriparus flaviceps</i>	0.014	1974	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.012	1974	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.012	1974	2011	TRUE
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	0.012	1975	2011	TRUE
Pyrrhuloxia	<i>Cardinalis sinuatus</i>	0.011	1974	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.011	1974	2010	TRUE
White-winged Dove	<i>Zenaida asiatica</i>	0.011	1987	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.01	1990	2007	TRUE
Bullock's Oriole	<i>Icterus bullockii</i>	0.01	1974	2010	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.01	1978	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
European Starling	<i>Sturnus vulgaris</i>	0.008	1974	2000	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.007	1978	2010	TRUE
Greater Roadrunner	<i>Geococcyx californianus</i>	0.007	1974	2011	TRUE
Ladder-backed Woodpecker	<i>Picoides scalaris</i>	0.007	1976	2011	TRUE
Black-tailed Gnatcatcher	<i>Poliophtila melanura</i>	0.007	1981	2009	TRUE
Crissal Thrasher	<i>Toxostoma crissale</i>	0.006	1974	2011	TRUE
Curve-billed Thrasher	<i>Toxostoma curvirostre</i>	0.006	1977	2011	TRUE
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	0.005	1977	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.005	1974	1978	TRUE
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.005	1976	2011	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.004	2004	2006	TRUE
Orchard Oriole	<i>Icterus spurius</i>	0.004	1980	1980	TRUE
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0.004	1980	1980	TRUE
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.004	1990	2002	TRUE
Cassin's Kingbird	<i>Tyrannus vociferans</i>	0.004	1987	1990	TRUE
Common Raven	<i>Corvus corax</i>	0.003	1981	2011	TRUE
Yellow-breasted Chat	<i>Icteria virens</i>	0.003	1987	1989	TRUE
Bronzed Cowbird	<i>Molothrus aeneus</i>	0.003	1997	2004	TRUE
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.003	1974	2007	TRUE
Rock Wren	<i>Salpinctes obsoletus</i>	0.003	1979	1999	TRUE
Black Phoebe	<i>Sayornis nigricans</i>	0.003	1978	1981	TRUE
Say's Phoebe	<i>Sayornis saya</i>	0.003	1975	2011	TRUE
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	0.003	1999	1999	TRUE
Lesser Goldfinch	<i>Spinus psaltria</i>	0.003	1981	2009	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.003	1979	2010	TRUE
White-throated Swift	<i>Aeronautes saxatalis</i>	0.002	2001	2010	TRUE
Lark Bunting	<i>Calamospiza melanocorys</i>	0.002	1979	1979	TRUE
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.002	1997	1997	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.002	1988	1988	TRUE
Canyon Towhee	<i>Melospiza fusca</i>	0.002	1977	1981	TRUE
Scaled Quail	<i>Callipepla squamata</i>	0.036	1974	2011	FALSE
Gambel's Quail	<i>Callipepla gambelii</i>	0.031	1974	2011	FALSE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.018	1974	2011	FALSE
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	0.011	1979	2009	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.007	1974	2011	FALSE
Burrowing Owl	<i>Athene cunicularia</i>	0.005	1975	2010	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.005	1979	2011	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.005	1978	2006	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Killdeer	<i>Charadrius vociferus</i>	0.003	1976	1982	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.003	1979	2008	FALSE
American Kestrel	<i>Falco sparverius</i>	0.003	1981	2011	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.002	1989	1989	FALSE
Golden Eagle	<i>Aquila chrysaetos</i>	0.002	1998	2001	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.002	2010	2010	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.002	1998	1998	FALSE
Snowy Egret	<i>Egretta thula</i>	0.002	1981	1981	FALSE
White-tailed Kite	<i>Elanus leucurus</i>	0.002	2007	2011	FALSE
Prairie Falcon	<i>Falco mexicanus</i>	0.002	2001	2007	FALSE
Peregrine Falcon	<i>Falco peregrinus</i>	0.002	2010	2010	FALSE
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	0.002	1988	1996	FALSE

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D.29 D15 – CORE – ONAQ (Onaqui-Benmore)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the VERNON route (Utah Route 155) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Western Meadowlark	<i>Sturnella neglecta</i>	0.217	1992	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.125	1992	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.075	1992	2011	TRUE
Brewer's Sparrow	<i>Spizella breweri</i>	0.064	1992	2011	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.062	1992	2011	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.035	1992	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.035	1992	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.034	1992	2011	TRUE
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	0.03	1992	2007	TRUE
Sage Thrasher	<i>Oreoscoptes montanus</i>	0.025	1992	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.024	1992	2011	TRUE
Vesper Sparrow	<i>Poocetes gramineus</i>	0.019	1995	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.018	1993	2010	TRUE
House Sparrow	<i>Passer domesticus</i>	0.017	1993	2011	TRUE
Spotted Towhee	<i>Pipilo maculatus</i>	0.016	1992	2011	TRUE
Black-throated Sparrow	<i>Amphispiza bilineata</i>	0.013	1992	2008	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.011	1992	2011	TRUE
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	0.009	1993	2011	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.009	1992	2011	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.008	1992	2010	TRUE
Chipping Sparrow	<i>Spizella passerina</i>	0.008	1992	2011	TRUE
Western Scrub-Jay	<i>Aphelocoma californica</i>	0.007	1996	2011	TRUE
Black-billed Magpie	<i>Pica hudsonia</i>	0.007	1992	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.006	1993	2002	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
American Robin	<i>Turdus migratorius</i>	0.006	1992	2011	TRUE
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	0.006	1992	2011	TRUE
Rock Pigeon	<i>Columba livia</i>	0.005	1992	2004	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.005	1992	2009	TRUE
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.005	1996	2011	TRUE
Bushtit	<i>Psaltriparus minimus</i>	0.005	1992	2009	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.004	1992	1996	TRUE
Bullock's Oriole	<i>Icterus bullockii</i>	0.004	2010	2011	TRUE
Mountain Bluebird	<i>Sialia currucoides</i>	0.004	1993	2011	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.004	1993	2007	TRUE
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	0.004	2007	2011	TRUE
Gray Flycatcher	<i>Empidonax wrightii</i>	0.003	1997	2010	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.003	2009	2011	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.003	1995	2011	TRUE
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.003	1994	2011	TRUE
Western Tanager	<i>Piranga ludoviciana</i>	0.003	2010	2010	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.003	2005	2006	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.003	1992	2004	TRUE
Plumbeous Vireo	<i>Vireo plumbeus</i>	0.003	1997	2011	TRUE
Juniper Titmouse	<i>Baeolophus ridgwayi</i>	0.002	2007	2007	TRUE
Scott's Oriole	<i>Icterus parisorum</i>	0.002	1992	2001	TRUE
Lazuli Bunting	<i>Passerina amoena</i>	0.002	2001	2007	TRUE
Say's Phoebe	<i>Sayornis saya</i>	0.002	1992	2011	TRUE
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	0.002	2003	2006	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.002	2001	2010	TRUE
Bewick's Wren	<i>Thryomanes bewickii</i>	0.002	1992	1992	TRUE
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.001	1994	2010	TRUE
California Gull	<i>Larus californicus</i>	0.14	1999	2006	FALSE
Ring-necked Pheasant	<i>Phasianus colchicus</i>	0.025	1992	2011	FALSE
Common Nighthawk	<i>Chordeiles minor</i>	0.013	1992	2010	FALSE
Long-billed Curlew	<i>Numenius americanus</i>	0.013	1992	2011	FALSE
Short-eared Owl	<i>Asio flammeus</i>	0.009	1992	2009	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.008	1992	2011	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Killdeer	<i>Charadrius vociferus</i>	0.007	1992	2011	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.006	1992	2011	FALSE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.006	1993	2009	FALSE
Wilson's Snipe	<i>Gallinago delicata</i>	0.006	1993	2011	FALSE
Ferruginous Hawk	<i>Buteo regalis</i>	0.005	1993	2006	FALSE
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	0.005	2000	2009	FALSE
Chukar	<i>Alectoris chukar</i>	0.004	2006	2006	FALSE
Burrowing Owl	<i>Athene cunicularia</i>	0.004	1992	2010	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.003	1993	2008	FALSE
Golden Eagle	<i>Aquila chrysaetos</i>	0.003	1992	2007	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.003	1995	2006	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.003	1996	2009	FALSE
Prairie Falcon	<i>Falco mexicanus</i>	0.003	1992	2006	FALSE
American Kestrel	<i>Falco sparverius</i>	0.003	1992	2011	FALSE
Sandhill Crane	<i>Grus canadensis</i>	0.003	2010	2010	FALSE
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.002	2000	2000	FALSE
Sora	<i>Porzana carolina</i>	0.002	1996	2001	FALSE

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D.30 D17 – CORE – SJER (San Joaquin Experimental Range)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the ONEALS route (California Route 191) – in descending order.

Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
Tricolored Blackbird	<i>Agelaius tricolor</i>	0.215	1983	2011	TRUE
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.141	1972	2011	TRUE
European Starling	<i>Sturnus vulgaris</i>	0.086	1972	2011	TRUE
Western Kingbird	<i>Tyrannus verticalis</i>	0.07	1972	2011	TRUE
Mourning Dove	<i>Zenaida macroura</i>	0.07	1972	2011	TRUE
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	0.054	1972	2011	TRUE
Western Meadowlark	<i>Sturnella neglecta</i>	0.046	1972	2011	TRUE
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.041	1972	2011	TRUE
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.04	1972	2011	TRUE
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.032	1972	2011	TRUE
Oak Titmouse	<i>Baeolophus inornatus</i>	0.029	1972	2011	TRUE
Bullock's Oriole	<i>Icterus bullockii</i>	0.027	1972	2011	TRUE
Western Scrub-Jay	<i>Aphelocoma californica</i>	0.022	1972	2011	TRUE
Common Raven	<i>Corvus corax</i>	0.017	1979	2011	TRUE
Brown-headed Cowbird	<i>Molothrus ater</i>	0.016	1974	2011	TRUE
Lark Sparrow	<i>Chondestes grammacus</i>	0.013	1972	2011	TRUE
Steller's Jay	<i>Cyanocitta stelleri</i>	0.012	1973	1973	TRUE
California Towhee	<i>Melospiza crissalis</i>	0.012	1972	2011	TRUE
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.011	1972	2011	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.01	1974	2011	TRUE
Barn Swallow	<i>Hirundo rustica</i>	0.01	1972	2009	TRUE
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	0.009	1973	1973	TRUE
House Sparrow	<i>Passer domesticus</i>	0.009	1974	2011	TRUE
Bushtit	<i>Psaltriparus minimus</i>	0.008	1972	2011	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Western Bluebird	<i>Sialia mexicana</i>	0.008	1972	2011	TRUE
Lesser Goldfinch	<i>Spinus psaltria</i>	0.007	1972	2011	TRUE
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.007	1972	2011	TRUE
Yellow-billed Magpie	<i>Pica nuttalli</i>	0.006	1972	2005	TRUE
Bewick's Wren	<i>Thryomanes bewickii</i>	0.006	1975	2011	TRUE
American Crow	<i>Corvus brachyrhynchos</i>	0.005	1973	1983	TRUE
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	0.005	1972	2011	TRUE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.004	1972	2003	TRUE
Northern Mockingbird	<i>Mimus polyglottos</i>	0.004	1972	2011	TRUE
Black Phoebe	<i>Sayornis nigricans</i>	0.004	1972	2011	TRUE
Tree Swallow	<i>Tachycineta bicolor</i>	0.004	1979	2009	TRUE
White-throated Swift	<i>Aeronautes saxatalis</i>	0.003	1973	1983	TRUE
Canyon Wren	<i>Catherpes mexicanus</i>	0.003	1972	2011	TRUE
American Goldfinch	<i>Spinus tristis</i>	0.003	1993	2007	TRUE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.003	1974	2009	TRUE
House Wren	<i>Troglodytes aedon</i>	0.003	1973	2011	TRUE
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	0.002	1981	2011	TRUE
Anna's Hummingbird	<i>Calypte anna</i>	0.002	1982	2011	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.002	1972	2006	TRUE
Rock Pigeon	<i>Columba livia</i>	0.002	1973	1983	TRUE
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.002	1976	2005	TRUE
Greater Roadrunner	<i>Geococcyx californianus</i>	0.002	1976	2007	TRUE
Hooded Oriole	<i>Icterus cucullatus</i>	0.002	1996	1996	TRUE
Blue Grosbeak	<i>Passerina caerulea</i>	0.002	2009	2011	TRUE
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.002	1975	2009	TRUE
Spotted Towhee	<i>Pipilo maculatus</i>	0.002	1972	2002	TRUE
Rock Wren	<i>Salpinctes obsoletus</i>	0.002	1972	2009	TRUE
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.002	2003	2005	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.002	1975	2009	TRUE
Lawrence's Goldfinch	<i>Spinus lawrencei</i>	0.002	2000	2008	TRUE
American Robin	<i>Turdus migratorius</i>	0.002	1979	2009	TRUE
Hutton's Vireo	<i>Vireo huttoni</i>	0.002	1987	2005	TRUE
Wilson's Warbler	<i>Cardellina pusilla</i>	0.001	1995	2009	TRUE
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.001	2005	2005	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Willow Flycatcher	<i>Empidonax traillii</i>	0.001	2005	2007	TRUE
Common Yellowthroat	<i>Geothlypis trichas</i>	0.001	2008	2008	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.001	1979	2008	TRUE
Lewis's Woodpecker	<i>Melanerpes lewis</i>	0.001	1993	1993	TRUE
Song Sparrow	<i>Melospiza melodia</i>	0.001	1979	1998	TRUE
Orange-crowned Warbler	<i>Oreothlypis celata</i>	0.001	1999	1999	TRUE
Lazuli Bunting	<i>Passerina amoena</i>	0.001	2008	2008	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.001	1979	1982	TRUE
Western Tanager	<i>Piranga ludoviciana</i>	0.001	1993	2009	TRUE
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	0.001	1977	1995	TRUE
Vesper Sparrow	<i>Poocetes gramineus</i>	0.001	1978	1978	TRUE
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	0.001	2008	2009	TRUE
Warbling Vireo	<i>Vireo gilvus</i>	0.001	2002	2005	TRUE
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.001	1997	1997	TRUE
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	0	2011	2011	TRUE
California Quail	<i>Callipepla californica</i>	0.024	1972	2011	FALSE
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.015	1972	2011	FALSE
Turkey Vulture	<i>Cathartes aura</i>	0.009	1972	2009	FALSE
Killdeer	<i>Charadrius vociferus</i>	0.008	1972	2009	FALSE
American Kestrel	<i>Falco sparverius</i>	0.005	1972	2011	FALSE
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	0.005	2000	2000	FALSE
Mallard	<i>Anas platyrhynchos</i>	0.004	1976	2011	FALSE
California Gull	<i>Larus californicus</i>	0.004	1999	2009	FALSE
Great Blue Heron	<i>Ardea herodias</i>	0.003	1974	2009	FALSE
Canada Goose	<i>Branta canadensis</i>	0.003	2005	2011	FALSE
Prairie Falcon	<i>Falco mexicanus</i>	0.003	1989	1989	FALSE
Wild Turkey	<i>Meleagris gallopavo</i>	0.003	1999	2005	FALSE
Cooper's Hawk	<i>Accipiter cooperii</i>	0.002	1973	1996	FALSE
Golden Eagle	<i>Aquila chrysaetos</i>	0.002	1975	2003	FALSE
Great Horned Owl	<i>Bubo virginianus</i>	0.002	1975	2011	FALSE
Green Heron	<i>Butorides virescens</i>	0.002	1981	2007	FALSE
White-tailed Kite	<i>Elanus leucurus</i>	0.002	1975	1983	FALSE
American Coot	<i>Fulica americana</i>	0.002	1989	2002	FALSE
Common Gallinule	<i>Gallinula galeata</i>	0.002	1979	1979	FALSE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Black-necked Stilt	<i>Himantopus mexicanus</i>	0.002	1979	1979	FALSE
Spotted Sandpiper	<i>Actitis macularius</i>	0.001	1976	1979	FALSE
Wood Duck	<i>Aix sponsa</i>	0.001	1978	2000	FALSE
Cinnamon Teal	<i>Anas cyanoptera</i>	0.001	1981	1981	FALSE
Great Egret	<i>Ardea alba</i>	0.001	1994	2008	FALSE
Red-shouldered Hawk	<i>Buteo lineatus</i>	0.001	2006	2011	FALSE
Swainson's Hawk	<i>Buteo swainsoni</i>	0.001	1987	2009	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.001	1981	1993	FALSE
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	0.001	2009	2009	FALSE
Western Screech-Owl	<i>Megascops kennicottii</i>	0.001	2007	2007	FALSE
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	0.001	1983	1983	FALSE
Osprey	<i>Pandion haliaetus</i>	0.001	2006	2006	FALSE
Pied-billed Grebe	<i>Podilymbus podiceps</i>	0.001	2007	2007	FALSE
Barn Owl	<i>Tyto alba</i>	0.001	1978	2011	FALSE

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D.31 D19 – RELOCATABLE – HEAL (Healy)

Recommended Sampling Window: TBD

Recommended Daily Sampling Period: TBD

Source: TBD

Species Lists:

Mean relative abundances (species abundance/total community abundance) of bird species observed during the Breeding Bird Survey on the SAVAGE route (Alaska Route 115) – in descending order. Source: (Sauer et al. 2011).

commonName	scientificName	meanRA	minYear	maxYear	landbird
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.223	1986	2010	TRUE
American Tree Sparrow	<i>Spizella arborea</i>	0.175	1986	2010	TRUE
Wilson's Warbler	<i>Cardellina pusilla</i>	0.1	1986	2010	TRUE
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.076	1986	2010	TRUE
Orange-crowned Warbler	<i>Oreothlypis celata</i>	0.074	1986	2010	TRUE
Fox Sparrow	<i>Passerella iliaca</i>	0.05	1986	2010	TRUE
Common Redpoll	<i>Acanthis flammea</i>	0.038	1986	2010	TRUE
Dark-eyed Junco	<i>Junco hyemalis</i>	0.037	1986	2010	TRUE
American Robin	<i>Turdus migratorius</i>	0.037	1986	2010	TRUE
Arctic Warbler	<i>Phylloscopus borealis</i>	0.026	1987	2010	TRUE
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.017	1987	2010	TRUE
Gray Jay	<i>Perisoreus canadensis</i>	0.016	1986	2010	TRUE
Varied Thrush	<i>Ixoreus naevius</i>	0.015	1986	2010	TRUE
Hermit Thrush	<i>Catharus guttatus</i>	0.013	1991	2010	TRUE
Swainson's Thrush	<i>Catharus ustulatus</i>	0.012	1986	2010	TRUE
Black-billed Magpie	<i>Pica hudsonia</i>	0.012	1986	2010	TRUE
Yellow Warbler	<i>Setophaga petechia</i>	0.012	1986	2005	TRUE
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	0.01	2001	2010	TRUE
Ruby-crowned Kinglet	<i>Regulus calendula</i>	0.01	1986	2010	TRUE
White-winged Crossbill	<i>Loxia leucoptera</i>	0.009	2004	2009	TRUE
Boreal Chickadee	<i>Poecile hudsonicus</i>	0.007	1986	2009	TRUE
Alder Flycatcher	<i>Empidonax alnorum</i>	0.005	1999	2010	TRUE
Gray-cheeked Thrush	<i>Catharus minimus</i>	0.003	1986	2010	TRUE
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.003	1986	2008	TRUE
Common Raven	<i>Corvus corax</i>	0.003	2000	2010	TRUE
Horned Lark	<i>Eremophila alpestris</i>	0.003	1987	1987	TRUE

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commonName	scientificName	meanRA	minYear	maxYear	landbird
Northern Shrike	<i>Lanius excubitor</i>	0.003	1986	1989	TRUE
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	0.003	1993	1993	TRUE
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.003	1989	2008	TRUE
Blackpoll Warbler	<i>Setophaga striata</i>	0.003	2003	2010	TRUE
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	0.003	1987	2010	TRUE
Northern Flicker	<i>Colaptes auratus</i>	0.002	1994	2007	TRUE
Hairy Woodpecker	<i>Picoides villosus</i>	0.002	2002	2004	TRUE
Belted Kingfisher	<i>Megaceryle alcyon</i>	0.001	2004	2009	TRUE
Downy Woodpecker	<i>Picoides pubescens</i>	0.001	2007	2007	TRUE
Mew Gull	<i>Larus canus</i>	0.035	1987	2010	FALSE
Willow Ptarmigan	<i>Lagopus lagopus</i>	0.018	1986	2010	FALSE
Harlequin Duck	<i>Histrionicus histrionicus</i>	0.008	1994	2007	FALSE
Wilson's Snipe	<i>Gallinago delicata</i>	0.006	1986	2007	FALSE
Golden Eagle	<i>Aquila chrysaetos</i>	0.005	1997	2010	FALSE
Whimbrel	<i>Numenius phaeopus</i>	0.005	1994	2002	FALSE
Wandering Tattler	<i>Tringa incana</i>	0.005	1986	1986	FALSE
Spotted Sandpiper	<i>Actitis macularius</i>	0.004	1986	1991	FALSE
Barrow's Goldeneye	<i>Bucephala islandica</i>	0.004	1997	2008	FALSE
Merlin	<i>Falco columbarius</i>	0.004	1994	2009	FALSE
Northern Hawk Owl	<i>Surnia ulula</i>	0.004	1997	2009	FALSE
Green-winged Teal	<i>Anas crecca</i>	0.003	1998	1998	FALSE
Short-eared Owl	<i>Asio flammeus</i>	0.003	1999	2010	FALSE
Upland Sandpiper	<i>Bartramia longicauda</i>	0.003	1997	1997	FALSE
Northern Harrier	<i>Circus cyaneus</i>	0.002	2009	2009	FALSE
American Kestrel	<i>Falco sparverius</i>	0.002	2002	2005	FALSE
Bald Eagle	<i>Haliaeetus leucocephalus</i>	0.002	2009	2009	FALSE
Semipalmated Plover	<i>Charadrius semipalmatus</i>	0.001	2004	2006	FALSE
Herring Gull	<i>Larus argentatus</i>	0.001	2007	2007	FALSE

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APPENDIX E UNKNOWN BIRD CODES

If you detect a bird that you are unable to identify, use the appropriate unknown bird code (below). Never guess on the identity of a bird. This is falsifying data. If you are unsure, record UNBI rather than incorrectly identifying a bird. However, recording a lot of unidentified birds is an indication that you need to study up and practice before performing more point counts.

Bird Type	Code
Unknown Accipiter	UNAC
Unknown Bird	UNBI
Unknown Blackbird	UNBL
Unknown Buteo	UNBU
Unknown Chickadee	UNCH
Unknown Corvid	UNCO
Unknown Dove	UNDO
Unknown Duck	UNDU
Unknown Empidonax	UNEM
Unknown Falcon	UNFA
Unknown Finch	UNFI
Unknown Flycatcher	UNFL
Unknown Gnatcatcher	UNGN
Unknown Grouse	UNGR
Unknown Gull	UNGU
Unknown Hawk	UNHA
Unknown Hummingbird	UNHU
Unknown Jay	UNJA
Unknown Nuthatch	UNNU
Unknown Oriole	UNOR
Unknown Owl	UNOW
Unknown Pipit	UNPI
Unknown Raptor	UNRA
Unknown Sparrow	UNSP
Unknown Swallow	UNSW
Unknown Swift	UNSI
Unknown Tanager	UNTA
Unknown Thrush	UNTH
Unknown Thrasher	UNTR
Unknown Vireo	UNVI
Unknown Warbler	UNWA
Unknown Woodpecker	UNWO
Unknown Wren	UNWR

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APPENDIX F CLUSTER INFORMATION

Clusters consist of either flocks or paired birds – i.e., birds of the same species observed together (foraging, flying, perching, or obviously interacting with each other). Two males of the same species singing 20 meters apart do NOT constitute a cluster.

How to record clusters:

Flocks: When two or more individuals of the same species are obviously in a flock and cannot be readily sexed (e.g. Cliff Swallow or Pine Siskin), record the distance to the center of the flock and record the number of individuals in the “Cluster Size” column of your data form. You do not need to enter a Cluster Code. When you can determine sex, enter the number of males on one line, and the number of females on the next line, with the appropriate number of each sex in the corresponding “Cluster Size” boxes.

Then enter the same letter on both lines for the “Cluster Code” (a, b, c ...). The Cluster Code is only used to link clusters that take up multiple lines on the data sheet.

Pairs: Often you may hear a bird singing or calling, look up, and see that it is a male bird with a female perched or foraging nearby. Or you may see one individual moving about, raise your binoculars to identify it, and observe that there are actually two individuals of the same species but opposite sex in that location. In these cases, enter the male and female on separate lines of your data form, with the appropriate codes for “HOW” detected. In the first scenario, the male “HOW” = S(inging) and the female “HOW” = V(usual). In the second scenario, “HOW” = V(usual) for both the male and female. In both cases enter the same letter for the “Cluster Code” of each member of the pair.