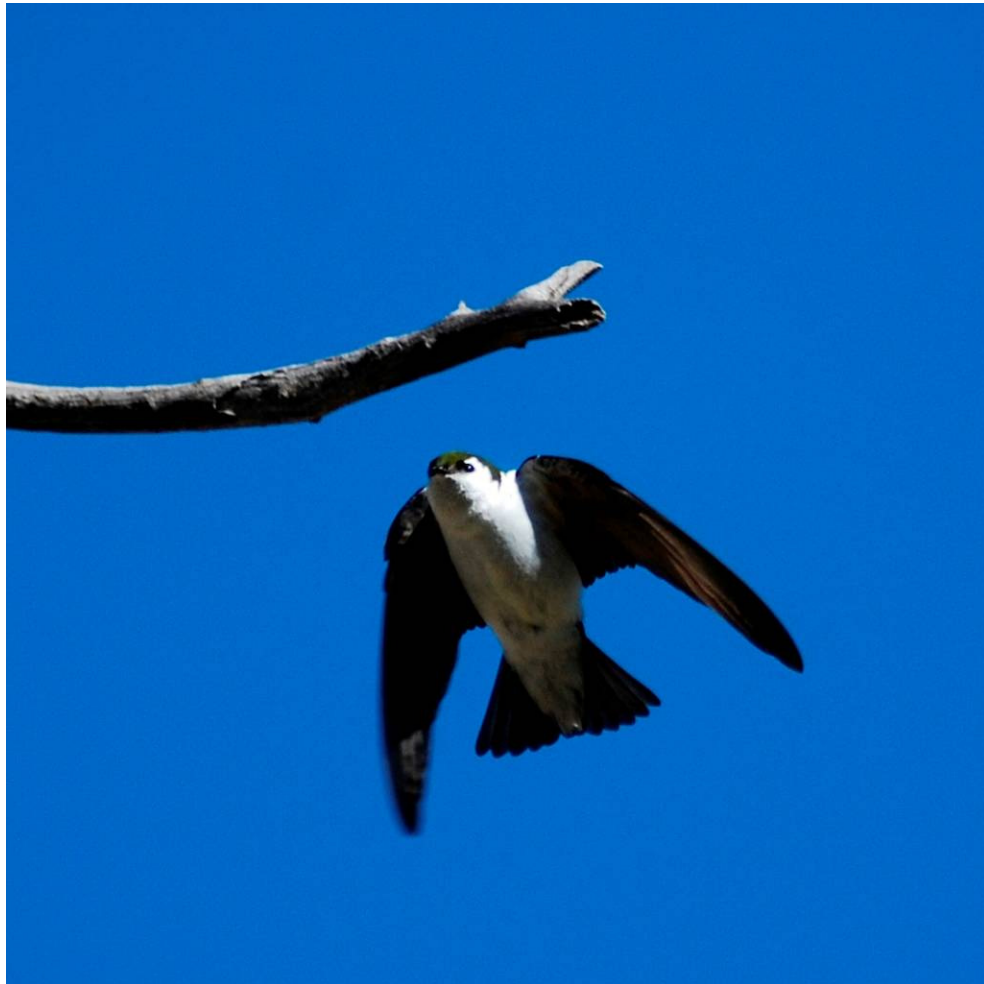


# Rocky Mountain Bird Observatory

## Field Protocol for Spatially Balanced Sampling of Landbird Populations





# ROCKY MOUNTAIN BIRD OBSERVATORY

**Mission:** *To conserve birds and their habitats*

**Vision:** *Native bird populations are sustained in healthy ecosystems*

**Core Values:** *(Our goals for achieving our mission)*

1. **Science** provides the foundation for effective bird conservation.
2. **Education** is critical to the success of bird conservation.
3. **Stewardship** of birds and their habitats is a shared responsibility.

**RMBO accomplishes its mission by:**

**Partnering** with state and federal natural resource agencies, private landowners, schools, and other nonprofits for conservation.

**Studying** bird responses to habitat conditions, ecological processes, and management actions to provide scientific information that guides bird conservation efforts.

**Monitoring** long-term trends in bird populations for our region.

**Providing** active, experiential, education programs that create an awareness and appreciation for birds.

**Sharing** the latest information in land management and bird conservation practices.

**Developing** voluntary, working partnerships with landowners to engage them in conservation.

**Working** across political and jurisdictional boundaries including, counties, states, regions, and national boundaries. Our conservation work emphasizes the Western United States, including the Great Plains, as well as Latin America.

**Creating** informed publics and building consensus for bird conservation needs.

## **Suggested Citation:**

Hanni, D. J., C. M. White, R.A. Sparks, J. A. Blakesley, G. J. Levandoski, and J. J. Birek. 2009. Field protocol for spatially-balanced sampling of landbird populations. Unpublished report. Rocky Mountain Bird Observatory, Brighton, CO. 33 pp.

## **Cover Photos:**

Violet-green Swallow by Jeff Birek – [jeff.birek@rmbo.org](mailto:jeff.birek@rmbo.org)

## **Contact Information:**

David Hanni

[david.hanni@rmbo.org](mailto:david.hanni@rmbo.org)

Chris White

[chris.white@rmbo.org](mailto:chris.white@rmbo.org)

RMBO Fort Collins Office

230 Cherry Street

Fort Collins, CO 80521

970.482.1707

## **ACKNOWLEDGEMENTS**

We sincerely thank the authors of Rocky Mountain Bird Observatory's original point transect protocol (Leukering et. al. 2005): Tony Leukering, Michael Carter, Arvind Panjabi, Douglas Faulkner, and Rich Levad.

# TABLE OF CONTENTS

<b>ACKNOWLEDGEMENTS</b> .....	<b>I</b>
<b>TABLE OF CONTENTS</b> .....	<b>II</b>
<b>I. PROJECT OVERVIEW</b> .....	<b>3</b>
<b>II. MATERIALS</b> .....	<b>3</b>
<b>III. CONDUCTING POINT COUNTS</b> .....	<b>3</b>
<b>IV. POTENTIAL ISSUES WHEN CONDUCTING POINT COUNTS</b> .....	<b>5</b>
<b>V. LITERATURE CITED</b> .....	<b>7</b>
<b>APPENDIX A. EXPLANATION OF FIELD FORMS AND DATA CODES</b> .....	<b>8</b>
I. TRANSECT DESCRIPTION SHEET .....	8
II. VEGETATION DATA SHEET .....	9
III. BIRD DATA.....	13
IV. OTHER IMPORTANT INFORMATION.....	18
<b>APPENDIX B. LOW-DENSITY TARGET SPECIES (“88” BIRDS)</b> .....	<b>19</b>
I. COLORADO .....	19
II. WYOMING.....	20
III. BLACK HILLS NATIONAL FOREST .....	21
<b>APPENDIX C. GUIDELINES FOR CLASSIFYING STRUCTURAL STAGE BY HABITAT</b> .....	<b>22</b>
<b>APPENDIX D. KEY OF TWO-LETTER CODES FOR SHRUBS AND TREES</b> .....	<b>24</b>
<b>APPENDIX E. OPTIMAL DATES FOR CONDUCTING SURVEYS</b> .....	<b>27</b>
<b>APPENDIX F. FOUR-LETTER BIRD CODES</b> .....	<b>28</b>
<b>APPENDIX G. GPS NAMING SYSTEM</b> .....	<b>30</b>
<b>APPENDIX H. SAMPLE TRANSECT DESCRIPTION SHEET</b> .....	<b>31</b>
<b>APPENDIX I. SAMPLE VEGETATION DATA SHEET</b> .....	<b>32</b>

## I. PROJECT OVERVIEW

Rocky Mountain Bird Observatory (RMBO) in cooperation with the USDA Forest Service, Bureau of Land Management, National Park Service, and other agencies, developed a program to monitor bird populations utilizing point counts as the primary sampling technique. We designed this program to be statistically rigorous, biologically accurate, and to produce data for analyses of population trends for most diurnal, regular-breeding landbird species. This document provides details of the design and of the operation of our monitoring program. We intend this protocol to instruct our field workers on how to conduct point counts and for others to follow when establishing monitoring projects of their own, so that the design and methods are comparable.

Please note that the configuration of survey points has changed from previous survey designs. Survey points are arranged in a 4 x 4 grid of 16 points, with 250 m spacing between points. Grids are selected using a spatially balance sampling algorithm (Blakesley and Hanni 2009). Grids are generally selected without regard to habitat type, except for some grids placed within riparian corridors. In some instances, grids are stratified by land ownership (National Forests, National Grasslands, National Parks, BLM land, etc

## II. MATERIALS

Before heading out into the field, each technician should be sure to have the following equipment (RMBO will supply all materials unless otherwise indicated below):

- A. Timepiece** with a countdown timer and a chime;
- B. Binoculars** (*you must provide this*);
- C. Declination-adjustable compass** with sighting capability (i.e., a mirror);
- D. Clipboard** (with instruction sheets/lists attached);
- E. Writing utensils** in case you lose one (pencil or indelible ink pen) (*3 pencils will be provided by RMBO at the start of the field season; if you lose these you must provide additional writing utensils*);
- F. GPS unit** with grid locations loaded onto it;
- G. Rangefinder**;
- H. Extra batteries**;
- I. Data forms** sufficient for all the points planned that morning;
- J. Plant ID guide**;
- K. Maps and transect locations**;
- L. Master list of four-letter codes** and;
- M. Master list of weather and habitat codes**, taped to the clipboard.

## III. CONDUCTING POINT COUNTS

### A. Seasonal Timing

Point counts should be performed after all migratory species have returned to their breeding areas and as early in the season as possible, but beware of performing them too early and potentially counting transient migrants, or missing some of the breeders that have not yet arrived. Counts performed in grasslands in late May are not comparable to counts performed in the same habitat in early July, as most locally-breeding species have completed nesting and are much less vocal in July than they were in May. Please see Appendix E for the list of dates that are optimal for surveying grids. In addition to seasonal timing, observers should survey each individual point-

count grid during the time of day that songbirds are most detectable. Observers should start conducting point counts approximately ½ hour before sunrise (once there is enough light to ID birds by sight) and finished before 11am (preferably before 10am).

## **B. Point Counts**

You will receive a GPS unit with all of the points for your transects pre-loaded onto it. Follow the GPS unit to each point count station (we will practice this during training). Please see Appendix G for a description of how transects are labeled within the GPS unit. Upon reaching a point, fill out the GPS accuracy and habitat data on the field forms **first**. **DO NOT begin counting until after this is done** (however, do identify and make a mental note of the locations of any birds flushed from around the count station upon your approach). Filling out the habitat data first is important for two reasons: 1) it will ensure that you do not forget to write it down, and 2) it will allow the local birds to “settle down” somewhat after the disturbance you created when approaching the point. Please see **Appendix A: Explanation of field forms and data codes** for more instructions on how to record habitat and bird data.

### **1. Habitat Data**

Fill in the habitat data for each of the 16 points **while at the point**. We will use the habitat data to relate bird density to vegetation features and habitat types. This information will have real applications for managing habitats for birds, so please be as accurate as possible with these data.

### **2. Bird Data**

After recording the general habitat data at the point count station activate your timepiece and begin recording the birds you see or hear. **The count duration is 5 minutes**. Place a mark (draw a line between detections) on the bird datasheet between birds recorded in each one-minute interval (see Appendix J: Sample Bird Data Sheet). To do this, simply start the timer, and when you hear the first beep (at one minute), draw a line under the last bird recorded and keep recording new birds until you hear the second beep (at two minutes). Then, draw another line under the last bird recorded and continue to draw lines under the last bird detected in each one-minute interval until the 5<sup>th</sup> beep when the count at this point is over. DO NOT record any other birds after the 5 minutes are over, even if it is an interesting bird (you could record this bird in the notes if you so desire). However, if the species is an “88” bird, then you can record it as such on the data sheet after the point data (see “88” bird info below). If you do not detect any birds during a minute interval, record **NOBI** (No Birds) in that interval. We are providing a time piece that beeps every minute and you must learn how to use it properly (we will go over this at training). Please make certain that the time piece’s beeper is on and is functioning correctly as it is impossible to pay attention to the birds and to note how much time (by looking at your time piece) has passed at the same time. If, during your 5 minute survey, you detect a bird that was flushed from the survey point upon your arrival, record the bird’s original distance from the survey point, because we assume that these birds would have remained at their original locations were it not for the disturbance created by the observer.

For each independently detected bird, you will record:

- 1) the **species**, using the appropriate four-letter code,
- 2) the **distance** (determined with a rangefinder) from you to the bird,
- 3) **how** the bird was detected (by song, call, drumming, other aural cues, or

- visually)
- 4) the **sex** of the bird, if known (if the bird is a juvenile, put in J for sex),
  - 5) the **cluster size** and **cluster ID** code for any birds observed as part of a cluster (i.e., non-independent detections). Please see Appendix A for further instructions on how to distinguish and record clusters.

While conducting counts, be sure to focus primarily on birds that are close to the point. While we do ask you to record all birds detected, distant birds have little effect on density estimates. However, missing close birds can have a significant effect on density estimates. Also, be sure to look and listen in all directions, including up. It is best to slowly rotate in place while you are counting; making three complete turns in the five minutes is probably adequate. **Don't forget to look up!** It is very important to stay in one place while counting. It is acceptable to take a step or two away from the point in order to identify a bird that you have detected from a point, but cannot identify from the point, but **ALWAYS** return ASAP to the point. Do NOT chase birds before or during the count. After the five minutes are up, you may chase down a bird that you couldn't identify on the point in order to get an identification for the point, but do not leave the point during the five minutes and do NOT record birds that were only found while chasing another bird after the count. **Remember: Consistency of methods and coverage is the key to useful data!**

Be aware of what is going on around you and realize that you may hear or see individual birds on multiple points. It is okay to record the same bird on multiple points only if the bird has not moved from the location where you originally detected it. For example, if you see a Western Meadowlark on a powerline, and that same Western Meadowlark is visible from the next two points in the same location, you would record it on all three point counts. However, if you see a Red-tailed Hawk soaring above you, and still see the hawk soaring on another point, only record this bird once.

## IV. POTENTIAL ISSUES WHEN CONDUCTING POINT COUNTS

### A. Window species

This is "listening through" (not detecting) a particular common species because you are habituated to it (Mourning Dove is a common window species).

### B. Look and Listen everywhere

Be sure to look up regularly, particularly in taller forest types and, particularly if you are wearing a hat. **Do not wear sunglasses or hats that can affect your hearing while counting birds!** This includes caps that pull down over your ears as well as full-brimmed hats that can deflect sound away from your ears. Be sure to look and listen in all directions (try to look and listen in all directions equally).

### C. Stand at Points

**Do not sit or kneel** as this can reduce the number of individuals recorded, by decreasing visibility, audibility and dexterity. If you are tired, take a short break after the point count. As long as you start early, you should have plenty of time to rest along the way.

### D. NO Pishing

Do not attract birds to you. Pishing is permissible after the count in order to attempt to identify an individual that was not identifiable on the count, but do not add other individuals after the count that were not first detected during the count period. **Never**



**ish or attract birds toward you when you are near a point that has not been completed!**

### **E. Airplane (and other) Noise**

If audibility of birds is reduced by mechanical noise, interrupt the count (i.e., stop your timer), and restart when the noise abates so that the total time still equals a five-minute count.

### **F. Guessing**

Never guess on the identity of a bird. Instead, use an unknown code (e.g. unidentified sparrow - UNSP) for those individuals about which you're not sure. However, recording a lot of unidentified birds is an indication that you need to learn/practice more before performing point counts. If you are unsure of the correct unknown code, make a note in the comments section so you can write the correct code in later.

### **G. Know the Area**

The day before conducting a point count survey, check out your survey area and familiarize yourself with the habitats found within the grid so you know what to expect. Plan out an access route during the daylight the day before, that way you will be able to find your way easier if you have to hike in the dark the next morning.

### **H. Practice**

Practice in habitat before counting for real. Be familiar with the songs and calls of all species found in a habitat before conducting point counts in that habitat. Use habitat-specific bird data queried from the RMBO Avian Data Center website ([www.rmbo.org/public/monitoring/countseffort.aspx](http://www.rmbo.org/public/monitoring/countseffort.aspx)) along with audio recordings to practice before (and during) the field season.

### **I. Weather**

Weather can always be a factor when conducting point counts. Never conduct a point count when it is raining, as birds will not be very active and visibility may be poor. Also, do not conduct a point count if the wind is strong enough to hinder your ability to hear bird calls and songs, as this will affect the number of birds you are able to detect.

## **V. LITERATURE CITED**

Blakesley, J.A. and D. J. Hanni. 2009. Monitoring Colorado's Birds, 2008. Tech. Rep. M-MCB08-01. Rocky Mountain Bird Observatory, Brighton, CO. 39 pp.

Buckland, S. T., D. R. Anderson, K. P. Burnham, J. L. Laake, D. L. Borchers, and L. Thomas. 2001. Introduction to distance sampling. Oxford University Press, London, UK.

## APPENDIX A. EXPLANATION OF FIELD FORMS AND DATA CODES

Please refer to Appendices H, I, and J to view example data sheets while reading the information below.

### I. Transect Description Sheet

#### A. Observer Initials

Record your first, middle, and last initials here.

#### B. Date Conducted

Record the date you sampled the transect.

#### C. Transect Accessible to

Please record how accessible the transect is (all vehicles, high-clearance, or 4WD). It is important for us to know the accessibility of each transect so that we can assign them to field technicians according to the type of vehicle they drive.

#### D. DeLorme Page

Don't forget to record the DeLorme page and coordinates the transect is on. This allows future field technicians to quickly locate the transect on the road map.

#### E. Access Point UTM's

See "G. Directions to Access Point" below.

#### F. Time Required to do the Transect

It is helpful to have an idea of what to expect before conducting a transect. Some transects are located on easy terrain and can be conducted relatively quickly, while others are on very difficult terrain and take a long time. Please record the amount of time it took you to conduct this transect so future field technicians can plan accordingly. If the transect required an hour hike to access it, include that time as well. **Note: If the transect is located far from a road and requires you to backpack in the day before, record how many days the transect took you to complete.** This will help future technicians to allow time for these transects.

#### G. Directions to Access Point (VERY IMPORTANT!)

We will provide you with a transect description sheet and topographic map for each transect assigned to you. You may be required to figure out directions to each of your transects using Google Earth (we will also provide you with Google Earth files containing the locations of all transects within your study area). If you do not already have Google Earth on your computer, we recommend you download it (it is a free program that can be found on the internet) and familiarize yourself with it. Once you figure out directions to your transect, record this information on the transect description sheet. Later, when entering your transect data into the database, you will enter this information as well.

Provide explicit directions from some nearby town, major intersection, or geographical feature readily found on a map to the access point in the space provided for directions on the transect description sheet. Provide mileages from intersections or other landmarks using your odometer. Try to locate the most logical and efficient location to access each transect. This location will become the Access Point. This point is the

end location for the directions you provide. For all sites, take GPS readings and record **UTM coordinates** for each access point. Also, **be explicit in your description about the exact location of the access point** (e.g. “the right post of the green metal gate” or “the NE corner of the cattle guard”). We will provide you with a *DeLorme Atlas and Gazetteer*.

Be as clear and accurate as possible when recording directions. Remember, someone will use your directions next year to find these transects.

**Example:** CO-PP17 - From intersection of US 160 & US 84 E of Pagosa Springs, follow US 84 S for about 5 mi. and turn right onto FR 651 (8 Mile Mesa Road). Continue on FR 651 for 4.7 miles to a fork. Take the right fork to a lookout tower in 0.6 mile. The access point is the outhouse near the fire tower. DeLorme page 88 C2.

## H. Transect description

Provide the **distance** and **bearing** *from the access point to the grid, or more specifically, to a first point if it becomes apparent that there is a logical order in which to survey the points. Record recommendations of a survey route through the grid for the subsequent year.* As some of these grids are miles from the nearest road, explicit details of a good route in (if found) will help future technicians greatly. Feel free to provide *between-point accounts* as well, when necessary, describing the topography, habitat, landmarks and/or other features that you pass prior to arriving at the next count station.

## I. Notes, Updates, and Camping Information

Provide directions and a description of camping options in the area. Sometimes, camping is available right at the Access Point. If not, then record direction to where you camped and provide UTMs for that location. It is important for future field technicians to know what their camping options are before arriving at the transect. If camping is unavailable (e.g., the transect is surrounded by private land) then record where you stayed.

Enter information relevant to the site, problems encountered during the transect, interesting birds seen, cool scenery, or other tidbits that either don't really fit in other places or that future surveyors might find interesting.

## II. Vegetation Data Sheet

### A. Site Data

1. **Observer:** Enter your first and middle initials and your full last name
2. **Date:** Enter the date in the format: MM-DD-YY
3. **GPS Unit #:** Enter the number from the RMBO silver property tag on the back of your GPS unit
4. **Transect ID:** Enter the full character code identifying the strata and number (e.g. CO-BCR16-AR8)
5. **Access Point:** Mark the access point using your GPS unit and record the coordinates on the data sheet. If a transect is located far from any road, it is still useful to pick a logical place to leave your vehicle and record that location.

**6. Time:** Enter start and stop times for entire point count grid (not individual points) using 24-hour clock

**7. Sky:** (start and end): Enter one-digit codes at beginning and end of the point count grid (not at points)

0=0-15% cloud cover    1=16-50% cloud cover    2=51-75% cloud cover

3=76-100% cloud cover    5=fog    6=drizzle

8=Light snow    9=T'storm, precipitation or not

**You shouldn't survey in any other conditions!**

**8. Wind:** (start and end): Enter one-digit codes at beginning and end of the point count grid:

0=Less than 1 mph; smoke rises vertically

1=1-3 mph; smoke drift shows wind direction

2=4-7 mph; leaves rustle, wind is felt on face

3=8-12 mph; leaves, small twigs in constant motion; light flag extended

4=13-18 mph; raises dust, leaves, loose paper; small branches in motion

**You shouldn't survey in any other conditions!**

**9. Temperature:** (start and end): Use °F (if you do not have a thermometer estimate to nearest 5°)

## B. Habitat Data

Unlike the bird data, which we record to an unlimited distance from each point, we only record habitat data within a 50-m radius of each point.

### 1. Point Info

**a. Distance to road:** Enter the distance in meters for **EACH** point based on your best knowledge of the site. **You should ignore roads beyond 100m.** *For our purposes, a "road" must be substantial enough so that it either causes a significant disruption of the understory vegetation OR a break in the canopy.* For example, a grassy 2-track running through an open meadow should not be considered a road, whereas a gravel or dirt road that forms a 3 to 4-m wide break in the grass cover would be considered a road. Similarly, an old, pine needle-covered logging track in an open forest situation is not a road, whereas a logging road that causes a clear and wide break in the woody understory vegetation or in the forest canopy is a road. We will cover this topic thoroughly during the training session.

**b. Private Property:** Enter "Y" for yes and "N" for no for **EACH** point.

**c. Level of accuracy:** enter the level of accuracy that is displayed on your GPS screen (+/- X meters) when you arrive at each point. You must do this in the field at each point.

### 2. Overstory (forested habitats only)

**a. Structural stage:** At each point-count station, identify and record *the structural stage that best describes the overstory trees* within a 50-m radius of the point-count station. Please use the following scale (see Appendix C for detailed habitat specific information on structural stages):

- 1) grass-forb (i.e., no or very few overstory trees present);
- 2) shrub-seedling (i.e., generally trees below head height);
- 3) sapling-pole;
- 4) mature;
- 5) old-growth.

**b. Canopy Cover:** Estimate closure of the combined canopy trees to the nearest 10 percent within a 50-m radius of the point-count.

**c. Mean Canopy Height:** At each point-count station, estimate the *average height to the top of the canopy trees* (in meters) within a 50-m radius circle to the nearest meter. Use a rangefinder to help gauge estimates.

**d. Species Composition:** Identify the dominant tree species in the overstory and record the **relative abundance (%)** of the total overstory occupied by each species within a 50-m radius of each point-count station; you can list up to five species. Note that if only one tree species is present in the overstory, the relative percent should be 100%, regardless of how much of the circle the tree species occupies. Record tree species on the data form using the correct 2-letter vegetation code (see Appendix D for plant species codes). Note that Snags (SN), dead trees (DC or DD), and dead burned trees (BU) should be considered here. Estimates in increments of 10% are adequate in most situations. However, if there are only a few individuals of a certain species, use smaller percentages to accurately reflect that while being sure that the total of all species sums to 100% (i.e. DF 98%, SN 2%).

### 3. Mid-story (forested habitats only)

**Sub-canopy species:** You should only fill out this section if, **and only if**, there is a *distinct* sub-canopy comprised of individual trees different from those making up the overstory. Enter up to three species' two-letter codes in the spaces provided (see Appendix D for plant species codes) in descending order of abundance. If there is no distinct sub-canopy, leave the provided spaces blank. This evaluation should not include foliage on mid-story branches from overstory trees, only those distinct trees that form a canopy (even if it is only one tree) below the overstory canopy.

### 4. Shrub layer

Use this category to estimate the amount and species makeup of any woody shrub layer (*including* seedling trees) present. Generally, shrubs are >0.5 meter high and <5.0 meters high. Anything taller than 5.0 meters should be considered part of the sub-canopy (e.g. very tall oaks or aspens that are of greater height); anything shorter than 0.5 meter should be considered in the ground cover category (except for the rare instances where there is a distinct shrub layer that are all less than 0.5 meter (sage transects) – in this case, record all shrubs species as a shrub layer and estimate cover as usual).

**a. Shrub Cover:** Estimate the *total* percent coverage of all woody shrub species AND seedling trees present within 50-m of the count station to the nearest 10%.

**b. Mean height:** Estimate the average height to the nearest 0.5 meter of the shrub layer.

**c. Species composition:** Identify the shrub species (including seedling trees) present and record the *relative* percent of the total shrub layer occupied by each species within a 50-m radius of each point-count station; you can list up to five species. Note that if only one shrub species is present, the relative percent should be 100%, regardless of how much of the circle the species occupies. Record shrub species on the data forms using the correct two-letter vegetation code (see Appendix D for plant species codes).

## 5. Ground Cover

**a. We classify ground cover into five categories:**

- 1) woody vegetation below 0.5 m (roughly knee height) including cacti;
- 2) dead and down trees (also of a minimum of 6" dbh);
- 3) broad-leaved herbaceous plants and forbs;
- 4) bare ground (including rocks) and/or leaf litter; and
- 5) grass.

**b. Cover:** For each of these categories, estimate the *total* percent of ground cover within 50 meters of the count station that qualifies for each. In most all cases, the categories in this section will add up to 100%. The only time this won't happen is if you have some ground cover type that is not on the data sheet (i.e. water). If water is present at a point, make a note of it at the bottom of the vegetation data sheet

Note: Please put a "0" in the box for any ground cover category that is absent from the 50-m circle, rather than leaving it blank.

**c. Grass height:** Estimate in centimeters the average height of the grass within the 50-m radius. Learn where 10cm, 20cm, 30cm, etc. are on your leg as a guide. You can also use your data sheet. 8 ½ " x 11" = 21.5cm x 28cm.

## 6. Croplands

If the point you are surveying is in cropland, please specify whether it is **bare (plowed), fallow, or active (and indicate crop species if known)**. Write these data in across the applicable row for the point in the section **Shrub Layer**.

## 7. Other (Y/N)

**a. Human structures:** Record either Y or N to indicate the presence or absence of human-created structures (e.g. cabins, bridges, mine shafts, etc) within a **50-m** radius of the count station. This includes any human structure that would influence (positively or negatively) the detection or the behavior of birds in the area, such as something that a bird could use for perching or nesting (e.g. windmill, gas well, mine shaft, building, or power pole). For example, you would not need to record a stop sign in a forested area because there are already plenty of places for a bird to perch. However, you would record a stop sign in grassland, as it provides a perch for singing that is higher than the surrounding vegetation.

**b. Cliff/rock:** Record either Y or N to indicate the presence of cliffs or large rocky outcrops within a **50-m** radius of the count station.

**c. Prairie dog town:** Record either Y or N to indicate the presence of a prairie

dog town. Abandoned towns will be marked as Y.

**d. Prairie dog presence:** Record either Y or N to indicate the presence of prairie dogs. If you have reason to believe a colony is active, but they are all inside (excessive heat or cold), mark Y. Look for fresh sign such as scat or diggings.

**e. # of Snags:** Count the numbers of snags (>3 meters high, >6 in. dbh) within a **50-m** radius of the count station.

### III. Bird Data

#### A. General Info

It is extremely important to fill in this data at the bottom of each and every bird form. If a bird form does not have this information and it becomes separated from the vegetation data sheet, then there is no way for us to know what transect the data came from. This data would become useless and an entire day's worth of data collection would be lost. Before starting your first point count, be sure to fill out this information:

- 1. Observer:** Fill in your first, middle and last initials on all pages of the bird form.
- 2. Project:** Fill in the 2-letter project code on all pages of the bird form (i.e. Colorado=CO, Black Hills National Forest=BH).
- 3. BCR:** Fill in the number of the BCR you are working in.
- 4. Transect Name:** Fill in the 4-character grid ID code (strata and number) on all pages of the bird form. Same as on habitat form.

#### B. Point Data

- 1. Point #:** Enter the number of the point (01-16) on the transect. **NOTE:** for entries for low density species *between points* enter "88" (see below for more information on "88" birds).
- 2. Species:** All birds detected during the 5-minute count period should be recorded using the correct 4-letter codes (See Appendix F for bird species codes; most are obvious, but please commit to memory those codes that are unusual and do not follow the general rules). If you ever record a bird and are unsure of the four-letter code, make a note of it in the notes section at the bottom of the page to avoid confusion later.

PLEASE, PLEASE use correct codes, as it makes data entry and analysis easier. Species that cause particular problems for observers include: **Northern Shoveler** (NSHO, not NOSH), Ring-necked Pheasant (RINP, not RNPH), **Western Wood-Pewee** (WEWP, not WWPE), **Gray Jay** (GRAJ, not GRJA), **Tree Swallow** (TRES, not TRSW), **Bank Swallow** (BANS, not BASW), **Barn Swallow** (BARS, not BASW), **MacGillivray's Warbler** (MGWA, not MAWA), **Yellow Warbler** (YWAR, not YEWA), **Yellow-rumped Warbler** (AUWA - for Audubon's Warbler, MYWA for Myrtle Warbler, not YRWA), **Lark Bunting** (LARB, not LABU), **Savannah Sparrow** (SAVS, not SASP), **Lazuli Bunting** (LAZB, not LABU) and **Red-winged Blackbird** (RWBL, not RWBB).



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

Unknown Bird	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

**3. Measuring Distances:** Using your Rangefinder, measure the distance from the point to each and every individual bird detected during the count and record the distance in meters on the data sheet under “Radial Distance”. If you detect a bird beyond one kilometer (1000m), fit number in the three spaces provided as best you can. **Please note that we record radial distance (horizontal distance), not actual distance.** If you detect a bird singing in a tree directly above you, the distance would be 0, not how far the bird is above you. We will review this during training.

You should measure all distances to birds using your Rangefinder whenever possible. If you cannot get a direct line of sight to the location of a bird, use the Rangefinder to measure to a point close to that bird, and then add or subtract the additional estimated distance between that point and the bird to obtain the best possible distance estimate from the point to the bird. Distance-sampling relies upon the assumption that you measure all distances accurately, so 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 pin-point their locations to a specific tree/bush, then measure the distance to that tree. If you are unable to pin-point its location to a specific tree/bush, then estimate the distance, but do not round distances to the nearest 5 or 10 meter interval. Rounding distances causes heaping at popular values and makes analysis more problematic! If you see or hear a bird that is beyond the range of the Rangefinder, measure to the furthest object in the direction of the bird that the Rangefinder can measure to, and estimate the distance beyond that object to the bird. Add your estimate plus the measured distance and record the sum as the total distance.

Every bird recorded on point counts must have a radial distance measurement associated with it! This is imperative! Because our monitoring programs rely on Distance-sampling techniques and analyses, bird data recorded without associated distances can NOT be used in analysis! We will further explain the premises behind Distance-sampling during the training session. But please, please, PLEASE do not forget to measure and record radial distances for EACH bird recorded on point counts.

**4. How:** In the “How” column, record **how each bird was detected**, i.e., whether the bird was detected by ear (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. Remember that how you detect a bird is different from how you identify it.

When birds sing, this is important information for us to know, as it is a strong indicator that the species is holding a breeding territory (and thus a potentially breeding species in the study area). **If you first detect a bird by means other than it singing and that same individual later sings, neatly write an ‘S’ in the ‘How’ box next to the first code entered.**

**5. Sex:** In the “Sex” column, record the sex of the bird, if known (F=female, M=male, U=unknown). Change a U to an M or F if you later see or otherwise identify the same individual as male or female. Assume that singing birds are males only if: 1) you can see that the singing bird is a male, 2) it is a warbler or sparrow, or 3) it is singing emphatically and repeatedly. Females of many species will vocalize, although generally their vocalizations are less emphatic and extensive. You should not record sex for birds giving only sex-unspecific calls.

Example 1:

On a point count, you detect six birds. You see a male RNSA, you hear a drumming RNSA, a calling WBNU, a singing AUWA, and a singing CHSP, and you see a brown-plumaged CAFI. You should record the radial distances for all six individuals. In order, the “How” column should be filled in with V, D, C, S, S, and V. Fill in the “Sex” column: M, U, U, M, M, and U respectively (male CAFI require two years to achieve adult plumage, thus a brown-plumaged bird cannot be sexed in the field).

**6. Transect notes:** Enter information relevant to the site or individual points in the notes section at the bottom of the data sheet. It is very important to make notes about rare or unusual birds here. After the field season, RMBO staff review the data and look for any detections that seem odd or out of place. If you positively identify a species that you believe we may question later, it is helpful to write notes to affirm your detection.

Here you will record the reasons why you did not survey certain points within the grid (if applicable). The choices and their codes are:

T:Ran out of **T**ime  
U:Terrain **U**nsafe (could not safely approach to within 25 m of point)  
R:Can't cross **R**iver  
P:Private Property - no **P**ermission  
W:**W**eather (rain or wind)  
S:**S**now pack impassible  
O:**O**ther - explain

This is also the location to record problems encountered during the survey, cool scenery, or other tidbits that either don't really fit in other places or that future surveyors might find interesting.

When entering data into the database, don't forget to look through the notes sections on your data sheets. Notes that are useful to someone surveying next year should be entered on the transect description page.

**7. Clusters:** "A cluster is a relatively tight aggregation of objects of interest..." (Buckland et al. 2001). In our point count sampling, clusters are actually our unit of observation, with most cluster sizes = 1. There are generally two cases in which cluster sizes are > 1: flocks, and paired birds. In either case, we define a cluster as birds of the same species that you 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. Distances between members of a cluster should be very short.

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 (a, b, c ...).

Example 2:

After recording a Western Tanager (WETA) and an American Robin (AMRO) on a point count, the observer hears a Black-headed Grosbeak (BHGR) give its distinctive squeaky call note. The observer turns to see the bird and notes that the calling bird is a male BHGR 27 meters away AND also notes that there is a female BHGR in the same tree, but about 29 meters away. Next, the observer hears 5 Pine Siskins (PISI), looks up, and measures that they are 36-38 meters away. Finally, the observer hears a Mountain Chickadee (MOCH) calling, looks up and sees that MOCH as well as a second MOCH in the same tree, both at 17 meters away. The sex of both individuals is unknown, but the method of detection differs, so record them on separate lines with a common Cluster Code. See table below.

The observer’s data looks like this (with a dash indicating no entry):

Point #	Species	Radial Distance	HOW	SEX	CLUSTER SIZE CODE	
03	WETA	46	S	M	1	-
-	AMRO	103	S	M	1	-
-	BHGR	27	C	M	1	a
-	BHGR	29	V	F	1	a
-	PISI	37	V	U	5	-
-	MOCH	17	C	U	1	b
-	MOCH	17	V	U	1	b

**8. Squirrels:** Yes, squirrels. In an effort to incorporate other information into our bird monitoring programs, we are also collecting data on red squirrels (RESQ) and Abert’s squirrels (ABSQ) during point counts. *Treat both squirrels as you would a bird on point counts and treat Abert’s squirrels as an “88” species as well.* That is, fill in the How and Sex boxes (generally a “U”) for each Abert’s squirrel detected between points. Please do not forget to record these squirrels **and** their associated data at all point counts, as the utility of these data depend on everyone collecting them throughout the study areas.

**9. Flyovers:** Some birds observed flying over a point without showing any signs of landing should be recorded as a flyover. However, individuals of species that habitually hunt on the wing (e.g. raptors, swallows, swifts) and that appear to be foraging or hunting in the vicinity around the point, should NOT be treated as flyovers. You should record these as if they were a perched bird. Additionally, individuals that you first detect in flight that are simply flying from perch to perch nearby should NOT be recorded as flyovers. Provide distance estimates to these flying individuals where you first detected them and record the best how-detected variable. For true flyovers, enter an “F” in the “How” column, and draw a short line through the distance column – i.e. you do not need to estimate distance for flyovers.

**10. “88” Birds:** While walking between points, record all low-density birds species on the list of “88” birds. You do not need to record distance *but do record* HOW and CLUSTER SIZE. **Also record any you think might be rare for the area in which you are surveying.** (See Appendix B for a list of 88 bird species.)

**11. VERY IMPORTANT: Check over your point-count data before leaving**

***each count station*** to make sure you have recorded all the required information (e.g. distances, how/sex info, etc.). Skip a line between entries for individual points. All individual birds on a particular point should be bunched together on the form; then you should leave a blank line before starting entries for the next point.

#### **IV. Other Important Information**

**Once you finish your transect and before leaving your sites, don't forget to:**

- 1) Check to make sure you entered your observer initials, point count grid #, and sheet #'s at the bottom of EACH page!**
- 2) Record the end of transect data (time, temp, sky, wind, transect notes) IMMEDIATELY UPON COMPLETING THE TRANSECT!**
- 3) Go through your data sheets carefully to make sure you have not forgotten to record ANY data. Your work is not done until you've reviewed your data from the morning!**
- 4) Provide clear and explicit directions to the access point, if you have not already done so!**

## APPENDIX B. LOW-DENSITY TARGET SPECIES (“88” BIRDS)

Record these species as 88 birds when you encounter them between points. You do not need to record distances, but please do record How, Sex, and Cluster information.

### I. Colorado

All galliforms	Gray Catbird
Turkey Vulture	Cedar Waxwing
All raptors	American Redstart
Mountain Plover	Ovenbird
Upland Sandpiper	Northern Waterthrush
Long-billed Curlew	Yellow-breasted Chat
Band-tailed Pigeon	Canyon Towhee
All cuckoos (including GRRO)	Rufous-crowned Sparrow
All owls	Black-throated Sparrow
All nightjars	Chestnut-collared Longspur
All swifts	Northern Cardinal
All woodpeckers (incl. sapsuckers but not NOFL)	Blue Grosbeak
Olive-sided Flycatcher	Indigo Bunting
Willow Flycatcher	Dickcissel
All phoebes	Bobolink
Great Crested Flycatcher	Great-tailed Grackle
Cassin’s Kingbird	Baltimore Oriole
Loggerhead Shrike	Scott’s Oriole
Gray Vireo	Brown-capped Rosy-finch
Chihuahuan Raven	Cassin’s Finch
Purple Martin	White-winged Crossbill
Bank Swallow	Lesser Goldfinch
Canyon Wren	Evening Grosbeak
American Dipper	Abert’s Squirrel
Veery	

Also record color phase information for Ferruginous Hawks in the Notes section of the data sheet (light or dark only).

## II. Wyoming

All cuckoos (including GRRO)	Golden-crowned Kinglet
All diurnal raptors	Gray Catbird
All galliforms	Gray Jay
All nightjars	Gray Vireo
All owls	Juniper Titmouse
All phoebes	Lazuli Bunting
All rosy-finches	Least Flycatcher
All swifts	Lesser Goldfinch
All woodpeckers (incl. sapsuckers but not NOFL)	Loggerhead Shrike
American Dipper	Long-billed Curlew
American Goldfinch	Mountain Plover
Ash-throated Flycatcher	Northern Rough-winged Swallow
Baltimore Oriole	Northern Cardinal
Bank Swallow	Northern Waterthrush
Black-and-white Warbler	Olive-sided Flycatcher
Black-chinned Hummingbird	Pine Grosbeak
Black-throated Sparrow	Pinyon Jay
Blue Grosbeak	Purple Martin
Brown Creeper	Pygmy Nuthatch
Bushtit	Red-eyed Vireo
Calliope Hummingbird	Rufous Hummingbird
Canyon Wren	Scott's Oriole
Cassin's Finch	Turkey Vulture
Cassin's Kingbird	Upland Sandpiper
Cassin's Sparrow	Veery
Cedar Waxwing	White-throated Swift
Chestnut-collared Longspur	White-winged Crossbill
Common Yellowthroat	Willow Flycatcher
Dickcissel	Wilson's Snipe
Evening Grosbeak	Yellow-breasted Chat
Fox Sparrow	

### III. Black Hills National Forest

All cuckoos (including GRRO)	Dickcissel
All diurnal raptors	Evening Grosbeak
All galliforms	Golden-crowned Kinglet
All nightjars	Gray Catbird
All owls	Hammond's Flycatcher
All phoebes	Indigo Bunting
All rosy-finches	Lark Bunting
All swifts	Lazuli Bunting
All woodpeckers (except NOFL and HAWO)	Least Flycatcher
American Dipper	Lesser Goldfinch
Baltimore Oriole	Loggerhead Shrike
Bank Swallow	Long-billed Curlew
Black-and-white Warbler	N. Rough-winged Swallow
Black-billed Magpie	Pinyon Jay
Blue Grosbeak	Pygmy Nuthatch
Bobolink	Red-eyed Vireo
Brown Creeper	Say's Phoebe
Canyon Wren	Turkey Vulture
Cassin's Finch	Upland Sandpiper
Cassin's Kingbird	Veery
Cedar Waxwing	White-throated Swift
Chestnut-collared Longspur	White-winged Crossbill
Clark's Nutcracker	Wilson's Snipe
Common Yellowthroat	Yellow-breasted Chat

**Report sightings of the following rare species ASAP** (within 3-5 days maximum) to: Steven R Hirtzel [shirtzel@fs.fed.us]. Make sure to include the date and location information:

**Sharp-shinned Hawk**

**Cooper's Hawk**

**Northern Goshawk**

**Broad-winged Hawk**

**Flammulated Owl**

**Yellow-billed Cuckoo**

**Black-billed Cuckoo**

**American Dipper** (outside of the Spearfish Creek watershed only)

**Pygmy Nuthatch**

Identifying the locations of rare species is a short benefit of this program that the Forest Service values very much and it can aid in the protection of these species. In your report, please provide UTM coordinates and a description of the location, with general directions to the site. On your GPS unit, log the sightings using the 4-letter code of the species.



## APPENDIX C. GUIDELINES FOR CLASSIFYING STRUCTURAL STAGE BY HABITAT

The following characteristics can generally define the various structural stages of the habitats listed below. Use this information as a guide to help you better understand what we mean by “structural stage”. Expect variability among sites depending on geographic location, elevation, aspect, slope, soil quality and other site characteristics. Therefore, you must use your head when judging structural stage. The important thing is to roughly assess the size (structural stage) and density (canopy coverage) of the trees at each point.

Record all data regarding habitat on the vegetation data sheet *prior to beginning each point count*.

### Habitat-Specific Information for Assessing Habitat and Structural Stage:

#### Aspen

- 1: Grass-Forb stage: Grasses and forbs dominate; aspen suckers/saplings are absent.
- 2: Shrub-Seedling stage: Suckers/saplings are present, up to 2 inches dbh and 4 m in height. Stem density can vary from 5,000 to 40,000 stems per acre.
- 3: Sapling-Pole stage: Saplings between 2 and 8 inches dbh and up to 6-13 m in height on good sites; on poorer sites trees may never reach 8 inches dbh and may be shorter than 6 m, with crooked and twisted boles.
- 4: Mature stage: On better sites, trees between 16-24 inches dbh and 28-33 m in height. Typically, there is a high density of grass, forbs and shrubs in the understory. Snags are also generally common in this stage.
- 5: Old-Growth stage: Large diameter trees and many snags are present, as are diseased trees and downed material. Snags often occur in large groups.

#### High-elevation Riparian

- 1: Grass-Forb stage: Grasses and forbs dominate; no woody growth occurs.
- 2: Shrub-Seedling stage: Willows up to 1.3 m in height occur.
- 3: Sapling-Pole stage: Willows up to 6.6 m in height dominate; alders may also occur. Mortality among willows may be substantial during this stage, resulting in thinning of the stand.
- 4: Mature stage: Alder and willow co-dominate; blue spruce is also often present.
- 5: Old-Growth stage: Blue-spruce dominates, along with willows and alders; heavy amounts of litter and downed material, and randomly distributed snags.

#### Mixed Conifer

- 1: Grass-Forb stage: Grasses and forbs dominate; no trees or saplings.
- 2: Shrub-Seedling stage: Saplings up to 1 inch dbh or 3 m in height; stand can be quite dense.
- 3: Sapling-Pole stage: Dominant trees > 1 inch dbh, but most trees <15 inch dbh; generally only very open stands have significant cone production in this stage.
- 4: Mature stage: Average dbh of dominant trees 15 - 25 inches; large dbh snags are relatively sparse.
- 5: Old-Growth stage: Similar to mature stage but with a greater proportion of large dbh trees; large snags and downfall are more common; forest can be single or multi-layered.

#### Montane Riparian

- 1: Grass-Forb stage: Grasses and forbs dominate; no woody growth occurs.
- 2: Shrub-Seedling stage: Willows up to 1.3 m in height occur.

- 3: Sapling-Pole stage: Willows up to 6.6 m in height dominate; alders may also occur. Mortality among willows may be substantial during this stage, resulting in thinning of the stand.
- 4: Mature stage: Alder and willow co-dominate, canopy trees also often present.
- 5: Old-Growth stage: larger trees common, along with willows and alders; heavy amounts of litter, downed material, and snags.

### **Pinyon-Juniper**

- 1: Grass-Forb stage: Grasses and forbs dominate; saplings and small trees are absent.
- 2: Shrub-Seedling stage: Juniper and/or woody shrubs are present; pinyon seedlings are generally absent or sparse.
- 3: Sapling-Pole stage: Junipers average ~2 m in height; pinyons 2-5 m in height. Few if any snags are present.
- 4: Mature stage: Wide range of tree sizes may be present; pinyons are generally between 6-18 inches dbh and 3-10 m in height; junipers are typically 6-12 inches dbh and average 6 m in height. Snags 6-20 inches dbh are typically present.
- 5: Old-Growth stage: Virtually indistinguishable from Mature stage, but incidence of snags, litter and downed material is generally higher.

### **Ponderosa Pine**

- 1: Grass-Forb stage: Bunchgrasses and bluegrass dominate; pine seedlings absent. This stage usually results from fire and/or logging.
- 2: Shrub-Seedling stage: Small pine saplings ( $\leq 1$  inch dbh) and a variety of woody shrubs are likely to be present, as well as grasses. Litter and downed material may also exist.
- 3: Sapling-Pole stage: Trees 1-7 inches dbh, 3-17 m in height; age of stand 6-50 yrs old. Stands in this stage can be quite dense, normally exceeding 70% canopy closure, and are typically even aged. Some small dbh snags may be present.
- 4: Mature stage: Average dbh of trees between 16 to 24 inches. Stand can be multi-layered, and snags suitable in size for most cavity-nesting birds should be present.
- 5: Old-Growth stage: Average dbh of dominant trees between 30 to 60 inches; stand uneven in age and generally open; numerous snags of a wide variety of sizes are present.

### **Spruce-Fir**

- 1: Grass-Forb stage: Primarily herbaceous plants; no trees or saplings; near complete absence of downed litter or snags.
- 2: Shrub-Seedling stage: Saplings up to 1 inch in diameter at breast height (dbh) are dominant.
- 3: Sapling-Pole stage: Stems 1-7 inches dbh, and 2-15 m in height are dominant.
- 4: Mature stage: Average dbh 16-22 inches.
- 5: Old-Growth stage: Average dbh of dominant trees  $> 22$  inches; forest is typically multi-layered, with trees of varying age/size, significant amounts of accumulated downfall and numerous, randomly distributed snags. Grasses and forbs are relatively scarce, but epiphytic vegetation (mosses & lichens) is prevalent.

## APPENDIX D. KEY OF TWO-LETTER CODES FOR SHRUBS AND TREES

### Code Shrubs/Small Trees

AL	Alder sp. ( <i>Alnus spp.</i> )
AB	Alder-leaved buckthorn ( <i>Rhamnus alnifolia</i> )
AP	American plum ( <i>Prunus americana</i> )
AC	Arizona Cypress ( <i>Cupressus arizonica</i> )
BE	Beaked hazelnut
BG	Beargrass ( <i>Nolina spp.</i> )
BI	Birch spp. ( <i>Betula spp.</i> )
BB	Blackberry/Raspberry ( <i>Rubus spp.</i> )
BL	Blackbrush ( <i>Coleogyne ramosissima</i> )
BF	Buffaloberry ( <i>Sheperdia canadensis</i> )
BH	Bush honeysuckle ( <i>Lonicera spp.</i> )
CC	Choke cherry ( <i>Prunus virginiana</i> )
CH	Cholla ( <i>Opuntia spp.</i> )
CR	Cliffrose or bitterbrush ( <i>Purshia spp.</i> )
CJ	Common juniper ( <i>Juniperus communis</i> ) – low growing shrub in high elev. (NOT the tree)
CB	Corkbark Fir
DH	Desert Holly ( <i>Berberis fremontii</i> )
DO	Desert Olive ( <i>Forestiera neomexicana</i> )
EB	Elderberry ( <i>Sambucus spp.</i> )
FB	Fendlerbush ( <i>Fendlera rupicola</i> )
GO	Gambel oak ( <i>Quercus gambelii</i> )
GB	Gooseberry/Currant ( <i>Ribes spp.</i> )
GW	Greasewood ( <i>Sarcobatus spp.</i> )
HA	Hawthorn ( <i>Crataegus spp.</i> )
HB	Huckleberry ( <i>Vaccinium spp.</i> )
IB	Indigo bush or Leadplant ( <i>Amorpha spp.</i> )
JU	Juniper (bush-size) – all <i>Juniperus</i> species (Utah, Rocky Mountain, and One-seed)
MZ	Manzanita ( <i>Artocostaphalis spp.</i> )
MT	Mormon Tea ( <i>Ephedra spp.</i> )
MO	Mountain ash ( <i>Sorbus scopulina</i> )
MM	Mountain mahogany ( <i>Cercocarpus spp.</i> )
MS	Mountain/Ocean spray
LC	New Mexico Locust ( <i>Robinia neomexicana</i> )
NB	Ninebark ( <i>Physocarpus spp.</i> )
OB	Oak bush – not Gambel oak
OG	Oregon grape ( <i>Berberis aquifolium</i> )
OT	Other shrub – unknown species or not on list
RA	Rabbitbrush ( <i>Chrysothamnus spp.</i> )
RD	Red-osier dogwood ( <i>Cornus sericea</i> )
RB	River (water) birch ( <i>Betula occidentalis</i> )
MA	Rocky mountain maple ( <i>Acer spp.</i> )
RO	Russian olive ( <i>Elaegnus angustifolia</i> )
SA	Sage spp. ( <i>Artemisia spp.</i> )
SL	Saltbush ( <i>Atriplex spp.</i> )

SB Serviceberry (*Amelanchier spp.*)  
 LO Shrub Live Oak (*Quercus turbinella*)  
 SC Shrubby cinquefoil (*Pentaphylloides floribunda*)  
 SE Single-leaf Ash (*Fraxinus anoala*)  
 SK Skunkbrush (*Rhus trilobata*)  
 SW Snakeweed (*Gutierrezia sarothrae*)  
 SY Snowberry (*Symphoricarpos spp.*)  
 TA Tamarisk/Saltcedar (*Tamarix pentandra*)  
 TB Thimbleberry (*Rubus spp.*)  
 VI Viburnum (*Viburnum spp.*)  
 WR Wild rose (*Rosa spp.*)  
 WI Willow spp. (*Salix spp.* - primarily for all shrubby willows)  
 WO Wolfberry (*Lycium pallidum*)  
 YU Yucca (*Yucca spp.*)

**Code Large trees**

HH American hophornbeam (*Ostrya virginiana*)  
 AH Ash (*Fraxinus spp.*)  
 BP Balsam poplar (*Populus balsamifera*)  
 BS Blue spruce (*Picea pungens*)  
 BX Box elder (*Acer negundo*)  
 BR Bristlecone pine (*Pinus aristata*)  
 BO Bur oak (*Quercus macrocarpa*)  
 BC **Burned** conifer  
 BD **Burned** deciduous  
 CW Crack willow (*Salix fragilis*)  
 DC **Dead** coniferous - recently dead (still has bark)  
 DD **Dead** deciduous - recently dead (still has bark)  
 DJ **Dead** Juniper – recently dead (still has bark)  
 DY **Dead** pinyon pine – recently dead (still has bark)  
 DF Douglas fir (*Psuedotsuga menziesii*)  
 ES Engelmann spruce (*Picea engelmannii*)  
 FC Fremont cottonwood (*Populus fremontii*)  
 JU Juniper spp. (*Juniperus spp.*)  
 LM Limber pine (*Pinus flexilis*)  
 LP Lodgepole pine (*Pinus contorta*)  
 NC Narrow-leaf cottonwood (*Populus angustifolia*)  
 PB Paper birch (*Betula papyrifera*)  
 PW Peachleaf willow (*Salix amigdaloides*)  
 PY Pinyon pine (*Pinus edulis*)  
 PC Plains cottonwood (*Populus deltoides*)  
 PP Ponderosa pine (*Pinus ponderosa*)  
 AS Quaking aspen (*Populus tremuloides*)  
 RO Russian olive (*Elaeagnus angustifolia*)  
 SU Subalpine fir (*Abies lasiocarpa*)  
 SN Unidentifiable snag – no bark  
 UC Unknown coniferous tree or not on list

UD Unknown deciduous tree or not on list  
WF White fir (*Abies concolor*)  
WS White spruce (*Picea glauca*)  
WP Whitebark pine (*Pinus albicaulis*)  
WI Willow species (*Salix* spp.)

## **APPENDIX E. OPTIMAL DATES FOR CONDUCTING SURVEYS**

We will provide you with optimal survey dates for your study area at training. Below are the optimal survey dates used in Colorado in 2008. These optimal dates will be determined by elevation.

### **Colorado**

#### **Optimal Survey Dates:**

<7,500ft (<2,286m) - 12 May - 15 June

7,500ft - 9,300ft (2,286m - 2,835m) - 5 June - 30 June

>9,300ft (>2,835m) - 25 June - 15 July

## APPENDIX F. FOUR-LETTER BIRD CODES

Code	Species	Code	Species	Code	Species	Code	Species
ABSQ	Abert's Squirrel	BCNH	Black-crowned Night-Heron	CHSP	Chipping Sparrow	FOTE	Forster's Tern
ACWO	Acorn Woodpecker	BHGR	Black-headed Grosbeak	CHUK	Chukar	FOSP	Fox Sparrow
AMAV	American Avocet	BTYW	Black-throated Gray Warbler	CITE	Cinnamon Teal	FRGU	Franklin's Gull
AMBI	American Bittern	BTSP	Black-throated Sparrow	CLNU	Clark's Nutcracker	GADW	Gadwall
AMCO	American Coot	BLGR	Blue Grosbeak	CCSP	Clay-colored Sparrow	GAQU	Gambel's Quail
AMCR	American Crow	BLJA	Blue Jay	CLSW	Cliff Swallow	GOEA	Golden Eagle
AMDI	American Dipper	BGGN	Blue-gray Gnatcatcher	COGR	Common Grackle	GCKI	Golden-crowned Kinglet
AMGO	American Goldfinch	BWTE	Blue-winged Teal	COME	Common Merganser	GRWA	Grace's Warbler
AMKE	American Kestrel	BOBO	Bobolink	CONI	Common Nighthawk	GRSP	Grasshopper Sparrow
AMPI	American Pipit	BRBL	Brewer's Blackbird	COPO	Common Poorwill	GRCA	Gray Catbird
AMRE	American Redstart	BRSP	Brewer's Sparrow	CORA	Common Raven	GRFL	Gray Flycatcher
AMRO	American Robin	BTLH	Broad-tailed Hummingbird	COYE	Common Yellowthroat	GRAJ	Gray Jay
ATTW	American Three-toed Woodpecker	BWHA	Broad-winged Hawk	COHA	Cooper's Hawk	GRPA	Gray Partridge
AWPE	American White Pelican	BRCR	Brown Creeper	COFL	Cordilleran Flycatcher	GRVI	Gray Vireo
AMWI	American Wigeon	BRTH	Brown Thrasher	CBTH	Curve-billed Thrasher	GBHE	Great Blue Heron
ATFL	Ash-throated Flycatcher	BCRF	Brown-capped Rosy-Finch	DEJU	Dark-eyed Junco	GCFL	Great Crested Flycatcher
BAIS	Baird's Sparrow	BHCO	Brown-headed Cowbird	GHJU	Dark-eyed Junco (Gray-headed)	GREG	Great Egret
BAEA	Bald Eagle	BUFF	Bufflehead	ORJU	Dark-eyed Junco (Oregon)	GHOW	Great Horned Owl
BAOR	Baltimore Oriole	BUOR	Bullock's Oriole	PSJU	Dark-eyed Junco (Pink-sided)	GRPC	Greater Prairie-Chicken
BTPI	Band-tailed Pigeon	BUOW	Burrowing Owl	WWJU	Dark-eyed Junco (White-winged)	GRRO	Greater Roadrunner
BANS	Bank Swallow	BUSH	Bushtit	DICK	Dickcissel	GRSG	Greater Sage-Grouse
BARS	Barn Swallow	CAGU	California Gull	DCCO	Double-crested Cormorant	GTGR	Great-tailed Grackle
BAGO	Barrow's Goldeneye	CAHU	Calliope Hummingbird	DOWO	Downy Woodpecker	GRHE	Green Heron
BEVI	Bell's Vireo	CAGO	Canada Goose	DUFL	Dusky Flycatcher	GTTO	Green-tailed Towhee
BEKI	Belted Kingfisher	CANV	Canvasback	DUGR	Dusky Grouse	AGWT	Green-winged Teal
BEWR	Bewick's Wren	CANT	Canyon Towhee	EAGR	Eared Grebe	GUSG	Gunnison Sage-Grouse
BLPH	Black Phoebe	CANW	Canyon Wren	EABL	Eastern Bluebird	HAWO	Hairy Woodpecker
BLRA	Black Rail	CAFI	Cassin's Finch	EAKI	Eastern Kingbird	HAFL	Hammond's Flycatcher
BLSW	Black Swift	CAKI	Cassin's Kingbird	EAME	Eastern Meadowlark	HETH	Hermit Thrush
BLTE	Black Tern	CASP	Cassin's Sparrow	EAPH	Eastern Phoebe	HEWA	Hermit Warbler
BAWW	Black-and-white Warbler	CAEG	Cattle Egret	EAWP	Eastern Wood-Pewee	HOLA	Horned Lark
BBWO	Black-backed Woodpecker	CEDW	Cedar Waxwing	EUCD	Eurasian Collared-Dove	HOFI	House Finch
BBMA	Black-billed Magpie	CCLO	Chestnut-collared Longspur	EUST	European Starling	HOSP	House Sparrow
BCCH	Black-capped Chickadee	CSWA	Chestnut-sided Warbler	EVGR	Evening Grosbeak	HOWR	House Wren
BCHU	Black-chinned Hummingbird	CHRA	Chihuahuan Raven	FEHA	Ferruginous Hawk	INBU	Indigo Bunting
BCSP	Black-chinned Sparrow	CHSW	Chimney Swift	FISP	Field Sparrow	ILBH	Indigo x Lazuli Bunting Hybrid

Code	Species	Code	Species	Code	Species	Code	Species
JUTI	Juniper Titmouse	NOPI	Northern Pintail	RBGR	Rose-breasted Grosbeak	VGSW	Violet-green Swallow
KILL	Killdeer	NOPO	Northern Pygmy-Owl	RCKI	Ruby-crowned Kinglet	VIRA	Virginia Rail
LARB	Lark Bunting	NRWS	Northern Rough-winged Swallow	RUDU	Ruddy Duck	VIWA	Virginia's Warbler
LASP	Lark Sparrow	NSHO	Northern Shoveler	RUGR	Ruffed Grouse	WAVI	Warbling Vireo
LAZB	Lazuli Bunting	NOWA	Northern Waterthrush	RUHU	Rufous Hummingbird	WEBL	Western Bluebird
LCSP	Le Conte's Sparrow	OLWA	Olive Warbler	RCSP	Rufous-crowned Sparrow	WEGR	Western Grebe
LEFL	Least Flycatcher	OSFL	Olive-sided Flycatcher	SAGS	Sage Sparrow	WEKI	Western Kingbird
LEGO	Lesser Goldfinch	OCWA	Orange-crowned Warbler	SATH	Sage Thrasher	WEME	Western Meadowlark
LESC	Lesser Scaup	OROR	Orchard Oriole	SACR	Sandhill Crane	WESJ	Western Scrub-Jay
LEYE	Lesser Yellowlegs	OSPR	Osprey	SAVS	Savannah Sparrow	WETA	Western Tanager
LEWO	Lewis's Woodpecker	OVEN	Ovenbird	SAPH	Say's Phoebe	WEWP	Western Wood-Pewee
LISP	Lincoln's Sparrow	PESA	Pectoral Sandpiper	SCQU	Scaled Quail	WBNU	White-breasted Nuthatch
LOSH	Loggerhead Shrike	PEFA	Peregrine Falcon	SCOR	Scott's Oriole	WCSP	White-crowned Sparrow
LBCU	Long-billed Curlew	PBGR	Pied-billed Grebe	SEWR	Sedge Wren	MWCS	White-crowned Sparrow (Mountain)
LEOW	Long-eared Owl	PIGR	Pine Grosbeak	SSHA	Sharp-shinned Hawk	WFIB	White-faced Ibis
LUWA	Lucy's Warbler	PISI	Pine Siskin	STGR	Sharp-tailed Grouse	WTPT	White-tailed Ptarmigan
MGWA	MacGillivray's Warbler	PIJA	Pinyon Jay	SEOW	Short-eared Owl	WTSW	White-throated Swift
MAWA	Magnolia Warbler	PLVI	Plumbeous Vireo	SNEG	Snowy Egret	WWCR	White-winged Crossbill
MALL	Mallard	PRFA	Prairie Falcon	SOSP	Song Sparrow	WITU	Wild Turkey
MAGO	Marbled Godwit	PUMA	Purple Martin	SORA	Sora	WILL	Willet
MAWR	Marsh Wren	PYNU	Pygmy Nuthatch	SPSA	Spotted Sandpiper	WISA	Williamson's Sapsucker
MCLO	McCown's Longspur	RECR	Red Crossbill	SPTO	Spotted Towhee	WIFL	Willow Flycatcher
MERL	Merlin	RESQ	Red Squirrel	SPPI	Sprague's Pipit	WIPH	Wilson's Phalarope
MOBL	Mountain Bluebird	RBWO	Red-bellied Woodpecker	STJA	Steller's Jay	WISN	Wilson's Snipe
MOCH	Mountain Chickadee	RBNU	Red-breasted Nuthatch	SWHA	Swainson's Hawk	WIWA	Wilson's Warbler
MOUP	Mountain Plover	REVI	Red-eyed Vireo	SWTH	Swainson's Thrush	WIWR	Winter Wren
MODO	Mourning Dove	REDH	Redhead	TEWA	Tennessee Warbler	WODU	Wood Duck
MIKI	Mississippi Kite	RHWO	Red-headed Woodpecker	SWHA	Swainson's Hawk	YWAR	Yellow Warbler
NOBI	NO BIRDS	RNSA	Red-naped Sapsucker	SWTH	Swainson's Thrush	YBSA	Yellow-bellied Sapsucker
NOBO	Northern Bobwhite	RNPB	Red-necked Phalarope	TEWA	Tennessee Warbler	YBCU	Yellow-billed Cuckoo
NOFL	Northern Flicker	RTHA	Red-tailed Hawk	TOSO	Townsend's Solitaire	YHBL	Yellow-headed Blackbird
FLIN	Northern Flicker (Intergrade)	RWBL	Red-winged Blackbird	TRES	Tree Swallow	YRWA	Yellow-rumped Warbler
RSFL	Northern Flicker (Red-shafted)	RBGU	Ring-billed Gull	TRUS	Trumpeter Swan	AUWA	Yellow-rumped Warbler (Audubon's)
YSFL	Northern Flicker (Yellow-shafted)	RNDU	Ring-necked Duck	TUVU	Turkey Vulture		
NOGO	Northern Goshawk	RINP	Ring-necked Pheasant	UPSA	Upland Sandpiper		
NOHA	Northern Harrier	ROPI	Rock Pigeon	VEER	Veery		
NOMO	Northern Mockingbird	ROWR	Rock Wren	VESP	Vesper Sparrow		

**Recently Changed Common Names**  
**Tricky Codes**



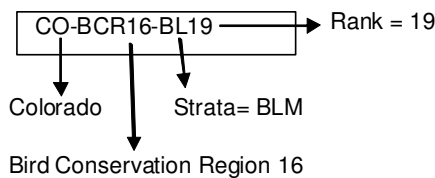
# APPENDIX G. GPS NAMING SYSTEM

At the beginning of the field season, you will receive a GPS unit containing waypoints for each point on each transect assigned to you. The following is an example of how transects and points will be labeled in your GPS unit:

## Monitoring Colorado Birds Grid Label & Point Label Explanation

The Grid (Transect) labels are based on the State, Bird Conservation Region (BCR), Strata Code (ie. BLM = BL) and the Rank (This number corresponds with the order of the sample)

Grid Label Example



Point Label Example (16 points per Grid)

The point GPS label is related to the Transect (Grid) label by the following;

CO-BCR16-BL19

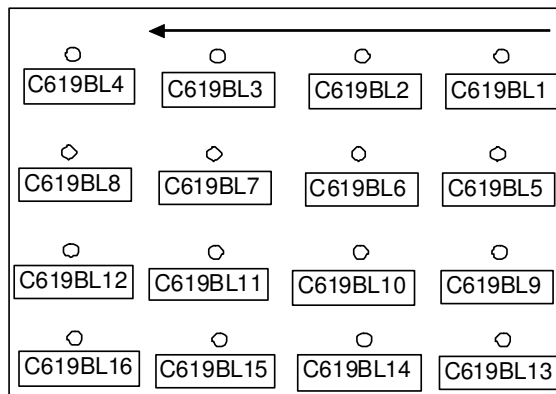
Point 1 GPS label; C 6 19 BL 1

C = first character of the Transect (Grid) Label  
 6 = last digit of the BCR (16 or 18) number  
 19 = The next 1 or 2 digits is the Rank  
 BL = The strata code  
 1 = the point number

Point Number	GPS label
1	C619BL1
2	C619BL2
3	C619BL3
4	C619BL4
5	C619BL5
6	C619BL6
7	C619BL7
8	C619BL8
9	C619BL9
10	C619BL10
11	C619BL11
12	C619BL12
13	C619BL13
14	C619BL14
15	C619BL15
16	C619BL16

Grid with GPS labels

Number order is from upper right to left



# APPENDIX H. SAMPLE TRANSECT DESCRIPTION SHEET

**Transect:** CO-BCR16-RO25

Observer Initials: CW

Date Conducted: 7/2/2008

Transect Name:

**Please verify all Transect Information. If AP, County, Map, etc. is inaccurate please note the correct data!**

Map Accurate?

Yes:  If no, please describe at bottom of page  
 No:

Transect is accessible to:  All Vehicle  
 High Clearance  
 4WD only

Roads of Colorado Page:  
*(if applicable)*

DeLorme Page: 27 D4

County: Routt

State: CO

Access Point UTM: z13, e357445, n4439716

Management Unit: ROUTT

Elevation: 2765

Time required to do the transect: 5 hours

### Transect Descriptions

Directions to Access Point:

From Toponas, go south on Hwy 131. Turn left onto Hwy 134 and drive, 5.7 miles. Turn left on FR270. Follow road 1.5 miles to transect. There is a turnout on the left where you can park, and this is the AP. This transect straddles FR270.

TransectDescription:

Relatively easy transect in mixed conifer with some aspen, with many points in open, high mountain meadows.

Suggested order of points:

2,3,4,8,7,6,10,11,12,16,15,14,13,9,5,1

Notes:

**\* Please remember to record bearings for all low density species!**

### 2008 Notes or Updates and camping information

Camping - Continue along FR270 to Lynx Pass Campground on the left. It is a small campground with just a few spots, about \$8/night. Nice spot.

UTMs:	zone	easting	northing
1:	13	357525	4439728
2:	13	357275	4439728
3:	13	357025	4439728
4:	13	356775	4439728
5:	13	357525	4439478
6:	13	357275	4439478
7:	13	357025	4439478
8:	13	356775	4439478
9:	13	357525	4439228
10:	13	357275	4439228
11:	13	357025	4439228
12:	13	356775	4439228
13:	13	357525	4438978
14:	13	357275	4438978
15:	13	357025	4438978
16:	13	356775	4438978

# APPENDIX I. SAMPLE VEGETATION DATA SHEET

Rocky Mountain Bird Observatory Point-Transsect Form

Observer (F, I, MI, Last name)	Date (mm/dd/yy)	GPS Unit #:	Transect ID	Time	0615	1010
C.M. White	07 15 08	1187	CO-BCR16-R024	Sky	0	0
Access Point UTM's	ZONE: 13	UTMs: 3 4 3 3 1 2 4 5 3 3 7 3 7		Wind	0	4+
				Temp	55	75

Point	Point info			Overstory - all spp. total to 100%												Other (Y/N)					
	Dist. to road (m)	Private property?	Accuracy	Struct stage(1-5)	Canopy Cover %	Mean Canopy Height	Species #1	Sp 1 abund %	Species #2	Sp 2 abund %	Species #3	Sp 3 abund %	Species #4	Sp 4 abund %	Species #5	Sp 5 abund %	Human structures?	Cliffrock?	P-dog town?	P-dogs present?	# of Snags
1	7	N	7	1	50	14	DC	40	LP	40	SU	20					N	N	N	N	4
2	7	N	7	2	50	16	LP	50	DC	30	SU	20					N	N	N	N	17
3	6	N	6	3	60	14	LP	60	ES	20	SU	10	DC	10			N	N	N	N	14
4	7	N	7	4	60	14	LP	70	SU	20	DC	10					N	N	N	N	8
5	12	N	12	5	60	20	LP	60	SU	30	DC	10					N	N	N	N	11
6	10	N	10	6	50	16	LP	70	DC	20	ES	10					N	N	N	N	16
7	12	N	12	7	50	14	LP	40	DC	40	SU	20					N	N	N	N	57
8	6	N	6	8	60	20	LP	40	ES	30	SU	20	DC	10			N	N	N	N	13
9	10	N	10	9	60	16	LP	60	DC	20	SU	20					N	N	N	N	15
10	8	N	8	10	50	16	LP	60	DC	30	SU	10					N	N	N	N	17
11	14	N	14	11	70	18	LP	50	SU	50	DC	20					N	N	N	N	11
12	9	N	9	12	60	20	LP	50	SU	30	DC	20					N	N	N	N	20
13	10	N	10	13	70	18	LP	50	ES	30	SU	10	DC	10			N	N	N	N	0
14	7	N	7	14	60	14	LP	50	SU	30	DC	20					N	N	N	N	9
15	11	N	11	15	60	16	LP	40	DC	30	SU	30					N	N	N	N	16
16				16																	

Midstory											
Distinct SUBCANOPY - If Present											
Point	Species			Struct stage	Species			Struct stage	Species		
	#1	#2	#3		#1	#2	#3		#1	#2	#3
1				7				13			
2				8				14			
3				9				15			
4				10				16			
5				11							
6				12							

Pt 16 - Too windy

If found, please mail to:  
 Rocky Mountain Bird Observatory ([www.rmbo.org](http://www.rmbo.org))  
 14500 Lark Bunting Lane, Brighton, CO 80603

Shrub layer - all spp. total to 100%												
Point	Percent Cover	Mean height (m)	Species #1	Sp 1 abund %	Species #2	Sp 2 abund %	Species #3	Sp 3 abund %	Species #4	Sp 4 abund %	Species #5	Sp 5 abund %
	1	20		1.5		SU		100				
2	30	3	RB	70	SU	30						
3	20	1.5	SU	70	ES	30						
4	20	1	SU	100								
5	30	2	RB	70	SU	30						
6	10	1	ES	100								
7	10	1.5	SU	100								
8	10	1.5	ES	100								
9	30	1	SU	70	GB	30						
10	20	1.5	SU	100								
11	20	1	SU	100								
12	30	1.5	RB	60	SU	40						
13	30	1.5	SU	100								
14	10	1	SU	100								
15	10	1.5	SU	100								
16												

Ground Cover - usually totals to 100%						
Point	Woody %	Dead and Down %	Herbaceous %	Bare / litter %	Grass %	Grass & Herb. Height (cm)
	1	30	10	20	20	20
2	40	10	10	30	10	15
3	40	20	10	10	20	15
4	50	10	10	20	10	5
5	20	10	30	20	20	15
6	30	10	10	40	10	5
7	30	5	10	45	10	15
8	50	5	20	15	10	5
9	30	10	30	10	20	20
10	20	10	30	20	20	15
11	60	5	10	15	10	5
12	30	10	40	10	10	10
13	60	10	20	10	0	5
14	70	10	10	10	0	5
15	70	10	10	10	0	5
16						

# APPENDIX J. SAMPLE BIRD DATA SHEET

How: V=visual; S=singing; C=calling; D=drumming; O=other aural detection. Sex: M=male; F=female; U=unknown  
 Between points, point # = 88. Rocky Mountain Bird Observatory, PO Box 1232, Brighton, CO 80601

Rocky Mountain Bird Observatory Point Transect Bird Form

Point #	Species	Radial Distance	HOW	SEX	Cluster		Point #	Species	Radial Distance	HOW	SEX	Cluster	
					Size	Code						Size	Code
02	RCKI	86	S	M				RBNW	103	C	U		
	WEWP	68	C	U				NOFL	309	C	U		
	MWCS	117	C/S	M				SAVS	84	S	M		
	NOFL	50	C	U				NOBI					
	AMRO	123	S	M									
	RESQ	32	C	U			08	AMRO	76	S	M		
	PISI	71	C	U				DEJU	58	S	M		
	WAVI	123	S	M				NOFL	207	C	U		
	WEWP	90	C	U				LISP	82	S	M		
								RESQ	12	C	U		
88	RNSA		C	U				RESQ	47	C	U		
								DEJU	65	S	M		
03	LISP	97	S	M				MWCS	79	S	M		
	CAGO		F	U	2			AMRO	45	C	U		
	LISP	125	S	M				AUWA	39	S	M		
	RECR	31	C	U	6			LISP	99	S	M		
	AUWA	33	S	M	1	A		RBNW	103	C	U		
	AUWA	27	V	F	1	A		NOBI					
	UNRA	700	V	W									
	WETA	63	S	M			12	RBNW	99	C	U		
	MWCS	101	S	M				AMRO	67	S	M		
	RCKI	116	S	M				HETH	176	S	M		
	NOGO	63	V	U				RCKI	121	S	M		
	DEJU	42	C/S	U				RESQ	28	C	U		
								AMRO	84	C	U		
04	LISP	72	S	M				TOSO	54	C/S	M		
	MWCS	105	S	M				NOBI					
	LISP	206	S	M				NOBI					
	AMRO	96	S	M									
	LISP	47	C/S	M									
	MWCS	108	S	M									
	BTLH	49	O	U									
	MWCS	6	C	U									
	LISP	107	S	M									
	MWCS	55	S	M									

Notes: \*NOGO detected at pt 3-observed perched in tree

Observer 1 Initials-all three: CMW      Year: 2008      State: CO      BCR: 16      Transect Name (e.g. RM99): R075