

**Northern Colorado Plateau Network
Point Transect Protocol
2012**



ROCKY MOUNTAIN BIRD OBSERVATORY

Mission: To conserve birds and their habitats

Vision: Native bird populations are sustained in healthy ecosystems

Core Values:

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:

- **Monitoring** long-term bird population trends to provide a scientific foundation for conservation action.
- **Researching** bird ecology and population response to anthropogenic and natural processes to evaluate and adjust management and conservation strategies using the best available science.
- **Educating** people of all ages through active, experiential programs that create an awareness and appreciation for birds.
- **Fostering** good stewardship on private and public lands through voluntary, cooperative partnerships that create win-win situations for wildlife and people.
- **Partnering** with state and federal natural resource agencies, private citizens, schools, universities, and other non-governmental organizations to build synergy and consensus for bird conservation.
- **Sharing** the latest information on bird populations, land management and conservation practices to create informed publics.
- **Delivering** bird conservation at biologically relevant scales by working across political and jurisdictional boundaries in western North America.

Suggested Citation:

Hanni, D. J., C. M. White, R.A. Sparks, J. A. Blakesley, J.J. Birek, N.J. Van Lanen, and J. A. Fogg. 2012. Northern Colorado Plateau Network Point Transect Protocol. Unpublished report. Rocky Mountain Bird Observatory, Brighton, Colorado, USA.

Cover Photos:

Lazuli Bunting by Nancy Bell. Used with permission.

Contact Information:

David Hanni- david.hanni@rmbo.org
Jora Fogg- jora.fogg@rmbo.org
Rocky Mountain Bird Observatory
Brighton, CO 80601
303.659.4348

ACKNOWLEDGEMENTS

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

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	I
TABLE OF CONTENTS	II
I. PROJECT OVERVIEW.....	3
II. TRANSECT DESIGN AND OVERVIEW	3
III. MATERIALS	3
IV. NAVIGATING TO THE SURVEY LOCATION	4
<i>RMBO online maps website</i>	<i>4</i>
<i>Google Earth files</i>	<i>4</i>
<i>Transect Description Sheet</i>	<i>4</i>
<i>Delorme and NPS Maps</i>	<i>6</i>
V. CONDUCTING THE POINT TRANSECT SURVEYS	8
<i>Seasonal Timing.....</i>	<i>8</i>
<i>Daily Timing</i>	<i>8</i>
<i>Point Counts – Getting Started.....</i>	<i>8</i>
COLLECTING HABITAT DATA	8
<i>Point Information Data Sheet.....</i>	<i>15</i>
COLLECTING BIRD DATA.....	16
<i>General Info</i>	<i>17</i>
<i>Point Data</i>	<i>17</i>
<i>Transect Counts.....</i>	<i>23</i>
VI. OTHER IMPORTANT INFORMATION	26
VII. POTENTIAL PROBLEMS WHEN CONDUCTING POINT COUNTS	26
VIII. LITERATURE CITED	28
APPENDIX A: LOW-DENSITY TARGET SPECIES (“88” BIRDS).....	29
APPENDIX B. KEY OF TWO-LETTER CODES FOR SHRUBS AND TREES.....	30
APPENDIX C. FOUR LETTER BIRD CODES FOR ALL PROGRAMS	33

I. PROJECT OVERVIEW

Rocky Mountain Bird Observatory (RMBO) in cooperation with the National Park Service has developed a program to monitor bird populations that utilizes point-counts along habitat-stratified transects (i.e., point transects) as the primary sampling technique. The goal of the Northern Colorado Plateau Network (NCPN) landbird monitoring effort is to contribute to the regional perspective of status and trends in landbird populations across three priority habitat types: sagebrush, pinyon-juniper woodlands, and riparian. The point transect portion of this program has been designed to be statistically rigorous and biologically sound, and should produce data for analyses of population trends for most diurnal, regularly-breeding landbird species. This document delineates the design and operation of the NCPN landbird monitoring program, now in its eighth year. We intend this protocol to instruct our field workers on how to run point counts and for others to follow when establishing monitoring projects of their own, so that the design and methods are comparable.

II. TRANSECT DESIGN AND OVERVIEW

The sampling design consists of 15 points spaced 250m apart, connected by a transect line. Because points within a given transect are not independent of each other, the entire transect, rather than the individual point, is the sampling unit. Observers record all avian species detected at each point. In addition, observers also record certain species of concern along the line transect between points. We estimate detection probability using Distance sampling (Buckland et al. 2001). We then use the detection probability to calculate density estimates for species with greater than 60 detections. We established 15 transects, each consisting of 15 points, within each habitat. Each transect is visited twice during the breeding season to increase the sample size and precision of the produced population estimates. Ideally, visits are spaced at least two weeks apart to better sample seasonal variation in singing rates.

Methods for selecting sampling locations differed between the upland habitats and riparian areas. For upland habitats, a gridded sampling frame with an inter-point spacing of 100m was generated for each of the 12 parks of interest in the NCPN. Inaccessible areas were delineated and eliminated from consideration. For each habitat type, points falling within a habitat patch were pooled across all parks. Perennial streams in the NCPN are limited. Thus, the 15 riparian areas included in landbird monitoring were selected based on availability. To determine the starting locations of the transects, the accessible extent of a riparian corridor was ascertained and measured. For riparian strips longer than the 3.5km transect, the starting location was randomly determined, but constrained to accommodate the full length of the transect (O'Dell et al. 2005).

III. MATERIALS

Before heading to the survey location, each technician should be sure s/he has the following equipment (unless otherwise indicated below, RMBO will supply all materials):

- 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** (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. **Vegetation and bird 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.

IV. NAVIGATING TO THE SURVEY LOCATION

Navigating to randomly selected survey locations can be challenging. Fortunately, there are a number of resources that you can utilize to assist you in finding your way to the most convenient access point for each survey site. You can utilize RMBO's online transect maps website, view the Google Earth file provided to you by your crew leader, review a previously existing transect description sheet, and consult Delorme or NPS maps.

RMBO online maps website

RMBO's online maps website is available at the following link:

<http://rmbo.org/v2/dataentry/monitoring/transectLocationMaps.aspx>

You will be required to login using the username and password provided to you at training. Once logged into the site, please select the appropriate project (e.g. state or park network you are working in) and transect you wish to view from the drop down menus. Once the appropriate transect appears you can use the zoom and scroll features to follow existing roadways to the most convenient access point. You can also toggle between the terrain, satellite and maps options. The terrain feature shows topography, which is useful for navigating to the transect and between points. The maps feature only shows roads, but can be useful when figuring out directions to a particular site. The satellite feature will display satellite photo imagery. We recommend that you take a careful look at steep transects using the satellite feature found in the upper left portion of the map. This will give you a better idea of whether steep slopes are vegetated or not.

Google Earth files

Prior to training you will receive a Google Earth file with transects that you are expected to complete. To view this KML file you will need to download a free version of Google Earth from the internet. Once Google Earth is installed you can simply double click on the KML file sent to you and view the transect locations. This file will help you plan the order you would like to conduct your assigned surveys in to minimize travel times and distances between survey locations. Additionally, you can zoom-in to get a better idea of existing roadways and the terrain at the survey locations.

Transect Description Sheet

You will receive a printed transect description sheet (Figure 1) corresponding to each transect that has been assigned to you. If, for some reason, you are missing a transect description sheet you can print one by visiting RMBO's landowner website (<https://fc.rmbo.org/>), logging in with your landowner username and password (different from your data entry and transect description password), and entering the full transect name. Most transect description sheets will already have information recorded on them; however, it is possible that you will be assigned a transect that has not been completed before. Please take the time to record or verify all information on the transect description sheet. This is the best opportunity for information obtained "on the ground" to be passed on to crew leaders

and future technicians. Be sure that each of the following fields is filled out before leaving the survey location:

1. Observer Initials

Record your login initials here.

2. Date Conducted (MM/DD/YYYY)

Record the date you sampled the transect.

3. Transect Accessible to

Please record what type of vehicle is required to access the transect (all vehicles, high-clearance, or 4WD). It is important for us to know the accessibility of each transect so that we can assign transects to field technicians with appropriate vehicles.

4. DeLorme Page

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

5. Access Point UTM's

Record the UTM's and projection zone for the closest spot to the transect where a surveyor can park their vehicle.

7. Directions to Access Point (VERY IMPORTANT!)

You will want to 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 these directions. When recording directions to the Access Point provide explicit directions from a nearby town, major intersection, or geographical feature readily found on a map to the Access Point. It is extremely helpful to provide mileages from intersections or other landmarks using your odometer. For all sites, take GPS readings and record **UTM coordinates** for each Access Point. It can be helpful to make the Access Point a recognizable feature on the landscape, like a cattle guard or sign post. You may encounter a situation where a road has been gated, washed out, etc. In these instances it is very important to record appropriate changes to the existing directions. Please don't inconvenience future surveyors by not making these changes.

If necessary, provide the distance and time to hike from the Access Point to the first point. Be as clear and accurate as possible when recording directions. Remember, someone will use your directions next year to find these transects.

DO NOT FORGET TO RECORD THE UTM'S OF THE ACCESS POINT ON THE TOP OF THE SHEET!

8. Transect description

Please include useful information about terrain, barbed wire fences encountered, and any other information that would be helpful to know when surveying a transect.

9. Notes, Updates, and Camping Information

Please provide directions and a description of camping options in this section. Sometimes, camping is available right at the Access Point. If not, then record directions to where you camped and provide UTM's 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 then record where you stayed. The nearest library or free internet access you used is often helpful information as well. Also, you can enter information relevant to the site, problems encountered during the transect, cool scenery, or other tidbits that either don't really fit in other places or that future surveyors might find interesting.

Delorme and NPS Maps

Delorme maps are a particularly useful tool for navigating around whatever study area you are working in. Maps produced by the National Park Service will display trail systems and parking areas and can greatly simplify navigation to a transect. In most cases, your employer will provide you with these maps. If you do not have a map that you feel is necessary, contact your supervisor to see if you can be reimbursed for the expense of a purchased map.

Transect Description Sheet

<http://fc.rmbo.org/TransectDescriptionSheets.aspx>**Transect: CP-PJ04**

Observer Initials:

Date Conducted:

Transect Name: Capitol Reef #1

Please verify all transect information. If the access point, county, map, or other information is inaccurate, please note the correct data!

Transect is accessible to: All Vehicles High Clearance 4WD Only

Delorme Page:
28 C2County:
GarfieldState:
UTAccess Point UTM:
12 494325 4208449Management Unit:
Capitol Reef National Park

Elevation:

Hiking time from AP to grid:

Difficulty:

Access Point Directions:

From the intersection of Hwy 24 and Hwy 95 in Hanksville, UT, drive west on Hwy 24 for 28.9 miles to its junction with the Notom-Bullfrog Road. Turn south onto the Notom-Bullfrog Road. Start measuring there. At mile 10, the pavement ends. At mile 13.8, reach the sandy Ranch Junction and veer right. At mile 14.6, veer left to avoid private property. At mile 19, pass "No Hunting" and "No Shooting" signs. At mile 20, reach a well-worn 2-track road on the left. Park there. The access point is a wooden sign (nothing written on it) approximately 40 meters east on the 2-track road. See the list of UTMs for the exact location of the access point.

Notes:

There is a free campsite (Cedar Mesa) 1.5 miles south of the access point on the Notom-Bullfrog Road. It's small (about 6 sites) and has a pit toilet. The gnats are horible in late June. It's a good idea to bring a headnet.

Transect Description:

From the access point walk 394 meters along a bearing of 331 degrees to reach point 1. Point 1 is on a steep slope. Follow a bearing of 270 degrees to points 2-11. Follow a bearing of 180 degrees to points 12-15. Between points 1 and 2, go over a small rock band. After you pass the rock band, the transect is level as you head in the general direction of Red canyon. For extra credit, find the massive petrified tree trunks between points 2 and 3 (hint: veer slightly north off of the transect line).

2012 Notes/Updates/Camping Information

Point:	Zone:	Easting:	Northing:	TRS:
1	12	494135	4208794	
2	12	493884	4208796	
3	12	493633	4208794	
4	12	493383	4208793	
5	12	493132	4208794	
6	12	492882	4208793	
7	12	492632	4208793	
8	12	492380	4208794	
9	12	492130	4208792	
10	12	491880	4208791	
11	12	491629	4208794	
12	12	491627	4208545	
13	12	491628	4208296	
14	12	491625	4208047	
15	12	491628	4207797	

Figure 1. Example Transect Description Sheet.

V. CONDUCTING THE POINT TRANSECT SURVEYS

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 without counting transient birds that are still migrating through. Counts performed in grasslands in late May are not comparable to counts performed in the same habitat in early July. Most local breeding birds complete nesting before July and are much less vocal than they are in May. We will provide you with optimal survey dates, based on primary habitat and elevation, for your study area at training. Below is an example of the optimal survey dates used in Colorado in 2008.

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

Daily Timing

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 finish no later than five hours after sunrise. In some cases, such as more southern locations, counts may need to be completed by approximately four hours after sunrise.

Point Counts – Getting Started

You will receive a GPS unit with all of the point locations for your transects loaded onto it. Follow the GPS unit to each point count station (we will practice this during training). Please see Appendix A for a description of how points 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 notes in the margin of your datasheet 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 while approaching the point.

COLLECTING HABITAT DATA

Fill in the habitat data for each of the 15 points **while at the point** during your first visit to a transect (habitat data does not need to be collected during your second visit to a transect). While conducting a transect for the second time in a year, please pause for one to two minutes once you've reached the point before beginning the count. This will give the bird community a chance to “settle down” in the event it was disturbed by your arrival. Unlike the bird data, which we record to an unlimited distance from each point, **we only record habitat data within a 50m radius of each point**. We 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. Because it is very important to finish the bird surveys we ask that you do not spend more than a couple minutes filling in habitat data at each point. Collect samples of unknown plant species (place in a numbered zip lock bag) so you can identify them after completing the survey. Below is a description of the fields found on the vegetation data sheet and brief instructions on recording this information. Please refer to Figure 2 for an example of a

completed vegetation datasheet.

Site Data

- 1. Observer:** Enter the unique data entry login that was provided to you
 - 2. Date:** Enter the date using the following 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 habitat and transect number (e.g. CP-PJ04)
 - 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 in military time for the entire survey (not individual points) using **Mountain Standard Time**.
 - 7. Sky:** (start and end) Enter the appropriate one-digit codes at the beginning and end of the survey(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

You should not survey in any other conditions!

- 8. Wind:** (start and end): Enter the appropriate one-digit codes at the beginning and end of the survey:
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 should not survey in any other conditions!

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

10. Assess point UTM: Enter the zone and UTM of the access point, if you are changing it from the current one or if none was previously recorded.

Point Data

- 1. GPS 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. Structural Stage: At each point-count station, identify and record *the structural stage that best describes the overstory trees* within a 50m radius of the point-count station. Please use the following scale:

Structural Stages By Habitat

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.

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.

Sage Shrubland

Not needed unless an overstory is present in which most cases refer to PJ or LR sections.

Overstory Data (not typically present in sage shrubland habitats)

- 1. **Canopy Cover:** Estimate the percent closure of the combined tree canopy within a 50m radius of the point-count. Use 1%, 5%, or multiples of 10% when estimating % overstory cover.
- 2. **Mean Canopy Height:** At each point-count station, estimate the *average height to the top of the canopy trees* within a 50m radius circle to the nearest 1m. Use a rangefinder to help gauge estimates.
- 3. **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 50m 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 datasheet using the correct two-letter vegetation code (see Appendix B for plant species codes). Note that Insect Infested (II), Snags (SN), dead trees (DC or DD), and dead burned trees (BU) should be considered part of the overstory species composition. Use 1%, 5%, or multiples of 10% when estimating overstory composition.

Miscellaneous Data (Y/N)

- 1. **Mid-story:** Record either Y or N to indicate the presence of several distinct layers of overstory vegetation.
- 2. **Cliff/rock:** Record either Y or N to indicate the presence of cliffs or large rocky outcrops within a **50m** radius of the count station.
- 3. **Prairie dog town:** Record either Y or N to indicate the presence of a prairie dog town. Abandoned towns should be marked as Y.
- 4. **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.
- 5. **# of Snags:** Count the number of snags (trees that are *completely* dead) that are $\geq 3\text{m}$ high and ≥ 6 inches dbh) within a **50m** radius of the count station.
- 6. **Tamarisk present:** Record either Y or N to indicate the presence of Tamarisk. This will generally only be on LR transects.

7. Tamarisk beetle: Record either Y or N to indicate the presence of Tamarisk beetles on Tamarisk.

Shrub Layer Data

Use this section to record the percent coverage and species makeup of any woody vegetation (*including* seedling trees) that is $\geq 0.25\text{m}$ high and $\leq 3.0\text{m}$ high. Anything taller than 3.0m should be considered part of the overstory (e.g. very tall oaks or aspens that are $>3.0\text{m}$); anything shorter than 0.25m should be considered part of the ground cover category.

1. Shrub Cover: Estimate the *total* percent coverage of all woody shrub species AND seedling trees present within 50m of the count station. Use 1%, 5%, or a multiple of 10% to estimate the % shrub cover.

2. Mean height: Estimate the average height to the nearest 0.25m of the shrub layer.

3. 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 50m 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 B for plant species codes). Use 1%, 5%, or multiples of 10% when estimating shrub layer composition.

Note: 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 Shrub Layer section.

Ground Cover Data

We classify ground cover into eight categories. For each of these categories, estimate the *total* percent of ground cover within 50m of the count station. Use 1%, 5%, or multiples of 10% when estimating % ground cover. The sum of the eight ground cover categories should sum to 100%.

The eight types of ground cover are:

- 1) woody vegetation below 0.25m (roughly mid calf height) including cacti;
- 2) dead and down trees with a dbh $\geq 6''$;
- 3) broad-leaved herbaceous plants and forbs;
- 4) bare ground (including rocks) and/or leaf litter (including all woody debris with a dbh $< 6''$);
- 5) living grass (including rushes, reeds, and sedges) that is still green or is clearly from this year's growing season;
- 6) residual/dead grass (including rushes, reeds, and sedges) that is no longer alive and is clearly from the previous year's growing season;
- 7) snow; and
- 8) water

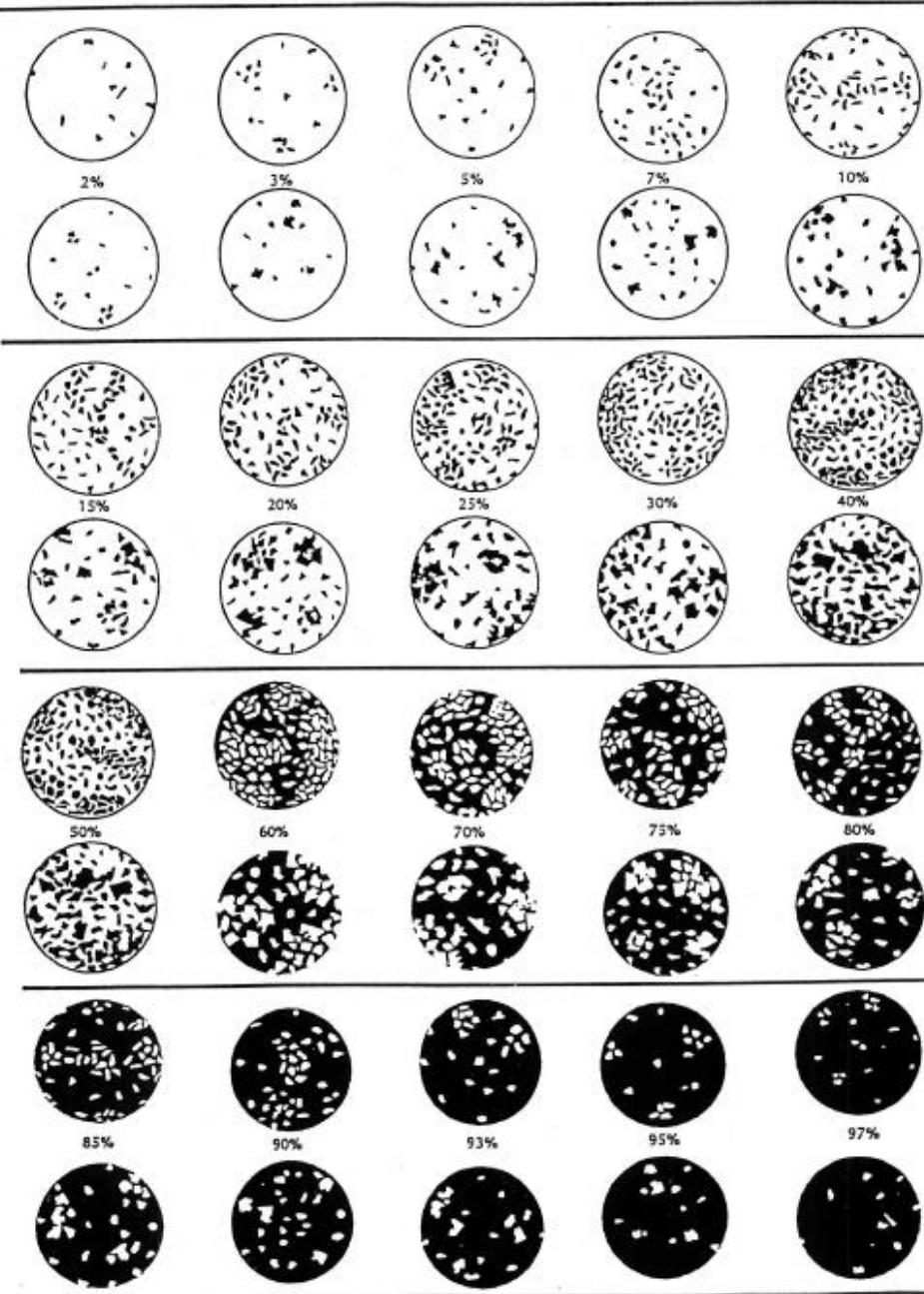
Note: Please put a "0" in the box for any ground cover category that is absent from the 50m circle, rather than leaving it blank.

Grass and herbaceous height: Estimate the average height of the living grass species and all herbaceous plants to the nearest centimeter within the 50m radius. You should

use your data sheet ($8\frac{1}{2}'' \times 11'' = 21.5\text{cm} \times 28\text{cm}$) or pencil (15cm) to help you estimate.

Residual/Dead grass height: Estimate the average height of the residual/dead grass (including rushes, reeds, and sedges) that is no longer alive and is clearly from the previous year's growing season. Estimates should be to the nearest centimeter and include all dead grass within a 50m radius.

COVER ESTIMATOR
(PERCENTAGE OF DARK AREA)



Barry, Sheila. 1994. Monitoring Vegetation Cover. Alameda County Resource Conservation District, 1996 Holmes St., Livermore, CA 94550

Figure 2. Estimates of percentage Cover

Rocky Mountain Bird Observatory Point- Transect Form

Observer (Login Initials)		Date (mm/dd/yy)	GPS Unit #:	Transect ID	Visit #	Time	10525	1003														
JORAL		06 20 11	1403	CP-SA05	1	Sky	0	0														
Access Point UTM's		ZONE:		UTMs:		Wind	2	3														
Point Info		Overstory - all spp. total to 100%							Other (Y/N)													
1	Point accuracy:	Point	Struct stage(1-5)	Canopy % Cover	Mean Canopy 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 %	Point	Overstory?	Cliff edge?	Prog. lawn?	Prog. past.?	Tamisk pred?	Tamisk boles?
2		1 2	0	0											1	N	N	N	N	0	-	
3		2 2	0	0											2	N	N	NN	NN	0	-	
4		3 2	1	1											3	N	N	N	N	0	-	
5		4 2	1	1											4	N	N	N	N	0	-	
6		5 2	1	1											5	N	N	N	N	0	-	
7		6 2	1	1											6	N	N	N	N	0	-	
8		7 2	1	1											7	N	N	N	N	0	-	
9		8 2	1	1											8	N	N	N	N	0	-	
10		9 2	1	1											9	N	N	N	N	0	-	
11		10 2	1	1											10	N	N	N	N	0	-	
12		11 2	1	1											11	N	N	N	N	0	-	
13		12 2	1	1											12	N	N	N	N	0	-	
14		13 2	1	1											13	N	N	N	N	0	-	
15		14 2	1	1											14	N	N	N	N	0	-	
		15 2	1	1											15	N	N	N	N	0	-	
		Shrub layer - all spp. total to 100%																				
Point	Point	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	70	1 SA 80	RA 20																			
2	40	1 SA 80	RA 20																			
3	40	1 SA 90	RA 10																			
4	50	1 SA 80	RA 20																			
5	30	1 SA 80	RA 20																			
6	40	1 SA 80	RA 20																			
7	40	1 SA 80	RA 20																			
8	40	1 SA 80	RA 20																			
9	50	1 SA 40	G 20	D 20	A 20																	
10	40	1 SA 30	D 20	G 20	A 20																	
11	40	2 G 30	S 20	A 20	S 20																	
12	40	2 G 30	S 20	A 20	S 20																	
13	40	1 G 0 40	S 20	S 20	L 20																	
14	50	1 G 0 20	S 20	S 20	L 20																	
15	50	1 G 0 30	K 4	S 20	V 20	A 20																
		Ground Cover - totals to 100%																				
Point	Snow %	Water %	Woody %	Dead and Down %	Herbaceous %	Bare / 100% %	Residual Grass %	Grass & Herb. Height (cm)	Residual Grass Height (cm)													
1	0	0	10	10	10	50	20	0	10	10	10	10	10	10	10	30	40	0	10	0		
2			10	10	10	50	20	0	10	10	10	10	10	10	10	45	25	0	10	0		
3	1	1	10	10	10	50	20	0	10	10	10	10	10	10	10	40	30	0	10	0		
4	1	1	10	10	10	60	10	0	10	10	10	10	10	10	10	50	20	0	10	0		
5	1	1	10	10	10	50	20	0	10	10	10	10	10	10	10	50	20	0	10	0		
6	1	1	10	10	10	50	20	0	10	10	10	10	10	10	10	50	20	0	10	0		
7	1	1	10	10	10	60	10	0	10	10	10	10	10	10	10	50	20	0	10	0		
8	1	1	10	10	10	60	10	0	10	10	10	10	10	10	10	50	20	0	10	0		

Figure 3. Example of a completed Vegetation Datasheet.

Point Information Data Sheet

If you are unable to survey a point on a transect, record a single reason why on this data sheet (Figure 3). If there is more than one reason you were unable to complete the point (e.g., the terrain is unsafe AND it is raining), please record the reason that is nearest the top of the table below (e.g., you would only record "U" for unsafe terrain and not "W" for weather/rain). Possible reasons points were not conducted are as follows:

P:	Private Property - Denied <u>Permission</u>
N:	Private Property - <u>No</u> contact with landowner
U:	Terrain <u>Unsafe</u> (could not safely approach to within 25 m of point)
R:	Can't cross <u>River</u>
S:	<u>Snow pack</u> impassible
H:	Running water near point - unable to <u>Hear</u>
W:	<u>Weather</u> (rain or wind)
G:	No <u>GPS</u> reception, cannot find point
T:	Ran out of <u>Time</u> (five hours past sunrise or noticeably decreased bird activity)
O:	Other - explain

These are just a few reasons; you may run into other unexpected issues in the field. For these instances record "O" for "Other" and be sure to take detailed notes on why points were not conducted. We need to report this information to our funders after the field season, so the more information you provide us, the less we will have to contact you with questions after the field season.

Point	Landowner Info/Reasons points were not conducted
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	U
11	
12	O - area closed, could not access
13	
14	T
15	T
16	U

Observer Initials (all three) Year State Transect Name (e.g. RM99)

J	A	F	2011	UT	BCR	CP-PJ10
---	---	---	------	----	-----	---------

Order of Importance Most ↓ Least	Please record the reasons why you did not survey certain points within the grid (if applicable). If more than one of the codes below apply, please record ONLY the code of highest importance.
P: Private Property - Denied Permission N: Private Property - No contact with landowner U: Terrain Unsafe (could not safely approach to within 25 m of point) R: Can't cross River S: Snow pack impassible H: Running water near point - unable to Hear W: Weather (rain or wind) G: No GPS reception, cannot find point T: Ran out of Time (five hours past sunrise or noticeably decreased bird activity) O: Other - explain	

Figure 4. Example of a completed Point Information Datasheet.

COLLECTING BIRD DATA

General Info

There are **two aspects** to the collection of bird data along point transects: the **5-minute point counts**, and the **continuous line-transect count of low-density target species** observed between the first and last points.

It is extremely important to fill in the blanks at the bottom of both sides 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. Also, we scan copies of all of our data, so the general info needs to be on both sides of the datasheet. **Before starting your first point count, be sure to fill out this information:**

1. **Observer:** Fill in your data entry login on all pages of the bird form.
2. **Transect ID fill in 2 letter project code (i.e. NCPN=CP), Habitat:** Fill in SA, PJ, or RI for sagebrush, pinyon-juniper, or riparian habitat, respectively. Rank: fill in the number of the survey (e.g. enter 04 for CP-PJ04)

Point Data

Enter the number of the point (01-15) on the transect you are about to survey. **NOTE:** for entries of low density species *between points* enter "88" as the point number (see below for more information on "88" birds). After recording the general habitat data at the point count station and denoting the point you are at on the bird datasheet, record the time next to the point number, activate your timepiece and begin recording the birds you see and hear. **The count duration is five minutes. It is extremely important to document the minute of the count that an individual bird was first detected.** To do this, simply write the number of the minute under the "minutes" column each time the beeper goes off. DO NOT record any other birds after the five 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. 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 simultaneously. If, during your five minute survey, you detect a bird that was flushed from the survey point upon your arrival (which you should have noted while collecting vegetation data), 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 when approaching the point.

While conducting counts, be sure to focus primarily on birds that are close to the point. Although 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 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, 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. Additionally, you should mentally track birds that may move around you during a point so as not to double count them during a single six-minute count.

For each independently detected bird, you will record:

- 1) the **species**,
- 2) the **radial distance** (in meters),
- 3) **how** the bird was detected,
- 4) if the bird was **visually** observed,
- 5) the **sex** of the bird, if known,
- 6) If you believe the bird is a **potential migrant**.
- 7) the **cluster size** and **cluster ID** code.

Please refer to Figure 4 for an example of a completed bird datasheet.

A. Species: All birds detected during the five-minute count period will be recorded using the correct four-letter codes (See Appendix C 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 or in the margin to avoid confusion later.

PLEASE, PLEASE use correct codes, as it makes data entry and analyses easier. Species that cause particular problems for observers include: **Cackling Goose** (CACG not CAGO), **Canada Goose** (CANG not CAGO), **Northern Shoveler** (NSHO, not NOSH), Ring-necked Pheasant (RINP, not RNPH), **Barn Owl** (BNOW not BAOW), **Barred Owl** (BDOW not BAOW), **Broad-tailed Hummingbird** (BTLH not BTHU), **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), **Cactus Wren** (CACW not CAWR), **Canyon Wren** (CANW not CAWR), **Cedar Waxwing** (CEDW not CEWA), **Black-throated Gray Warbler** (BTYW not BTGW), **MacGillivray's Warbler** (MGWA, not MAWA), ,), **Canyon Towhee** (CANT not CATO), **Lark Bunting** (LARB, not LABU), **Sage Sparrow** (SAGS not SASP), **Savannah Sparrow** (SAVS, not SASP), **Lazuli Bunting** (LAZB, not LABU) and **Red-winged Blackbird** (RWBL, not RWBB).

Some individuals can be identified to subspecies. If you can identify one of the below subspecies, please use the four-letter codes below:	
Subspecies	Code
Northern Flicker (Red-shafted)	RSFL
Northern Flicker (Yellow-shafted)	YSFL
Northern Flicker (Intergrade)	FLIN
Yellow-rumped Warbler (Audubon's)	AUWA
Yellow-rumped Warbler (Myrtle's)	MYWA
Dark-eyed Junco (Gray-headed)	GHJU
Dark-eyed Junco (Oregon)	ORJU
Dark-eyed Junco (Pink-sided)	PSJU
Dark-eyed Junco (Red-backed)	RBJU
Dark-eyed Junco (Slate-colored)	SCJU
Dark-eyed Junco (White-winged)	WWJU
White-crowned Sparrow (Gambel's)	GWCS
White-crowned Sparrow (Mountain)	MWCS

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

Distance: 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 datasheet under “Radial Distance”. If you detect a bird beyond one kilometer (1000m), enter the distance as “999”. **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. If you cannot get a direct line of sight to the location of a bird, estimate the distance that bird is from a visible point and use the Rangefinder to measure to that point. 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. **Please estimate the distance from the visible point to the bird BEFORE using the Rangefinder to get the distance from you to that point.** Distance-sampling relies upon the assumption that you measure all distances accurately, so use your rangefinders to determine distances for every bird detection!

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 10m interval. Rounding distances causes heaping at popular values and makes analyses more problematic! If you see or hear a bird that is beyond the range of the Rangefinder, estimate the distance the bird is past a point that is within-range of your Rangefinder and add that distance to what the Rangefinder displays. **Once again, estimate the distance between the bird and point-within-range BEFORE using the Rangefinder to get the distance from you to that point.** 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 CANNOT be used in analyses! 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.

Bearing: Record a bearing to all individuals that are a low-density (“88” birds) species in standard degrees.

How: In the “How” column, record **how each bird was detected** (i.e., 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 in the upper left portion of the box. Remember that how you detect a bird may be 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 potentially breeding 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 lower right portion of the ‘How’ box.**

Flyovers: A bird observed flying over a point without showing any signs of landing or using the surrounding habitat should be recorded as a “flyover”. However, individuals of

species that habitually hunt on the wing (e.g. raptors, swallows, swifts) or appear to be foraging (e.g. crossbills, goldfinches, waxwings) 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.

Visual: In the "Visual" column enter a checkmark if you were able to visually identify the individual at any time during the survey. Check this box even if you recorded "V" for the detection type. This column is meant to further assure us of proper identification and recorded distances. You may also check this box if you visually identify the individual before or after the point count.

Sex: In the "Sex" column, record the sex of the bird only if you visually observe a sexually dimorphic species and can identify the sex of the individual (M or F). If you are unable to visually observe the bird or if the bird is of a species that does not exhibit sexual dimorphism, record the sex as "U" for unknown. Change the U to an M or F if you later identify the same individual as male or female. Females of many bird species sing at least occasionally, and female singing behavior of many species is poorly understood, so please do not assume that singing birds are males.

Example: On a point count, you detect six birds. You see a male RNSA, you hear a drumming RNSA, you hear a calling WBNU, you see a male AUWA that later signs, you hear 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, V/S, S, and V. Fill in the "Sex" column: M, U, U, M, U, and U respectively (male CAFI require two years to achieve adult plumage, thus a brown-plumaged bird cannot be sexed in the field).

Migrating?: In the "Migrating?" column enter a checkmark if you have reason to believe the detected individual is not on its breeding territory. Clues that a bird may be migrating through are 1) the bird is in a large flock 2) the bird is in habitat that differs substantially from where it is typically found during the breeding season (e.g., a Brewer's Sparrow that is detected in a desert environment with no sagebrush) 3) available range maps indicate that the bird migrates through the area but does not breed there.

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; single species flocks and paired birds. In either case, we define a cluster as birds of the same species that are observed TOGETHER (foraging, flying, perching, or obviously interacting with each other). Distances between members of a cluster should be very short (within 20m). Two males of the same species singing 20m apart do NOT constitute a cluster. Please record the two types of clusters as follows.

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. Next, 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 datasheet.

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 datasheet, with the appropriate codes for “HOW” detected and “Sex”. In the first scenario, the male “HOW” = S(inging) and the female “HOW” = V(isual). In the second scenario, “HOW” = V(isual) 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: 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 27m away AND also notes that there is a female BHGR in the same tree, but about 29m away. Next, the observer hears 5 Pine Siskins (PISI), looks up, and measures that they are 36-38m 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 17m 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. The observer’s data looks like this:

Point #	Minute	Species	Radial Distance	How	Visual?	Sex	Cluster	
							Size	Code
03	1	WETA	46	S		U	1	
		AMRO	103	S		U	1	
	2	BHGR	27	C	x	M	1	A
		BHGR	29	V	x	F	1	A
	3	PISI	37	C	x	U	5	
	4	NOBI						
	5	MOCH	17	C	x	U	1	B
		MOCH	17	V	x	U	1	B

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 (fill in the radial distance, how and sex boxes) and treat Abert’s squirrels as an “88” species (see below) as well.* 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.

“88” Birds: Whenever you are not actively conducting a five minute point count, record all low-density birds species on the list of “88” birds. In addition to collecting all of the usual bird data, also record a bearing to the individual so the straight-line distance to the transect can be calculated. **Also record any birds you think might be rare for the area in which you are surveying.** (See Appendix B for a list of “88” bird species.) If you record an “88” bird and then subsequently detect that individual on a point count,

please cross out the “88” detection and simply keep the point count detection.

Transect notes: Enter information relevant to the site or individual points in the notes section at the bottom of the datasheet. This is a good place to record problems encountered during the survey, or anything that may have affected your point counts (loud noises, cows, etc.) This is also the location to record notes regarding rare or unusual birds. It is very important to take notes about rare or unusual birds because 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. Useful notes regarding a rare species should include information regarding key field marks (both visual and/or auditory), the age and sex of the bird, how you differentiated the rare species from other, similar, species and any relevant information regarding behavior and/or weather conditions. Also, if you were able to obtain a photo or audio recording of the species please bring this to the attention of your supervisor.

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

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). 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.

Transect Counts (i.e., between points)

Conduct a continuous line transect count *between the first and last points* of the transect and record all observations of low-density target species (“88” birds, see Appendix B) and other rare or unusual bird species. For each low-density target species detected, you should **measure radial distance and take a bearing from your position on the transect to the target bird**. Use your compass to sight in the direction of the bird and record the bearing in the appropriate space on the field form. Make sure that you are on the exact bearing from your previous point to your next point before measuring and recording this data. **You should record bearings for all low-density target species detected on transects, regardless of whether you record them on points or while in between points.** Do not forget to take a bearing for low-density targets detected during point counts, as the time spent at point counts is part of the *continuous line* transect. Fill in the “How” and “Sex” columns for each low-density target just as you would for any other bird. For all low-density target species observed between points, record “88” as the point number. **Record any species on the “88” list or that you think might be rare for the area you are surveying in.**

While walking between points, move at a constant speed and concentrate on listening and looking for target species. Keep your eyes and ears open and spend as little time as possible looking down. However, do watch where you are going enough to follow the correct compass bearing and avoid hazards. If you detect target species as true flyovers (i.e., they are not using the habitat), enter the species code and “F” in the how detected column and record all other information as you would for a perched bird. If you already recorded an individual bird on a point, do NOT count it again. **However, if you record a target bird in between points, and then while conducting your next point count**

you hear/see that same individual bird again, remove it from the “88” category, add it to your point count, and treat it as though it was first detected during that point count. The line transect begins after the first point is conducted and ends after the last point is conducted, so do not record any “88” birds observed outside of this time frame. You can add these birds to the notes section, but not the point count data.

When entering the point count data into the database, be sure to enter any “88” birds recorded between points with the point you came from, not the one you are going to. So, if you detect a RNSA while going from point two to point three, you would enter it in the database along with the birds you detected on point two. Also, be sure to check the box indicating this bird is an 88 bird and enter “88” for the time period.

NCPN Point Transect Bird Form												Page <u>1</u> of <u>3</u>										
How: V=visual; S=singing; C=calling; F=flyover; D=drumming; O=other aural detection Between points, point # = 88 If found, please return to: PO Box 1232, Brighton, CO 80601 or call (970) 482-1707 ext. 24												Sex: M=male, F=female, U=unknown; J=juvenile										
Start Time	Point #	Species	Radial Distance	Bearing	HOW	Visual?	SEX	Migrating?	Size	Cluster	Start Time	Point #	Species	Radial Distance	Bearing	HOW	Visual?	SEX	Migrating?	Size	Cluster	
Minute									Code	Code		Minute								Code	Code	
041520	01	1	NOMO	039	S	/	U					052604	1	RBN	066	279	C		U			
			MODO	073	C	/	U															
			LASP	113	S	/	U															
			WEME	178	S	/	U															
			BTS	SP220	S	/	U															
			2WEME	193	S	/	U															
			CORA	219	C	/	U															
			BTS	SP093	S	/	U															
			3BTS	SP168	S	/	U															
			4NOBI																			
			5^																			
0506	02	1	BGGN	065	S	/	U					053405	1	BTYW	028		S	/	M			
			PLVI	098	S	/	U															
			BTS	SP190	S	/	U															
			GRVI	112	S	/	U															
			BTS	SP106	S	/	U															
			2ROWR	139	S	/	U															
			3^	091	C	/	U															
			CORA	290	C	/	U															
			4NOBI																			
			5HOFI	062	S	/	M															
0517	03	1	BTS	SP052	G	/	U															
			^	110	S	/	U															
			^	115	S	/	U															
			HOFI	038	S	/	U															
			^	082	S	/	U															
			2GRVI	117	S	/	U															
			BGGN	061	C	/	U															
			3^	059	C	/	U															
			MODO	070	C	/	U															
			4BTS	SP026	S	/	M															
			WCME	197	C	/	U															
			5NDOB	I																		
Notes:																						
Observer Login				Date				Program				Transect Name (e.g., PJ99)										
NVL				5/17/11				CP				PJ 08										

Figure 5. Example of completed Bird Datasheet.

VI. OTHER IMPORTANT INFORMATION

Once you finish surveying your transect and before leaving the site, don't forget to:

- 1) Check to make sure you entered your observer initials, point count grid #, and sheet #'s on 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!

VII. POTENTIAL PROBLEMS WHEN CONDUCTING POINT COUNTS

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).

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 or visual field 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 (equally). Avoid wearing bright colors that may attract species to you (hummingbirds, etc.) or frighten birds away from you.

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 time for short rests along the way.

NO Pishing

Do not attract birds to you during the counts. Pishing is permissible after the count in an 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 pish or attract birds toward you when you are near a point that has not been completed!**

Airplane (and other) Noise

If your ability to hear 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 six-minute count.

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.

Know the Area

The day before you survey a transect, 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 the day before. You will be able to find your way in the dark more easily if you have already done the hike during daylight hours.

Practice

Practice identifying birds in a habitat or elevation range before counting in that area. Be familiar with the songs and calls of all species found in an area before conducting point counts there. Birding on-site the evening before is often helpful when camping at or near the transect. Use BCR- or habitat-specific bird data queried from the RMBO Avian Data Center website (www.rmbo.org/public/monitoring/countseffort.aspx) along with audio recordings to practice before (and during) the field season.

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 (light mist or drizzle is fine as long as it is not impacting the bird activity). 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. If you are unsure if the weather is impacting your ability to detect birds or decreasing bird activity, conduct the count and review the data afterwards. If you detected very few birds or almost all of your detections were visual it is likely that your ability to hear and/or bird activity is impacted by the weather. In these instances make a note that the data should not be included in the analyses in the Notes section.

VIII. LITERATURE CITED

- Buckland, S. T., D. R. Anderson, K. P. Burnham, J. L. Laake, D. L. Borchers, and L. Thomas. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, Oxford, UK.
- Leukering, T., M. Carter, A. Panjabi, D. Faulkner, and R. Levad. Revised 2005. Point Transect Protocol. Unpubl. document. Rocky Mountain Bird Observatory Rocky Mountain Bird Observatory, Brighton, CO. 29 pp.
- O'Dell, T., S. Garman, A. Evenden, M. Beer, E. Nance, D. Perry, and R. DenBleyker. 2005. Northern Colorado Plateau Inventory and Monitoring Network, Vital Signs Monitoring Plan, National Park Service, Inventory and Monitoring Network. Moab, UT.

APPENDIX A: LOW-DENSITY TARGET SPECIES (“88” BIRDS)

Northern Colorado Plateau Network

Record radial distance **and bearing** for these species whenever they are encountered anywhere along a transect in ALL HABITATS:

ALL galliforms
Turkey Vulture
ALL raptors
ALL owls
Common Nighthawk
Common Poorwill
ALL woodpeckers (except NOFL)
Black Phoebe
American Crow
Black-capped Chickadee
Mountain Chickadee
Red-breasted Nuthatch
White-breasted Nuthatch
Western Bluebird
Townsend's Solitaire
Northern Mockingbird
Lucy's Warbler
Yellow-rumped Warbler
Common Yellowthroat
Blue Grosbeak
American Goldfinch

APPENDIX B. 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 Juniperus species (Utah, Rocky Mountain, and One-seed)
MZ	Manzanita (<i>Arctostaphylos 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>)

Code	Shrubs/Small Trees
RO	Russian olive (<i>Elaeagnus angustifolia</i>)
SA	Sage spp. (<i>Artemisia spp.</i>)
SL	Saltbush (<i>Atriplex spp.</i>)
SB	Serviceberry (<i>Amelanchier spp.</i>)
LO	Shrub Live Oak (<i>Quercus turbinella</i>)
SC	Shrubby cinquefoil (<i>Pentaphylloides floribunda</i>)
SE	Single-leaf Ash (<i>Fraxinus anomala</i>)
SK	Skunkbrush (<i>Rhus trilobata</i>)
SW	Snakeweed (<i>Gutierrezia sarothrae</i>)
SY	Snowberry (<i>Symphoricarpos spp.</i>)
TA	Tamarisk/Saltcedar (<i>Tamarix pentandra</i>)
TB	Thimbleberry (<i>Rubus spp.</i>)
VI	Viburnum (<i>Viburnum spp.</i>)
WR	Wild rose (<i>Rosa spp.</i>)
WI	Willow spp. (<i>Salix spp.</i> - primarily for all shrubby willows)
WO	Wolfberry (<i>Lycium pallidum</i>)
YU	Yucca (<i>Yucca spp.</i>)

Code	Large trees
HH	American hophornbeam (<i>Ostrya virginiana</i>)
AH	Ash (<i>Fraxinus spp.</i>)
BP	Balsam poplar (<i>Populus balsamifera</i>)
BS	Blue spruce (<i>Picea pungens</i>)
BX	Box elder (<i>Acer negundo</i>)
BR	Bristlecone pine (<i>Pinus aristata</i>)
BO	Bur oak (<i>Quercus macrocarpa</i>)
BC	Burned conifer
BD	Burned deciduous
CW	Crack willow (<i>Salix fragilis</i>)
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 (<i>Psuedotsuga menziesii</i>)
ES	Engelmann spruce (<i>Picea engelmannii</i>)
FC	Fremont cottonwood (<i>Populus fremontii</i>)
JU	Juniper spp. (<i>Juniperus spp.</i>)
LM	Limber pine (<i>Pinus flexilis</i>)
LP	Lodgepole pine (<i>Pinus contorta</i>)
NC	Narrow-leaf cottonwood (<i>Populus angustifolia</i>)
PB	Paper birch (<i>Betula papyrifera</i>)
PW	Peachleaf willow (<i>Salix amygdaloides</i>)

Code	Large trees
PY	Pinyon pine (<i>Pinus edulis</i>)
PC	Plains cottonwood (<i>Populus deltoides</i>)
PP	Ponderosa pine (<i>Pinus ponderosa</i>)
AS	Quaking aspen (<i>Populus tremuloides</i>)
RO	Russian olive (<i>Elaeagnus angustifolia</i>)
SU	Subalpine fir (<i>Abies lasiocarpa</i>)
SN	Unidentifiable snag – no bark
UC	Unknown coniferous tree or not on list
UD	Unknown deciduous tree or not on list
WF	White fir (<i>Abies concolor</i>)
WS	White spruce (<i>Picea glauca</i>)
WP	Whitebark pine (<i>Pinus albicaulis</i>)
WI	Willow species (<i>Salix spp.</i>)

APPENDIX C. FOUR LETTER BIRD CODES FOR ALL PROGRAMS

Species	Code	Species	Code
Abert's Towhee	ABTO	Black Rosy-Finch	BLRF
Acadian Flycatcher	ACFL	Black Scoter	BLSC
Acorn Woodpecker	ACWO	Black Skimmer	BLSK
Alder Flycatcher	ALFL	Black Swift	BLSW
Allen's Hummingbird	ALHU	Black Tern	BLTE
American Avocet	AMAV	Black Turnstone	BLTU
American Bittern	AMBI	Black Vulture	BLVU
American Black Duck	ABDU	Black-and-white Warbler	BAWW
American Black Duck	ABDU	Black-backed Woodpecker	BBWO
American Coot	AMCO	Black-bellied Plover	BBPL
American Crow	AMCR	Black-billed Cuckoo	BBCU
American Dipper	AMDI	Black-billed Magpie	BBMA
American Flamingo	AMFL	Blackburnian Warbler	BLBW
American Golden-Plover	AMGP	Black-capped Chickadee	BCCH
American Goldfinch	AMGO	Black-capped Gnatcatcher	BCGN
American Green-winged Teal	AGWT	Black-capped Vireo	BCVI
American Kestrel	AMKE	Black-chinned Hummingbird	BCHU
American Oystercatcher	AMOY	Black-chinned Sparrow	BCSP
American Pipit	AMPI	Black-crested Titmouse	BCTI
American Redstart	AMRE	Black-headed Grosbeak	BHGR
American Robin	AMRO	Black-headed Gull	BHGU
American Three-toed Woodpecker	ATTW	Black-legged Kittiwake	BLKI
American Tree Sparrow	ATSP	Black-necked Stilt	BNST
American White Pelican	AWPE	Blackpoll Warbler	BLPW
American Wigeon	AMWI	Black-tailed Gnatcatcher	BTGN
Anna's Hummingbird	ANHU	Black-throated Blue Warbler	BTBW
Arizona Woodpecker	ARWO	Black-throated Gray Warbler	BTYW
Ash-throated Flycatcher	ATFL	Black-throated Green Warbler	BTNW
Audubon's Warbler	AUWA	Black-throated Sparrow	BTSP
Bachman's Sparrow	BACS	Blue Grosbeak	BLGR
Baird's Sparrow	BAIS	Blue Jay	BLJA
Bald Eagle	BAEA	Blue-gray Gnatcatcher	BGGN
Baltimore Oriole	BAOR	Blue-winged Teal	BWTE
Band-tailed Pigeon	BTPI	Bobolink	BOBO
Bank Swallow	BANS	Bohemian Waxwing	BOWA
Barn Owl	BANO	Bonaparte's Gull	BOGU
Barn Swallow	BARS	Boreal Chickadee	BOCH
Barred Owl	BADO	Boreal Owl	BOOW
Barrow's Goldeneye	BAGO	Botteri's Sparrow	BOSP
Bell's Vireo	BEVI	Brandt's Cormorant	BRAC
Belted Kingfisher	BEKI	Brewer's Blackbird	BRBL

Species	Code	Species	Code
Bendire's Thrasher	BETH	Brewer's Sparrow	BRSP
Bewick's Wren	BEWR	Bridled Titmouse	BRTI
Black Oystercatcher	BLOY	Broad-tailed Hummingbird	BTAH
Black Phoebe	BLPH	Broad-winged Hawk	BWHA
Black Rail	BLRA	Brown Creeper	BRCR
Species	Code	Species	Code
Brown Thrasher	BRTH	Common Goldeneye	COGO
Brown-capped Rosy-Finch	BCRF	Common Grackle	COGR
Brown-crested Flycatcher	BCFL	Common Ground-Dove	COGD
Brown-headed Cowbird	BHCO	Common Loon	COLO
Buff-breasted Sandpiper	BBSA	Common Merganser	COME
Bufflehead	BUFF	Common Moorhen	COMO
Bullock's Oriole	BUOR	Common Murre	COMU
Burrowing Owl	BUOW	Common Nighthawk	CONI
Bushtit	BUSH	Common Poorwill	COPO
Cackling Goose	CACG	Common Raven	CORA
Cactus Wren	CACW	Common Yellowthroat	COYE
California Condor	CACO	Connecticut Warbler	CONW
California Gull	CAGU	Cooper's Hawk	COHA
California Quail	CAQU	Cordilleran Flycatcher	COFL
California Thrasher	CATH	Costa's Hummingbird	COHU
Calliope Hummingbird	CAHU	Crissal Thrasher	CRTH
Canada Goose	CANG	Curve-billed Thrasher	CBTH
Canada Warbler	CAWA	Dark-eyed Junco	DEJU
Canvasback	CANV	Dickcissel	DICK
Canyon Towhee	CANT	Double-crested Cormorant	DCCO
Canyon Wren	CANW	Downy Woodpecker	DOWO
Cape May Warbler	CMWA	Dunlin	DUNL
Caspian Tern	CATE	Dusky Flycatcher	DUFL
Cassin's Finch	CAFI	Dusky Grouse	DUGR
Cassin's Kingbird	CAKI	Eared Grebe	EAGR
Cassin's Sparrow	CASP	Eastern Kingbird	EAKI
Cassin's Vireo	CAVI	Eastern Meadowlark	EAME
Cattle Egret	CAEG	Eastern Phoebe	EAPH
Cave Swallow	CASW	Eastern Screech-Owl	EASO
Cedar Waxwing	CEDW	Elf Owl	ELOW
Cerulean Warbler	CERW	Eurasian Collared-Dove	EUCD
Chestnut-backed Chickadee	CBCH	Eurasian Wigeon	EUWI
Chestnut-collared Longspur	CCLO	European Starling	EUST
Chestnut-sided Warbler	CSWA	Evening Grosbeak	EVGR
Chihuahuan Raven	CHRA	Ferruginous Hawk	FEHA
Chimney Swift	CHSW	Field Sparrow	FISP

Species	Code	Species	Code
Chipping Sparrow	CHSP	Five-striped Sparrow	FSSP
Chukar	CHUK	Flammulated Owl	FLOW
Cinnamon Teal	CITE	Forster's Tern	FOTE
Clapper Rail	CLRA	Fox Sparrow	FOSP
Clark's Grebe	CLGR	Franklin's Gull	FRGU
Clark's Nutcracker	CLNU	Gadwall	GADW
Clay-colored Sparrow	CCSP	Gambel's Quail	GAQU
Cliff Swallow	CLSW	Gila Woodpecker	GIWO
Colima Warbler	COLW	Gilded Flicker	GIFL
Common Black-Hawk	COBH	Glaucous Gull	GLGU
Species	Code	Species	Code
Glaucous-winged Gull	GWGU	Hermit Warbler	HEWA
Glossy Ibis	GLIB	Herring Gull	HERG
Golden Eagle	GOEA	Hooded Merganser	HOME
Golden-cheeked Warbler	GCWA	Hooded Oriole	HOOR
Golden-crowned Kinglet	GCKI	Hooded Warbler	HOWA
Golden-crowned Sparrow	GCSP	Horned Grebe	HOGR
Golden-crowned Warbler	GCRW	Horned Lark	HOLA
Golden-winged Warbler	GWWA	House Finch	HOFI
Grace's Warbler	GRWA	House Sparrow	HOSP
Grasshopper Sparrow	GRSP	House Wren	HOWR
Gray Catbird	GRCA	Hutton's Vireo	HUVI
Gray Flycatcher	GRFL	Inca Dove	INDO
Gray Hawk	GRHA	Juniper Titmouse	JUTI
Gray Jay	GRAJ	Kentucky Warbler	KEWA
Gray Vireo	GRVI	Killdeer	KILL
Gray-crowned Rosy-Finch	GCRF	Ladder-backed Woodpecker	LBWO
Gray-headed Junco	GHJU	Lapland Longspur	LALO
Great Black-backed Gull	GBBG	Lark Bunting	LARB
Great Blue Heron	GBHE	Lark Sparrow	LASP
Great Crested Flycatcher	GCFL	Laughing Gull	LAGU
Great Egret	GREG	Lazuli Bunting	LAZB
Great Gray Owl	GGOW	Le Conte's Sparrow	LCSP
Great Horned Owl	GHOW	Le Conte's Thrasher	LCTH
Greater Pewee	GRPE	Least Bittern	LEBI
Greater Prairie-Chicken	GRPC	Least Flycatcher	LEFL
Greater Roadrunner	GRRO	Least Grebe	LEGR
Greater Sage-Grouse	GRSG	Least Sandpiper	LESA
Greater Scaup	GRSC	Least Tern	LETE
Greater White-fronted Goose	GWFG	Lesser Black-backed Gull	LBBG
Greater Yellowlegs	GRYE	Lesser Goldfinch	LEGO
Great-tailed Grackle	GTGR	Lesser Prairie-Chicken	LEPC

Species	Code	Species	Code
Green Heron	GRHE	Lesser Scaup	LESC
Green-tailed Towhee	GTTO	Lesser Yellowlegs	LEYE
Green-winged Teal	GWTE	Lewis's Woodpecker	LEWO
Gunnison Sage-Grouse	GUSG	Lincoln's Sparrow	LISP
Gyrfalcon	GYRF	Loggerhead Shrike	LOSH
Hairy Woodpecker	HAWO	Long-billed Curlew	LBCU
Hammond's Flycatcher	HAFL	Long-billed Dowitcher	LBDO
Harlan's Hawk	HALH	Long-eared Owl	LEOW
Harlequin Duck	HADU	Long-tailed Duck	LTDU
Harris's Hawk	HASH	Lucy's Warbler	LUWA
Harris's Sparrow	HASP	MacGillivray's Warbler	MGWA
Heermann's Gull	HEEG	Magnolia Warbler	MAWA
Henslow's Sparrow	HESP	Mallard	MALL
Hepatic Tanager	HETA	Marbled Godwit	MAGO
Hermit Thrush	HETH	Marsh Wren	MAWR
Species	Code	Species	Code
McCown's Longspur	MCLO	Pine Grosbeak	PIGR
Merlin	MERL	Pine Siskin	PISI
Mew Gull	MEGU	Pinyon Jay	PIJA
Montezuma Quail	MONQ	Piping Plover	PIPL
Mountain Bluebird	MOBL	Plumbeous Vireo	PLVI
Mountain Chickadee	MOCH	Prairie Falcon	PRFA
Mountain Plover	MOPL	Prothonotary Warbler	PROW
Mountain Quail	MOUQ	Purple Finch	PUFI
Mountain White-crowned Sparrow	MWCS	Purple Martin	PUMA
Mourning Dove	MODO	Pygmy Nuthatch	PYNU
Mourning Warbler	MOWA	Pyrrhuloxia	PYRR
Mute Swan	MUSW	Red Crossbill	RECR
Myrtle Warbler	MYWA	Red-bellied Woodpecker	RBWO
Nashville Warbler	NAWA	Red-breasted Merganser	RBME
Northern Bobwhite	NOBO	Red-breasted Nuthatch	RBNU
Northern Cardinal	NOCA	Red-breasted Sapsucker	RBSA
Northern Flicker	NOFL	Red-eyed Vireo	REVI
Northern Goshawk	NOGO	Red-faced Warbler	RFWA
Northern Harrier	NOHA	Redhead	REDH
Northern Hawk Owl	NHOW	Red-headed Woodpecker	RHWO
Northern Mockingbird	NOMO	Red-naped Sapsucker	RNSA
Northern Parula	NOPA	Red-necked Grebe	RNGR
Northern Pintail	NOPI	Red-necked Phalarope	RNPH
Northern Pygmy-Owl	NOPO	Red-shafted Flicker	RSFL
Northern Rough-winged Swallow	NRWS	Red-shouldered Hawk	RSHA
Northern Saw-whet Owl	NSWO	Red-tailed Hawk	RTHA

Species	Code	Species	Code
Northern Shoveler	NSHO	Red-throated Loon	RTLO
Northern Shrike	NSHR	Red-winged Blackbird	RWBL
Northern Waterthrush	NOWA	Ring-billed Gull	RBGU
Nuttall's White-crowned Sparrow	NWCS	Ring-necked Duck	RNDU
Olive Warbler	OLWA	Ring-necked Pheasant	RNEP
Orange-crowned Warbler	OCWA	Rock Pigeon	ROPI
Oregon Junco	ORJU	Rock Wren	ROWR
Osprey	OSPR	Rough-legged Hawk	RLHA
Ovenbird	OVEN	Ruby-crowned Kinglet	RCKI
Pacific Golden-Plover	PAGP	Ruby-throated Hummingbird	RTHU
Pacific Loon	PALO	Ruddy Ground-Dove	RUGD
Pacific-slope Flycatcher	PSFL	Ruffed Grouse	RUGR
Painted Bunting	PABU	Rufous Hummingbird	RUHU
Painted Redstart	PARE	Rufous-crowned Sparrow	RCSP
Palm Warbler	PAWA	Sage Sparrow	SAGS
Pectoral Sandpiper	PESA	Sage Thrasher	SATH
Peregrine Falcon	PEFA	Sanderling	SAND
Phainopepla	PHAI	Sandhill Crane	SACR
Pied-billed Grebe	PBGR	Savannah Sparrow	SAVS
Pileated Woodpecker	PIWO	Say's Phoebe	SAPH
Species	Code	Species	Code
Scaled Quail	SCQU	Unidentified Sparrow	UNSP
Scarlet Tanager	SCTA	Unidentified Swallow	UNSW
Scissor-tailed Flycatcher	STFL	Unidentified Thrush	UNTH
Scott's Oriole	SCOR	Unidentified Warbler	UNWA
Sedge Wren	SEWR	Unidentified Woodpecker	UNWO
Semipalmated Plover	SEPL	Unidentified Wren	UNWR
Semipalmated Sandpiper	SESA	Upland Sandpiper	UPSA
Sharp-shinned Hawk	SSHA	Varied Bunting	VABU
Sharp-tailed Grouse	STGR	Varied Thrush	VATH
Short-billed Dowitcher	SBDO	Vaux's Swift	VASW
Short-eared Owl	SEOW	Veery	VEER
Smith's Longspur	SMLO	Verdin	VERD
Snow Bunting	SNBU	Vermilion Flycatcher	VEFL
Snow Goose	SNGO	Vesper Sparrow	VESP
Snowy Egret	SNEG	Virginia Rail	VIRA
Snowy Owl	SNOW	Virginia's Warbler	VIWA
Snowy Plover	SNPL	Warbling Vireo	WAVI
Song Sparrow	SOSP	Western Bluebird	WEBL
Sooty Grouse	SOGR	Western Flycatcher	WEFL
Sora	SORA	Western Grebe	WEGR
Spotted Sandpiper	SPSA	Western Gull	WEGU

Species	Code	Species	Code
Spotted Towhee	SPTO	Western Kingbird	WEKI
Sprague's Pipit	SPPI	Western Meadowlark	WEME
Spruce Grouse	SPGR	Western Sandpiper	WESA
Steller's Jay	STJA	Western Screech-Owl	WESO
Summer Tanager	SUTA	Western Scrub-Jay	WESJ
Surf Scoter	SUSC	Western Tanager	WETA
Swainson's Hawk	SWHA	Western Wood-Pewee	WEWP
Swainson's Thrush	SWTH	Whimbrel	WHIM
Tennessee Warbler	TEWA	Whip-poor-will	WPWI
Thayer's Gull	THGU	White-breasted Nuthatch	WBNU
Townsend's Solitaire	TOSO	White-crowned Sparrow	WCSP
Townsend's Warbler	TOWA	White-faced Ibis	WFIB
Traill's Flycatcher	TRFL	White-headed Woodpecker	WHWO
Tree Swallow	TRES	White-tailed Ptarmigan	WTPT
Tufted Titmouse	TUTI	White-throated Sparrow	WTSP
Tundra Swan	TUSW	White-throated Swift	WTSW
Turkey Vulture	TUVU	White-winged Crossbill	WWCR
Wilson's Phalarope	WIPH	White-winged Dove	WWDO
Wilson's Snipe	WISN	White-winged Junco	WWJU
Wilson's Warbler	WIWA	White-winged Scoter	WWSC
Winter Wren	WIWR	Whooping Crane	WHCR
Wood Duck	WODU	Wild Turkey	WITU
Yellow Rail	YERA	Willet	WILL
Yellow Warbler	YEWA	Williamson's Sapsucker	WISA
Yellow-bellied Sapsucker	YBSA	Willow Flycatcher	WIFL
Yellow-billed Cuckoo	YBCU	Zone-tailed Hawk	ZTHA
Yellow-breasted Chat	YBCH		
Yellow-headed Blackbird	YHBL		
Yellow-rumped Warbler	YRWA		
Yellow-shafted Flicker	YSFL		