ROCKY MOUNTAIN BIRD OBSERVATORY

AND

NATIONAL PARK SERVICE

LANDBIRD MONITORING PROTOCOL
FOR THE
CHIHUAHUAN DESERT NETWORK (CHDN), SONORAN DESERT NETWORK (SODN), AND SOUTHERN PLAINS NETWORK (SOPN)

2012

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I. Project Overview

This Landbird Monitoring Protocol (LMP) gives step-by-step instructions for conducting bird counts at parks in the CHDN, SODN and SOPN using the point-transect method (Buckland et al. 2001), including procedures for collecting data and filling in the CHDN/SODN/SOPN "Point-Transect" field data form. Instructions on completing the "Incidental Observations" data form are also included.

II. Procedures Prior to Going into the Field for a Survey

1. If the transect/point has been sampled previously in the season, determine the point sequence and conduct the survey in the opposite or different direction if possible.
2. Make certain that your UTM coordinates (NAD83 datum) for that transect/points are in the GPS unit.
3. Organize equipment and materials for the following morning's survey. Prepare food and personal gear to facilitate a timely departure from camp or trailhead. Bring appropriate gear, including extra water and a first aid kit every day. Before heading out into the field, be sure to have the following equipment and materials (RMBO will supply unless otherwise indicated):

   A. Timepiece with a countdown timer and a chime;
   B. Binoculars (you must provide these);
   C. Declination-adjustable compass with sighting capability (e.g., a mirror);
   D. Clipboard (with instruction sheets attached);
   E. Writing utensils (pencil or indelible ink pen) (*3 pencils will be provided by your employer 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. Maps and transect locations;
   K. Master list of four-letter codes and;
   L. Master list of weather and habitat codes, attached to the clipboard.

4. The day before conducting a point count survey, check out your survey area and familiarize yourself with the habitat. Plan out an access route during the daylight so you will be able to find your way easier to the first point if you have to hike in the dark the next morning. Determine the point to point route you will take to conduct the survey. If the survey is in a remote area, be sure to make arrangements to camp the previous night near the survey area.
5. Consult weather reports. Canceling surveys during the breeding season is rare in our region but strong storms can occur. Unless there are extreme conditions predicted for the morning surveys (i.e., strong winds and/or heavy rain), we recommend that observers attempt to conduct a survey. Counts should not be conducted if wind strength on the Beaufort scale is a sustained 5 or greater, or if it is raining (anything greater than a drizzle). If you encounter these conditions, wait until the weather improves or cancel the sampling for that day and try again on another day. Consider data entry on days when surveys are canceled or locating other transects on the park that you will be surveying.

6. Sampling will occur in the morning, beginning approximately ½ hour before sunrise (once there is enough light to ID birds by sight) and ending no later than 3 ½ hours after official sunrise. There is considerable variation among sunrise times, and it is advisable to use a table localized for the area being sampled (see Appendix A for sunrise times). Attempt to arrive at the first point while it is still dark so that the count can begin as soon as it is light enough to see. Singing rate for most species is usually highest before or near official sunrise and then declines slowly over the next few hours.
7. As an added safety measure for RMBO field technicians, SPOT (Satellite Personal Tracker) Units are provided for each individual. SPOT units are a way for technicians to regularly check in with their field crew leaders to maintain contact when both parties have irregular access to internet and phone service as well as send a "help" message in the event of an emergency. RMBO requires field technicians to send their crew leader an "ok" message prior to, and following, the completion of each survey. This assures the field crew leader that technicians are able to safely get into, and out of, their transects on a daily basis. The nature of this form of contact requires the regular and consistent use of the units; otherwise, the field crew leader is left wondering if the technician forgot to check in or if they are in need of assistance. The use of SPOT units will be covered in detail during training, and more information is available in the Safety Protocol.
8. The location of sample points within groups or transects has been pre-determined and will be provided to the field crew in map form and UTM coordinates for each point will be loaded onto their GPS units which will be used to navigate to the points.

   SOPN Only:
   Despite the fact that the group/transect and its respective bird-survey points have been established, they might not have been visited before. When a point is visited for the first time, the *Establish New Sampling Point* datasheet must be filled out for each individual point. That information is also entered into the bird monitoring database. Because the sampling history of each point is tracked, it is extremely important to use the point ID that was pre-assigned, or the ID assigned for new sampling points using the *Establish New Sampling Point* datasheet. Your supervisor will advise you if and where this datasheet is to be completed.

III. 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 and NPS transect/group 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 for data entry at training. Once logged into the site, please select the appropriate project (e.g. state or park network you are working in) and transect 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 time and distance 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 need a new transect description sheet, notify your crew leader. 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 data entry login here.
2. Date Conducted (MM/DD/YYYY)
Record the date you sampled the transect.
3. 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 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 UTMs
The UTMs and projection zone for the closest spot to the transect where a surveyor can park their vehicle.
6. Access and Transect Difficulty
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. It is helpful for surveyors to know if they will be pressed for time to complete all 16 points, so they can ensure that they move quickly between points, etc. Please record the access and transect difficulty using the rubric (Table 1) so future field technicians can plan accordingly.

Table 1. Difficulty Rubric

Rating Rubric	**Transect Difficulty**			
Access difficulty	1: Easy	2: Moderate	3: Difficult	4: Inaccessible Terrain
1: Easy	11	12	13	14
2: Moderate	21	22	23	24
3: Difficult	31	32	33	34
4: Inaccessible Terrain	4	4	4	4

Explanation of codes

Access Difficulty (Measure of the hiking difficulty from the access point to the transect):
1: < 3 km and easy topography. Hike to transect requires less than 45 minutes.
2: 3 km - 6 km with relatively easy topography. Hike to transect requires less than 75 minutes.
3: > 6 km and/or difficult terrain. Transect likely requires backpacking into transect the day before.
4: Transect is inaccessible due to river, cliffs, or other dangerous terrain.

Transect Difficulty (Measure of the difficulty traveling between points on a transect):
1: Relatively flat transect. 16 points are easily surveyed in approximately 4 hours.
2: Hilly terrain, areas with dense vegetation, a few stream crossings. Technician might not be able to complete all 16 points during the sampling period.
3: Steep slopes, dense vegetation, or difficult stream crossings throughout the transect. Technician is unlikely to complete 12 or more points during the sampling period.
4: Transect has cliffs, rivers, or other dangerous terrain that do not permit 6 points to be finished.

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 grid, or more specifically, to the 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, if necessary. As some of these grids are miles from the nearest road, explicit details of a good route in will help future technicians greatly.

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

In this section, please record the primary habitat types encountered on the transect. When necessary, please provide between-point accounts, describing paths future technicians may want to follow to travel between points. You can also 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 the area in this section. Sometimes, camping is available right at the Access Point. If not, then record directions 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. 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.

Transect Description Sheet http://fc.rmbo.org/TransectDescriptionSheets.aspx

Transect: WY-BCR10-SR9 Observer Initials: Date Conducted:

Transect Name:

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: 49 B6

County: Fremont

State: WY

Access Point UTM: 12 616008 4851224

Management Unit: Shoshone National Forest

Elevation: 2612

Hiking time from AP to grid:

Difficulty:

Access Point Directions:

From Dubois take FR 285 (aka Horse Creek Rd) North to Double Cabin Trailhead and Campground. This is your access point. You must cross a rather wide, but fairly shallow creek immediately. Follow trail to East along creek to Zone 12 619893 4848769. From here leave main trail (just before it crosses the creek) and head up draw towards transect along what appears to be a cattle trail; however, this is truly an unmarked hiking/horseback riding trail complete with cutout fallen logs. This trail takes you to both the recommended camping site and to the transect. ***AP (12 616008 4851224) to transect = PUBLIC.

Notes:

Camped in draw below transect (12 621143 4850943). You could also camp at access point; however, this would leave you with about a 2.5 - 3 hour hike to the transect (approx. 6km).

Transect Description:

Transect was primarily in LP, much of which suffered beetle kill. Points 13 - 16 were inaccessible due to terrain. Sandals are recommended for crossing the creek that runs through the middle of the transect.

2012 Notes/Updates/Camping Information

Point:	Zone:	Easting:	Northing:	TRS:
1	12	623100	4852150	T44N R105W 4
2	12	622851	4852131	T44N R105W 5
3	12	622602	4852113	T44N R105W 5
4	12	622353	4852095	T44N R105W 5
5	12	623118	4851900	T44N R105W 4
6	12	622869	4851882	T44N R105W 5
7	12	622620	4851864	T44N R105W 5
8	12	622371	4851846	T44N R105W 5
9	12	623136	4851652	T44N R105W 4
10	12	622887	4851633	T44N R105W 5
11	12	622638	4851615	T44N R105W 5
12	12	622389	4851597	T44N R105W 5
13	12	623154	4851402	T44N R105W 4
14	12	622905	4851384	T44N R105W 5
15	12	622656	4851366	T44N R105W 5
16	12	622407	4851348	T44N R105W 5

1 of 2 3/20/2012 5:02 PM

Figure 1. Example Transect Description Sheet.

IV. Location and Event Information

Before starting your first point count on each survey day, it is extremely important to fill the blanks at the top and bottom of the field data form. Be sure to fill out this information:

1. **Park Code**: Four-letter park code. See the transect/group maps.
2. **Transect/Group (location)**: Unique identifier for the collection of points (transect or group) on the day's survey. See transect/group maps.
3. **Visit Number**: For transect/groups that require multiple visits, record the visit number here.
4. **Date**: Record the date you are conducting the survey (MM/DD/YY).
5. **Observer Name**: Write in the unique data entry login initials (to be assigned by your supervisor) of the person conducting the counts.
6. **Page Number**: Fill in the page number associated with the bird data in the upper right corner of the data form. Please count each side of a datasheet as a page.

If a field data form does not have this information and it becomes separated from the rest of the data forms, there is no way for us to know what transect/group the data came from. This data would become useless and an entire day's worth of data collection would be lost. We scan copies of all of our data, so this information needs to be on both sides of the datasheet.

V. Sampling Conditions

The following information must be filled in on the field data form at the beginning and end of each survey morning. For each condition there is a "/" on the data form. Conditions at the beginning of each survey are written to the left of the dash and conditions at the end of the survey are written to the right of the dash. For example, "Temp. (^{o}F) 40/45" indicates the temperature at the beginning of the survey was 40°F and the temperature at the end of the survey was 45°F. To allow for the proper calibration of the weather instrument, place it away from the ground and your body (e.g., hanging from a shrub).

- **Temp(erature) (^{o}F):** (start and end) Record the ambient temperature in degrees Fahrenheit, rounded off to the nearest degree. The thermometer should be placed above the ground and allowed to adjust to ambient air temperature. If you do not have a thermometer estimate to the nearest 5°)
- **Wind (0-5)**: (start and end) Record the one-digit code (0 through 5; see below) that applies to the strength of the wind at beginning and end of point count. Record the average wind conditions for each count, not the maximum condition (e.g., periods of gusty winds).

Codes (Beaufort scale) used to record wind strength

Wind Code	Explanation
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
5	Fresh breeze, small trees sway (30-39mph km/h)

***You shouldn't survey when the wind is above 4!**

- **Sky**: (start and end) Enter one-digit codes at beginning and end of point count:

Sky Code	Explanation
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 shouldn't survey in any other conditions!

- **Time (hhmm):** Write in the time you start surveying and the time you end surveying using military time. Examples: 0630 (6:30 am) and 0802 (8:02 am)

VI. Approaching Points and Beginning the Count

1. Navigate to the first point using the GPS unit. You must be able to get within 25 m of a point to conduct a survey. If you are unable to get within 25 m, most likely because of a physical barrier, then do not survey the point. However, you should try to get as close to each point as possible. Once you arrive at the point, begin the count as soon as possible, but wait at least one minute to calm your heartbeat if hiking to the point was strenuous. If hiking was extremely strenuous, rest away from the point (e.g., 100 m) for a few minutes, then continue to the point. After denoting the point you are at on the field data form, record the time next to the point number, activate your timepiece and begin recording the birds you see or hear. **The count duration is six 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. Stop the count at the end of the sixth minute. DO NOT record any other birds after the six minutes are over, even if is an interesting bird (you could record this bird in the notes if you so desire). However, if the bird represents a new species for the park being surveyed, then enter "88" in the point number column and record the species, how it was detected, and the sex.
2. Conduct the six minute count without interruption. Occasionally aircraft noise can be loud and can last for up to 30 seconds. In these instances, stop your stopwatch and wait for the noise to subside. Once the noise is gone, start your stopwatch again and continue the count where you left off. If excessive noise interrupts the count for more than 2 minutes, start the survey again after the disturbance has passed. Include notes about disturbance in the notes on the datasheet.
3. It is 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 6 minutes are up, you may chase down a bird that you couldn't identify on the point in order to get identification, but do not leave the point during the 6 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!***

4. 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 six minutes is probably adequate.
5. 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 during 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.
6. Pay attention to birds that flush as you approach the survey point, and make a note of the bird's distance from the point before it flushed. If, during your six minute count, you detect a bird that flushed from the survey point upon your arrival, record the bird's original distance from the point. We assume that these birds would have remained at their original locations were it not for the disturbance created by the observer.
7. Point counts are conducted as a "snapshot" in time. The survey results should represent the actual distribution of the birds relative to the point. The underlying theory of distance sampling requires that each point be recorded as close to a "snapshot in time" as possible.

At each point you will record:

1) Number of the point on the transect/group.
2) The time that you begin the count.
3) Each minute during the six minute count.
4) The species, using the appropriate four-letter code.
5) The radial distance in meters from you to the bird.
6) How the bird was detected.
7) The sex of the bird, if known.
8) If the bird was visually observed.
9) If you believe the bird is a potential migrant.
10) The cluster size and cluster ID code for any birds observed as part of a cluster (i.e., non-independent detections).

1. **Point #:** Enter the number of point on the transect/group you are about to survey. Indicate the start of a new point by leaving a blank line on the data form and recording the next point number. If observations from one point span multiple pages, be sure to include ("cont.") next to the point number at the top of the next page. NOTE: for birds detected between points that are not currently on the species list for the park being surveyed enter "88" for the point number (see below for more information).
2. **Time:** Record the time in military time when you begin the count at each point.
3. **Minute (1-6)**: Record the minute you are in during the six minute count. Minute 1 is from 0-60 seconds.

4. **Species**: Record the four-character code for all birds detected during the six minute count period. Refer to Appendix B for a complete list of bird species codes. **Use of the Correct Codes is Crucial**, due to data management and data analysis needs. This also assists in the data entry process.

Species that cause particular problems for observers include:

Cackling Goose (CACG not CAGO), **Canada Goose** (CANG not CAGO), **Barn Owl** (BNOW not BAOW), **Bank Swallow** (BANS not BASW), **Barn Swallow** (BARS not BASW), **Barred Owl** (BDOW not BAOW), **Black-throated Gray Warbler** (BTYW not BTGW), **Broad-tailed Hummingbird** (BTLH not BTHU), **Canyon Towhee** (CANT not CATO), **Canyon Wren** (CANW not CAWR), **Cedar Waxwing** (CEDW not CEWA), **Gray Jay** (GRAJ not GRJA), **MacGillivray's Warbler** (MGWA not MAWA), **Northern Shoveler** (NSHO not NOSH), **Lark Bunting** (LARB not LABU), **Lazuli Bunting** (LAZB not LABU), **Red-winged Blackbird** (RWBL not RWBB), **Ring-necked Pheasant** (RINP not RNPH), **Savannah Sparrow** (SAVS not SASP), **Tree Swallow** (TRES not TRSW), **Western Wood-Pewee** (WEWP not WWPE), and **Yellow Warbler** (YWAR not YEWA).

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	Subspecies	Code
Northern Flicker (Red-shafted)	RSFL	Dark-eyed Junco (Pink-sided)	PSJU
Northern Flicker (Yellow-shafted)	YSFL	Dark-eyed Junco (Red-backed)	RBJU
Northern Flicker (Intergrade)	FLIN	Dark-eyed Junco (Slate-colored)	SCJU
Yellow-rumped Warbler (Audubon's)	AUWA	Dark-eyed Junco (White-winged)	WWJU
Yellow-rumped Warbler (Myrtle's)	MYWA	White-crowned Sparrow (Gambel's)	GWCS
Dark-eyed Junco (Gray-headed)	GHJU	White-crowned Sparrow (Mountain)	MWCS
Dark-eyed Junco (Oregon)	ORJU		

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 Kingbird	UNKI
Unknown Bird	UNBI	Unknown Meadowlark	UNME
Unknown Blackbird	UNBL	Unknown Myiarchus	UNMY
Unknown Buteo	UNBU	Unknown Nuthatch	UNNU
Unknown Cardinal	UNCA	Unknown Oriole	UNOR
Unknown Chickadee	UNCH	Unknown Owl	UNOW
Unknown Cormorant	UNCT	Unknown Pipit	UNPI
Unknown Corvid	UNCO	Unknown Raptor	UNRA
Unknown Dove	UNDO	Unknown Sandpiper	UNSA
Unknown Duck	UNDU	Unknown Sparrow	UNSP
Unknown Empidonax	UNEM	Unknown Swallow	UNSW
Unknown Falcon	UNFA	Unknown Swift	UNSI
Unknown Finch	UNFI	Unknown Tanager	UNTA
Unknown Flicker	UNFR	Unknown Thrasher	UNTR
Unknown Flycatcher	UNFL	Unknown Thrush	UNTH
Unknown Gnatcatcher	UNGN	Unknown Towhee	UNTO
Unknown Grouse	UNGR	Unknown Vireo	UNVI
Unknown Gull	UNGU	Unknown Warbler	UNWA
Unknown Hawk	UNHA	Unknown Woodpecker	UNWO
Unknown Hummingbird	UNHU	Unknown Wren	UNWR
Unknown Jay	UNJA		

If no birds are detected during a one-minute period, enter NOBI (No Birds) in the space for four-letter bird codes. If no birds are detected during a six minute count, you should have six time periods recorded, each with NOBI written next to it. This will help you keep track of your minute intervals, and the data will reflect that you did conduct a six minute count.

5. **Distance (m)**: 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 field data form under "Radial Distance". If you detect a bird beyond 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.

   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 rangefinder 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 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, 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 analysis! We will further explain the premises behind Distance-sampling during the training session. But PLEASE, PLEASE do not forget to measure and record radial distances for EACH bird recorded on point counts.

6. How: In the "How" column, record **how each bird was detected**, i.e., whether the bird was detected sight or 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 in the upper left portion of the box. 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 lower right portion of the 'How' box.

<u>Flyovers</u>: A bird observed flying over a point without showing any signs of 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. Additionally, individuals that you first detect in flight that are simply flying from perch to perch nearby should NOT be recorded as flyovers. For true flyovers, enter an "F" in the "How" column.

6. **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.

7. 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, 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.

If you record a bird and visually identify it as a juvenile, record "J" in Sex column. The surveys we conduct are for breeding bird and juveniles do not fall into this category. Marking juvenile birds as such will allow us to factor these birds out of analysis.

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 sings, 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).

8. **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 unusual 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) the bird is outside of its typical breeding range.

9. **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 within 20m do NOT constitute a cluster. Please record the two types of clusters as follows.

   <u>Flocks</u>: 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 datasheet.

   <u>Pairs</u>: 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:

Time	Point #	Minute	Species	Radial Distance	How	Sex	Visual	Migrant?	Cluster	
									Size	Code
0552	03	1	WETA	46	S	M	X		1	
			AMRO	103	S	U			1	
		2	BHGR	27	C	M	X		1	A
			BHGR	29	V	F	X		1	A
		3	PISI	37	C	U	X		5	
		4	NOBI							
		5	MOCH	17	C	U	X		1	B
			MOCH	17	V	U	X		1	B
		6	NOBI							

10. **Notes:** Record any comments that seem appropriate and that might affect the quality of the data in the notes section at the bottom of the page, e.g., noise from nearby stream or vehicles on road. Clearly indicate which point you are referring to in the notes.

    Record any breeding behavior that may be observed using the standard breeding bird atlas codes (see below). If you locate a nest, record the UTM, indicate what plant species it is in or near and note the number of eggs and the number of brown-headed cowbird eggs, if appropriate or feasible.

Breeding behavior codes used to note breeding observations.

Code	Explanation
CN	Carrying nesting material (e.g., stick, grass, mud, cobwebs). This applies for all species except some species of wrens (cactus, Bewick's, house, marsh) and verdins.
NB	Nest building seen at actual nest site, excluding some species of wrens (see above), woodpeckers, and verdins.
DD	Distraction displays. Defense of unknown nest or young or injury feigning. Used if adult bird is seen trying to lead people away from nest or young (e.g., killdeer broken-wing act, Cooper's hawk diving at you). Does not include agitated behavior.
UN	Used nest or eggshells found. Use only when identification is unmistakable. Do not use for species that build multiple nests in a breeding season, such as cactus wrens and verdins.
FL	Recently fledged young of altricial species incapable of sustained flight or downy young of precocial species restricted to the natal area by dependence on adults or limited mobility. Note – barely fledged blackbirds and swallows may fly considerable distances.
ON	Occupied nest indicated by adult entering or leaving nest in circumstances indicating an occupied nest, including those in high trees, cliffs, cavities, and burrows where the contents of the nest and incubating brood cannot be seen.
CF	Adults seen carrying food, excluding raptors, corvids, roadrunners, and shrikes.
FY	Adults feeding recently fledged young. Young cowbirds begging food confirm both the cowbird and the host.
FS	Adult carrying fecal sac.
NE	Nest with eggs found. Be careful with identification unless you see adult. Cowbird eggs confirm both the cowbird and the host.
NY	Nest with young seen or heard. Use when you see or hear the young. Cowbird chick in the nest confirms both the cowbird and the host.

Make notes about rare or unusual birds that you detect. After the field season, RMBO staff will review your data looking for any detections that seem odd or out of place. If you positively identify a species that you believe might be questioned later, write notes to affirm your identification. Useful notes regarding a rare species should include information on key field marks (both visual and/or auditory), what was 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.

This is also the location to record problems encountered during the survey or other information that either don't 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 field data form.

VII. Point Information Datasheet

There is a separate datasheet with 16 lines on it; one line for each point on the survey (Figure 5). If you are conducting a survey with less than 16 points, then simply cross out the additional points on the datasheet. If you are unable to survey a point on a transect, record the reason why you were unable to survey on this datasheet (Figure 5). Possible reasons points were not conducted are as follows:

P:	Private Property - Denied **P**ermission
N:	Private Property - **N**o contact with landowner
U:	Terrain **U**nsafe (could not safely approach to within 25 m of point)
R:	Can't cross **R**iver
S:	**S**now pack impassible
H:	Running water near point - unable to **H**ear
W:	**W**eather (rain or wind)
G:	No **G**PS reception, cannot find point
T:	Ran out of **T**ime (5 hours past sunrise or noticeably decreased bird activity)
O:	**O**ther - 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	O: Pt. on public property, but denied access by USFWS b/c of active wolf den.
4	
5	
6	
7	
8	
9	U Scree Slope (steep)
10	
11	
12	
13	
14	
15	P Mr. Johnson denied access
16	P " " " "

Observer Initials (all three)			Year	State	BCR	Transect Name (e.g. RM99)
N	V	L	2010	WY	10	SRØ9

Order of Importance	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.	
Most	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 (Past 11am or noticeably decreased bird activity)
Least	O:	Other - explain

Figure 5. Example of a completed Point Information Datasheet.

VIII. Other Important Information:

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.). All individual birds on a particular point should be bunched together on the field data form followed by a blank line before starting entries for the next point.

Once you finished the transect/group and <u>before</u> leaving the site, don't forget to:

A. Check to make sure you entered all of the information at the bottom of each page of the field data form, and you filled in the "Page __of __" section in the upper right-hand corner of each field data form.
B. Record the sampling conditions data (time, temp, sky, and wind) immediately upon completing the transect/group.
C. Go through your field data forms carefully to make sure you have not forgotten to record any data.

Upon return to your camp or vehicle, use your list of four-letter species codes to verify any codes that you were unsure of when recording in the field, and use sources of known bird calls and songs to identify any unknown vocalizations detected during the survey.
Your work is not done until you have reviewed your data from the morning!

IX. 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. Looking/listening everywhere--Be sure to look up regularly, 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). Avoid wearing bright colors that may attract species to you (hummingbirds, etc.) or frighten birds away from you.

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 for short rests along the way.

D. Recording data--Unless specifically instructed, do not use a second person as a recorder; this can enable the observer to record more birds (or fewer, if the recorder detracts from the job at hand or creates more disturbances).

E. 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!

F. 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 6-minute count.

G. 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.

H. Practice—Practice identifying birds in a habitat before counting in that area. Become familiar with species found in that habitat and their songs and calls. Be familiar with the songs and calls of all species found in an area before conducting point counts. 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. Consult the park bird checklists that will be provided to you.

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 very active and visibility may be poor. Also, do not conduct counts 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 that the weather is impacting your ability to detect birds or 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 was impacted by the weather. In these instances make a note that the data should not be included in the analyses.

X. Recording Incidental Observations

If you are within a park but not conducting a point count and you observe an unusual or rare bird, or a bird in an unusual location or exhibiting breeding behavior, you are encouraged to record "Incidental" observations. These observations are recorded on the Incidental Observations Field Datasheet. Unique observations of other taxa are encouraged if the observer is confident of his/her identification skills.

The following information is recorded on each Incidental Observations datasheet:

Location Information: to be recorded at the top of each data form only once.

1. **Park Code**: Four digit code for the park.
2. **Observer Name**: full name of the observer.
3. **Year**: yyyy format.

Individual Observations: all fields should be filled out to the best of the observer's ability.

1. **Date**: mm/dd format.
2. **Time**: record as 24-hour time (e.g., 8:05am = 0805; 3:17pm = 1517).
3. **Taxon**: taxonomic class (bird, plant, fish, herp, mammal).
4. **Species**: use four-letter species codes for birds or write out entire common names for other taxa groups.
5. **Number of individuals**

6. **UTM (X, Y) coordinates**: using NAD83 datum.
7. **Comments**: any comments unique or relevant to the detection. Include breeding behavior codes for birds.

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, England.

Appendix A. Sunrise times for Phoenix, Arizona and Amarillo, Texas for April, May, and June.

Day	Phoenix, AZ			Amarillo, TX		
	APR	MAY	JUN	APR	MAY	JUN
1	6:16	5:40	5:19	7:34	6:56	6:34
2	6:14	5:39	5:19	7:32	6:55	6:34
3	6:13	5:38	5:19	7:31	6:54	6:33
4	6:12	5:37	5:19	7:30	6:53	6:33
5	6:10	5:36	5:18	7:28	6:52	6:33
6	6:09	5:35	5:18	7:27	6:51	6:33
7	6:08	5:34	5:18	7:25	6:50	6:33
8	6:06	5:33	5:18	7:24	6:49	6:32
9	6:05	5:32	5:18	7:23	6:48	6:32
10	6:04	5:32	5:18	7:21	6:47	6:32
11	6:03	5:31	5:18	7:20	6:46	6:32
12	6:01	5:30	5:18	7:19	6:45	6:32
13	6:00	5:29	5:18	7:17	6:45	6:32
14	5:59	5:28	5:18	7:16	6:44	6:32
15	5:58	5:28	5:18	7:15	6:43	6:32
16	5:56	5:27	5:18	7:13	6:42	6:32
17	5:55	5:26	5:18	7:12	6:42	6:32
18	5:54	5:26	5:18	7:11	6:41	6:33
19	5:53	5:25	5:18	7:10	6:40	6:33
20	5:52	5:24	5:19	7:08	6:40	6:33
21	5:50	5:24	5:19	7:07	6:39	6:33
22	5:49	5:23	5:19	7:06	6:38	6:33
23	5:48	5:23	5:19	7:05	6:38	6:34
24	5:47	5:22	5:20	7:04	6:37	6:34
25	5:46	5:22	5:20	7:02	6:37	6:34
26	5:45	5:21	5:20	7:01	6:36	6:35
27	5:44	5:21	5:21	7:00	6:36	6:35
28	5:43	5:21	5:21	6:59	6:35	6:35
29	5:42	5:20	5:21	6:58	6:35	6:36
30	5:41	5:20	5:22	6:57	6:35	6:36
31		5:20			6:34	

Appendix B. Four-Letter Bird Codes

Common Name	Code
Abert's Towhee	ABTO
Acadian Flycatcher	ACFL
Acorn Woodpecker	ACWO
Alder Flycatcher	ALFL
American Avocet	AMAV
American Bittern	AMBI
American Coot	AMCO
American Crow	AMCR
American Dipper	AMDI
American Goldfinch	AMGO
American Kestrel	AMKE
American Pipit	AMPI
American Redstart	AMRE
American Robin	AMRO
American Three-toed Woodpecker	ATTW
American Tree Sparrow	ATSP
American White Pelican	AWPE
American Wigeon	AMWI
Anna's Hummingbird	ANHU
Arizona Woodpecker	AZWO
Ash-throated Flycatcher	ATFL
Baird's Sandpiper	BASA
Baird's Sparrow	BAIS
Bald Eagle	BAEA
Baltimore Oriole	BAOR
Band-tailed Pigeon	BTPI
Bank Swallow	BANS

Common Name	Code
Barn Owl	BNOW
Barn Swallow	BARS
Barred Owl	BDOW
Barrow's Goldeneye	BAGO
Bell's Vireo	BEVI
Belted Kingfisher	BEKI
Bendire's Thrasher	BETH
Bewick's Wren	BEWR
Black Phoebe	BLPH
Black Rail	BLRA
Black Rosy-Finch	BLRF
Black Swift	BLSW
Black Tern	BLTE
Black Vulture	BLVU
Black-and-white Warbler	BAWW
Black-backed Woodpecker	BBWO
Black-bellied Whistling-Duck	BBWD
Black-billed Cuckoo	BBCU
Black-billed Magpie	BBMA
Black-capped Chickadee	BCCH
Black-capped Gnatcatcher	BCGN
Black-chinned Hummingbird	BCHU
Black-chinned Sparrow	BCSP
Black-crested Titmouse	BCTI
Black-crowned Night-Heron	BCNH
Black-headed Grosbeak	BHGR
Black-necked Stilt	BNST

Common Name	Code
Blackpoll Warbler	BLPW
Black-tailed Gnatcatcher	BTGN
Black-throated Blue Warbler	BTBW
Black-throated Gray Warbler	BTYW
Black-throated Green Warbler	BTNW
Black-throated Sparrow	BTSP
Blue Grosbeak	BLGR
Blue Jay	BLJA
Blue-gray Gnatcatcher	BGGN
Blue-throated Hummingbird	BLUH
Blue-winged Teal	BWTE
Blue-winged Warbler	BWWA
Boat-tailed Grackle	BTGR
Bobolink	BOBO
Bohemian Waxwing	BOWA
Bonaparte's Gull	BOGU
Boreal Chickadee	BOCH
Boreal Owl	BOOW
Botteri's Sparrow	BOSP
Brewer's Blackbird	BRBL
Brewer's Sparrow	BRSP
Bridled Titmouse	BRTI
Broad-billed Hummingbird	BBLH
Broad-tailed Hummingbird	BTLH
Broad-winged Hawk	BWHA
Bronzed Cowbird	BROC
Brown Creeper	BRCR

Common Name	Code
Brown Pelican	BRPE
Brown Thrasher	BRTH
Brown-capped Rosy-Finch	BCRF
Brown-crested Flycatcher	BCFL
Brown-headed Cowbird	BHCO
Buff-breasted Flycatcher	BBFL
Buff-collared Nightjar	BCNI
Bufflehead	BUFF
Bullock's Oriole	BUOR
Burrowing Owl	BUOW
Bushtit	BUSH
Cackling Goose	CACG
Cactus Wren	CACW
California Gull	CAGU
California Quail	CAQU
Calliope Hummingbird	CAHU
Canada Goose	CANG
Canvasback	CANV
Canyon Towhee	CANT
Canyon Wren	CANW
Carolina Chickadee	CACH
Carolina Wren	CARW
Caspian Tern	CATE
Cassin's Finch	CAFI
Cassin's Kingbird	CAKI
Cassin's Sparrow	CASP
Cassin's Vireo	CAVI
Cattle Egret	CAEG
Cave Swallow	CASW

Common Name	Code
Cedar Waxwing	CEDW
Chestnut-backed Chickadee	CBCH
Chestnut-collared Longspur	CCLO
Chestnut-sided Warbler	CSWA
Chihuahuan Raven	CHRA
Chimney Swift	CHSW
Chipping Sparrow	CHSP
Chuck-will's-widow	CWWI
Chukar	CHUK
Cinnamon Teal	CITE
Clapper Rail	CLRA
Clark's Grebe	CLGR
Clark's Nutcracker	CLNU
Clay-colored Sparrow	CCSP
Cliff Swallow	CLSW
Common Black-Hawk	CBHA
Common Gallinule	COGA
Common Goldeneye	COGO
Common Grackle	COGR
Common Ground-Dove	COGD
Common Loon	COLO
Common Merganser	COME
Common Nighthawk	CONI
Common Peafowl	CPEA
Common Poorwill	COPO
Common Raven	CORA
Common Tern	COTE
Common Yellowthroat	COYE
Cook's Petrel	COPE

Common Name	Code
Cooper's Hawk	COHA
Cordilleran Flycatcher	COFL
Costa's Hummingbird	COHU
Crested Caracara	CRCA
Crissal Thrasher	CRTH
Curve-billed Thrasher	CBTH
Dark-eyed Junco	DEJU
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
Dickcissel	DICK
Double-crested Cormorant	DCCO
Downy Woodpecker	DOWO
Dusky Flycatcher	DUFL
Dusky Grouse	DUGR
Dusky-capped Flycatcher	DCFL
Eared Grebe	EAGR
Eastern Bluebird	EABL
Eastern Kingbird	EAKI
Eastern Meadowlark	EAME
Eastern Phoebe	EAPH
Eastern Screech-Owl	EASO
Eastern Wood-Pewee	EAWP
Elegant Trogon	ELTR
Elf Owl	ELOW
Eurasian Collared-Dove	EUCD

Common Name	Code
European Starling	EUST
Evening Grosbeak	EVGR
Ferruginous Hawk	FEHA
Ferruginous Pygmy-Owl	FEPO
Field Sparrow	FISP
Flammulated Owl	FLOW
Forster's Tern	FOTE
Fox Sparrow	FOSP
Franklin's Gull	FRGU
Gadwall	GADW
Gambel's Quail	GAQU
Gila Woodpecker	GIWO
Gilded Flicker	GIFL
Golden Eagle	GOEA
Golden-crowned Kinglet	GCKI
Golden-crowned Sparrow	GCSP
Golden-fronted Woodpecker	GFWO
Golden-winged Warbler	GWWA
Grace's Warbler	GRWA
Grasshopper Sparrow	GRSP
Gray Catbird	GRCA
Gray Flycatcher	GRFL
Gray Hawk	GRHA
Gray Jay	GRAJ
Gray Partridge	GRPA
Gray Vireo	GRVI
Gray-cheeked Thrush	GCTH
Gray-crowned Rosy-Finch	GCRF
Great Blue Heron	GBHE

Common Name	Code
Great Crested Flycatcher	GCFL
Great Egret	GREG
Great Gray Owl	GGOW
Great Horned Owl	GHOW
Greater Pewee	GRPE
Greater Prairie-Chicken	GRPC
Greater Roadrunner	GRRO
Greater Sage-Grouse	GRSG
Greater Scaup	GRSC
Greater White-fronted Goose	GWFG
Greater Yellowlegs	GRYE
Great-tailed Grackle	GTGR
Green Heron	GRHE
Green Kingfisher	GKIN
Green-tailed Towhee	GTTO
Green-winged Teal	AGWT
Groove-billed Ani	GBAN
Gunnison Sage-Grouse	GUSG
Hairy Woodpecker	HAWO
Hammond's Flycatcher	HAFL
Harlequin Duck	HARD
Harris's Hawk	HRSH
Harris's Sparrow	HASP
Heermann's Gull	HEEG
Henslow's Sparrow	HESP
Hepatic Tanager	HETA
Hermit Thrush	HETH
Hermit Warbler	HEWA
Herring Gull	HERG

Common Name	Code
Hooded Merganser	HOME
Hooded Oriole	HOOR
Hooded Warbler	HOWA
Horned Grebe	HOGR
Horned Lark	HOLA
House Finch	HOFI
House Sparrow	HOSP
House Wren	HOWR
Hutton's Vireo	HUVI
Inca Dove	INDO
Indigo Bunting	INBU
Indigo x Lazuli Bunting Hybrid	ILBH
Juniper Titmouse	JUTI
Killdeer	KILL
King Rail	KIRA
Ladder-backed Woodpecker	LBWO
Lark Bunting	LARB
Lark Sparrow	LASP
Lawrence's Goldfinch	LAGO
Lazuli Bunting	LAZB
Le Conte's Sparrow	LCSP
Le Conte's Thrasher	LCTH
Least Bittern	LEBI
Least Flycatcher	LEFL
Least Grebe	LEGR
Least Sandpiper	LESA
Least Tern	LETE
Lesser Goldfinch	LEGO
Lesser Nighthawk	LENI

Common Name	Code
Lesser Prairie-Chicken	LEPC
Lesser Scaup	LESC
Lesser Yellowlegs	LEYE
Lewis's Woodpecker	LEWO
Lincoln's Sparrow	LISP
Little Blue Heron	LBHE
Loggerhead Shrike	LOSH
Long-billed Curlew	LBCU
Long-billed Dowitcher	LBDO
Long-eared Owl	LEOW
Louisiana Waterthrush	LOWA
Lucifer Hummingbird	LUHU
Lucy's Warbler	LUWA
MacGillivray's Warbler	MGWA
Magnificent Hummingbird	MAHU
Magnolia Warbler	MAWA
Mallard	MALL
Marbled Godwit	MAGO
Marsh Wren	MAWR
McCown's Longspur	MCLO
Merlin	MERL
Mexican Chickadee	MECH
Mexican Jay	MEJA
Mississippi Kite	MIKI
Montezuma Quail	MONQ
Mountain Bluebird	MOBL
Mountain Chickadee	MOCH
Mountain Plover	MOUP
Mourning Dove	MODO

Common Name	Code
Mourning Warbler	MOWA
Nashville Warbler	NAWA
Nelson's Sparrow	NESP
Northern Beardless-Tyrannulet	NBTY
Northern Bobwhite	NOBO
Northern Cardinal	NOCA
Northern Flicker	NOFL
Northern Flicker (Intergrade)	FLIN
Northern Flicker (Red-shafted)	RSFL
Northern Flicker (Yellow-shafted)	YSFL
Northern Goshawk	NOGO
Northern Harrier	NOHA
Northern Hawk Owl	NOHO
Northern Mockingbird	NOMO
Northern Parula	NOPA
Northern Pintail	NOPI
Northern Pygmy-Owl	NOPO
Northern Rough-winged Swallow	NRWS
Northern Saw-whet Owl	NSWO
Northern Shoveler	NSHO
Northern Waterthrush	NOWA
Olive Warbler	OLWA
Olive-sided Flycatcher	OSFL
Orange-crowned Warbler	OCWA
Orchard Oriole	OROR
Osprey	OSPR
Ovenbird	OVEN
Pacific-slope Flycatcher	PSFL
Painted Bunting	PABU

Common Name	Code
Painted Redstart	PARE
Pectoral Sandpiper	PESA
Peregrine Falcon	PEFA
Phainopepla	PHAI
Pied-billed Grebe	PBGR
Pileated Woodpecker	PIWO
Pine Grosbeak	PIGR
Pine Siskin	PISI
Pinyon Jay	PIJA
Piping Plover	PIPL
Plumbeous Vireo	PLVI
Prairie Falcon	PRFA
Prothonotary Warbler	PROW
Purple Finch	PUFI
Purple Martin	PUMA
Pygmy Nuthatch	PYNU
Pyrrhuloxia	PYRR
Red Crossbill	RECR
Red Phalarope	REPH
Red Squirrel	RESQ
Red-bellied Woodpecker	RBWO
Red-breasted Merganser	RBME
Red-breasted Nuthatch	RBNU
Red-breasted Sapsucker	RBSA
Red-eyed Vireo	REVI
Red-faced Warbler	RFWA
Redhead	REDH
Red-headed Woodpecker	RHWO
Red-naped Sapsucker	RNSA

Common Name	Code
Red-necked Grebe	RNGR
Red-necked Phalarope	RNPH
Red-shouldered Hawk	RSHA
Red-tailed Hawk	RTHA
Red-winged Blackbird	RWBL
Ring-billed Gull	RBGU
Ring-necked Duck	RNDU
Ring-necked Pheasant	RINP
Rock Pigeon	ROPI
Rock Wren	ROWR
Roseate Spoonbill	ROSP
Rose-breasted Grosbeak	RBGR
Rose-throated Becard	RTBE
Rough-legged Hawk	RLHA
Ruby-crowned Kinglet	RCKI
Ruby-throated Hummingbird	RTHU
Ruddy Duck	RUDU
Ruffed Grouse	RUGR
Rufous Hummingbird	RUHU
Rufous-crowned Sparrow	RCSP
Rufous-winged Sparrow	RWSP
Rusty Blackbird	RUBL
Sabine's Gull	SAGU
Sage Sparrow	SAGS
Sage Thrasher	SATH
Sandhill Crane	SACR
Savannah Sparrow	SAVS
Say's Phoebe	SAPH
Scaled Quail	SCQU

Common Name	Code
Scarlet Tanager	SCTA
Scissor-tailed Flycatcher	STFL
Scott's Oriole	SCOR
Sedge Wren	SEWR
Semipalmated Plover	SEPL
Sharp-shinned Hawk	SSHA
Sharp-tailed Grouse	STGR
Short-eared Owl	SEOW
Snow Goose	SNGO
Snowy Egret	SNEG
Snowy Plover	SNPL
Solitary Sandpiper	SOSA
Song Sparrow	SOSP
Sooty Grouse	SOGR
Sora	SORA
Spotted Owl	SPOW
Spotted Sandpiper	SPSA
Spotted Towhee	SPTO
Sprague's Pipit	SPPI
Spruce Grouse	SPGR
Squirrel (Abert's)	ABSQ
Steller's Jay	STJA
Stilt Sandpiper	STSA
Sulphur-bellied Flycatcher	SBFL
Summer Tanager	SUTA
Swainson's Hawk	SWHA
Swainson's Thrush	SWTH
Swamp Sparrow	SWSP
Tennessee Warbler	TEWA

Common Name	Code
Thick-billed Kingbird	TBKI
Townsend's Solitaire	TOSO
Townsend's Warbler	TOWA
Tree Swallow	TRES
Tricolored Heron	TRHE
Tropical Kingbird	TRKI
Trumpeter Swan	TRUS
Tufted Titmouse	TUTI
Turkey Vulture	TUVU
Upland Sandpiper	UPSA
Varied Bunting	VABU
Varied Thrush	VATH
Vaux's Swift	VASW
Veery	VEER
Verdin	VERD
Vermilion Flycatcher	VEFL
Vesper Sparrow	VESP
Violet-crowned Hummingbird	VCHU
Violet-green Swallow	VGSW
Virginia Rail	VIRA
Virginia's Warbler	VIWA
Warbling Vireo	WAVI
Western Bluebird	WEBL
Western Flycatcher	WEFL
Western Grebe	WEGR
Western Kingbird	WEKI
Western Meadowlark	WEME
Western Sandpiper	WESA
Western Screech-Owl	WESO

Common Name	Code
Western Scrub-Jay	WESJ
Western Tanager	WETA
Western Wood-Pewee	WEWP
Whip-poor-will	WPWI
Whiskered Screech-Owl	WHSO
White-breasted Nuthatch	WBNU
White-crowned Sparrow	WCSP
White-crowned Sparrow (Gambel's)	GWCS
White-crowned Sparrow (Mountain)	MWCS
White-eared Hummingbird	WEHU
White-eyed Vireo	WEVI
White-faced Ibis	WFIB
White-tailed Kite	WTKI
White-tailed Ptarmigan	WTPT
White-throated Sparrow	WTSP
White-throated Swift	WTSW

Common Name	Code
White-winged Crossbill	WWCR
White-winged Dove	WWDO
Whooping Crane	WHCR
Wild Turkey	WITU
Willet	WILL
Williamson's Sapsucker	WISA
Willow Flycatcher	WIFL
Wilson's Phalarope	WIPH
Wilson's Plover	WIPL
Wilson's Snipe	WISN
Wilson's Warbler	WIWA
Winter Wren	WIWR
Wood Duck	WODU
Wood Stork	WOST
Worm-eating Warbler	WEWA
Yellow Warbler	YWAR

Common Name	Code
Yellow-bellied Flycatcher	YBFL
Yellow-bellied Sapsucker	YBSA
Yellow-billed Cuckoo	YBCU
Yellow-billed Magpie	YBMA
Yellow-breasted Chat	YBCH
Yellow-eyed Junco	YEJU
Yellow-green Vireo	YGVI
Yellow-headed Blackbird	YHBL
Yellow-rumped Warbler	YRWA
Yellow-rumped Warbler (Audubon's)	AUWA
Yellow-rumped Warbler (Myrtle)	MYWA
Yellow-throated Vireo	YTVI
Yellow-throated Warbler	YTWA
Zone-tailed Hawk	ZTHA