

ROCKY MOUNTAIN BIRD OBSERVATORY

AND

NATIONAL PARK SERVICE

LANDBIRD MONITORING PROTOCOL

FOR THE

**CHIHUAHUAN DESERT NETWORK (CHDN), SONORAN DESERT
NETWORK (SODE), AND SOUTHERN PLAINS NETWORK (SOPN)**

2011



Table of Contents

Table of Contents	2
Procedures Prior to Going in the Field for a Survey:.....	3
Location and Event Information	4
Sampling Conditions.....	5
Approaching Points and Beginning the Count.....	6
Point Data.....	7
Potential Concerns When Conducting Point-Transects	13
Recording Incidental Observations	14
Literature Cited	14
Sunrise times for Phoenix, Arizona and Amarillo, Texas for April, May, and June.....	15

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.

Procedures Prior to Going in 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 countdown timer and chime.
 - B. Binoculars (you must provide this).
 - C. Clipboard
 - D. Writing utensils (3 pencils will be provided by RMBO at the start of the field season; if you lose these you must provide additional writing utensils).
 - E. GPS unit.
 - F. Rangefinder.
 - G. Extra batteries.
 - H. Field data forms sufficient for all the points planned that morning.
 - I. Maps of transect/group/point locations
 - J. Master list of four-letter species codes
 - K. Spot unit
 - L. Weather instrument
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 4 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 (before 11am), or in more southern locations in the CHDN and SODE, counts need to be completed before 9am (see attached sunrise table). There is considerable variation among sunrise times, and it is advisable to use a table localized for the area being sampled (see attached sample 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. Also, directions on SPOT unit usage can be viewed at:

ftp://fc.rmbo.org/public/monitoring/equipment/SPOT_2_User_Guide_V2_printed_Oct8_2009

OR

ftp://fc.rmbo.org/public/monitoring/equipment/SPOT_UsersGuide_2007_10_16 for the respective models.

Location and Event Information

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. Points will be located as close as possible using the UTM coordinates provided.

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* data sheet 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* data sheet.

Prior to beginning point counts on each survey day, fill in the Location and Event Information at the top of the field data form:

- **Park Code:** Four-letter park code. See the group/transect maps.

- **Transect/Group (location):** Unique identifier for the collection of points (group or transect) on the day's survey. See group/transect maps and UTM coordinates.
- **Visit Number:** Number of the visit to the group/transect in the current season.
- **Date (mm/dd/yyyy):** Write in the month (2 digits), day (2 digits) and year (4 digits) in the format shown. Examples are 05/02/2006 and 06/25/2006.
- **Observer Name:** Fill in the full name of the person conducting the counts.

It is extremely important to fill in the information (observer, year, visit #, park code-transect/group name) at the bottom of the front and back of each and every field data form before starting your point count. 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.

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. (°C) 13/17" indicates the temperature at the beginning of the survey was 13°C and the temperature at the end of the survey was 17°C. 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) (°C):** Record the ambient temperature in degrees Celsius, rounded off to the nearest degree. The thermometer should be placed above the ground and allowed to adjust to ambient air temperature.
- **Wind (0-6):** Record the wind code (0 through 6; see below) that applies to the strength of the wind. 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	calm, smoke rises vertically (< 2 km/h)
1	smoke drifts (2-5 km/h)
2	light breeze felt on face, leaves rustle (6-12 km/h)
3	leaves and twigs in constant motion (13-19 km/h)
4	small branches move, raises loose paper, dust rises (20-29 km/h)
5	fresh breeze, small trees sway (30-39 km/h)
6	strong breeze, large branches moving, wind whistling (40-50 km/h)

- **Cloud Cover (%):** Visual estimate of the percent cloud cover, rounded off to the nearest 10 percent. This should be a number between 0 (no clouds) and 100 (completely overcast). If there are patches of clouds in different areas of the sky, try to picture gathering all of them together into one part of the sky and recording what percent of cloud cover that would represent.

- **Time (hhmm):** Write in the time you start surveying and the time you end surveying using the hour and minute format for military time. Fill in all four digits. Examples are 0630 (6:30 am) and 0802 (8:02 am).

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. Activate your timepiece and begin recording the birds you see or hear. **The count duration is 6 minutes.** A watch type that signals the passage of each one minute interval is ideal because you will note the minute in which the detection takes place. Stop the count at the end of the 6th minute.
2. Conduct the 6-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 data sheet.
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. ***Don't forget to look up!***
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 6 minute survey, you detect a bird that flushed from the survey point upon your arrival, then record that bird on your point count, using the bird's original distance from the survey point. We assume that these birds would have remained at their original locations were it not for the disturbance created by the observer.

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.

Point Data

At each point you will record:

- 1) Number of the point on the transect/group.
 - 2) The minute in which a bird was first detected.
and for each independently detected bird, record:
 - 3) The species, using the appropriate four-letter code.
 - 4) The horizontal distance in meters (determined with a rangefinder) from you to the bird.
 - 5) How the bird was detected (by song, call, drumming, other aural cues, or visually).
 - 6) The sex of the bird, if known.
 - 7) 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 “99” (see below for more information).
 2. **Minute (1-6):** Record the minute in which the bird (or group of birds) was first detected. Minute 1 is from 0-60 seconds.
 3. **Species:** Record the 4-character code for all birds detected during the 6-minute count period. You will be provided 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:

Northern Shoveler (NSHO, not NOSH), Ring-necked Pheasant (RINP, not RNPH), Western Wood-Pewee (WEWP, not WWPE), Gray Jay (GRAJ, not GRJA), Tree Swallow (TRES, not TRSW), Bank Swallow (BANS, not BASW), Barn Swallow (BARS, not BASW), MacGillivray’s Warbler (MGWA, not MAWA), Yellow Warbler (YWAR, not YEWA), Yellow-rumped Warbler (AUWA – for Audubon’s Warbler, MYWA for Myrtle’s Warbler, not YRWA), Lark Bunting (LARB, not LABU), Savannah Sparrow (SAVS, not SASP), Lazuli Bunting (LAZB, not LABU) and Red-winged Blackbird (RWBL, not RWBB).

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 Accipiter	UNAC
Unknown Bird	UNBI
Unknown Blackbird	UNBL
Unknown Buteo	UNBU
Unknown Chickadee	UNCH
Unknown Corvid	UNCO
Unknown Dove	UNDO
Unknown Duck	UNDU
Unknown Empidonax	UNEM
Unknown Falcon	UNFA
Unknown Finch	UNFI
Unknown Flycatcher	UNFL
Unknown Gnatcatcher	UNGN
Unknown Grouse	UNGR
Unknown Gull	UNGU
Unknown Hawk	UNHA

Unknown Bird	Code
Unknown Hummingbird	UNHU
Unknown Jay	UNJA
Unknown Nuthatch	UNNU
Unknown Oriole	UNOR
Unknown Owl	UNOW
Unknown Pipit	UNPI
Unknown Raptor	UNRA
Unknown Sparrow	UNSP
Unknown Swallow	UNSW
Unknown Swift	UNSI
Unknown Tanager	UNTA
Unknown Thrush	UNTH
Unknown Thrasher	UNTR
Unknown Vireo	UNVI
Unknown Warbler	UNWA
Unknown Woodpecker	UNWO
Unknown Wren	UNWR

If no birds are detected during a 1-minute period, enter NOBI (No Birds) in the space for four-letter bird codes. If no birds are detected during a 6-minute count, you should have 6 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 6-minute count.

4. **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 whenever possible. If you cannot bet 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 as much as possible!

Always measure distances to where you first detected the bird, not to where you first identified it. For birds that are vocalizing but not seen, try to pin-point their locations to a specific tree/bush, then measure the distance to that tree. If you are unable to pin-point its location to a specific tree/bush, then estimate the distance, but do not round distances to the nearest 5 or 10 meter interval. Rounding distances causes heaping at popular values and makes analysis more problematic! If you see or hear a bird that is beyond the range of the rangefinder, estimate the distance the bird is past a point-within-range 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.

5. **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. Remember that how you detect a bird is different from how you identify it.

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

In the column labeled “Visual?” on the data sheet, place a check mark for birds you actually saw, even if your initial detection type is visual.

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

Example:

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

- 7. Clusters:** “A cluster is a relatively tight aggregation of objects of interest...” (Buckland et al. 2001). In our point count sampling, clusters are actually our unit of observation, with most cluster sizes = 1. There are generally two cases in which cluster sizes are > 1: flocks, and paired birds. In either case, we define a cluster as birds of the same species that you observed TOGETHER (foraging, flying, perching, or obviously interacting with each other). Two males of the same species singing 20 meters apart do NOT constitute a cluster. Distances between members of a cluster should be very short.

How to record clusters:

Flocks: When two or more individuals of the same species are obviously in a flock and cannot be readily sexed (e.g. Cliff Swallow or Pine Siskin), record the distance to the center of the flock and record the number of individuals in the “Cluster Size” column of your data form. You do not need to enter a Cluster Code. When you can determine sex, enter the number of males on one line, and the number of females on the next line, with the appropriate number of each sex in the corresponding “Cluster Size” boxes. Then enter the same letter on both lines for the “Cluster Code” (a, b, c ...). The Cluster Code is only used to link clusters that take up multiple lines on the data sheet.

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

Example:

After recording a Western Tanager (WETA) and an American Robin (AMRO) on a point count, the observer hears a Black-headed Grosbeak (BHGR) give its distinctive squeaky call note. The observer turns to see the bird and notes that the calling bird is a male

BHGR 27 meters away AND also notes that there is a female BHGR in the same tree, but about 29 meters away. Next, the observer hears 5 Pine Siskins (PISI), looks up, and measures that they are 36-38 meters away. Finally, the observer hears a Mountain Chickadee (MOCH) calling, looks up and sees that MOCH as well as a second MOCH in the same tree, both at 17 meters away. The sex of both individuals is unknown, but the method of detection differs, so record those on separate lines with a common Cluster Code (see table below).

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

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

8. **Flyovers:** Birds observed flying over a point without showing any signs of using the habitat should be recorded as a flyover. However, individuals of species that habitually hunt on the wing (e.g. raptors, swallows, swifts) and that appear to be foraging or hunting in the vicinity around the point, should NOT be treated as flyovers. You should record these as if they were a perched bird. Additionally, individuals that you first detect in flight that are simply flying from perch to perch nearby should NOT be recorded as flyovers. For true flyovers, enter an "F" in the "How" column and fill in the sex and horizontal distance as previously described.
9. **"99" Birds:** While walking between points, record all bird species that are not currently on the species checklist for the park being surveyed. You do not need to record distance *but do record* HOW and CLUSTER SIZE. You will be provided a bird checklist for each park.
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, your data will be reviewed 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.

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.

11. VERY IMPORTANT: Check over your point-count data before leaving each count station to make sure you have recorded all the required information (e.g. distances, how, sex info, etc.). 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.

12. Once you finished the transect/group and before 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, cloud cover, 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.

13. 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!

Potential Concerns When Conducting Point-Transects

- 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).
- C. Stand at points**--**Do not sit or kneel** as this can reduce the number of individuals recorded, by decreasing visibility, audibility and dexterity. If you are tired, take a short break after the point count. As long as you start early, you should have plenty of time to rest along the way.
- D. 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). We may occasionally assign someone to conduct point counts with you, and this person’s presence will be explicitly noted on the datasheet.
- E. NO Pishing**--Do not attract birds to you. Pishing is permissible after the count in order to attempt to identify an individual that was not identifiable on the count, but do not add other individuals after the count that were not first detected during the count period. Never 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** 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.

Recording Incidental Observations

When observers are within or near a park unit but not conducting a point-transect survey and they observe a bird in an unusual location or exhibiting breeding behavior, we encourage them to record “Incidental” observations. These observations are recorded on the *Incidental Observations* data form. 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 data form:

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., 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 scientific name for other taxa groups.
- 5. Number of individuals:** number of animals seen in association with the other 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.

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

Day	Phoenix, AZ			Amarillo, TX		
	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>
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	