Bird Monitoring Protocol for Agate Fossil Beds National Monument, Nebraska and Tallgrass Prairie National Preserve, Kansas

Standard Operating Procedure (SOP) # 5

Conducting the Variable Circular Plot Count

Version 1.00 (July 18, 2003)

Revision History Log:

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #

This SOP gives step-by-step instructions for conducting 5-minute bird counts at Agate Fossil Beds National Monument, Nebraska and Tallgrass Prairie National Preserve, Kansas using the Variable Circular Plot (VCP) methodology. The SOP describes the procedure for collecting data and filling in the data form "Field Data Form – Variable Circular Plot Counts" (Form 1).

Procedures:

1. Prior to the day of the counts, determine which plots will be sampled in which order, and make a list that will be taken into the field of the UTMX and UTMY coordinates for those plots.

2. Sampling will occur in the morning, beginning as soon as it is light enough to see a distance of at least 200 m and ending no later than 4 hours after official sunrise. Try to arrive at the first plot 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 for the next four hours.

3. Do not conduct the count during high winds or heavy rains because these conditions inhibit bird activity and impair your ability to see and hear birds. Counts should not be conducted if wind strength on the Beaufort Scale is a sustained 4 or greater (see Table 5.01.1), or if it is raining hard or snowing (rain code $\geq$4 in Table 5.01.2). If you encounter these conditions, wait until the weather improves or else cancel the sampling for today and try again on another day.

4. Navigate to the coordinates of the next plot on the list using the GPS. Approach the plot vigilantly, and if you observe a bird close to the center of the plot that flushes as a result of you approaching the plot, you should record the initial distance from the plot center to that bird on the data form. The reason for this is that a critical assumption of the distance

methodology is that any bird directly at (or very close to, e.g., <5-10 m) the plot center will always be detected, i.e., g(0) = 1. If the data are analyzed as grouped data (as recommended), this is not a problem if the bird does not move beyond the first grouping interval. However, if a bird that otherwise would have been recorded in the plot during the count flushes prior to the beginning of the count as a result of the approach of the observer, abundance will be underestimated for that species. The alternative approach is to wait for several minutes after reaching the plot before starting the count, but this approach is likely to underestimate bird density near the plot because of birds flushing as the observer approaches.

5. Once you arrive at the plot center, begin the count as soon as possible. You should have time to fill in the location, event, and weather conditions information at the top of the form during the count. If not, these can be filled in at the end of the 5-minute count.

6. Set your watch to beep at 3 minutes, and then begin the count. Once you reach the 3-minute mark, make a mark on the VCP data form and continue the count for another 2 minutes, making sure that you fill in 3-5 in the Time Interval column for any species detected between 3 and 5 minutes. Only new birds should be recorded.

7. Use a new copy of the "Field Data Form – Variable Circular Plot Counts" for each 5-minute count. Even if no birds are detected at a particular plot, there should still be a form for that plot each time it is sampled (with the first line on the form filled in as explained below under the Species code). As soon as you are able to during or just after the 5-minute count, record the following information at the top of the form:

Location ID: This is the Location Identification code stored in the VCP database to refer to a particular place on the ground (the plot ID code). If you do not know what the LocationID is for this particular plot, or if you are establishing a new plot, you can instead circle the 4-character ParkCode (AGFO or TAPR) and the Location Description, such as "AGFO Plot #46". The LocationID usually contains the 4-character ParkCode, 6-character Project Code ("Tweety") and a plot number assigned by the Project Manager. An example is AGFOTweety11 for Plot Number 11 at Agate Fossil Beds National Monument.

Park: Circle the appropriate ParkCode (AGFO or TAPR) if you do not know the LocationID for this plot and you are going to instead write in a Location Description as described below.

Location Description: This is a brief description (<200 characters) of the sampling location referred to by the LocationID code. An example would be "AGFO Plot #46", but it could also be something like "Bird VCP plot number 46, 150 m north of highway marker 46 next to rock wall". If the LocationID for the plot is already known, you do not need to record anything in this space because a description is already stored in the database.

Date (mm/dd/yyyy): Write in the month (2 digits), day (2 digits) and year (4 digits) in the format shown. Include the forward slash. Examples are 05/02/2001 and 06/01/2001.

Starting time (hhmm): Write in the time to the nearest minute when the 5-minute counting period begins, using the hour and minute format shown. Use military time (add 12 to the hour beginning with 1 pm through 11 pm). Fill in all four digits. Examples are 0630 (6:30 am), 0802 (8:02 am). Bird sampling should not occur during the afternoon, but for the habitat form you would record 1:30 pm as 1330 and 8:00 pm would be 2000.

Observer Initials: Fill in the three initials of the person conducting the counts using capital letters. If you do not have a middle name, either make one up or put an underscore for your middle initial. Examples would be DGP for David G. Peitz or SGF for Steven G. Fancy. In the database, these initials will correspond to the full name and contact information for that person. (The 3-character initials in the database must be unique, and if two people have the same initials, one should be given an honorary middle name).

Temperature (C): Record the ambient temperature during the 5-minute count in degrees Celsius, to one decimal place or rounded off to the nearest degree.

Wind (0-6): Record the wind code (0 through 6) from the following Table 5.01.1 as it applies to the strength of the wind during the 5-min count. Record the average wind condition during the 5 minutes, not the maximum condition (do not worry about gusts).

Table 5.01.1. Codes (Beaufort scale) used to record wind strength during bird counts.

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)

Rain (0-5): Record the rain code (0 through 5) from the following Table 5.01.2 as it applies to conditions during the 5-min count.

Table 5.01.2. Codes used to record precipitation codes during bird counts.

Rain Code	Explanation
0	no rain
1	mist or fog
2	light drizzle
3	light rain
4	heavy rain; difficult to hear birds
5	snow

Clouds (0-100): Record percent cloud cover, rounded off to the nearest 10 percent. This should be a number between 0 (no clouds) and 100 (complete overcast). If there are patches of clouds in different areas of the sky, try to image gathering all of them together into one

part of the sky and recording what percent of cloud cover that would represent. Cloud cover is recorded because it affects bird activity and singing for many species.

Noise (0-3): Record the Noise Code (0-3) from the following Table 5.01.3 that applies to background noise conditions during the count, as it relates to your ability to hear birds.

Table 5.01.3. Codes used to record level of background noise as it effects observer's ability to hear birds.

Noise Code	Explanation
0	quiet; normal background noises; no interference
1	low noise; might be missing some high-pitched songs/calls of distant birds
2	medium noise; detection radius is probably substantially reduced
3	high noise; probably detecting only the loudest/closest birds

8. Once you have started your watch and begun the 5-minute counting period, record all birds heard or seen during the 5 minutes, regardless of their distance from the center of the plot. For flyovers (birds that fly above the top of the vegetation canopy, never touch down in your field of view, and do not appear to be foraging, displaying, or behaving in any other way that might suggest a link to the habitat below them) you do not need to estimate the distance to the bird; instead just enter the species code and the number of them that you detected as shown in the example below.

9. The distance that you record should be the horizontal distance in meters between the center of the plot (where you should be standing) and the location where you first detected the bird. If the bird is flying directly at you and then lands nearby, record the distance to where you first saw it flying towards you, not the distance to where it landed. For species that occur in clusters or flocks, you will record to the distance from the observer to the center of the flock, plus the flock size. If a bird is high in a tree, image dropping a plumb bob from the bird down to the ground, and measure the distance to that spot on the ground (the horizontal distance).

10. Many birds are heard and not seen. To estimate the distance to a bird that you detect only by sound, you should first try to determine where it is and select some object near where the bird is, such as a tree or rock that you think it is concealed by, and then estimate to that object.

11. For each bird heard or seen (at any distance) during the 5-minute counting period, record the following information on the "Field Data Form – Variable Circular Plot Counts":

Time Interval: Enter either 0-3 or 3-5, depending on whether you first detected this bird (or flock) during the first three minutes of the count or during the last two minutes of the 5-minute count. This approach makes it possible to compare the data to those collected during BBS counts, which involve a 3-minute sampling period, by analyzing only birds detected during the first three minutes of the VCP count, and only those birds detected with 400 meters of the observer (the cutoff distance for BBS counts).

Observ. #: This is an observation number which will help tie records in the database back to the paper copy of the field data form. Each row on the data form will be sequentially given a number, 1, 2, 3, 4, etc. to record which row of the data form this is. The numbers do not need to be sequential, so if you make a mistake and delete a row from the data sheet, it does not matter that there is a gap in the observation numbers.

Species: This is the 4-character AOU code for the species detected. Examples are WEME for Western Meadowlark, CCLO for Chestnut-collared Longspur and BHGR for Black-headed Grosbeak. These codes are usually easy to determine based on a bird's AOU common name, except where more than one species has the same code and one has to be modified from the convention. Codes for species known to occur at Agate Fossil Beds National Monument and Tallgrass Prairie National Preserve are listed in Appendix A of the protocol narrative. If no birds are detected during a 5-minute count, you should enter data for the first line of the form (0-3 for Time Interval and 1 for Observ. #) and record the code NOBI for "No Birds" in the Species column.

Distance (m): Record the horizontal distance in meters between the center of the plot where you are standing, and the location or presumed location of the bird where you first detected it. Use a laser range-finder whenever possible to get as accurate a distance as possible. **Do not round off numbers to the nearest 5 meters; estimate the distance to the nearest meter**. If you cannot see the bird, estimate the distance to some object (tree, bush, rock) where you think the bird is located.

DT (Detection Type): Record a number 1, 2, 4, 8 or 9 for the detection type based on the following explanations:

1 = heard first, but not seen (i.e., detected initially by sound) during the 5-min count
2 = seen first (regardless of whether it was later heard or not) during the 5-min count
4 = heard first, but then seen (a DT of 1 can be changed to a 4) during the 5-min count

Two additional Detection Type codes can be used for birds that are not detected during the 5-minute count, but that are detected while traveling between plots or before or after the 5-minute sampling period begins. These data are useful for developing annual checklists of birds occurring in the park and for distribution information.

8 = heard, but not during the 5-minute sampling period
9 = seen, but not during the 5-minute sampling period

The Detection Type code will be used later in various analyses. For example, distances to birds that are seen (code 2 or 4) are probably more accurate than those to birds that are only heard (DT = 1). Recording the DT makes it possible to develop distance histograms to compare birds seen versus those that are only heard. Also, there are probably different detection functions for birds heard versus seen, and recording the DT makes it possible to analyze data separately if needed.

Sex: Record the sex (Male, Female, Unknown) of the bird wherever possible. If it is known that only males of a species sing, and a bird is detected only by song, record the sex as Male.

Age: Record the age category (Adult, Juvenile, Unknown) of the bird wherever possible.

Flock Size: For most species, each individual bird will be treated independently as a separate observation, but for species that usually occur in clusters or flocks, the appropriate unit is the cluster or flock, and not the individual bird. For example, if quail almost always occur in coveys of 10 to 40 birds, and you observe a covey of 40 quail during a count, it is not appropriate to record 40 distances and treat them as independent observations in the analysis. For flocking species, record the distance to the center of the flock and the number of birds in the flock, rather than the distance to each individual bird.

Prev. Plot (Previous Plot): Place an X in this column if the bird was already detected from a previous plot. Bias caused by repeated counting of the same individual from more than one plot is usually small unless repeated counting is common during a survey (Buckland et al. 1993:37) or in cases where a rare bird is counted from multiple plots (Nelson and Fancy 1999). Recording whether a bird is thought to have been counted at a previous plot allows the data to be analyzed two different ways, depending on which is most appropriate. Some authorities say that you should not count a bird if you think it was recorded from another plot already, whereas other authorities argue that you should always count each bird detected, even if it was probably detected previously. By placing an X in this column for those cases where you think the bird has already been counted from another station, you allow future investigators the option of analyzing data by either approach.

 # Flyover: Use the flyover column to record the number of birds of a particular species that fly above the top of the vegetation canopy, never touch down in your field of view, and do not appear to be foraging, displaying, or behaving in any other way that might suggest a link to the habitat below them. These are birds that appear to just be passing over, without actually utilizing the habitat you are surveying. Do not estimate distance to these birds; instead just enter the number of them that you detected, as shown in the example below.

Comments: Record any comments that seem appropriate and that might help someone interpret and analyze the data correctly.

12. At the end of the day, compare vocalizations with known bird sounds on tapes to identify all unknown bird species recorded in the field. If a species is seen in the field and characteristics recorded but it was not identified, it should be identified at this time using reference materials.

Example for filling in the field data form:

Field Data Form – Variable Circular Plot Counts

LocationID: TAPRTweety103 **or** Park: AGFO (TAPR) **and** Location Description: _____

Survey: May 2001 Date (mm/dd/yyyy): 05/23/2001 Start Time (hhmm): 0916 Observer Initials: DGP

Conditions:
Temperature (C): 8.0 Wind (0-6): 1 Rain (0-5): 0 Clouds (0-100): 30 Noise (0-3): 0 Protocol Version: 1.0 May 2002

Time Interval	Observ. #	Species	Distance (m)	DT	Sex	Age	Flock Size	Prev. Plot	# Fly Over	Comments
0-3	1	WEME	35	4	M	A	1			
0-3	2	BHCO	56	4	M	A	1			
0-3	3	HOLA	30	4	M	A	1			
0-3	4	CLSW							1	
3-5	5	GRSP	22	2	M	A	1			

In the example above, four birds were detected during the first three minutes of the count, and one (the Grasshopper Sparrow GRSP) was detected during the second two minutes of the count. The first record, a Western Meadowlark (WEME) was heard, and then when the observer searched for it, it was seen at a distance of 35 meters. The observer therefore recorded the DT Detection Type of 4 since it was heard and then seen. The bird was a male adult. The same occurred for the next two detections: a Brown-headed Cowbird (BHCO) was heard and then seen at a distance of 56 meters, and a Horned Lark (HOLA) was heard and then seen at a distance of 30 meters. When the Horned Lark was first seen it was flying at a distance of 30 meters from the observer, and then landed about 80 meters away. The distance of 30 meters was recorded since that was the distance at which it was first detected. Also during the first three minutes of the count, a Cliff Swallow (CLSW) flew high across the plot and out of view. It was recorded as a flyover. No distance, sex or age was recorded for the flyover. Finally, about four minutes into the count, the observer spotted a Grasshopper Sparrow foraging in the grass about 22 meters away. After it was spotted, it gave a call, but the DT was recorded as a 2 since it was seen before it was heard.

Field Data Form – Variable Circular Plot Counts

LocationID: ______________________________ OR Park: AGFO TAPR and Location Description: ______________________________

Survey: ______________________ Date (mm/dd/yyyy): ________________ Start Time (hhmm): ________ Observer Initials: _______

Conditions:
Temperature (C): ______ Wind (0-6): ______ Rain (0-5): ______ Clouds (0-100): ______ Noise (0-3): _______ Protocol Version: ________

Time Interval	Observ. #	Species	Distance (m)	DT	Sex	Age	Flock Size	Prev. Plot	# Fly Over	Comments
0-3	1									

Variable Circular Plot Count Data Form: Categories, Definitions and Descriptions

Codes (Beaufort scale) used to record wind strength during bird counts.

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)

Codes used to record precipitation codes during bird counts.

Rain Code	Explanation
0	no rain
1	mist or fog
2	light drizzle
3	light rain
4	heavy rain; difficult to hear birds
5	snow

Codes used to record level of background noise as it effects observer's ability to hear birds.

Noise Code	Explanation
0	quiet; normal background noises; no interference
1	low noise; might be missing some high-pitched songs/calls of distant birds
2	medium noise; detection radius is probably substantially reduced
3	high noise; probably detecting only the loudest/closest birds

Codes used to record the type of detection (Detection Type, DT) of birds during a count.

DT Code	Explanation
1	heard first, but not seen (i.e., detected initially by sound) during the 5-min count
2	seen first (regardless of whether it was later heard or not) during the 5-min count
4	heard first, but then seen (a DT of 1 can be changed to a 4) during the 5-min count
8	heard, but not during the 5-minute sampling period
9	seen, but not during the 5-minute sampling period