**Breeding Bird Monitoring Protocol for the Heartland Inventory and Monitoring Network**

**Standard Operation Procedure 2: Training Observers**

**Version 3.00 (04/08/2020)**

**Revision History Log:**

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| Previous Version # | Revision Date | Author | Changes Made | Reason for Change | New Version # |
| 1.01 | May 2008 | D.G. Peitz | Entire document | Edited to reflect that bird monitoring has been expanded to ten additional network parks | 2.00 |
| 2.00 | May 2018 | D.G. Peitz | Updated throughout to NRR format. Minor edits throughout the documents. | Updated throughout to make SOP NRSS compliant. | 3.00 |
| 2.00 | April 2020 | D.G. Peitz | Added section on habitat training. | Habitat training section was added to ensure data was being collected consistently between crews and across years, | 3.00 |
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This Standard Operating Procedure explains the training procedures that all observers should follow to learn: (1) how to identify birds by sight and vocalizations; (2) how to estimate distances in the field; and (3) how to estimate ground cover and measure tree characteristics.

**Identification of Birds by Sight and Vocalizations**

The most essential component for the collection of credible, high-quality bird data is well-trained and experienced observers. This cannot be overemphasized. Proficient bird observers obtain species estimates within 90% of total species known to be present and estimate abundance within 80% accuracy (Ralph et al. 1993). Various studies have shown that observer bias is one of the most noteworthy bias factors in trend analysis of songbird populations (Kepler and Scott 1981, Baker and Sauer 1995). Before conducting variable circular plot counts, read "Reducing Bird Count Variability by Training Observers" by Kepler and Scott (1981) for a detailed discussion of training observers to identify birds by sight and sound as well as training them to estimate distances.

1. See Appendix C of the “Breeding Bird Monitoring Protocol for the Heartland Inventory and Monitoring Network Narrative” for a list of bird species likely to be encountered at parks within the Network. Beginning several months prior to the field-season, review and practice bird identification skills.
2. Birders should pass a minimum proficiency test on the vocalizations and sight identification of bird species likely to be encountered, correctly identifying all common species likely to be encountered and 90% of the less frequently encountered species (i.e. species encountered less than ten times annually).
3. Regardless of skill level, birders should spend time in the field familiarizing themselves with the birds in a park prior to starting a survey.
4. Suggested reference materials for conducting bird surveys for the Heartland Inventory and Monitoring Network:
   * Tapes, CDs, or online programs of bird songs for species found in Arkansas, Indiana, Iowa, Kansas, Minnesota, Missouri, Ohio, and Nebraska.
   * National Audubon Society Interactive CD-ROM Guide to North American Birds. This interactive CD-ROM is an excellent resource for learning calls, identification by sight, and background information on bird species.
   * Bird slides of species likely to be encountered can be obtained from Cornell Laboratory of Ornithology.
   * National Geographic. 1987. Field Guide to Birds of North America, 3rd Edition. National Geographic, Washington, D.C. 480 pages.
   * Robbins, C.S., B. Bruun, and H.S. Zim. 1983. Golden: A Guide to Field Identification of North American Birds. Western Publishing Company, Inc., Racine, WI. 360 pages.
   * Stokes, D. W. and L. Q. Stokes. 1995. Stokes Field Guide to Birds: Western Region. Little, Brown and Company, New York, NY. 519 pages.
   * Stokes, D. W. and L. Q. Stokes. 1995. Stokes Field Guide to Birds: Eastern Region. Little, Brown and Company, New York, NY. 471 pages.

**Estimating Distances to Birds Seen or Heard**

Read the paper "Reducing Bird Count Variability by Training Observers" by Kepler and Scott (1981) for a detailed discussion of training observers to identify birds by sight and sound as well as training them in distance estimating. For observers who are already competent at identifying birds by sight and sound, one full day of training is usually all that is necessary to be able to estimate distances within ±10%. Experienced observers usually recalibrate themselves the afternoon before a bird survey begins (variable circular plot counts are done early in the morning, so people usually travel to the study site on the morning before the count and recalibrate the afternoon before the count).

1. Begin by placing flagging at 10 m, 25 m, 50 m and 100 m from a central point and having observers estimate distances to trees, rocks, and flagging from the central point.
2. Have each observer place flagging at 4-5 locations visible from the station, and then have everyone in the group record distances to each flag in a field book. Distances should be estimated to the nearest meter. Then, use tape measures to measure the distance to each flag, and have each person compare their initial estimate to the actual distance. A laser rangefinder may also be useful for measuring the actual distances and should be used if available. Repeat this exercise at several sites with both open and closed vegetation until observers can consistently estimate distances to within 10-15% of the actual distance. For objects within 20 m of the station, observers should be able to accurately estimate distances to within 1 m of the true distance.
3. Most birds are usually heard but not seen and estimating distances to birds that are only heard is often the greatest source of error in variable circular plot counts. With all observers at the central point, have each observer estimate the distance to vocalizing birds pointed out by the leader. Horizontal distances should be estimated as if a plumb bob was lowered to the ground from the bird's location. Observers should visually identify the tree or branch where they think the bird is an estimate the horizontal distance to an object that they can see directly below a point from where they think the bird is vocalizing.
4. Half of the group should place themselves at various distances away from the central point, and quietly wait until a bird vocalizes near them. Place reference markers at measured distances from the central point to help these "spotters" estimate the distance between the central point and birds that vocalize. The other half of the group should remain at the central point and estimate the distance to any birds that vocalize. The observer closest to the bird should then indicate where the bird was vocalizing, and the distance to the point directly under the bird should be measured from the station using a tape measure or rangefinder. This is a slow but important part of the training and should be repeated until observers have experience with estimating distances to a number of different species and call or song types. In the field laser rangefinders should be used if available to measure distances. However, it is important to follow this exercise to learn how to estimate distances in the event the rangefinder quits, and as a quick check on the accuracy of the measurements taken with the rangefinder. Rangefinders are often influenced by objects closure or farther away from what is being measured.
5. Simultaneous counts: Divide observers into groups of 4-5 persons and conduct 5-minute counts from the same location. At the end of each count, have the observers compare notes and discuss any discrepancies in the species detected and the estimated distances to them. Remember that the distance to where the bird was first detected should be recorded, so that if a bird flies towards the central point, the distance where it was first heard or seen is recorded, not the closest distance or where it lands. Continue these simultaneous counts until there is consistency among observers in species and distances recorded (recommend no difference in species identification and less than 10% difference in distance estimates).

**Collecting Habitat Data**

1. Familiarize yourself with the Heartland Inventory and Monitoring Network standard cover classes, SOP #5 “Documenting Habitat Variables”.
2. Spend time prior to the field season practicing estimating cover classes of different vegetation guilds and ground cover categories within 1.78-m practice plots. Staff skilled in conducting cover class estimates are needed to assist in training and confirming cover class estimates. A cover class training kit is helpful for practicing estimation even without an experienced person present.

The challenge in training observers in estimation is to reduce the variability among all estimates obtained in the field, thus reducing the sampling error rate. Therefore: at the start of the field season, train observers on cover estimation in a group setting is crucial. All crew members must be in agreement for what constitutes a specific coverage; cover estimation should not be a one‑person decision.

Encourage both seasoned and new field personnel to memorize the specific cover class breakdown and codes used for the bird monitoring project. Because there are numerous cover class breakdowns utilized by different monitoring projects, often experienced field staff find it difficult to break away from past cover class breaks. Alternatively, cover class codes are often difficult to remember for new field staff.

Reiterate the importance of obtaining both an accurate estimation and a high level of precision around an estimate. When training new observers, demonstrating what constitutes 15% of a plot for cool-season grasses verses broad-leaved forb is as important as discussing how to do so. Utilize the collective knowledge of seasoned field staff, emphasizing the importance of sharing their experiences with the crew. Communication among the experienced and new observers will ensure a higher degree of precision in foliar cover estimations.

Utilize the cover estimation training kit. This kit consists of laminated shapes of varying size and color. They can be deployed within a sample frame to simulate plants. Staff can estimate cover of the shapes and check their estimates by aggregating the cards within the frame to see the total area.

Provide a half day of training in various habitats when training new observers; provide two to three hours of training with the entire crew in various habitats to acquire consistency among all observers.

Throughout the sampling season, re-train field sampling crews in cover estimation. Periodically test all crew members in guild and ground cover identification and in cover class estimates.

Using the cover class training kit

Foliar cover estimates for both vegetation and ground cover require accuracy, consistency and periodic calibration, especially when working in different habitat types. This exercise is designed to provide a method for ensuring and allowing for all three requirements. It should be used to train and refresh the field crew prior to and throughout the field season.

Overview:

Estimate cover class (or percent cover) that each color is occupying in the plot frame. This exercise will simulate estimating cover classes for guild or ground cover types in the field. In this exercise, a group of same colored shapes represent a guild or ground cover type.

**Figure 2.0.** Schematic of training frame with simulated guild cover shapes distributed across the 10-m2 plot frame. In this instance the cover class where the poster board is color-coded red equals cover class 2.

Training kit materials:

* 10-m2 plot frame used for field sampling.
* 4 different colors of poster board (55.88 x 71.12 cm), see Table C1 for details.
* Ruler (metric).
* Scissors or utility knife.
* Pencil
* Storage container (e.g., large plastic ziplock bag)

Table 2.0. Poster board requirements for cover classes 1 – 4.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class | Class range (%) | Area (cm2) | Dimension (cm) | No. sheets\* |
| 1 | trace-1.0 | 500 | 20 x 25 | 1 |
| 2 | 1.1-5 | 2500 | 50 x 50 | 1 |
| 3 | 5.1-25 | 15000 | 3 full sheets + 50 x 70 | 4 |
| 4 | 25.1-50 | 37500 | 9 full sheets + 50 x 58 | 10 |
| 5 | 50.1-75 |  |  |  |
| 6 | 75.1-95 |  |  |  |
| 7 | 95.1-100 |  |  |  |

\* = Effective area of a poster board is 55 x 70 cm per sheet (3850 cm2).

For cover classes 5 – 7, cover class estimate based on area *not* occupied by poster board:

* Cover class 5 = Total area of 10-m2 frame not covered by cover class 4 poster board.
* Cover class 6 = Total area of 10-m2 frame not covered by cover class 3 poster board.
* Cover class 7 = Total area of 10-m2 frame not covered by cover class 2 poster board.

Therefore, if cover class 4 is represented by green shapes, the total area not occupied by green shapes is equal to cover class 5.

Training kit design

Assign a color to each cover class.

1. Cover classes 1 – 4 are represented by distinct colors of poster board.
2. See Table 2.0 to determine how many sheets of poster board are required for each cover class.
3. Measure, mark, and cut poster board to dimensions for each cover class using only one color for a cover class.
4. Cut larger pieces from step 3 into amorphous shapes.
5. Place colored shapes throughout 10m2 plot frame (shapes from different cover classes can overlap to simulate overlapping foliar cover in the field, yet shapes within a single cover class do not overlap to retain total area represented by all shapes of a single color).

Training kit use

Deploy shapes inside 10-m2 sampling hoop. Each field crew member estimates cover class for each set of colored shapes. Colors chosen randomly for this example. ‘Actual’ answer column is included only to demonstrate how cover classes 5 – 7 are derived and tested in the exercise.

Table 2.2 Cover estimation kit datasheet.

|  |  |  |
| --- | --- | --- |
| Color | Estimate | Actual |
| Black |  | Cover class 1 |
| Red |  | Cover class 2 |
| Yellow |  | Cover class 3 |
| Green |  | Cover class 4 |
| Total area not green |  | Cover class 5 |
| Total area not yellow |  | Cover class 6 |
| Total area not black |  | Cover class 7 |

1. Staff skilled in measuring tree heights, canopy cover, and basal areas of trees influencing bird plots is also needed on the habitat crew. Instructions for using a clinometer (tree height), densiometer (canopy cover), and cruz-all or prizm (basal area) accompany each instrument and should be reviewed and practiced prior to the field season. All members on the habitat crew should be trained and proficient in using each instrument prior to departing for field work.

## Literature Cited

Barker, R. J., and J. R. Sauer. 1995. Statistical aspects of point count sampling. Pages 125‑130 *in* C. J. Ralph, J. R. Sauer, and S. Droege, eds. Monitoring Bird Populations by Point Counts, USDA Forest Service, Pacific Southwest Research Station, General Technical Report PSW‑GTR‑149.

Kepler, C. B. and J. M. Scott. 1981. Reducing bird count variability by training observers. Studies in Avian Biology 6:366-371.

Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin and D. F. DeSante. 1993. Handbook of field methods for monitoring landbirds. USDA Forest Service, Pacific Southwest Research Station, General Technical Report PSW-GTR-144.