

Chapter Nineteen

Terrestrial Plant Species and Habitat Classification Monitoring

The principal motivation for collecting information on habitat and vegetative characteristics is to monitor potential habitat changes over time. One goal of the Iowa statewide monitoring program is to collect data that can be compared to data collected from other places. Data comparisons are most appropriate when the information has been collected in a similar manner. To that end, the following protocol has been designed based upon the USFS Forestry Inventory and Analysis (FIA) protocols.

IOWA HABITAT CLASSIFICATION AND MONITORING:

Within each of the permanent hexagonal sampling sites, 4 plots will be established in the center of the site as diagramed below. Additional plots will be established at each of the bird point count locations, i.e. at each point of the hexagon. This will result in a total of 10 possible vegetative plots per hexagon/sampling site. Eight of the plots will be sampled each year. If time permits, all 10 plots should be sampled.

Nested plots centered on middle of hexagonal plot, see diagrams below for additional information.

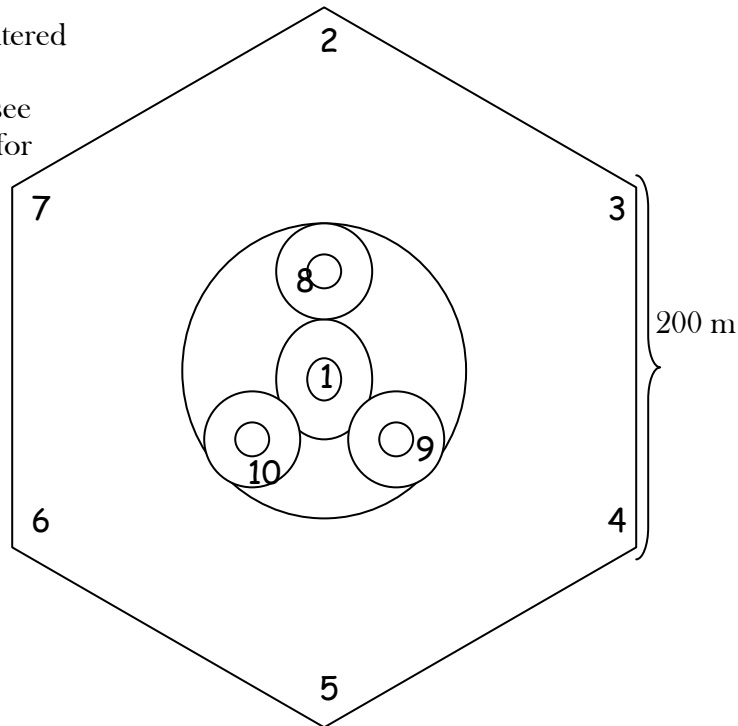
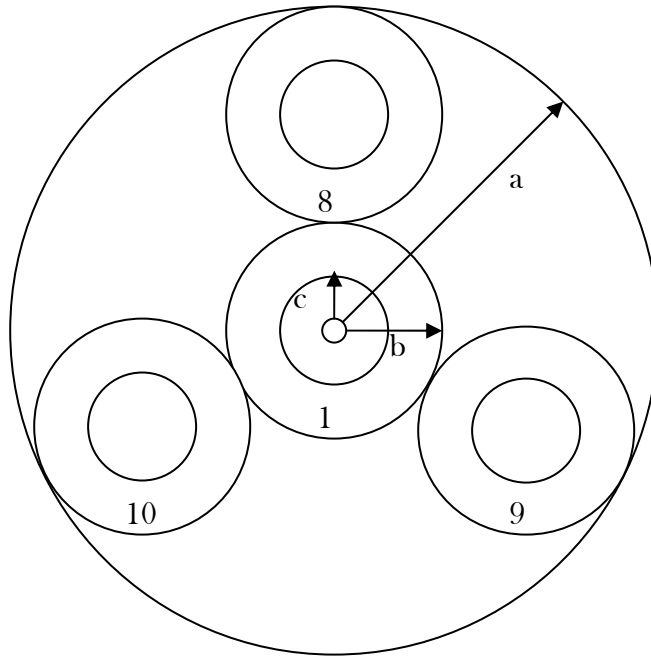


Diagram of nested subplots centered around the center of the hexagonal sampling plot.

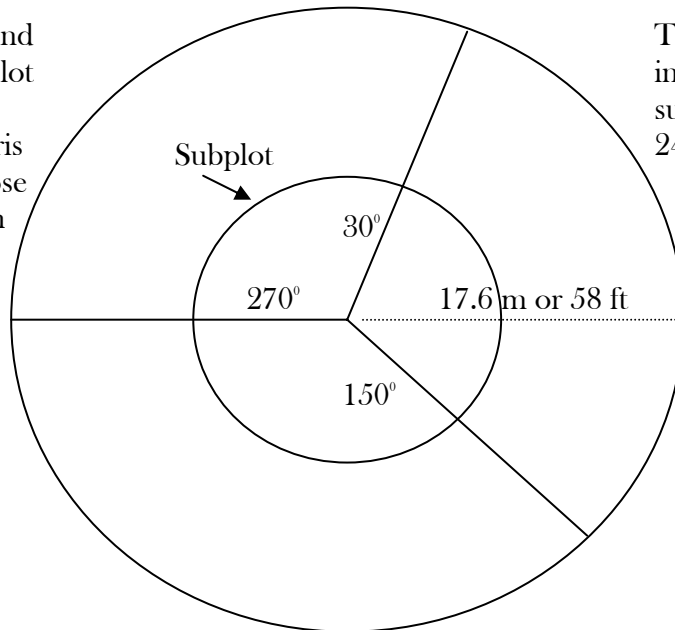
Distances:
 $a = 56.4 \text{ m}$
 $b = 17.6 \text{ m}$
 $c = 7.3 \text{ m}$



Subplots are numbered 1, 8, 9, and 10.

Within & around any given subplot

--- woody debris transects, choose 1 per any given subplot.



The radius of the interior (true subplot) plot is 24 ft (7.3 m).

Q1, Q2, & Q3
are located 4.572
m (or 15 ft)
from the center
of each
subplot at the
angles indicated.
Q1, Q2, & Q3
are all 1 m²
quadrats.

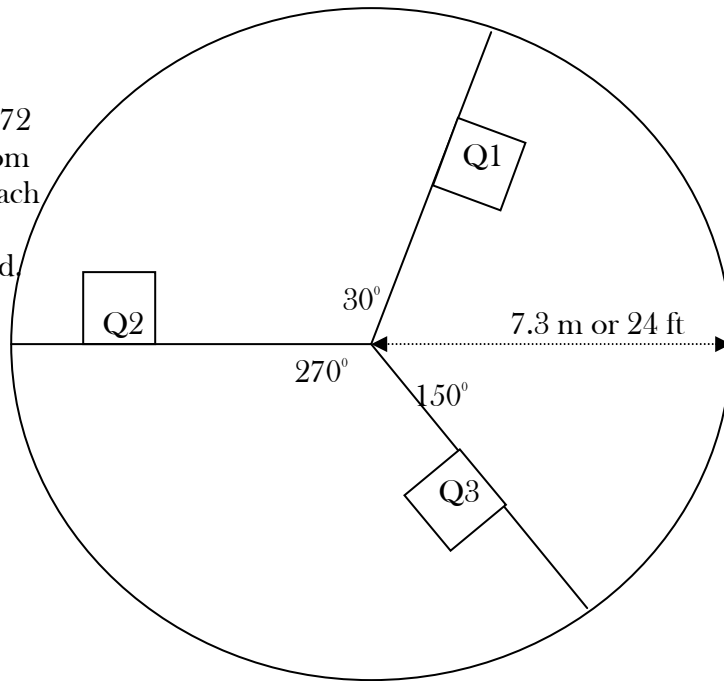


Diagram of the interior of any one of the subplots associated with the larger plant composition monitoring area.

SURVEY METHODS:

This section of the monitoring plan is more important for characterizing the habitat available to species noted in the permanent sampling sites than it is for comparing the area to other places within the US. Therefore, this protocol could be changed significantly from the FS MSIM protocol.

Plot Layout

The first subplot is centered directly over the middle of the hexagon (around bird point count station #1). Each additional bird point count station (#2-7) will have a terrestrial habitat plot centered around it. The center of subplots 8-10 are located 36.4 m (120 ft) from the center of subplot 1 at angles of 120°, 240°, and 360°, respectively. Within each of the 10 subplots, 3 - 1 m² quadrats are sampled approximately 4.572 m (15 ft) from the center of the subplot. The location of each quadrat should be permanently marked to facilitate future measurements using a GPS unit. Within each hexagonal sampling area, a total of 16 to 30 quadrats will be measured for plant composition depending on time constraints.

Within each of the 10 subplots, 1 woody debris transect (extending 17.6 m or 58 ft) should be established in 1 of the 3 pre-determined aspects (30°, 150°, 270°). Each transect is first marked in a straight line (using a hip chain or a surveyors tape) as it is critical not to bias the measurements by moving the line to include (or exclude) logs.

If time is limited, data should still be collected from at least 2 of the 3 quadrats for 8 of the 10 possible subplots (always subplots 1-7 & one of 8, 9, or 10). Additional information should be

collected in the remaining quadrats as time allows. In each subplot location, the decision as to which of the 2 quadrats are to be surveyed should be random.

Ground Truthing of Data Obtained from GIS

The data collected in Chapter 3 (Landscape Characteristics) needs to be ground-truthed and would be appropriate to ground-truth as part of this protocol.

Timing

Plots should be visited at least once in the summer (mid-June through mid-August). If possible, additional visits in the spring (mid-April through mid-June) and fall (mid-August through mid-October) could be added for a total of 3 habitat visits per site.

INTERIOR SUBPLOT measurements: (within each 0.017 ha (7.3 m or 23 ft) subplot):

Tree and Snag Measurement

Tree species, diameter at breast height (cm), and height to nearest m are recorded for all trees and snags ≥ 12.5 cm (5 in) in diameter. Decay class is also estimated for snags based upon the following classification table.

Snag Decay Class Table (adapted from Manley et al., 2004).

Decay class	Limbs & branches	Top of snag	Bark remaining
1	All present	Intact	100%
2	Few limbs, no fine branches	May be broken or intact	Varies
3	Limb stubs	Broken	Varies
4	Few or no stubs	Broken	Varies
5	None	Broken	< 20%

Ground Cover Percent

An estimate of ground cover, using 5 classes: litter, vegetation, rock, soil/sand, and water, should be made such that the final percentage equals 100 for this plot. This plot is a 1 m² plot near the middle of the interior subplot. Due to trampling problems associated with centering this plot around the bird point count pole, this plot should be positioned approximately 2 meters toward the center point (point 1). The plot at the center of the hexagon should be positioned 2 m in any direction from this pole.

Litter Depth

At 3 locations (2.5, 5, & 7.5 m) along one of the transects, litter depth is measured and recorded. Care should be taken to ensure areas that have been disturbed by the animal trapping and searching efforts is avoided. Please record the direction of the transect. This direction should be either 30°, 150°, or 270° and should be chosen from among these 3 at random.

General Plant List

Within each 0.08 acre (0.03 hectare) subplot (with a radius of 7.3 m or 24 feet), one technician spends 5 minutes searching for as many different plant species as possible. This search is timed exactly and does not include time spent in species identification (it is beneficial to have a well trained botanist or at least a knowledgeable enthusiast). Another technician records the data as it is being voiced, each crew should have a system to keep unknown plant

species identified in such a way as to allow the specimen collected to be easily matched to the data recorded on the data sheet.

Quadrats

For the quadrat measurements, the 1-m² frame is positioned on the ground at the correct location. The frame should be level with the ground – to achieve this, one or two sides of the frame may need to be propped up. If the area is heavily vegetated, it may be necessary to carefully thread the frame down through the vegetation as best as possible. Should the area be on a hillside, the technician should stay downslope of the frame to avoid accidentally stepping into the quadrat.

Technicians should estimate the percent of cover of all vascular plants that are within each quadrat. Plants that are living and plants that have died within the given year should be included. Quadrat cover could only exceed 100% if plant canopies of different species overlap, covering the same ground cover, between 0 and 6 ft above the ground surface. All ‘trace’ plants are recorded as 1% or < 1%. Other categorical percentage classes are: 1-5%, 6-25%, 26-50%, 50-75%, 75-99%, and 100%. Also within each quadrat, a ‘trampling code’ is assigned to quantify damage by humans or wildlife. A trampling code of 1 = 0-10% of quadrat trampled; 2 = 10-50% of quadrat trampled; and 3 = 50-100% of quadrat trampled.

If possible, unknown plants should be collected off the measured plot for later identification. Suggested labels for each unknown plant are located in Appendix A. Unknown plants should be pressed in a plant press before leaving the property to ensure that the unknowns are there (not accidentally dropped in the field).

Canopy Cover

Using a densitometer, 4 canopy cover estimates (yes or no for canopy cover) are made around the perimeter of the 0.017 hectare plot in the 4 cardinal directions.

SUBPLOT (within each 0.1 hectare (17.6 m or 58 ft radius) plot):

Woody Debris Transects

For every log greater than 7.7 cm (3 in) in diameter that touches the transect line, the following information is recorded: diameter at the small end, diameter at the large end, length to the nearest 0.5 m, and decay class.

Log Decay Class Table (adapted from Manley et al., 2004).

Decay class	Structural Integrity	Texture
1	Fresh, intact log	No rot
2	Sound	Mostly intact, but partly soft
3	Piece supports its own weight	Large pieces, but ‘crunches’
4	Does not support weight, but maintains shape	Small pieces, can push a metal rod through it
5	None, crumbled and spread out on ground	Soft and powdery

Vertical Vegetation

The woody debris transects also serve as point intercept lines for estimating vertical vegetation density. Beginning at 2m from the center point, all vegetation that touches the

transect at exactly 2m is recorded (this is a vertical measurement only, the vegetation has to be touching at one point). Plant species and height are recorded. From this data, relative frequency of plant species and vertical density of vegetation can be estimated (Manley et al. 2005). The same procedure is repeated at 7, 12, and 17 meters from the center point.

Ground Cover Percent

As a comparison for the plant composition subplot estimates, every 5 m along the woody debris transects, the ground cover percent will be estimates for a 1 m stretch. Seven ground cover classifications (herbaceous plant, grass, shrub, tree, rock, litter, and bare soil) should be used and the percentage of ground that is within a 1 m² plot centered at the point on the transect corresponding to 5, 10, and 15 m from the center point of the subplot.

Tree and Snag Measurement

Tree species, diameter at breast height (cm), and height to nearest m are recorded for all trees and snags ≥ 28 cm (11 in) in diameter. Decay class is also estimated for snags following the same categories as used for the interior subplot snag decay classes.

EQUIPMENT LIST:

Plant press, cardboard, and newspaper to collect unknowns (this could be left in truck, but plants should be pressed before site is left).

Unknown/collected plant labels

1 m² quadrat sampling frame

Hand lens

Field guides & species lists

Stopwatch

Folding hand trowel

Hip chain or surveyors tape

Standard field kit: Clip board, pencils, ruler, small scissors, Sharpie markers, hand sanitizer, & data sheets.

Dissecting scope at lab or office

STAFF & TRAINING:

Two weeks of training should include 1) visits to herbarium collections – learn to identify common species and learn the correct way to press plants, 2) field trips to practice identification skills in the field, and 3) practice surveys with supervisor to ensure proper procedures are followed.

DATA QUALITY & MANAGEMENT:

Technicians need to understand that the correct identification of plant species is critical and the importance of following the data collection protocol exactly.

Potential sources for error in this protocol include the timing of the surveys, returning to each site for at least 2 visits should reduce the variation associated with timing. Errors associated with the technician (diligence, species ID, etc.) can be mitigated by having different observers do the repeat visits and with ‘testing’ technician plant knowledge. Another testing possibility would be if both technicians are plant knowledgeable, having both record information for one quadrat and then they immediately compare data to determine discrepancies.

DATA ANALYSIS:

Plant species composition data will primarily be used as covariates to correlate to wildlife species presence or absence. However, as PAO methods are concerned with detecting the proportions of area occupied as well as trends in occupancy rates, we could use program PRESENCE to determine occupancy probabilities for plant species of interest, depending on the quantity of the data collected.

SAFETY CONSIDERATIONS:

Typical field considerations should be followed. Proper hygiene (i.e. hand washing before meals, checking for ticks & other potential parasites) should be maintained. Technicians should look out for poison ivy and poison oak.

ADDITIONAL METHODS FOR SPECIAL LOCATIONS: None.

LITERATURE CITED:

- Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/1998/classwet/classwet.htm> (Version 04DEC98, last accessed April 25, 2005).
- Manley, PN, B Van Horne, JK Roth, WJ Zielinski, MM McKenzie, TJ Weller, FW Wackerly, and C Hargis. 2004. Multiple Species Inventory and Monitoring Technical Guide. Review Draft. USDA Forest Service, Washington Office, Ecosystem Management Coordination Staff, Wildlife Fish Watershed Air Research Staff.
- USDA Forest Service. 2003. Forest Inventory and Analysis National Core Field Guide, Volume 1: Field Data Collection Procedures for Phase 2 Lots, Version 1.7. Internal Report. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. <http://fia.fs.fed.us/library/field-guides-methods-proc/>. Last accessed December 11, 2006.

Suggested labels for unknown and collected plants:

Species ID in field:_____
Hexagon plot ID:_____
Subplot ID:_____
Quadrat ID:_____
Habitat code (for quadrat):_____
Percent cover:_____
Associated species:_____

Collector's initials:_____
Photo #:_____
Comments as to habitat or other things of interest: _____

