Instructions for CMMN habitat structure assessment

Standardized tracking of habitat using either or both of the approaches below is strongly recommended for all stations, whether or not participating in the Trend Monitoring Program. It is especially important when vegetation height and extent is changing over time, either suddenly or through ongoing succession. Results help researchers understand quickly whether changes have occurred that may affect interpretation of their analyses of your data.

Standardized photographs

Standardized photos of trap sites, census routes, and of the site more generally, convey a non-quantitative but informative quick impression of site conditions and whether they have changed over time. Quantitative habitat assessment (next section) also describes habitat change across the site in general, but does not illustrate change at specific capture sites where change can directly impact banding totals.

Instructions for standardized photography should be **detailed in the station protocol**, and should cover all of the following:

- **Specifications for standardized** locations from which photos should be taken. Provide a list of points that include net lanes and other traps, key locations along census route or other count locations, and other locations that illustrate large portions of the Count Area not shown in other photos. As a general guideline, aim to specify one location to illustrate each net/trap site and up to 10 locations elsewhere. (Some locations might be used for multiple photos.)
- For each location give **clear instructions** for where the photographer should stand and the direction to point camera. Verbal descriptions provide the most useful guidance, such as "Stand one m away from the southernmost pole of each net and take photo showing habitat along each side of net;" or for points along census route "Take 4 photos: forward and back along trail and one to each side").
- **When photos should be taken.** Specify the **month**, either during migration coverage or close to start or end of that period. Ask that photos be date stamped if possible. A full set of photos should be taken **every 3 years, beginning in 2024**. If there is a major change at one or a few locations between scheduled years, photos should be taken of the affected locations to document the change.
- **Name files and folders according to the following standard naming convention,** which will facilitate easy search and sorting of the archival files at Birds Canada. **Image files should be named *[Station name]_[Code for ID of photo location]_[Date]*.** Once named, image files for the year (plus any extras taken in the previous 2 years) should be placed in a **folder named *Site photos_[Site Name]_ [Year]*.**
- **What to do with completed sets of photographs**. A copy of the photo folder **should be sent to Birds Canada** at the end of the year when taken, along with submission of that year's count data. Another set should be stored locally. Instructions in the protocol for annual site maintenance should **recommend consulting the photo archives** to see the desired end point for trimming, mowing, etc.

Habitat Structure Assessment (HSA)

CMMN instructions for HSA are based on the system used by the MAPS program, but modified to be suitable for volunteers with no botanical knowledge or experience in habitat assessment. Unlike photographs, CMMN's HSA is a semi-quantitative system that estimates condition of vegetation structure across the Count Area as a whole. Such estimates should suffice for documenting significant habitat succession over time despite variation among observers, but sites wishing to use more quantitative measurements or to gather data on specific plant species may choose instead to use an academically accepted method of vegetation assessment.

Regardless of method selected, **HSA should be repeated at least every 5 years,** moving the schedule forward if there has been a sudden change such as fire or severe wind damage. It is best to assess habitat at the same time each year,

preferably in the summer when migration monitoring will not be disrupted and vegetation is at a stage intermediate to that experienced by migrants both in spring and fall.

Guidelines for the following aspects of HSA should be **detailed in the station protocol**. Stations using different methods for HSA should modify these instructions accordingly.

- **Specify the methods to be used and where to find additional materials**. The latter should be a secure and accessible location for storage of any instructions not included in the protocol itself. For sites using the CMMN assessment method, the extra materials should include the detailed instructions below, materials for field use (base map and blank field form), archived maps and field forms from previous assessments, and the excel file that summarizes data from all repetitions.
- **When assessments should be conducted**. Specify **the month**, and the frequency of repetition, giving a **start year** from which future assessment dates can be calculated. (When a major change in habitat triggers reassessment at a shorter interval, the protocol should be updated with a new start year.)
- **How to name and store results files.** Data from the field sheets should be **added to the Excel file and saved as *Habitat assessment_[Station name]_[Year].*** Scan or photograph the station map with **current** Habitat Zones marked, and save it as ***Habitat map_[Station name]_[Year]*****.** Place these 2 files in **a folder named *HSA_[Site name]_ [Year]*****.**
- **What to do with completed assessment**. Keep a copy of the HSA folder and original field forms for station archives. Submit a copy of the folder to Birds Canada along with your count data at the end of the year.

DETAILED INSTRUCTIONS FOR CMMN HABITAT STRUCTURE ASSESSMENT

Step 1. Create a base map

CMMN has provided blank base maps to most stations. (Yours may differ slightly from the example in Figure 1, depending on when it was made.) If you need a new map, you can prepare one yourself using the blank map grid in Appendix 1 (If you need help or have questions, contact cmmn-rcsm@birdscanada.org.) As in the example, the map should outline the Count Area on a gridded background, and show the location of each net, census route if there is one, and any other significant features that serve as landmarks to help place yourself on the map (buildings, roads, water bodies or streams, etc.). Safely archive your base map for future use.

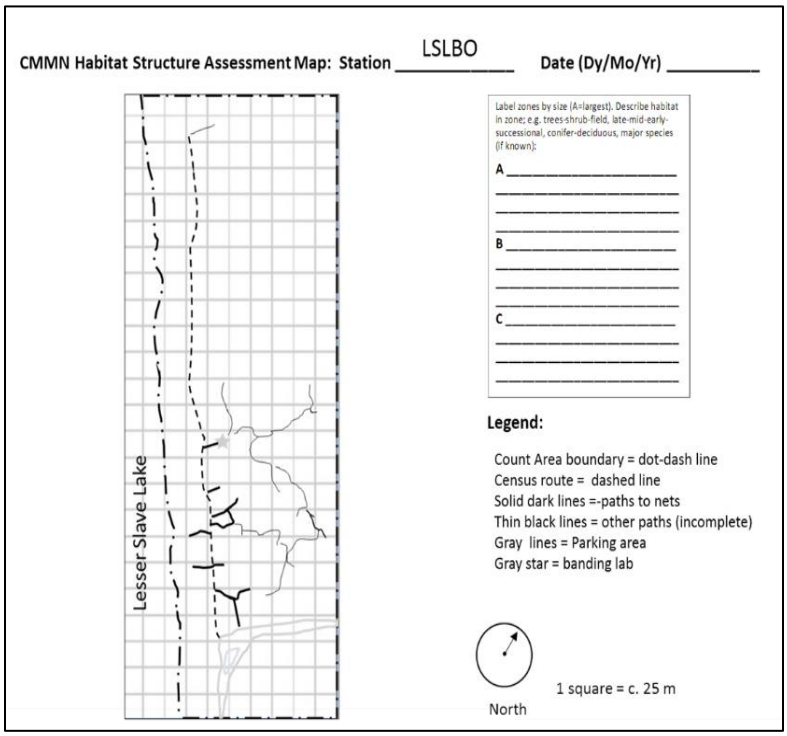


Figure 1. Sample HSA base map

For each assessment, make a copy of the original base map to take into the field for use in Step 2.

Step 2: Define and map the habitats within the Count Area

Although satellite map views can be helpful in initial definition of habitat zones, they are not always up to date or available for the correct season, and the apparent habitat structure they show is often unreliable. G**round-truthing is essential for defining habitat zones. Before going any further, read through ALL remaining instructions**, because some of the information is relevant to deciding what should be considered a separate zone.

On a copy of the base map, draw in the current location of habitat zone boundaries as best you can. Remember that the whole point of the exercise is to document any change that may have occurred in the size and configuration of structural zones since the previous assessment. You may refer to maps from previous assessments to help you understand which habitats patches were defined in past, but should draw a new one each time based on what you see now. **Do not simply repeat the zone boundaries used before**. On the map, label the habitat zones in sequence of size within the Count Area ('A' is largest, 'B' second largest, etc; e.g. Figure 2). Write in a brief description of the primary habitat type (trees, shrubs, short herbaceous). Note that knowledge of plant species is not required, but specify as closely as you are able (e.g. conifer vs. deciduous trees, or mown grass vs. natural ground cover).

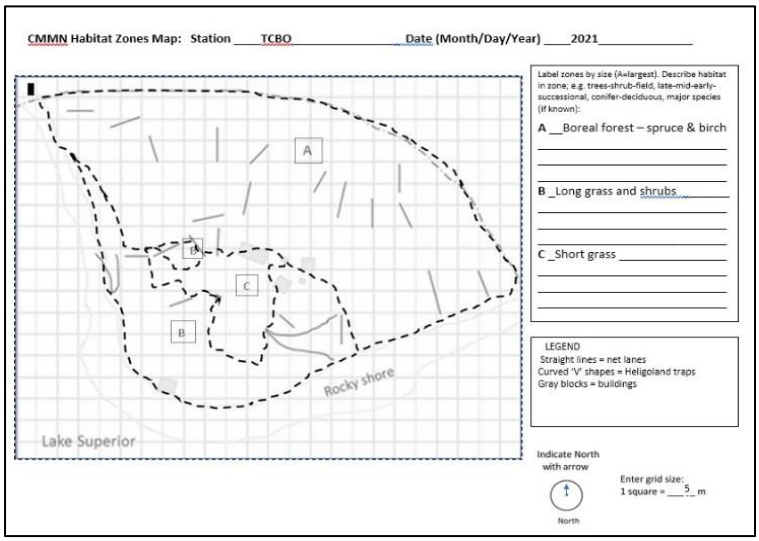


Figure 2. Count area at Thunder Cape Bird Observatory with habitat zones labeled by size.

Tips:

- Define and separate habitat zones primarily by simple successional stage: e.g., short herbaceous, shrub, woodland. Non-contiguous areas of the same type (e.g., deciduous woods separated by a large field) should be considered parts of a single zone (e.g. zone B in Figure 2).
- Most CMMN stations will have only one or two habitat types. Where habitat is a mosaic of types (e.g., young woodland with small openings) and no one type clearly dominates a particular part of the Count Area, the entire area can be considered as a single habitat zone.
- Unvegetated areas (water bodies, rocky outcrops) should not be treated as separate zones, regardless of size. Non-vegetated areas within the Count Area should be considered part of the nearest habitat zone.
- To decide whether a small area (e.g., < 0.5 ha) of distinct habitat is large enough to be treated as a separate category, consider its effect on bird observations. For example, Thunder Cape Bird Observatory has a small area of mown grass (0.1 ha) and a slightly-larger area of short shrub (both strictly managed to maintain their character), as shown in Figure 2. A 6-hour daily watch takes place from a platform in the open area. Allowing the shrub to start growing over the mowed area would markedly affect daily bird counts, so both scrub and mowed lawn should be considered as separate habitat zones.
- If you want advice on defining habitat zones at your site, consult the CMMN Science Committee (cmmn-rcsm@birdscanada.org)

Step 3. Assess habitat structure within each habitat zone**. For this step, you should not take data from previous assessments into the field with you. Start anew each time.**

Print a Habitat Assessment Form (Appendix 2) for use in the field.

- Using the gridded map you used for Step 2, calculate the number of squares within each habitat zone, including estimated proportions of squares that are split between zones. Then divide the totals for each zone by the total number of grid squares within the Count Area as a whole. The resulting proportions should add up to 100.

Next, fill in the tables on the field form for each zone. There are 3 tables for each zone: Vegetative layers, Vegetative type, and Aquatic features. Print another page if you have defined more than three habitat zones.

- First table: Use the gridded map to **determine % cover of vegetative layers.** (It may prove helpful to enlarge portions of the station map that show specific zones.)

  Vegetative layers are defined by height, as shown on the field form. Starting with the Upperstory, sketch in locations of trees and their approximate canopy width. Imagine looking down from above and tracing the outer limit of every tree, as illustrated by the solid circles surrounding tree crowns in Figure 3. Count the grid squares covered by those circles, and divide by the total number within the zone. For example, in Figure 3 there are 221 squares in the zone, of which c. 34 are covered by the circled trees. Percent coverage by Upperstory vegetation is therefore 34/221 x 100, or 15%. Although an estimate, results will be more consistent among observers than simple eyeballing of coverage.

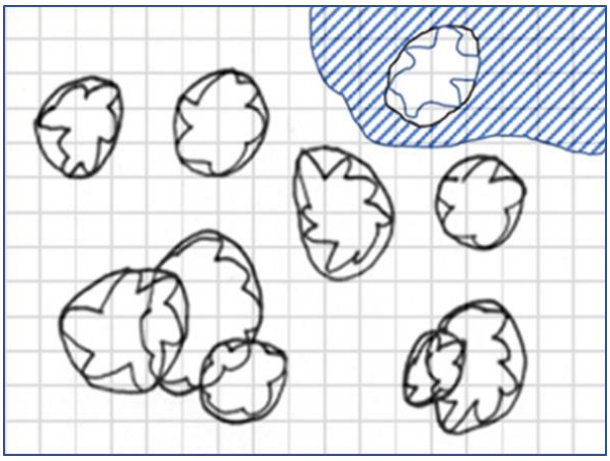
  

  Figure 3. Estimating % cover within a habitat zone, by sketching distributions of Upperstory, Midstory, and Understory

  When estimating coverage by Midstory, *exclude all portions of the zone already included in Upperstory*. For example, shrubs in Figure 3 are indicated by the shaded area, consisting of 31 grid squares minus c. 5 squares already counted as Upperstory. Percent shrub in this zone is therefore 26/221 X 100, or 12%. Repeat the same procedure for Understory, which in Figure 3 includes all the non-shaded area exclusive of the circles covered by trees. The result is 74%, and the sum of the coverage by the 3 layers adds up to 100%.

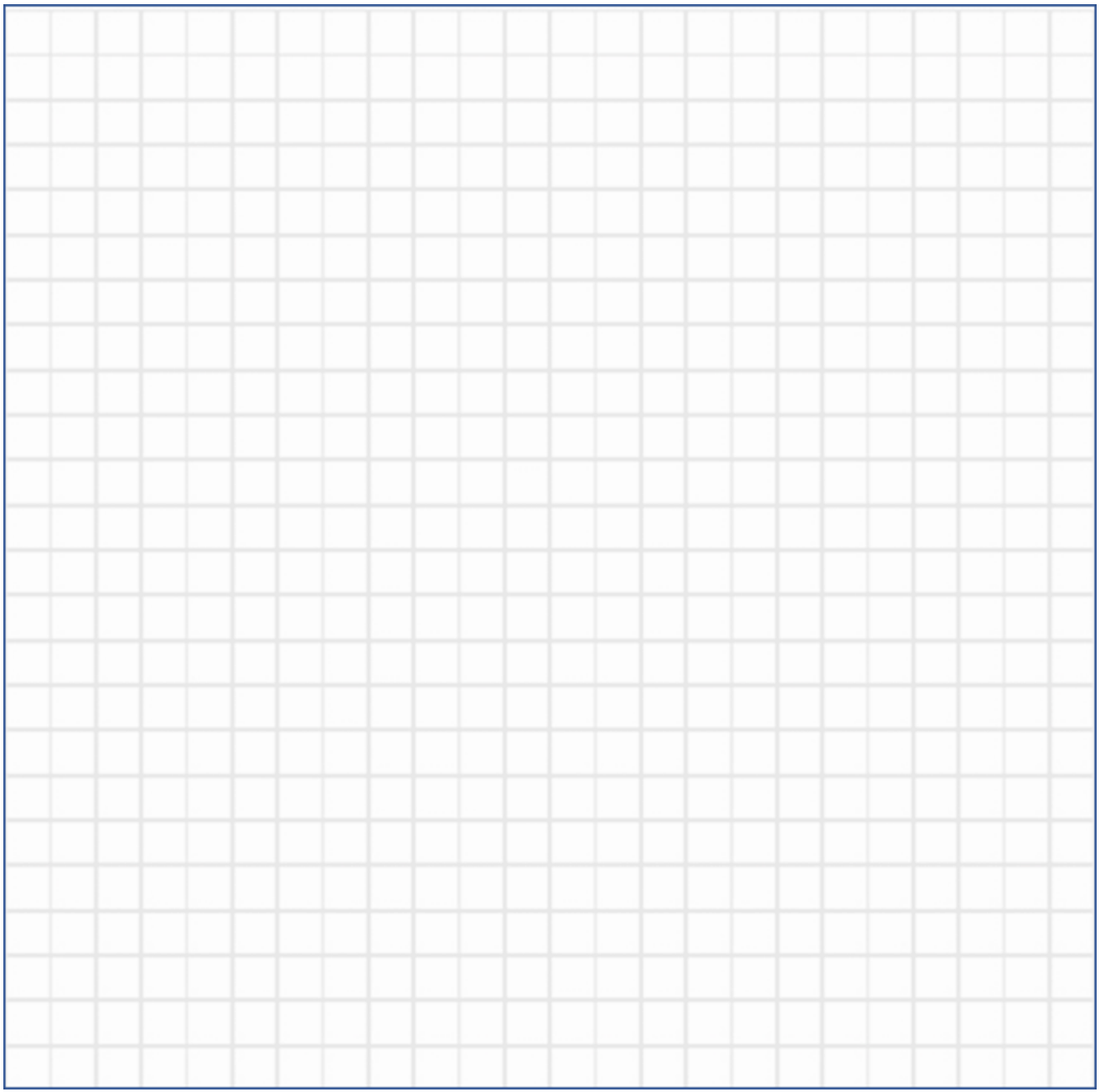
- Second table: **Estimate average height** of trees, shrubs and herbaceous vegetation within each zone. To estimate height of tree canopy, try locating a tree of about average height, then visualize where its tip would land if the tree fell over and measure the distance between that point and the base of the tree.
- Third table: **Indicate extent of any water features**

Step 4. Enter data into files for submission to Birds Canada

Appendices

1. Base map template
2. Habitat Structure Assessment - Field sheet
3. Fields for excel file that will be submitted to Birds Canada. (For information only, as data should be entered directly into that file)

CMMN Habitat Zones Map: Station _____ Date (Month/Day/Year) _____



Label zones by size (A=largest). Describe habitat in zone; e.g. trees-shrub-field, late-mid-early-successional, conifer-deciduous, major species (if known):

A _____

_____

_____

_____

B _____

_____

_____

_____

C _____

_____

_____

_____

LEGEND: _____

_____

_____

_____

_____

_____

Indicate North with arrow

North

Enter grid size:
1 square = _____ m

CMMN Habitat Structure Assessment – Field form SEE INSTRUCTIONS

Station name: _____ Date: (m/d/y)_____ Surveyed by: _____

Zone A (as indicated on station map).
Percent of Count Area taken up by this zone (see instructions): _____%

Vegetative Layers	**% cover in this zone**		**Vegetation Type**	**Average height (m)**
Upperstory: >15m			Trees	
Midstory: 5 - 15m			Shrubs	
Understory: 0.5 - 5m			Herbaceous veg	

Aquatic Features	**% cover in this zone**	**Circle any applicable category**		
Running water		<2 m wide	2-5m wide	>5m wide
Standing water		<50m^2	<50m^2 |>50m^2	>50m^2

Zone B (as indicated on station map).
Percent of Count Area taken up by this zone (see instructions): _____%

Vegetative Layers	**% cover in this zone**		**Vegetation Type**	**Average height (m)**
Upperstory: >15m			Trees	
Midstory: 5 - 15m			Shrubs	
Understory: 0.5 - 5m			Herbaceous veg	

Aquatic Features	**% cover in this zone**	**Circle any applicable category**		
Running water		<2 m wide	2-5m wide	>5m wide
Standing water		<50m^2	<50m^2 |>50m^2	>50m^2

Zone C (as indicated on station map).
Percent of Count Area taken up by this zone (see instructions): _____%

Vegetative Layers	**% cover in this zone**		**Vegetation Type**	**Average height (m)**
Upperstory: >15m			Trees	
Midstory: 5 - 15m			Shrubs	
Understory: 0.5 - 5m			Herbaceous veg	

Aquatic Features	**% cover in this zone**	**Circle any applicable category**		
Running water		<2 m wide	2-5m wide	>5m wide
Standing water		<50m^2	<50m^2 |>50m^2	>50m^2

Appendix 3. Data to be transferred from field form to excel file.

Station name	
Survey year	
Survey date (month, day)	
Name(s) of surveyor(s)	
Zone label (as on HSA map for station)	
% of Count Area taken up by this zone	
% of zone covered by upperstory (>15 m high)	
% of zone covered by midstory (5-15 m high)	
% of zone covered by understory (0.5-5 m high)	
% of zone covered by running water	
% of zone covered by standing water	
Average height trees within zone (m)	
Average height shrubs within zone (m)	
Average height herbaceous vegetation within zone (m)	
Enter 'X' if mean width of running water <2 m	
Enter 'X' if mean width of running water = 2-5 m	
Enter 'X' if mean width of running water >5 m	
Enter 'X' if area of standing water <50m^2	
Enter 'X' if area of standing water = 50m^2 - 50m^2	
Enter 'X' if area of standing water >50m^2	