

Protocol for Camera Set Up and Maintenance

*Supplemental research to:
Influence of deer harvest regulations on antlerless harvest, abundance, and sex and age composition: implications for managing deer in the face of chronic wasting disease*

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Site Selection and Camera Setup

1. You have an ordered list of 108 randomly selected locations for the cameras within each of the 8 townships. Use OnX app (with random sites uploaded) for navigating and identifying landowners. Work your way through the list in sequential order and attempt to gain permission from landowners to access 18 points per township (this process may have been started in previous seasons). For new camera sites only, you will have latitude to set the camera within 50 m or 100 m of the randomly selected point (see details below), which may place the camera location on the land of a different landowner. A landowner grants permission for you to access their land by signing the “Landowner Agreement” document annually. For camera sites from previous seasons, given you have permission again, try to place cameras in the exact locations as previous seasons (refer to GPS-coordinate records).
2. Before you go into the field to set up cameras, make sure you have an iPad (or CAT device) with the Survey123 survey Deer Cameras downloaded (and updated). You must also have one hard copy of the “Camera Location Datasheet” for each camera.
3. Once you have permission to access the appropriate land, set up the camera. Aim to start setting up cameras by mid-June. All cameras must be set up before July 14 (data collection starts on July 15). Ideally, cameras will be set up about 2 weeks before the official data collection period starts. This approach will allow time for an initial camera check and time to address any problematic cameras (e.g., poor field of view, vegetation setting off camera) prior to the start of the data collection period. Place camera within 50 m of the randomly selected point but prioritize staying as close to the random point as possible. In exceptional circumstances you may select a location within 100 m. Exceptional circumstances include high risk of theft, open water, road right-of-ways, agricultural fields.
4. Record basic site information in Survey123.
 - a. Season Year
 - b. Study Area (APR or Non-APR)
 - c. Township
 - d. Point ID
 - i. 1st digit = 1 for Non-APR Zone; 2 for APR Zone
 - ii. 2nd digit = 1-4 corresponding to the paired townships
 - iii. 3rd - 5th digit = 3 digit number based on GRTS sample selection order
5. Record specific location information on a “Camera Location Datasheet” (datasheet included at end of document).

6. Check that camera settings, date, and time are correct. Record camera ID, card ID, and SD card set date in Survey 123. Camera settings:

- a. Mode = Trail
- b. Capture Delay = 5s
- c. PicSize – LOW
- d. MultiShot = RPF-3 SHOT
- e. Smart IR = On
- f. Night Exp = Fast Motion
- g. Temp Units = F
- h. Info Strip = On
- i. SD Management = Off
 - i. *If this is accidentally turned on, and the SD card becomes full, the camera will start to delete photos to make room for the new ones. This must be set to “off”.*

7. Camera Placement Protocol

- a. Cameras will be placed in a northerly direction to minimize direct sunlight exposure to the camera trap. Sunlight can trigger cameras and UV exposure can reduce the sensitivity of the camera’s heat sensor. South-facing bearings between 91 and 269 should be avoided. Record camera direction, in degrees, in Survey123.
- b. Find the closest straight tree that is not so thin that it will blow in the wind (or so thin that people can easily cut through the tree to remove the camera).
- c. If no suitable trees are available, use a steel T-post to mount the camera.
- d. Mount the camera to the tree (or T-post) using the fabric strap with the center of lens 14 – 16” above ground, but use personal judgement if terrain is uneven (e.g., if your camera tree is located on a hill, you should adjust the height of the lens accordingly). Record camera height in inches from ground to center of lens in Survey123.
- e. Clear all vegetation and debris (e.g., branches, logs, large rocks) five meters in front of the camera. Our cameras have an approximate 44-degree horizontal detection angle (22 degrees to the left and 22 degrees to the right). Using a compass, determine the area to be cleared and remove all ground and shrubby vegetation. The camera is set very low to the ground so clear all vegetation to a maximum height of 2 – 3 inches.
- f. Turn on the camera and use the display screen to check your camera placement. In Survey123, hold the phone directly in front of the camera lens and take a picture of the camera field of view. Review photo and make sure:
 - i. No vegetation that will easily be moved by wind was in camera view.
 - ii. Horizon is close to the center of the image.
- g. In Survey 123, enter SD card number and the SD card set date and time.
- h. In Survey 123, enter the names of staff that set up the camera.

- i. Record the site name, set date, and set time on the whiteboard. Using the viewing screen on the camera, center the whiteboard in the camera frame so that all information is visible and push "OK" to take a photo of the whiteboard. These photos will be saved on the SD card and provide additional reference.
- j. Check camera to see if photos were taken and recorded on the SD card.
 - i. If you are unable to record photos on the card, switch out the card with one of the extras provided and try again.
 - ii. Do not delete whiteboard photos as they will be used to double check that photos are assigned to the correct site.
- k. Check that camera is set to "ON" and close camera. If you are with a partner, both of you are responsible for making sure the camera is on. You can do this by using a double-verbal confirmation (e.g., one of you says "camera is on" and the other person responds with "camera is on").
- l. Wrap cable around tree and secure it to camera with lock.
- m. Take a photo of the camera in Survey123. Stand 10 ft in front of the camera and take a picture of the camera set-up. Center the camera in the image.
8. Complete the "Landcover" fields in Survey123.
 - a. Near Cover – Select the majority cover in a 1-m radius from the camera ("Open" or "Closed")
 - b. Landscape Cover – Select the majority cover in a 100-m radius from the camera. ("Open" or "Closed")
 - c. Landscape Landcover Type – Select the majority landcover in a 100-m radius from the camera.
 - d. Open Water – Stand next to the camera and look around. Is there open water within sight? ("Yes" or "No")
 - e. Deer Sign – Meander around within a few meters of the camera. Is there deer sign (scat, tracks, bedding, etc.) within sight? ("Yes" or "No")
 - f. Wildlife Trail – Stand next to the camera. Is the camera on or within sight of a wildlife trail? ("Yes" or "No")
9. If there is additional information you would like to capture about the site, use the "Comments" section in Survey123 if it does not relate to the specific location or landowner. Any information about landowners, GPS coordinates, or directions to sites should only be recorded on the paper location datasheet (MDNR should not have any landowner or location data).

CWD APR Deer Study
CAMERA LOCATION DATASHEET

Point ID: _____

Record the 5-digit unique ID assigned to the point.

Staff Name 1:

Staff Name 2:

Landowner Name:

Landowner Agreement Signed: YES NO

Landowner Phone: _____

Landowner Email: _____

Date Location Recorded: _____

Latitude: _____ **Longitude:** _____

Hold the GPS receiver directly over the camera. Record the location in decimal degrees to as many decimal places as possible.

Street Address: _____

Record street address of property, if available.

Directions:

Describe how to access the camera location.

Notes:

Field Setup Checklist:

- ☐ Marked in GPS
- ☐ SD card checked for recording
- ☐ Camera batteries >80%
- ☐ Camera date checked
- ☐ Camera settings checked
- ☐ Field of view clear of vegetation
- ☐ Photo of whiteboard with Point ID and date taken and saved to SD card
- ☐ Survey123 form completed

Survey123 And Camera Checking

1. Getting started with Survey123

- a. Connect a CAT phone (or iPad) to a WIFI network. Go to the Play Store and install the “Survey123 for ArcGIS” app (if Survey123 is already installed, update if necessary).
- b. Open the “Survey123” app. In the “My Surveys” screen, tap the menu icon and sign in using your assigned ArcGIS username and password.
 - i. If the Deer Cameras survey (created by S. Mayhew) is already installed, tap the Updates Available header. Then tap Deer Cameras to download the updated version.
 - ii. If the Deer Cameras survey is not already installed, tap your initials in the upper right corner and select Download Surveys. Find the survey called Deer Cameras and tap to download.
- c. Tap the left-pointing arrow in the upper left corner to return to “My Surveys” screen.

2. Collecting data with Survey123 during camera setup

- a. Note, your CAT phone (or iPad) should be offline at the time of data collection.
- b. When at each camera location, tap “Collect” in Survey 123.
- c. Complete the entire Survey 123 form (as described in the Site Selection and Camera Setup protocol). Note that you should only enter 1 SD card per camera at the time of set up.
- d. When the survey form is completed, tap the check mark at the bottom of the screen. Your survey will be saved in the outbox.

3. Submitting Survey123 data

- a. Whenever possible, preferably at the end of each field day, connect the CAT phone to a WIFI network.
- b. On the “Deer Cameras” screen in Survey123, open the Outbox and tap the “Send” button at the bottom of the screen. If you do not see the “Send” button, you may need to force close the Survey123 app and restart.

4. Survey123 data collection and SD-card replacement

- a. Before heading out into the field for camera maintenance (i.e., camera checks), open the Survey123 app on your CAT phone. Open the “Deer Cameras” survey.

- b. Tap "Inbox." At the bottom of the "Deer Cameras Inbox" screen, tap the "Refresh" button so you can see all of the available camera locations.
- c. Once you are at a camera location, tap on the appropriate camera location in the "Deer Cameras Inbox" screen.
- d. Do not change any of the setup data. Scroll down to the "SD Cards" section. Tap the + button to add another SD card.
- e. Enter the new SD card ID and the date and time of SD card change.
- f. Tap the check mark at the bottom of the survey screen. Your survey will be saved in the outbox.
- g. Make sure to follow the "Submitting Data" instructions when possible.

5. Camera maintenance during camera checks

- a. Verify camera is still set up appropriately.
 - i. Confirm field of view and fix any issues or deviations from setup protocol.
- b. Change SD cards during every camera check.
 - i. To remove the SD card, push it in so it clicks and unlocks, then remove (to replace it, push it in and make sure it clicks and locks).
 - ii. Sometimes the new SD card (the one brought into the field to replace the SD card in the camera) will still have photos on it. To check, press the D-pad arrows to scroll through any old photos. To delete, press "M" and scroll up or down to the "Delete All" function.
 - iii. To prevent mixing up new and old SD cards, always make sure the camera is off and the old SD card has been removed and put away before inserting a new card and deleting photos.
 - iv. SD cards can accidentally become locked if a tiny tab is switched on the actual SD card.
- c. Take photo of whiteboard with site ID, date and time during every camera check.
 - i. Make sure SD card is recording photos.
- d. Clear vegetation at every camera check.
 - i. Clear all vegetation to a maximum height of 2 – 3 inches.
- e. Complete Survey123 form during every camera check (SD card portion).
- f. Double check camera settings every camera check.
- g. Replace batteries if <80% battery life.
 - i. If you change batteries, you may have to reset all the settings (including time and date).
 - ii. Make sure the battery pack is locked into place properly because it may back out over time and eventually fail to take pictures.