Protocol for Identifying Wildlife in Camera-Trap Photos

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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Prepared by:
Steven M. Gurney – Graduate Research Assistant, The Christensen Lab for Wildlife Population Health, Michigan State University
Melissa J. Nichols – Wildlife Research Technician, Michigan Department of Natural Resources, Wildlife Division

Principle Investigators:
Sonja A. Christensen – The Christensen Lab for Wildlife Population Health, Michigan State University
Dwayne R. Etter – Michigan Department of Natural Resources, Wildlife Division
Sarah L. Mayhew – Michigan Department of Natural Resources, Wildlife Division

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF NATURAL RESOURCES · DNR · MICHIGAN

The Christensen Lab
For Wildlife Population Health

The Christensen Lab for Wildlife Population Health
Michigan State University
Natural Resources Building
480 Wilson Road, Room 13
East Lansing, MI 48824

I know this is a lot of text, but please review this document before beginning to tag photos, even if you have tagged photos for this project in the past. To improve your understanding and accuracy of photo IDing, you will be provided with comprehensive, species-specific training prior to reviewing photos.

Getting Started

A data manager will provide you with a flash drive. The main folder will contain subfolders labeled with things like "21003_Check2." Within this folder will be another folder titled "Photos" and a database file called "PhotoID.accdr." This database file is a standalone file that is not truly connected to our main photo database (i.e., if something happens to this file you have access to it will not harm the main database). Each of these folders and databases contains the info for one camera during one two-week period. Depending on the site, the folder could contain 5 to over 5000 photos—and our big goal is to identify the deer in each of these photos. Also worth noting, the database you will be working with is a Microsoft Access application and uses an auto-save feature.

When you open the PhotoID.accdr file you will be asked to select your name. If your name does not appear in the list, just type it in and the database will add your info (we just need your name and initials in the dialog box that pops up). Sometimes it is much quicker to flip through the photos outside of the database (where they will be larger and you can zoom in), and sometimes you will want to look at a series of photos before deciding on an ID.

To assign a species to a photo, select the appropriate species in the drop-down box at the bottom left. You can assign multiple species to the same photo by adding additional rows in the subform. For this project, we have divided deer into multiple "species" – Doe, Fawn, Legal Buck, Sub-legal Buck, and Unknown Deer, then those species are broken down even farther based on the number of antler points on bucks and details (e.g., cannot see head) on Unknown deer. The only other species we are interested in are bear, bobcat, fox, and coyote (fox and coyote new to 2022). Once you have created a row in the subform for each species present in an image, use the "Next" button to move on. Do not just skip photos with nothing or non-focus species in them – specify "None" as the ID otherwise you will not be able to differentiate between photos that have not been looked at yet and those that have been reviewed but do not contain any focal species. We are only identifying deer, bear, bobcat, fox, and coyote. Please do not add other species to the table (e.g., if a photo contains a raccoon, it is still tagged as "None"). Also, do not worry about the number of individuals in a photo tagged as "None"—leave it as the default 1 individual for photos tagged as "None". For example, if a photo contains 5 raccoons it would be tagged as "None" with the default 1 number of individuals, which basically means we have a single record for an image labeled "None".

If you spot an interesting photo, a photo that would be good for presentations, a photo of a feral hog, or a photo of an animal that appears ill, please use the "Highlight" checkbox on the right side – tick this box to flag photos to be reviewed by project PIs. If you identify an animal that looks ill, or if you identify a feral hog in any images, share that information with the project PIs immediately. You can also add comments to these photos in the comments column.

Using Keyboard Shortcuts

Using the mouse to identify species can be unwieldy and time-consuming, so there are keyboard shortcuts available when using the PhotoID form. To see a list of keyboard shortcuts available, click the link below the "Next" and "Previous" buttons. These shortcuts will only work when the "focus" is on the main form, not within the subform where species are listed. This can be tricky to figure out, but if the keyboard shortcuts are

not working, try clicking the “Next” button, and then click the “Previous” to return to the record you were on – this ensures that the main form has the focus. In addition to the shortcuts specific to a species or detail, you can use the “Z” key to repeat all of the data recorded from the previous photo.

You can also use the up, down, left, and right arrows to move between records, and pressing the space bar will move to a new line in the subform so you can add an additional ID. Getting this system down can take some practice, but once you learn how to use it you will be able to work through hundreds of photos in no time. There are a couple of situations to note when using the shortcut keys – first, detail shortcuts will only work if the appropriate species has already been assigned. Otherwise, the species shortcut will take precedence if it exists. For example, if “f” is the shortcut for fawn, “b” is the shortcut for bear (both in the Species table), and “b” is also assigned for the detail “Buttonbuck” associated with the species fawn (in the Detection Details table). Pressing “f” then “b” will set the species to Fawn and the detail to “Buttonbuck,” but pressing “b” first will set the species to Bear.

How To ID Photos

Almost all deer should be assigned a species and detail tag. Keyboard shortcuts for all possible combinations:

Species shortcut table:

Shortcut	Species
b	Bear
c	Bobcat
y	Coyote
v	Fox
p	Camera Problem
d	Doe
f	Fawn
l	Legal Buck (at least 4 points on one side)
s	Sub-legal buck (does not have 4 points on a side)
u	Unknown Deer
x	Camera Setup/Takedown
r	**Remove (photos of humans)**

Detection Details List:

Shortcut	Species	Detail
b	Fawn	Buttonbuck
f	Fawn	Female
q	Legal Buck	Four Point
f	Legal Buck	Five Point
s	Legal Buck	Six Point
v	Legal Buck	Seven Point
e	Legal Buck	Eight Point
n	Legal Buck	Nine Point
t	Legal Buck	≥ Ten Point
t	Sub-Legal Buck	Three Point
q	Sub-Legal Buck	Four Point
f	Sub-Legal Buck	Five Point
s	Sub-Legal Buck	Six Point
p	Sub-Legal Buck	Spike
a	Unknown Deer	Antlered
l	Unknown Deer	Antlerless
u	Unknown Deer	Cannot see head

Example: You have a photo with a doe, two fawns, and a buck with three points on one side and two points on the other. You should have three tagging lines:

If you were using keyboard shortcuts you would have typed out: “d”, “space bar”, “f”, “2”, “space bar”, “s”, “f” → these keystrokes would indicate “Doe”, “New line”, “Fawn”, “2 individuals”, “New line”, “Sublegal buck”, “Five Points”

Note that the spacebar will allow you to jump to the next row for data entry without having to point and click. Also, there is an option to add comments in the table where you input species. However, you should only add

comments when deemed absolutely necessary because adding comments can really slow down the photo-review process for you.

Legal Bucks must have 4 or more points on at least one antler beam. Sub-legal Bucks must have less than 4 points on both antler beams. First determine if the buck is Legal or Sub-legal then move on to the detail category. Count every single point that looks like it would be an inch or greater by November—this can be tricky when antlers are still covered in velvet so use your best judgement. We are recording total points in the detail category, not just the points from one side. Sometimes it is not possible to see every single point. If you can see that a deer has at least four points on one side but cannot see both sides of the rack, ID the deer as "Legal Buck" with no point description (i.e., provide no detail). If you can only see one side of a rack and there are three or fewer points on that side, ID the deer as "Unknown Deer" with an "Antlered" detail since you cannot be sure the other side of the rack does not have four or more points. Sometimes it is obvious that a deer is not a legal buck, but you cannot count all points, in this case it would be okay to ID the deer as "sublegal buck" with no detail, but only use this if you are extremely confident there's no way the other side has four points. A similar approach can be applied for legal bucks.

Every deer tagged as "Unknown Deer" must also be assigned a detail (antlered, antlerless, cannot see head). It can be very difficult to differentiate between sexes of fawns, so it is okay if you do not assign a detail to fawn photos. However, later in the season many male fawns will start to have antler growth and buttons will become visible—so keep an eye out for that and assign the "Buttonbuck" detail to these fawn images.

If a deer walks completely out of the frame, you should no longer tag it. If, however, one deer walks in front of another deer, but you know both deer are still present you should ID both deer. If a deer walks out of the frame and then a deer walks back in the frame, be conservative and do not assume it was the same deer unless you identify similar characteristics (e.g., number of antler points).

Eyeshine without deer confirmation is not enough to ID a deer, photos that contain eyeshine that does not later reveal itself to be a deer should be labeled as "None". If you see eyeshine in the distance, and a deer slowly reveals itself, then it would be appropriate to tag the early eyeshine photos as that deer.

Don't be afraid to go back and change your IDs if more information presents itself. For example, you did not notice a fawn in some tall grass until it pops out later, but then you go back in the image series and can see movement behind the grass. In this situation, those earlier photos should likely be tagged as fawn. It is a common occurrence to have to go back and change IDs, so make sure to address these issues as they arise because if you do not they will likely be flagged in the database and result in additional work for the photo judge (i.e., the 3rd observer or referee that resolves discrepancies between IDs).

If you find a photo of a human who is not one of our technicians (i.e., the photo is not a camera maintenance photo at the very beginning or end of the series), please ID it as "Remove" so we can delete them from our master photo storage. We do not want to keep any photos of humans—we are required by the university to remove all photos of humans (tag as "Remove" and so we can delete in bulk later).

If a photo is a white-out due to flash overexposure, and you cannot be sure what is in the photo frame, label the photo as "camera problem." If there is a white-out photo but you can identify deer, then do not label the photo as "camera problem", instead provide deer IDs. A similar approach should be applied for our other species of interest defined above.

The "Batch ID" button is a wonderful resource, especially when you are looking at a thousand photos of a bedded deer (or photos of a fawn dawdling in front of the camera also happens often). Flip through the

photos outside of the database to find the last photo in the series of nothing. Starting with the first photo in the series, click “Batch ID” and navigate to the final photo of the series. Notice you can only add one ID per “Batch ID,” so if you have a doe and a fawn in 100 photos you will have to add them separately using the Batch ID function (i.e., do 2 separate batch ID functions).

Sometimes you will have a group of deer hang out in front of a camera for a long series of photos and it can be difficult to know what deer are in each photo. In these instances, it can be helpful to copy the photos into a PowerPoint and label each deer; then track one deer through the series of photographs to better tell (a) what the deer is (i.e., sometimes you only get one clear shot of antlers out of a series of 100 photographs) and (b) to tell when each deer leaves the frame. Once you have tracked each deer throughout the photo series and have triple checked that each deer has been marked, go back to the database and enter all of the information for each photograph.

Adding Boxes to Photos

In some cases, even after photos have been identified it can be difficult to spot the animal in question or figure out exactly what’s going on. These cases can be frustrating when the IDs are reconciled, since the referee needs to repeat the effort of trying to find the animal all over again to determine which ID is correct. To alleviate these issues, you can add “boxes” to photos to highlight specific regions, thereby helping the referee spot the important content. A box is just an orange box that draws attention to a specific part of a photo. They are stored in the database and not added to the image files themselves, so they will not appear if you open the image file externally. They only appear within the database in the PhotoID form, and they are only visible to the observer who created them or when comparing IDs. To add boxes in the PhotoID form, single-click or click and drag on the region you want to highlight. You can add up to 5 boxes per photo. To delete an existing box, click within it. Also, there is an option to add comments in the table where you input species. However, you should only add comments when deemed absolutely necessary because adding comments can really slow down the photo-review process for you.Photo and data input example:

Example of Photo and Data Input:

Species	Detail	Individuals
Doe		1
Fawn		**2**