

Camera Installation Instructions

Before going into the field:

The following field equipment and supplies need to be ready and packed before the team leaves for a field assignment:

- 1) **Trail camera unit.** Unit should include the actual trail camera with 8 Eneloop batteries and SD card already in place, the trail camera armored case with label attached, and the master python cable lock with matching key on keychain. **REMEMBER!!!** When packing the camera traps to take in the field do not store them with food or any other substances that might attach odors to the camera trap. Food or other smells might attract animals to the camera trap in the field, thus biasing the estimates of detection probability.
- 2) **GPS capable device.** This can either be a portable or handheld GPS unit or a GPS-capable smartphone with either the TopoMaps+ (iPhone) or Backcountry Navigator (Android) application downloaded.
- 3) **Fieldwork folder.** The fieldwork folder should include this camera installation sheet; the datasheet required for each check; the station placard to be displayed after a deployment, check, or takedown; a dry erase marker, and a pen.
- 4) **Hiking equipment.** Please make sure to have **AT LEAST** the following whenever going out into the field:
 - a. Daypack and hiking partner (all volunteers **MUST** be accompanied by **AT LEAST** one other person
 - b. Map, GPS, or compass
 - c. Extra clothing, food, and water
 - d. First-aid kit
 - e. Headlamp or flashlight
 - f. Matches and fire-starting kit or lighter
 - g. Knife or multi-use camping tool
 - h. Sunglasses and sunscreen
 - i. Water treatment device
 - j. Whistle or something capable of loud noise
 - k. General storage device

Locating the best place for each trail camera point in the field

Using the GPS unit, navigate to the proposed point where a camera is expected to be deployed. This is the potential location that was determined during the sampling design and has been assigned to you beforehand. Once your crew reaches this location, find the best possible location as close as possible to the predetermined coordinates. Choose the exact location that gives the highest probability of obtaining useful photographs within 100 meters (about the length of a football field) from the original coordinates. Often this will be a wildlife trail, hiking trail, stream or water source, or even a dirt road. Different species have unique travel habits, and trail characteristics affect the species that use those trails. Select the location that is likely

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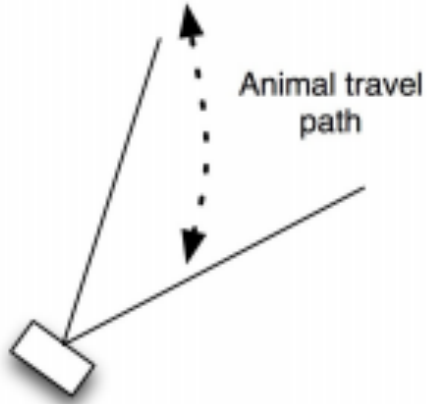
to yield photos of the largest number of species (path of least resistance). DO NOT choose a location on the basis of behavior of any single species. It is your responsibility to decide the final location of the camera trap. The following are some helpful tips for picking a site:

- 1) **Choose a “wildlife-friendly” site.** Once within the vicinity of the predetermined coordinates, start searching for the nearest location such as trails, dirt roads, creek banks, and paths to water that animals use on a regular basis and with a good chance of animal visitation. Look for signs of animals (tracks, scrapes, game trails) nearby.
- 2) **Try to determine the travel path.** Try to choose a site where the travel path is limited to the area that the camera trap can photograph (see below figure). A single trail with evidence of use and limited travel alternatives is optimal for placing camera traps (see below figure). In some cases, it may be necessary to pile brush to restrict the options for movement on a wide trail, but this is not recommended.
- 3) **Consider the sensor’s range and field of view.** A wide trail has more places at which wildlife can cross a sensor and thus, the greater the area that must be covered by the sensor’s field of view. This field of view should be maximized as much as possible. However, the maximum distance to the far side of the trail should not be farther than the maximum range of the sensor. This is typically about 110 feet for Bushnell (roughly 35 yards on a football field). Locations in the Wasatch rarely have this much open space, but it is something to keep in mind. If you find yourself in an area where you can take more the 30 paces, it is probably too open. Conversely, if you can only take 5-10 paces, your location is probably not open enough and you should consider finding a new location.
- 4) **Consider the terrain.** The ground under the camera trap unit needs to be reasonably level. Trails with ruts or slopes can result in the ground obscuring a traveling animal from the sensor beam, and might cause the camera trap to miss photograph opportunities. A path with a pronounced slope on one side can result in a sensor beam that is at shoulder height when wildlife walk on the upside of the path, but miss the animal entirely if it walks on the down slope of the path. Be aware of all the possibilities of travel in front of the camera traps. If it is impossible to find level terrain, which may be the case (especially in the Wasatch), then make sure to angle the camera accordingly so that it is reasonably parallel to the ground (see figure).
- 5) **Find a suitable tree in which to set the camera.** Finally, find a spot with a suitable tree. Suitable trees have trunks that are reasonably straight and thin enough to tie the cable lock around, but not so thin that wind, people, or other animals can shake it excessively. Further, if the tree is slanted, the camera will be slanted when mounted. Trees that minimize direct sunlight exposure to the camera by pointing north or south are best, as direct sunlight to the sensor will trigger false photographs and excessive heat can reduce the sensitivity of the heat sensor. You will be affixing the camera to trees at knee height (approximately 40 cm or 20 inches).

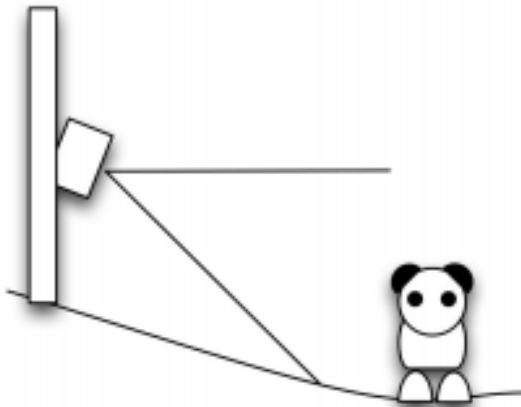
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Recommended

Camera positioned diagonal to animal path maximizes probability of detection

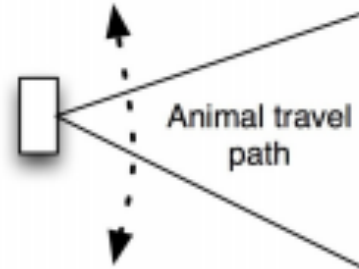


In sloped terrain, camera should be angled and parallel to the ground to ensure detection

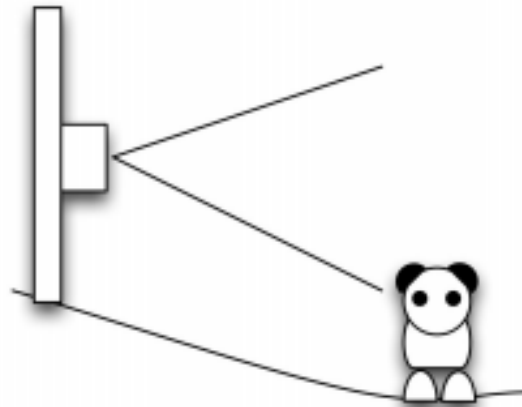


Not Recommended

Camera perpendicular to animal path minimizes probability of detection



In sloped terrain, not adjusting the camera angle will result in incomplete detection



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Step by step camera placement and installation instructions:

- 1) **Choose a location that maximizes the probability of detecting wildlife.** If available, service roads, trails, waterways, and wildlife trails are the best option.
- 2) Find the straightest tree at least six inches in diameter and 5-20 feet back from the road, trail, waterway, or wildlife trail of interest. Camera traps should be set back at least 2 meters from the nearest point at which wildlife might travel across the sensor. This allows for clear, focused pictures and a large enough field of detection from the sensor. The longer an animal is in the detection zone, the less chance of missing a photographic opportunity.
- 3) There cannot be anything blocking the field of view between the camera and feature you are focusing on. That's why it is important to **"set the stage"** for the camera. Occasionally, limitations in terrain or suitable trees hamper complete coverage of a feature. Clear any brush (by hand only, not with any equipment), branches, or other vegetation that might either obscure the camera's view or accidentally trigger it (keep in mind the wind, growing plants, and the sun in open areas) as needed to maximize detection within the field of view of the camera trap. Anything that obstructs the beam reduces the detection ability of the camera and could result in poor quality photographs. Large leaves, twigs, or grass can result in false triggers when the sun heats them up and they blow in the wind. Try not to disturb the trail or lay down too much vegetation to force animals to pass in front of the camera because some animals will turn around if faced with obstructions. Try to keep the **"stage"** as natural as possible.
- 4) **Record the spatial coordinates of the location.** Once the final location for the camera has been chosen, record the longitude and latitude of the final placement of the camera using your GPS unit. It is **absolutely crucial** to take a GPS location for each camera trap point, so do this **BEFORE** setting up the camera. This location should be as close as possible to the actual tree or post in which the camera will be mounted. Following the layout in the datasheet, go to **AT LEAST** the **fourth decimal place** when recording a fix.
- 5) When the camera is open, notice the power switch, screen, and navigation buttons.
- 6) Make sure all of the camera settings are correct by switching to the **SETUP** position and clicking the **MENU** button. Navigate through the settings by using the <= and => arrows. Change individual settings by using the up and down arrows. Setting changes must be **SET** by clicking the **OK** button. and cycling through the settings under **MENU**. Settings should be as follows:

Option	Setting
Mode	Camera
Image Size	8M Pixel
Image Format	Full Screen
Capture Number	3 Photo
LED Control	High
Camera Name	Set to Site ID (e.g., RB_01)
Interval	15s (15 seconds)

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Sensor Level	High
NV Shutter	Medium
Camera Mode	24hrs
Time Stamp	On
Set Clock	Set to current date/time
Field Scan	Off
Coordinate Input	Off
ALL VIDEO SETTINGS	DOES NOT MATTER. WE WILL NOT USE VIDEO, SO THESE WILL NOT APPLY.

- 7) Once settings are adjusted, turn the camera to the **ON** position. The front of the camera will blink red for roughly ten seconds before arming. Check for this blinking light **BEFORE** you place the camera in the lock box.
- 8) Once the camera is armed and in the lock box, mount the camera to the tree at knee height (approximately 40 cm or 20 inches) and ensure that it is pointing as straight as possible.
- 9) Use the lock to attach the camera and armored case to the tree to maximize coverage of the wildlife feature upon which the camera is focused (e.g., avoid having the camera perpendicular to the trail, road, or stream. Instead have the camera centered to maximize the amount of trail, road, or stream within the field of view. **REMEMBER THE ABOVE FIGURE!**). A well-placed twig between the camera trap housing and the tree trunk can help adjust the angle at which the sensor is pointed. Try to use live wood to brace cameras and adjust camera angles because dead wood can be too brittle. Try to avoid pointing the camera trap at objects in direct sunlight such as large rocks, waving grass, and/or sunlit streams that may absorb heat and trigger sensors. Also try to avoid orienting the camera trap facing exactly west or east since the sun will shine directly on it in the morning or afternoon, causing potential false-positive shots. Direct sunlight may also cause damage to the temperature sensor.
- 10) Check and recheck the camera position. Walk to the center of the trail, road, or stream within the view of the camera and make sure you are looking directly at the camera's triggering mechanism (the camera should not be pointed too far up or too far down). You should be able to look directly through the lens when the camera is centered at you. Adjust the tilt so that it is perpendicular with the ground (no clockwise or counterclockwise slants).
- 11) Make sure you have all of your tools and gear (**KEYS ARE THE MOST COMMONLY MISPLACED ITEM**) and that the site looks as undisturbed as possible.
- 12) As you leave the site, step in front of the camera to take a photo of the "Site Information Placard". **REMEMBER:** Cameras are heat AND motion-activated. If the heat sensor is triggered but the motion sensor is not triggered, and vice versa, the camera will not take a photo. Therefore, when displaying this placard wave to the camera for at least 15 seconds before leaving (camera will be set to a 15 second resting interval) to ensure a photo has been taken.

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Important notes on using remote cameras:

- A blue light will glow on the camera when the batteries are low. If this happens during one of your checks, the camera may be taking too many photos. Please check the camera at during your check and see how many photos have been taken (Bushnell's max on 32 GB SD cards is roughly 15,000 photos).
- **PLEASE!!!** do **NOT** share the images from the camera study on any social media site without permission, especially photos of individuals, vehicles, and human activity. **THIS IS ILLEGAL!!!**
- Never insert or remove a memory card while the camera is **ON**. Always turn it **OFF** first.
- Never erase a memory card. Only switch out memory cards.
- In wet weather, try to keep the inside of the camera as dry as possible.
- Make sure the rubber seal on the camera case is clear of any dirt or debris.
- Make sure the camera lens, motion sensor, and LED cover are clean.
- Foliage blowing in the wind can trigger the camera: try to remove it as best as possible.
- Direct sunlight can trigger the camera: try to position them out of direct sunlight and facing north/south instead of east/west.

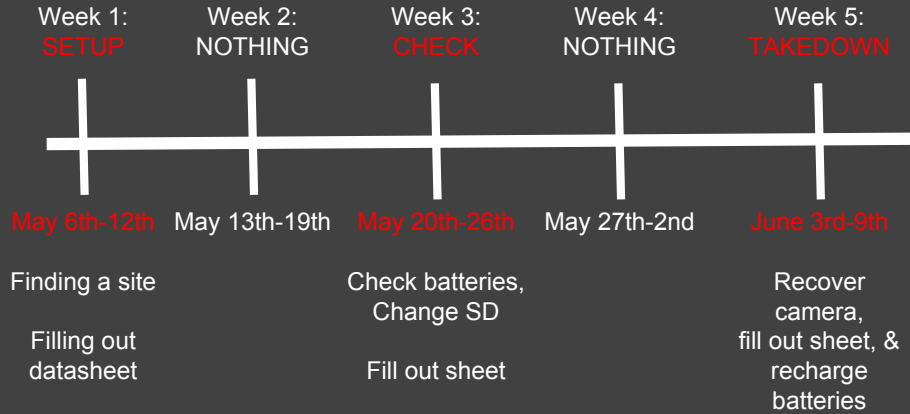
If you cannot make a check:

It is expected that you complete all your setups, checks, and takedowns. However, if this is not possible please contact one of the administrators as soon as possible, but AT LEAST by the Thursday of the designated week:

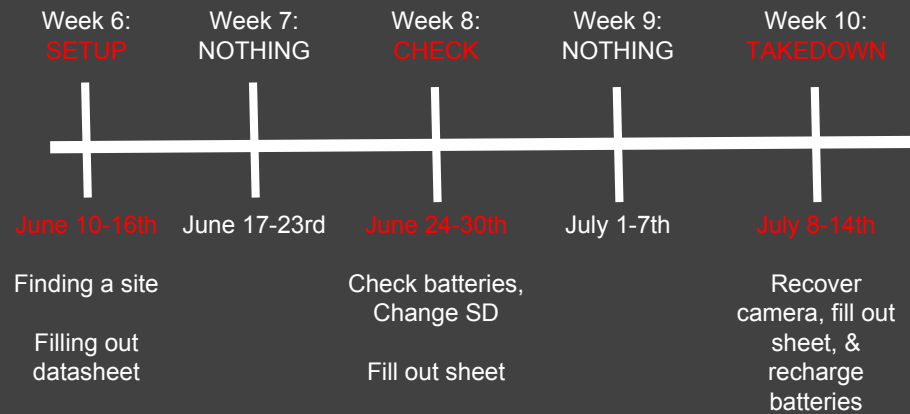
Austin's contact information: (801) 577-6548, austin.m.green@utah.edu

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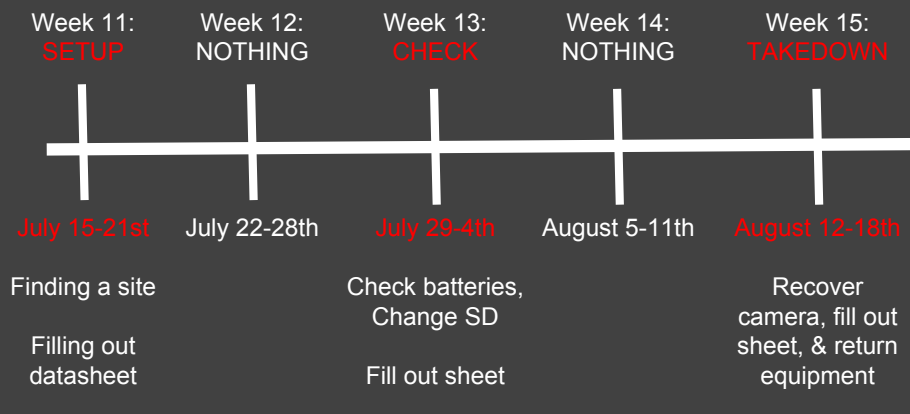
Rotation 1: Millcreek 1st location



Rotation 2: Millcreek 2nd location



Rotation 3: Millcreek 3rd location



Camera Installation Instructions

Good Camera Setup



Camera Installation Instructions

Bad Camera Setup



Camera Installation Instructions

HUMAN ACTIVITY



WILDLIFE ACTIVITY

