Camera-trapping protocol for large-scale lynx camera survey-summer

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This document will serve to provide guidance on camera placement and data recording for the WSU-led lynx camera survey in the Okanogan. Because such a large amount of ground will be covered, I am placing a premium on ease of camera placement. In addition to this document, there are data sheets which will be used to record pertinent data for each camera that is placed in the field.

Cell selection: Cameras will be placed in 40km^2 hexagonal cells, which simulate the lower-end estimates of female lynx home ranges in the state. I will provide a list and map of cells that were randomly selected for sampling to each collaborator for their area. If a particular cell cannot be sampled (e.g., lack of permission, not enough time to reach the cell given time constraints), please select the nearest cell that can be sampled.

Placing the camera: Within each 40km^2 grid, 4 cameras will be placed along movement pathways that include roads, abandoned roads, two-tracks, hiking trails, or ridgelines. During camera work in the Loomis State Forest and Black Pine Basin, we have had good success detecting lynx along major movement pathways. Thus, I expect it should be fairly easy to quickly access a number of locations in each grid cell. Please do **not** put cameras out on small game trails, off trail, or in other areas that don't represent major movement pathways – detection rates will drop dramatically. Cameras within each grid cell should be spaced 1 km apart at a minimum (if possible) to increase coverage of the grid cell. This restriction doesn't hold between grid cells – thus, a camera placed at the western edge of grid cell A that is less than 1km from a camera placed at the eastern edge of grid cell B is OK. If, due to access or other restrictions, cameras must be placed closer than 1 km apart, that is OK – it is more important to get the full complement of cameras out in the grid cell than to follow any minimum spacing rules (**the grid cell will be the unit of analysis**). As the main goal of this work is lynx detection, cameras should be placed above 1000m (~3900 feet) elevation where possible, and in forested areas. Again, if this is not possible due to access, lack of high elevation sites, or other restrictions, placing cameras at lower elevations or open habitats is acceptable. Ideally, more than one type of movement pathway should be used for camera placement in each grid cell (e.g., 1 cameras placed on larger roads, 1 on smaller roads, and 1 on a hiking trail or abandoned logging trails), but again, this may not be possible in all cells. I leave it to the discretion of the individual putting cameras out to choose appropriate locations, given the restrictions mentioned above. I will provide a map and UTM coordinates of *potential* camera locations in each grid cell, but leave it to the discretion of the individual putting cameras out whether or not to use these potential sites.

Setting the camera: For summer deployments, cameras should be placed approximately knee height (38-48cm/15-19inches) and aimed perpendicular to the road/trail. The trail area immediately in front of the camera should be cleared of vegetation/grasses, as this will obstruct camera images, and may also

trigger the camera. In addition, please be sure that there is no vegetation in front of the camera, or near the camera that may grow to obstruct the camera during the 30-60 day period it will be out. Taking care to ensure proper set up is key, particularly if cameras cannot be checked for long periods of time. Cameras should be set to record a burst of 4 images on each detection, with a one minute delay between successive triggers. If a camera model being used doesn't have this option, that is OK, but it must be noted on the data sheet. If placed in areas where theft is a possibility or that will have lots of human traffic, then cameras should be placed in such a way to make them less visible as much as possible (e.g., slightly set-back from the travel pathway), without compromising image quality, field of view (camera can 'see' across the entire trail), and infrared sensor detection. ***Please use the test function on the camera to make sure the camera-trap has a decent cone of detection, both in length and width, in relation to the trail where movement will occur***. Python cable locks should be used to secure cameras in all areas, although these are a visual deterrent only, and will not stop a committed thief. Cameras should be left to run for **at least 60 days and up to 90**. If possible, a 30-day check for camera functionality should be performed. During this check, the camera should be checked for sufficient battery life, position, and functionality, and the SD card swapped out, or the image data downloaded. ***Remember to make sure the cameras is turned on prior to leaving the area!!***

*Note: We have not found baiting with scents to be particularly effective in improving lynx detection at cameras. Given that scented pads also add the complication of needing to set out and refresh baits, I have elected **to not use** scented baits as part of this protocol.

Data management: When cameras are initially set out, please record all relevant data on the "Camera Set-up" data sheet.

At the 30 or 60 day check, please download all image data to a folder labeled with the name of the camera, and whether or not this is a 30day_1st, 30day_2nd , or 60day_download. Thus, the name of a folder that was downloaded after a 45 day check might be CamID_234_45day_1st. A folder of images that was downloaded after the second 45 day check, might be CAmID_234_45day_2nd. A folder of images that was downloaded after 90 days (there was no 45 day check) would be labeled as CamID_234_90day. I will provide an external hard-drive for image storage, although I recommend saving the image folders to at least two separate locations (the external hard drive and a local computer). If the SD card is not going to be reused, images can be left on the card (in addition to being downloaded to a computer), and the card left in the camera. If the SD card is going to be redeployed, please erase the images before redeployment. I will engage with each of you to obtain the SD cards and/or image folders upon completion of the 90 day sampling period.