**A Window to the Wild: Remote Camera Workshop for Gathering Partners: A Conference for Friends of Minnesota's Natural Resources**

**Community Leadership Challenge (CLC)**

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**Abstract:**

*Motion-triggered cameras are a popular method of surveying biodiversity, which is especially relevant in an age where global biodiversity is in decline due to a variety of factors (climate change, habitat destruction, over-harvesting, poaching, etc). The State of Minnesota faces its own ongoing issues in biodiversity and there are many research and monitoring efforts underway to facilitate species conservation. Implementation of environmental education curriculum has a strong power to connect people to the natural world and foster an appreciation for nature. The following workshop will be held with participants of "Gathering Partners: A Conference for Friends of Minnesota's Natural Resources". The curriculum described in this project uses camera traps as a tool to raise awareness for conservation and wildlife monitoring efforts in the state. The lesson will give participants hands-on experience and a working knowledge of this technology. The goal of this curriculum is to deepen the public's understanding of the State's natural resource management practices and empower people to participate in citizen science. The general public is a largely untapped resource when it comes to wildlife monitoring in Minnesota. Successful implementation of the lesson serves as a starting point for the future development of a citizen science volunteer effort using trail cameras on public and private lands of Minnesota.*

**Introduction:**

In the state of Minnesota, there are over 2,000 native wildlife species and an estimated 16 percent of those have been categorized as Species in Greatest Conservation Need (SGCN) (MNDNR, 2016). The criteria to be considered an SGCN is that the species is rare, populations are on the decline, or face serious threats that forecast probable decline (MNDNR, 2016). Data derived from wildlife surveys in Minnesota is important to biologists and policymakers facing ongoing controversies such as wolf management and the declines of fisher and marten populations in the past decade (Abraham, 2018). Studies using camera traps in research methodologies have been utilized for large-scale, long-term monitoring of terrestrial wildlife (Steenweg et al., 2016). Motion-triggered cameras have also proven to be an effective survey technique because they can be used to estimate distribution, behavior, corridor use, and population size, among other metrics of wildlife population dynamics (Moruzzi et al., 2002). Additionally, remotely triggered cameras are preferred to detect species like forest carnivores that are nocturnal, have secretive habits, may be difficult to physically trap/handle, or that occur at low densities (Iannarilli et al., 2018).

For conservation efforts to be long-lasting and effective, there needs to be human community support surrounding the goals of those projects (Kareiva, 2012). Researchers have demonstrated the power of using remotely triggered cameras with citizen science volunteers. The data that volunteers help to collect can be used to answer applied management questions as well as connect those people to wildlife (Parsons et al., 2018). A study by Schuttler, et al. (2019) suggests that citizen scientists, including young students, can contribute to real-world research, verified by professionals. The study also boasted of community-wide impacts as a result of the community involvement in wildlife monitoring in diverse locations around the world (Schuttler, et al., 2019). Camera trap technology is increasingly accessible and affordable, with people of many different backgrounds able to experiment with its use (Brown & Gehrt, 2009). MNDNR research biologist, John Erb, suggests that remote cameras offer easy and reliable species identification and are increasingly popular among outdoor enthusiasts (Abraham, 2018). A recent Minnesota Conservation Volunteer (MCV) article, entitled, "Counting on Cameras" covered the future of remote camera surveys in the state. The article suggests that researchers are considering the coordination and training of citizen volunteers to help with wildlife monitoring efforts (Abraham, 2018).

## Project Details:

**Methods**:

In the summer of 2020, I led a 2-hour long session at the Sugarloaf Nature Center for visitors about trail cameras and some wildlife research projects happening locally. Folks of various ages joined and I gave an introduction to trail camera photography, conservation photojournalism, and some tips for beginners. For my Project Dragonfly course, Issues in Biodiversity, I formalized this lesson, adapted it for state park guests, and gave it a name; "Selfies with Citizens: Remote Cameras at Tettegouche State Park". In the Spring of 2021 I connected with Andrea Lorek Strauss, Extension Educator in the department of Fish, Wildlife & Conservation Education of the University of Minnesota Extension. Andrea asked if I would lead a workshop for "Gathering Partners", a conference for friends of Minnesota's natural resources. This CLC project transforms the aforementioned lesson plan once more for this new audience and venue. The resulting CLC workshop focused specifically on adult learners and how they can contribute to citizen science through trail cameras.

The main method of this CLC was a field trip which took place on Saturday, May 15th from 1--4pm, in which participants and I hiked to 3 different locations at the Wolf Ridge Environmental Learning Center

(WRELC) campus as part of the Gathering Partners conference. I shared stories of conservation initiatives as well as stories of professional conservation photographers. I used an iPad (for viewing trail cam videos and pictures in the field), laminated images, as well as interactive activities as teaching tools. I felt that the best way to engage viewers and for me to gauge what they wanted to learn and what they retained was by interacting with them directly during and after the event. The majority of the field portion of the class involved hands-on experience checking and setting trail cameras and learning wildlife tracking techniques.

**Evaluation**:

One of the ways I measured success was through post-presentation feedback from Andrea and the participants. Andrea sent me a post-conference email thanking me for leading the event and mentioned in person how much the participants appreciated the workshop (A, Lorek Strauss, personal communication, May 15th, 2021). In addition, each of the four participants reached out to me individually via email following the program. One student wrote, "Thank you so much for a fun and informative field trip. Not only did I learn some good tips about using trail cameras, but you also pointed out looking for signs of presence or activity of wildlife - I suggest this for a future Gathering Partners field trip!" (R. Bumann, personal communication, May 26th, 2021). I also received a follow-up request from the group for a peer-reviewed article about monitoring pollinators with trail cameras (H. Einess, personal communication, May 26th, 2021). Furthermore, I was able to see that members of the group accessed the shared google drive folder link that I sent to trail camera images and video after the workshop.

According to Salazar et al (2020), my workshop is an example of a low-intensity program, since it can be categorized as a one-day field trip. Low-intensity programs with short exposure are unlikely to have a large influence on a person's connection to nature but may be more impactful in regards to knowledge or attitudes (Salazar et al., 2020). For this reason, I used an informal assessment to measure the participants' knowledge/attitudes pre and post-workshop. I used a large whiteboard (30"L x 45"W) and erasable markers for the exercise.

Before the workshop (see **Image 1** below) commenced I greeted participants and prompted them with these two statements: 1) what comes to mind when you think of setting a trail cam? and 2) what comes to mind when you think of trail cams as "tools"? I had students elaborate on what they meant by the words they wrote down. In response to prompt 1, students thought about camera positioning and false trigger events as well as considerations about choosing a camera location and tools that might be associated with preparing a camera for deployment (hand saw, batteries, memory card, etc). In response to prompt 2, the adult learners also had thoughts about using trail cameras to monitor for species presence, targeting a camera at a particular species, and recording data. After the lesson I erased the white board and had them think about the same prompts (see **Image 2** below). Post lesson, they had these new thoughts in response to prompt 1; that one should consider animal behaviour in setting cameras, consider sheltering the PIR sensor to prevent false triggers, set the camera at a 45 degree angle to the animals anticipated movement, and even discussed advantages about a particular brand of trail camera. In response to prompt 2, the students discussed how cameras could be used to investigate a hypothesis, how cameras could track changes in species as a result of climate change and other factors, as well as learning new information about a species natural history or behavior.

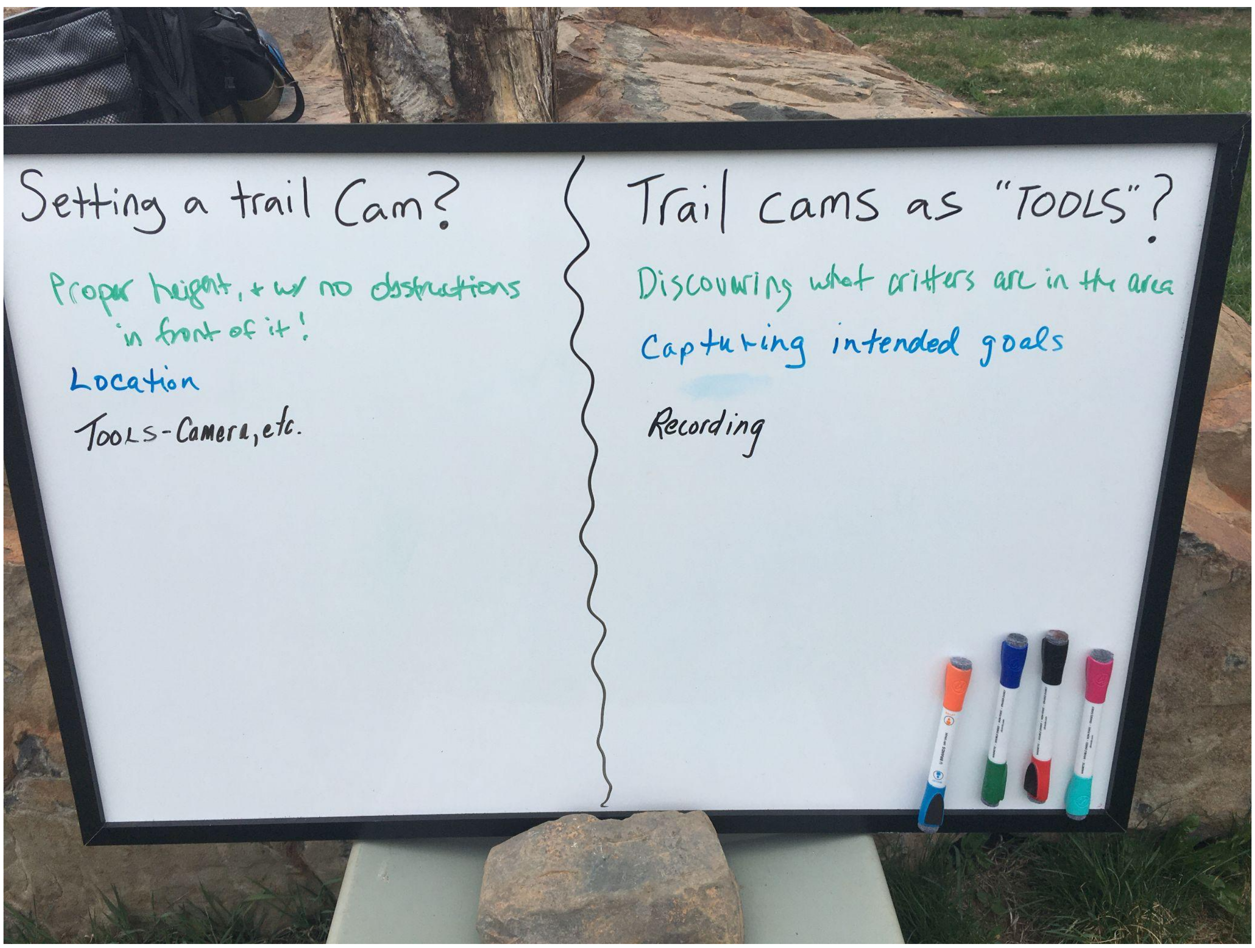


**Image 1**: An image of the whiteboard before the workshop began. Participants were invited to write what came to mind when thinking about the phrases written at the top.


**Image 2**: An image of the whiteboard after the workshop. Participants were invited to write what came to mind when thinking about the phrases written at the top, now that they have experienced the lesson.

Another activity at the end of class included an informal assessment where the participants were each given a trail camera to experiment with. They each had 15 minutes to scout the immediate vicinity and set up a trail camera. Each person then took turns demonstrating to each other their trail camera setup. We discussed the following prompts: 1) How/Why did they choose that location? And 2) What factors did they consider when setting up the camera? Each student was able to successfully place their camera and articulate their reasoning behind the set-up decisions.

## Reflections & Conclusion:

The active experimentation phase (practicing the setup of remote cameras during the lesson) clearly drove home for students that they have the ability to learn how to use this technology on their own. The field check of the camera was the portion of the lesson that seemed to grab participants' attention the most, as I received many questions and was witness to excited conversation as we reviewed images in real time. The informal assessment at the end of class in which participants set their own cameras seemed to be beneficial in giving students an opportunity to experience the technology firsthand. I felt that the assessment with the whiteboard could have been better captured had I recorded our discussions. The images I took of the whiteboard do not do justice to the conversations that grew out of the prompts.

## Next Steps:

The next step in furthering this project will be recruiting other collaborators and host facilities to deliver this lesson or similar curricula. Given the opportunity, this lesson would be adapted for other audiences and settings, such as school children, private landowners, hunters, and visitors to nature centers, city parks, or other such natural areas. I plan to present this lesson to management agencies as a template for creating a citizen science network in the state of Minnesota. According to a recent article by the Minnesota Conservation Volunteer Magazine, Minnesotans have a tendency to watch nature closely and get excited about remote, automated, motion-triggered cameras; a common reaction to trail camera images is “surprise and enlightenment: look what is living among us” (Goetzman, 2018).

## **Appendix**:

Remote Camera Placement and Retrieval Guide

Remote Camera Info Sheet, Pre-Trip Checklist

## Literature Cited:

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