

Camera Traps

Observing natural animal behaviours in the wild can be difficult! Animals react to the presence, sound, smells and movements of people, making recording natural observations tricky. This is where camera traps come in.



What is a camera trap?

A 'camera trap' is a special type of camera that is **deployed** in the field to record what happens in that area. They can record both daytime colour footage, or nighttime **infrared** footage. The cameras start recording when they detect movement and can be set to record either a short burst of video, a single image, or a series of images.

How does it work?

Researchers identify a location for a camera to be set up. They usually try and aim the cameras at an area where animals will be moving through, or a location they know the animals will frequent. They attach the camera to a fixed point, usually a tree, but sometimes a fence post or other unmoveable object.

They will leave the camera in location for a set amount of time. Every time something moves in front of the camera, whether it is an animal, a human, or a blade of grass moving in the wind, the camera will activate. Depending on the settings and the battery life, these cameras can record thousands of images. The researchers will return to the site, collect the camera, and download the images to see what photographs they have taken.



These cameras are made tough to withstand a wide range of conditions. They have to be waterproof to be outside in all kinds of weather, and cope with low and high temperatures.

While these cameras are tough, Zambia can be even tougher! In hot weather the cameras can overheat and corrupt the images or stop working.

To combat this, researchers will sometimes place a piece of elephant dung on top of the camera. The fibrous dung acts as an insulator and keeps the worst of the heat off the camera.

What are the benefits of camera traps?

- They are very low impact on the animals. They can be set and left for months at a time, allowing the researchers insight to the animals natural behaviours.
- They can be used to monitor for specific behaviours, for example, if researchers want to test a new type of lion repellent, they can set out a control camera (without the repellent) and a test camera (with the repellent) and observe the differences.
- They can record footage at a definition high enough that we can identify individuals (see lion whisker spot patterns for more information!).
- Camera traps are great for **citizen science** projects. The images can be uploaded to a site like [zooniverse.org](https://www.zooniverse.org) and members of the general public can contribute to the research project. This helps spread conservation messages and connect people to the project, resulting in more support and better outcomes.
- While researchers set the camera trap with a specific species in mind, they will get all sorts of photos. This lets researchers observe other animals that use the habitat, natural phenomena and human activity.



Jaguar investigating a camera



Whirlwind caught on camera



Poacher caught on camera

What are some of the risks of camera traps?

- Their data is stored in the camera until they are collected. This means if the camera is damaged or stolen, the data is lost as well. When big animals like elephants are around, you have to make sure you're not attaching your camera to their favourite scratching tree.
- They are expensive too! If they are damaged or stolen they are costly to replace. If a **poacher** finds a camera they may damage or remove it to avoid being caught.
- ANY movement will set it off. Sometimes all a camera will record is 40,000 photographs of grass waving in the wind.
- Because there are so many images, a large amount of work is required to check them all. The good news is students, interns, citizen scientists, and volunteers can help out. AI is also being used through a process called 'machine learning'.



Vocabulary

citizen science - when members of the general public help out with research, by taking photos, identifying images, or processing data.

deployed - put out into the field to do work

infrared - a wavelength of light not visible to the human eye, that can be recorded at night by a special camera

poacher - a person illegally killing and taking wildlife

Practicalities

What are the costs involved in this method? (materials, resources, etc.)

What are the personnel requirements? Break your answer down into the different steps in this method and what level of expertise and how much time is required for each step.

Implications

What questions is this method of data collection trying to answer?

What might the flow on impact be for conservation of lions?



Say Cheese!

Lets participate in our own citizen science project. These images were recorded on camera traps in Zambia. Can you identify the animals in each picture? You may need some online research to help you with the species.



Species:

of animals: 1 / 2 / 3 / 4 / 5

Young present: Yes / No

Sex: M / F / Unknown



Species:

of animals: 1 / 2 / 3 / 4 / 5

Young present: Yes / No

Sex: M / F / Unknown



Species:

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of animals: 1 / 2 / 3 / 4 / 5

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Sex: M / F / Unknown

Say Cheese!

Some times the cameras record human interactions, or the impacts of human activity. Look at the four images below and identify the human element and the impact.



What is the human element?

.....

How is this impacting wildlife in this image?

.....

.....



What is the human element?

.....

How is this impacting wildlife in this image?

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What is the human element?

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How is this impacting wildlife in this image?

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Citizen Science

The following table contains data from a citizen science project called 'Snapshot Serengeti'. In this project, citizen scientists have viewed camera trap images and identified the species and number of animals in each image. From the camera, we know what time of day these images were recorded. For each species, 30 random data points were selected from the data set.

On this page, you will plan a display to interpret this data, and on the next page you will create this display.

What is one question you think you can answer with this data?

.....

.....

What visual display (line graph, bar graph, pie chart etc.) would you make to help you answer this question? (For example: if you wanted to know which species had the most individual sighted you could create a pie chart).

.....

Use the space below to collate the data for your visual display. (For example: If you were making the above pie chart, you could tally the number of each species below)

Citation: Swanson AB, Kosmala M, Lintott CJ, Simpson RJ, Smith A, Packer C (2015)
Snapshot Serengeti, high-frequency annotated camera trap images of 40
mammalian species in an African savanna.
Scientific Data 2: 150026. ([DOI](#)) ([bibtext](#))



Data Display

Create your display in the box below. Don't forget to include a title, labels, units of measurement and a legend.



Buffalo

Time	Number
9:14	1
7:06	1
21:46	1
23:01	2
23:04	2
23:09	2
23:19	2
23:26	2
7:08	2
23:10	3
23:16	3
23:20	3
23:29	3
23:32	3
11:41	3
23:28	4
23:30	4
23:33	4
11:42	4
23:25	5
23:39	5
23:17	6
23:37	6
23:14	7
1:21	1
1:25	1
1:34	1
1:39	1
1:59	1
2:01	1



Elephant

Time	Number
14:28	1
10:30	1
14:29	2
8:39	4
16:49	9
15:42	1
18:25	1
11:05	1
11:06	1
11:07	1
11:09	1
11:10	1
11:17	1
11:19	1
11:20	1
11:25	1
15:44	2
18:27	2
11:21	2
11:03	4
11:04	4
17:36	1
16:15	1
16:21	1
16:25	1
13:33	1
13:35	1
0:51	1
0:58	1
14:16	1



Giraffe

Time	Number
6:28	1
6:58	1
7:47	1
12:50	1
12:54	1
13:25	1
20:56	1
14:13	1
13:28	1
13:32	1
16:40	1
11:35	1
12:31	1
12:36	1
17:43	1
19:19	1
17:03	1
12:30	1
1:26	1
14:51	1
14:56	1
8:53	1
11:41	1
9:38	1
20:23	1
19:04	1
19:07	1
13:40	1
13:43	1
13:47	1



Impala

Time	Number
10:02	6
10:22	3
14:15	3
14:18	3
14:27	3
14:31	3
14:33	3
14:42	3
14:45	3
19:18	1
11:38	3
13:53	4
13:55	4
14:08	4
14:13	4
14:19	4
14:21	4
14:40	4
16:50	4
10:01	1
10:07	6
13:56	5
14:16	5
16:19	1
9:31	3
13:23	3
13:22	6
13:15	8
13:18	8
17:16	10



Lion

Time	Number
10:57	1
11:27	1
11:29	1
11:35	1
11:40	1
12:07	1
12:10	1
12:15	1
12:53	1
17:35	2
10:31	2
10:46	2
9:02	2
11:15	2
11:44	2
10:40	3
14:45	1
9:27	1
9:29	1
9:37	1
20:02	1
10:07	1
12:32	1
19:29	1
9:57	1
16:50	1
16:51	1
16:53	1
7:43	1
5:16	1



Zebra

Time	Number
17:32	3
1:45	10
15:20	4
15:42	4
11:13	3
15:39	5
7:38	8
8:18	5
15:40	6
7:20	1
15:19	7
15:17	8
9:50	7
15:13	9
16:08	9
16:24	1
20:24	1
7:01	2
16:27	2
7:14	4
7:16	4
7:03	5
7:05	6
7:08	7
7:10	9
7:12	9
7:07	10
15:19	1
10:46	1
14:10	2

Sampling vs Census

Questions

Using your data display, attempt to answer the question you set you to answer:

Do you think the sample of data you have is large enough that your answer accurately reflects what is happening in the Serengeti? Explain your answer.

The original 'Snapshot Serengeti data set (season one) contains 1,048,575 images. What are the difficulties with working with a dataset that large?

The sample of data you have received was chosen using a random number generator (simple random sampling). Do you think this was the best method of sampling to use? Explain your answer.

Using the answer to your original questions, how could this information influence conservation of lions? Write a conservation message below.

