## Topic Info

|  |  |
| --- | --- |
| info\_id | num\_cams |
| question |  |

## Note banner

:::{hint}

If you only have a set number of cameras to deploy (e.g., 30), select “Yes” and enter the number of cameras in the numeric field.

If you aren’t limited by a certain number of cameras, select “No” and leave the numeric field blank.

If you’re unsure about how many cameras you have or you would like to see all of the options (irrelevant of the number of cameras; e.g., to be gauge your options and/or to determine the number of cameras you need), you can also select “No.”

:::

## Overview

**\*\*<font size=“4”><span style=“color:#2F5496”>How does this relate to study design?</font></span>\*\***

The number of cameras available will impact the appropriate modelling approaches (in combination with other aspects of your study, such as the detectability and/or rarity of your {{ target\_species\_tu }}) or the number of covariates you hope to include in your models.

For example, 30 cameras may be enough to evaluate “occupancy” if your {{ target\_species\_tu }}) is relatively common, however, if your target species is rare, more sites will be required in order for your estimates to be reasonably precise ({{ rtxt\_shannon\_et\_al\_2014 }}; {{ rtxt\_kays\_et\_al\_2020 }}; {{ rtxt\_wearn\_gloverkapfer\_2017 }}). More sites will be needed if covariates on occupancy or detection probability are to be added into models ({{ rtxt\_wearn\_gloverkapfer\_2017 }}).

:::{seealso}

You can refer to [Appendix A - Table A2]( https://ab-rcsc.github.io/RCSC-WildCAM\_Remote-Camera-Survey-Guidelines-and-Metadata-Standards/1\_survey-guidelines/1\_10.1\_AppendixA-Tables.html) to get a sense of the required number of cameras for each of the modelling approaches and according to the {{ survey\_tu\_objectives }}.

\*\*RCSC et al. (2024) - Appendix A - Table A2.\*\* Summary of appropriate study design, {{ cam\_spacing\_tl }}, and {{ survey\_tl }} effort (adapted from Wearn & Glover-Kapfer \[2017\] with additional references included) for various [modelling approaches](#mods\_modelling\_approach). \*\*Note:\*\* these guidelines use the best available information, however, there is uncertainty associated with each approach. To address this, the table contains ‘minimum,’ ‘ideal’ and ‘often’ used values, as well as qualifiers.

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[\*Download the PDF\*]( <https://ab-rcsc.github.io/RCSC-WildCAM_Remote-Camera-Survey-Guidelines-and-Metadata-Standards/_downloads/a2c4924f22f971faa27c706b8bb6dd0a/Surv_Guidelines_AppendixA-Table-A2_v2.pdf>)

:::

## In-depth

```{include} include/00\_coming\_soon.md

```

“The optimal number of cameras required will be influenced by factors such as landscape heterogeneity, {{ survey\_tl }} duration and spatial scale, species rarity and desired level of precision ({{ rtxt\_colyn\_et\_al\_2018 }}; {{ rtxt\_rovero\_et\_al\_2013 }}). For example, Kays et al. (2020) found that 25–35 cameras were needed for precise estimates of species richness, depending on the spatial scale of the {{ survey\_tl }} and landscape diversity. The number of cameras required for precise estimates of {{ occupancy\_tl }} was highly sensitive to the occurrence rate of species, with \<20 cameras required for common species and \>150 cameras required for rare species ({{ rtxt\_kays\_et\_al\_2020 }}). In general, deploying more cameras and/or for longer durations always results in more precise estimates; however, users can consider rotating cameras across multiple sites for shorter durations (if feasible). There are several useful references and applications available to help determine the optimal number of cameras for a {{ survey\_tl }} (e.g., {{ rtxt\_efford\_boulanger\_2019 }}).

When the {{ survey\_tl\_objectives\_abrv }} and [modelling approach](#mods\_modelling\_approach) warrant, placing multiple cameras at a site (either on the same attachment point or nearby) can significantly increase the [detection probability](#detection\_probability) of less common species (more than increasing the number of {{ cam\_days\_per\_cam\_location\_tl }}; {{ rtxt\_oconnor\_et\_al\_2017 }}; {{ rtxt\_pease\_et\_al\_2016 }}; {{ rtxt\_stokeld\_et\_al\_2016 }}) or be useful for individual identification.”

--- RCSC et al. (2024)

## Figures

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| --- | --- | --- | --- |
| Image | file\_name | Caption (if applicable) | ref\_id |
|  | figure1\_filename.png | figure1\_caption | figure1\_ref\_id |
|  | figure2\_filename.png | figure2\_caption | figure2\_ref\_id |
|  | figure3\_filename.png | figure3\_caption | figure3\_ref\_id |
|  | figure4\_filename.png | figure4\_caption | figure4\_ref\_id |
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|  | figure11\_filename.png | figure11\_caption | figure11\_ref\_id |
|  | figure12\_filename.png | figure12\_caption | figure12\_ref\_id |
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|  |  |  |  |

Shorten long captions (example)

\*\*Gotelli & Colwell (2011) - Fig. 4.1\*\* Species accumulation and rarefaction curves.

:::{dropdown}

The jagged line is the species accumulation curve for one of many possible orderings of 121 soil seedbank samples, yielding a total of 952 individual tree seedlings, from an intensive census of a plot of Costa Rican rainforest (Butler & Chazdon 1998). The cumulative number of tree species (y-axis) is plotted as a function of the cumulative number of samples (upper x-axis), pooled in random order. The smooth, solid line is the sample-based rarefaction curve for the same data set, showing the mean number of species for all possible combinations of 1, 2, . . . , m∗, . . . , 121 actual samples from the dataset—this curve plots the statistical expectation of the (sample-based) species accumulation curve. The dashed line is the individual-based rarefaction curve for the same data set—the expected number of species for (m∗) (952/121) individuals, randomly chosen from all 952 individuals (lower x-axis). The black dot indicates the total richness for all samples (or all individuals) pooled. The sample-based rarefaction curve lies below the individual-based rarefaction curve because of spatial aggregation within species. This is a very typical pattern for empirical comparisons of sample-based and individual-based rarefaction curves.

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## Video

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| vid4\_caption | vid4\_url | vid4\_ref\_id |
| vid5\_caption | vid5\_url | vid5\_ref\_id |
| vid6\_caption | vid6\_url | vid6\_ref\_id |

## Shiny

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Shiny caption = shiny\_caption

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Shiny name = shiny\_name2

Shiny caption =shiny\_caption2

Shiny URL = shiny\_url2

## Analytical tools & resources

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| --- | --- | --- | --- | --- |
| Type | Name | Note | URL | ref\_id |
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| resource15\_type | resource15\_name | resource15\_note | resource15\_url | resource15\_ref\_id |

## References / Glossary

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## Notes

##### POPULATE – INFO

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:::{hint}

replace me with text

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\*\*{{ term\_mod\_occupancy }}\*\*: {{ term\_def\_mod\_occupancy }}

:::::::{tab-set}

::::::{tab-item} Overview

This section will be available soon! In the meantime, check out the information in the other tabs!

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::::::{tab-item} In-depth

:::{note}

\*\*This content was adapted from\*\*: The Density Handbook, “[Using Camera Traps to Estimate Medium and Large Mammal Density: Comparison of Methods and Recommendations for Wildlife Managers](https://www.researchgate.net/publication/368601884\_Using\_Camera\_Traps\_to\_Estimate\_Medium\_and\_Large\_Mammal\_Density\_Comparison\_of\_Methods\_and\_Recommendations\_for\_Wildlife\_Managers)” (Clarke et al., 2024)

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\*\*Leroy (2024)\*\* The rarity cut-off point is here defined as the threshold of occurrence below which species are considered rare.

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\*\*Leroy (2024)\*\*Weight assignation curve adjusted to an arbitrary rarity cut-off.

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Check back in the future!

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:::::{tab-item} Analytical tools & resources

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