# INFO ENTRY - QUESTION INFO

ENTRY NOTES:

* green = does not need to be editted
* yellow = info for the inputter
* ref\_id = “refs\_glossary\_2024-08-09.xls > “references” tab
  + if the reference not present, either add it (if you’re confident that you can follow the format), or add a comment in this doc with the info and I will adjust
* **images – file name in** “refs\_glossary\_2024-08-09.xls > “references” tab
* Ignore everything in the “POPULATE MARKDOWN” section
* Size of columns in tables and text format do not matter; see note on bold and italize below
* Any content with “glue}`` prefix or surrounded by “{{ “ / “ }}” indicates where text will be inserted from the keys
* You may see “<br>” throughout, you can ignore these
* additional formatting notes (optional)
  + \*\***bold**\*\*
  + \**italics*\*
* **Topic Info**
  + If the topic is NOT related to a question, you can leave “question” as NULL
  + “question” here is more for your reference
* **Assumptions, Pros, Cons**
  + Only for modelling approaches; can ignore otherwise (leave table here)
  + [WILL BE HERE, BUT INSERTED DIRECTLY FROM CSV FILE (THUS NO INPUT NEEDED)]
* **Advanced**
  + If the topic doesn’t warrant inclusion, you can leave as NULL
* **Figures**
  + Placeholders here as “filename” can leave in if not <5 images
* **Video**
  + no “<” before the URL text and a “>” after URL in this case
  + ref\_id in this example is not correct, just for illustrative purposes
* **Analytical tools & resources**
  + The ref\_id should be included in the reference column (and the full text reference in the master reference file). If you aren’t sure if the reference is in the master doc, add the full text ref as a comment.
  + Please add a “<” before the URL text and a “>” after (e.g., <http://www.somesitelink.com>)
  + Type can be something similar to: Article, App/Program, R package
* **References / Glossary** 
  + items in-text above (IGNORE FOR NOW)
* **Notes**
  + (future ref / not included in markdown conversion)

## Topic Info

"

ANALYTICAL INNOVATIONS

2021

\*Mammalian Biology, 102\*, 581–590. (2022)

Moeller & Lukacs, 2021

moeller\_lukacs\_2021

Moeller, A. K.,& Lukacs, P. M. (2021) spaceNtime: an R package for estimating abundance of unmarked animals using camera-trap photographs. \*Mammalian Biology, 102\*, 581–590. <https://doi.org/10.1007/s42991-021-00181-8>

* Yu, Hongmin, Zhixue Lin, and Fanrong Xiao. “Role of Body Size and Shape in Animal Camouflage.” *Ecology and Evolution* 14, no. 5 (May 2024): e11434. <https://doi.org/10.1002/ece3.11434>.

Mammalian Biology

|  |  |
| --- | --- |
| **info\_id** | sp\_size |
| **question** | **Question:** What is the approximate size of the Target Species?  Discuss influence of body size on design choices + Include mention of potential season effects on movement / HR + motility; movement; home range size |

## Overview

Here are a few examples of comparable species for each body size options:

* \*\***Small**\*\*: rodents and similarly sized species in the “Mustelidae” family [i.e., weasels, badgers, otters, martens, wolverine, etc.])
* \*\***Medium**\*\*: small and mid-sized species, ~< 33 lbs (or 15 kilograms), such as meso-carnivores (i.e., Red, fox, Coyote) {{Roemer et al., 2009}}
* \*\***Large**\*\*: bears or ungulates (i.e., large mammals with hooves, such as White-tailed deer, Elk, Moose, etc)
* \*\***Multiple**\*\* - \*select this option if your study includes multiple Target Species that vary in body size.\*

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

Body size **affects the detection process** (O’Brien et al., 2011). Species with a larger body size are more likely to be detected; and therefore may require lower sampling effort than smaller species ({{ ref\_intext\_chatterhee\_et\_al\_2021 }}). Larger species moving through the camera’s detection zone are more likely to trigger the camera ({{ ref\_intext\_chatterhee\_et\_al\_2021 }}; {{ ref\_intext\_rowcliffe\_et\_al\_2011 }}; Hofmeester et al. 2017); they can also be detected farther away or occur at wider angles ({{ ef\_intext\_rowcliffe\_et\_al\_2011 }}; {{{ ref\_intext\_hofmeester\_et\_al\_2017 }}). Whereas, small mammals are often undetected due to their small size (O’Brien, Kinnaird, and Wibisono 2011; Anile and Devillard 2016) and because “small species which routinely move at fast speeds, such as stoats and weasels, are likely to have especially small detection zones” ({{Glen et al., 2013}}).

```{figure} ../03\_images/03\_image\_files/kays\_et\_al\_2021\_fig6\_clipped.png

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```

\*\*Kays et al. (2021) - Fig. 6\*\*: Relationship between trigger probability and body mass for four focal species (ascending order by weight: gray fox, raccoon, coyote, white-tailed deer). Error bars show standard deviation. Body mass values come from North Carolina animals in the mammal collections of the NC Museum of Natural Sciences

When thinking beyond the camera's FOV, larger species generally also have larger home ranges {{Garland, 1983}} and daily movement distances, making them more likely to be detected at multiple cameras {{ ref\_intext\_chatterhee\_et\_al\_2021 }}, therefore there are also implications for which models may be appropriate (due to assumptions of “site closure” / “independent locations”).

::: {note}

This is an especially important consideration when targetting multiple species of varying sizes.

:::

## Advanced

Add some info here

## Figures

|  |  |  |  |
| --- | --- | --- | --- |
| **Image** | **file\_name** | **Caption (if applicable)** | **ref\_id** |
|  | kays\_et\_al\_2021\_fig6\_clipped.png | \*\*Kays et al. (2021) - Fig. 6\*\*: Relationship between trigger probability and body mass for four focal species (ascending order by weight: gray fox, raccoon, coyote, white-tailed deer). Error bars show standard deviation. Body mass values come from North Carolina animals in the mammal collections of the NC Museum of Natural Sciences | kays\_et\_al\_2021 |
|  | anile\_devillard\_2016\_fig2.jpg | figure2\_caption | anile\_devillard\_2016 |
|  | anile\_devillard\_2016\_fig3.jpg | figure4\_caption | anile\_devillard\_2016 |
|  | bodysize\_movement.png | figure4\_caption | bodysize\_movement.png |
|  | fisher\_et\_al\_2011\_fig6.png | figure5\_caption | fisher\_et\_al\_2011 |
|  | chatterjee\_et\_al\_2021\_table2\_clipped.png | \*\*Chatterjee et al. (2021) – Table 2\*\*:  igure6\_caption | chatterjee\_et\_al\_2021 |

## Video

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| vid2\_caption | vid2\_url | vid2\_ref\_id |
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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 |

## Analytical tools & resources

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## References / Glossary

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| **ref\_id** | **glossary\_keys** |
| {{ ref\_intext\_chatterhee\_et\_al\_2021 }}  {{ ref\_bib\_fisher\_et\_al\_2011 }}  {{ ref\_bib\_roemer\_et\_al\_2009 }}  {{ ref\_bib\_labarbera\_et\_al\_2009 }} | keys\_here |

## Notes

Not used

* Very small species (< 100 g) are sometimes detected by higherend camera traps on the market today (e.g. Fig 4-3), but detections will only be reliable at distances less than 2 m from the camera ({{Rowcliffe et al. 2011}})
* There is also some evidence that detection angles are smaller for species which move at faster speeds ({{Rowcliffe et al. 2011}}.
* Small species which routinely move at fast speeds, such as stoats and weasels, are likely to have especially small detection zones ({{Glen et al., 2013}}).
* "Most species with larger body sizes had moderate or high detection probabilities and thus required lower sampling efforts than smaller mammals. This makes sense, as larger-bodied animals are more likely to trigger the camera trap and have larger home ranges (Garland 1983) and daily movement distances, making them more likely to be detected at multiple cameras." (Chatterhee et al., 2021)
* “While occupancy was positively correlated with body size, detection probability was not significantly correlated with body size (r = 0.17, P = 0.49).” (Chatterhee et al., 2021)
* Species with higher dispersal ability (i.e., able to travel further distances) are also more likely to be absent during the survey (may generally occur at a camera location, but weren’t detected when you were sampling)
* Body size affects how easy it is to detect an individual moving through the camera’s detection zone ([detectability]()); larger species can be detected farther away or occur at wider angles ({{Rowcliffe et al. 2011}}; {{Hofmeester et al. 2017}}). ;;;;; However, body size has been found to have the most important effect on detection zones, with larger species being detected at larger distances and wider angles ({{Rowcliffe et al. 2011}}; {{Hofmeester et al. 2017}}).

Other

“All other things being equal, larger species might be more easily trapped as they move more slowly than smaller species, or because their population density is higher (see Bengsen et al., 2011 and Rowcliffe & Carbone, 2008; Rowcliffe et al., 2008 on the importance of population density on trapping rates).”

* Ofstad, E. G., Herfindal, I., Solberg, E. J., & Sæther, B.-E. (2016). Home ranges, habitat and body mass: Simple correlates of home range size in ungulates. *Proceedings of the Royal Society B: Biological Sciences*, *283*(1845), 20161234. <https://doi.org/10.1098/rspb.2016.1234>
* LaBarbera, M. (n.d.). Analyzing Body Size as a Factor in Ecology and Evolution.

# POPULATE MARKDOWN \_2024-09-14 - INFO

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# {{ title\_i\_sp\_size }}

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

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

\*\*{{ term\_sp\_size }}\*\*: {{ term\_def\_sp\_size }}

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\*\*Large\*\*: bears or ungulates (i.e., large mammals with hooves, such as White-tailed deer, Elk, Moose, etc)

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

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```{figure} ../03\_images/03\_image\_files/kays\_et\_al\_2021\_fig6.png

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```

\*\*Kays et al. (2021) - Fig. 6\*\*: Relationship between trigger probability and body mass for four focal species (ascending order by weight: gray fox, raccoon, coyote, white-tailed deer). Error bars show standard deviation. Body mass values come from North Carolina animals in the mammal collections of the NC Museum of Natural Sciences

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::: {note}

This is an especially important consideration when targetting multiple species of varying sizes.

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#### ::::::{tab-item} AdvancedAdd some info here

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#### ::::::{tab-item} Visual resources

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\*\*Kays et al. (2021) - Fig. 6\*\*: Relationship between trigger probability and body mass for four focal species (ascending order by weight: gray fox, raccoon, coyote, white-tailed deer). Error bars show standard deviation. Body mass values come from North Carolina animals in the mammal collections of the NC Museum of Natural Sciences

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figure2\_caption

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\*\*Chatterhee et al. (2021) – Table 2\*\*:

igure6\_caption

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#### ::::::{tab-item} Shiny apps/Widgets

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

| Type | Name | Note | URL |Reference |

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{{ ref\_intext\_chatterhee\_et\_al\_2021 }}

{{Fisher

et al., 2011}}

{{Roemer et al., 2009}}

{{LaBarbera et al\_1989 }}

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