Understanding the effects of urbanization and artificial light at night on the wildlife activity in Fort Collins, Colorado

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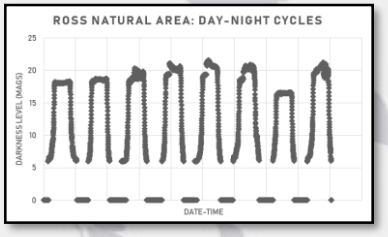
SQM Darkness Values (mags)
- 0 - 20
- 21 - 22
- 23 - 26

Field Methods

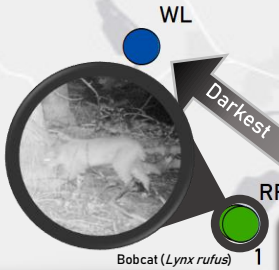
Two parallel transects of 31 trail cameras was in place from a Urban Wildlife Information Network project; new measurements were taken between 3/29/18 – 5/16/18.

16 of these sites were chosen to add sky quality meters (SQMs) to measure darkness levels. Four SQMs were distributed across the city to measure zenith darkness values.

Mean darkness readings at each site were compared to species information from camera traps.



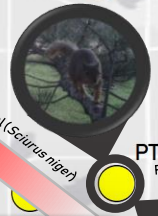
Example of raw data from SQM units – shows the cycles of darkness and brightness over 8 days of the field season.



Bobcat (*Lynx rufus*)

WL
Darkest
Laporte
BW
RR
1
Reservoir Ridge
Darkest Value: 21.3
Number of Photos: 53
Species Seen: 6
McM
LM
CL
Fort Collins
Springer
NF
RFM
RNA
Predicted trend of brightness
Brightest
Ross Natural Area
Darkest Value: 19.9
Number of Photos: 46
Species Seen: 4
RD
ELC1
PT
Raccoon (*Procyon lotor*)
AR
Power Trail
Darkest Value: 17.2
Number of Photos: 58
Species Seen: 4
GM
Darkest
Fossil Creek Reservoir
Darkest Value: 20. 7
Number of Photos: 42
Species Seen: 4

Red Fox (*Vulpes vulpes*)



Fox Squirrel (*Sciurus niger*)

Coyote (*Canis latrans*)

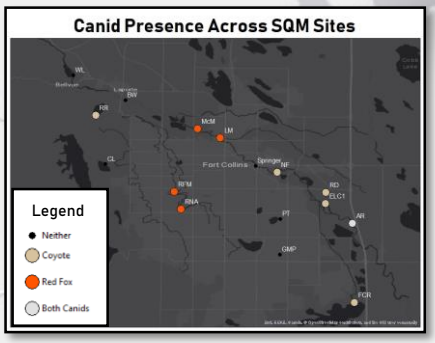
Predictions

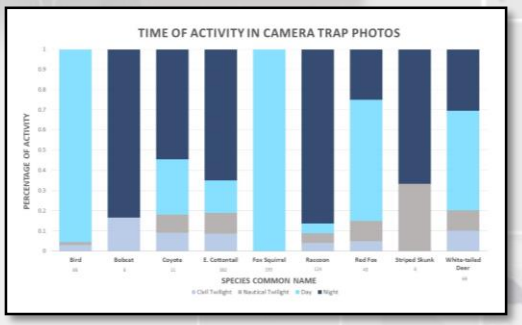
- Sites towards the center of the city will be the brightest, while those further out will be darkest
- Species richness will be highest at the darkest sites
- Of the larger carnivores:
  - Coyotes and bobcats will be seen only in rural, dark sites
  - Red fox will be seen in natural areas within the city
- Artificial light at night may affect normal activity patterns of wildlife

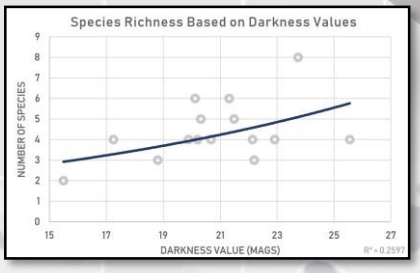
Conclusions

- SQMs measured ground illuminance, so the brightness gradient predicted across the city was not seen.
- Large carnivores (bobcats and coyotes) were isolated to sites on the outskirts of the city. Red fox were seen in bright sites within the city's natural areas. Red fox and coyote presence rarely overlapped.
- There was a slight positive correlation between species richness and the darkness of the site.
- More research is necessary to understand the impact of light on activity patterns in wildlife.

Results







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