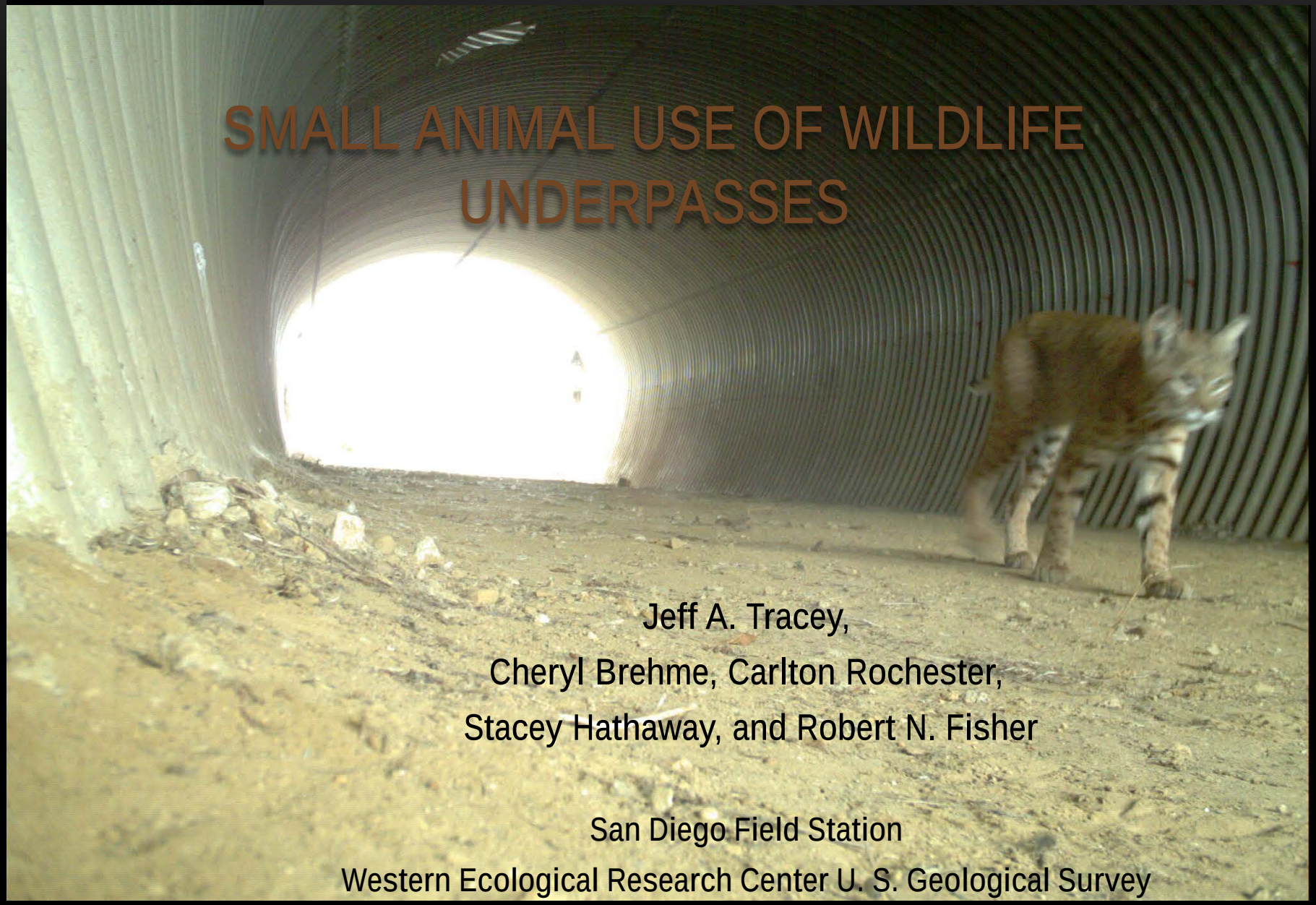
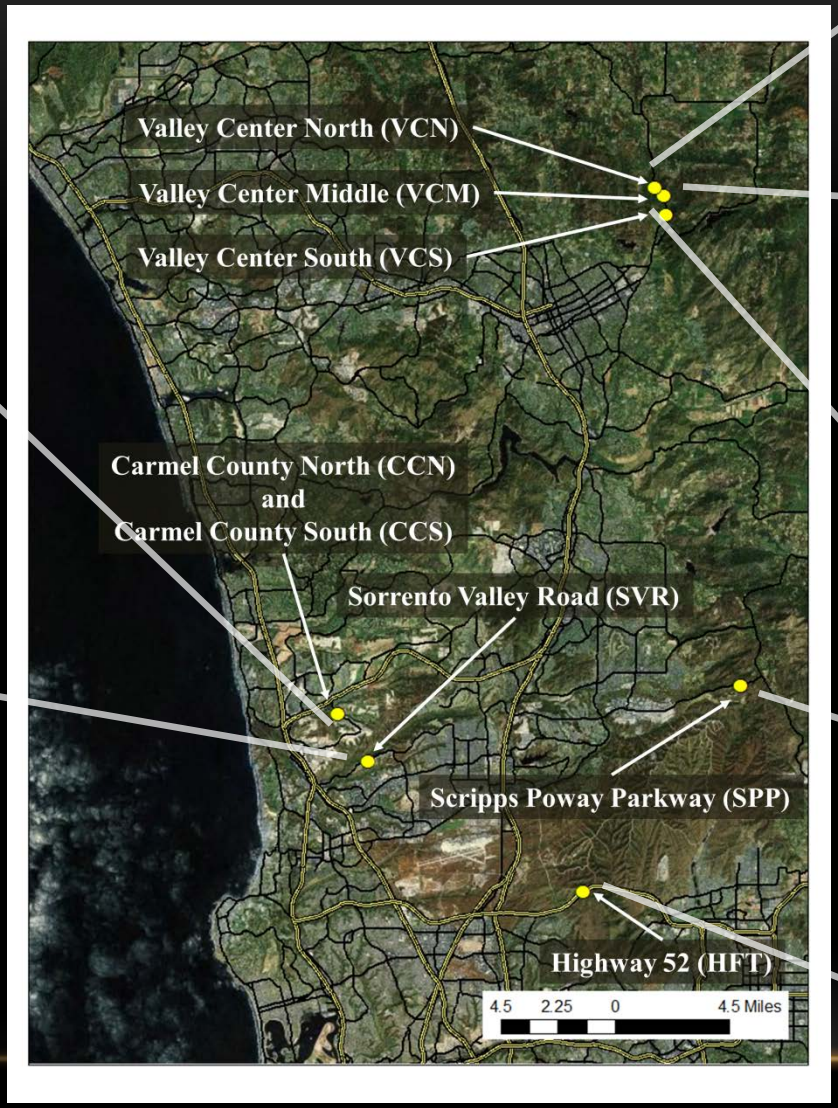


SMALL ANIMAL USE OF WILDLIFE UNDERPASSES

Jeff A. Tracey,
Cheryl Brehme, Carlton Rochester,
Stacey Hathaway, and Robert N. Fisher

San Diego Field Station
Western Ecological Research Center U. S. Geological Survey

STUDY AREAS



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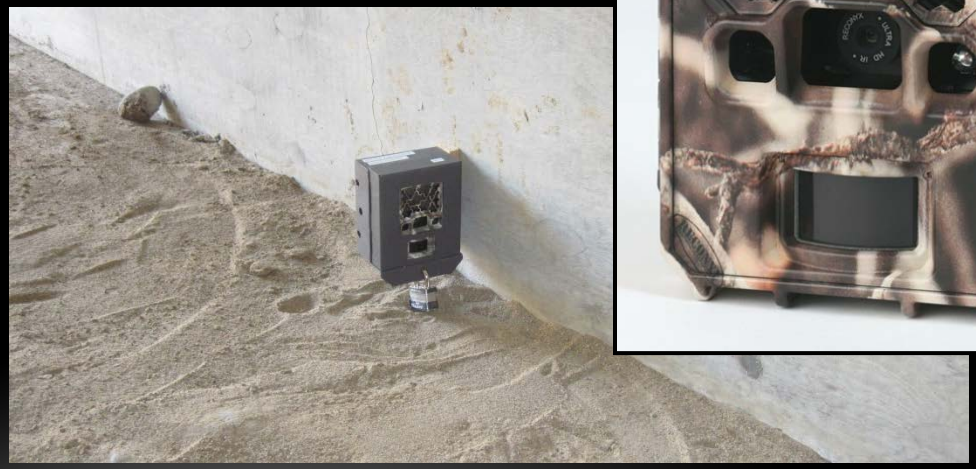
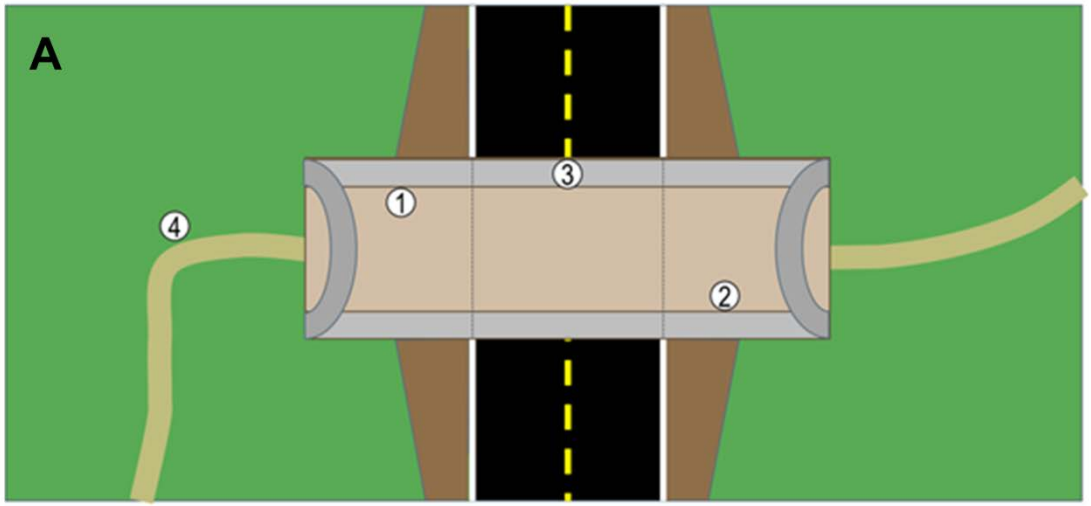
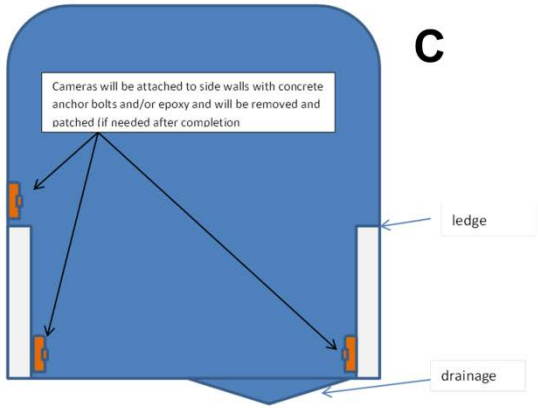
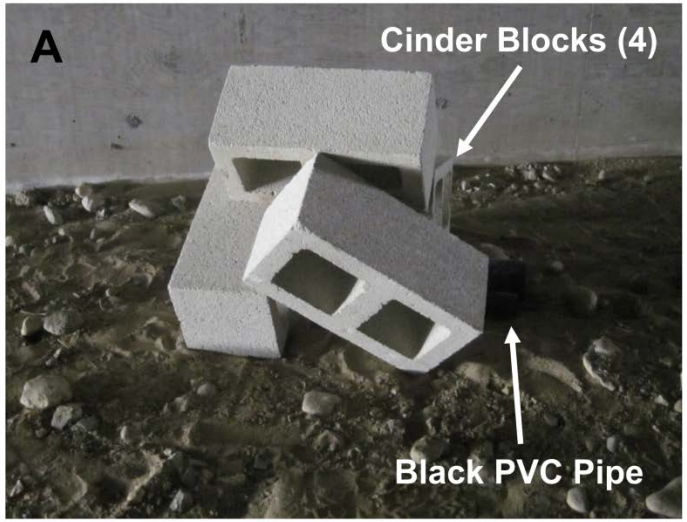
CAMERA INSTALLATION & PLACEMENT

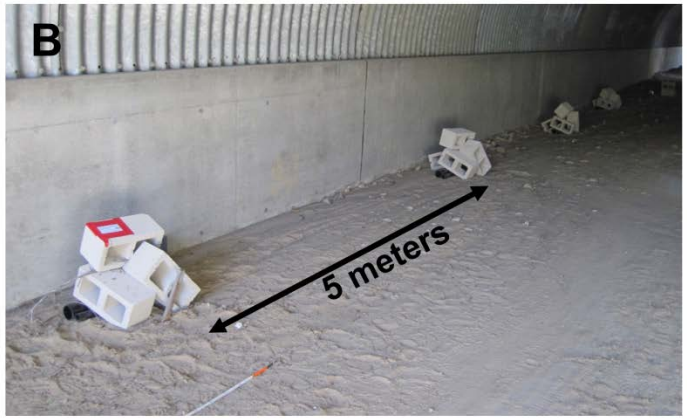


TREATMENT









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SUMMARY OF IMAGES COLLECTED

- Max of 29 cameras deployed:
  - 16 Interior Ground-level Cameras
  - 5 Interior Ledge Cameras
  - 8 Exterior Cameras
- Challenges with external cameras

Year	Trigger	Images
2012	Motion	337,281
2012	Time	852,249
2013	Motion	638,514
2013	Time	1,337,412
	TOTAL	3,165,456

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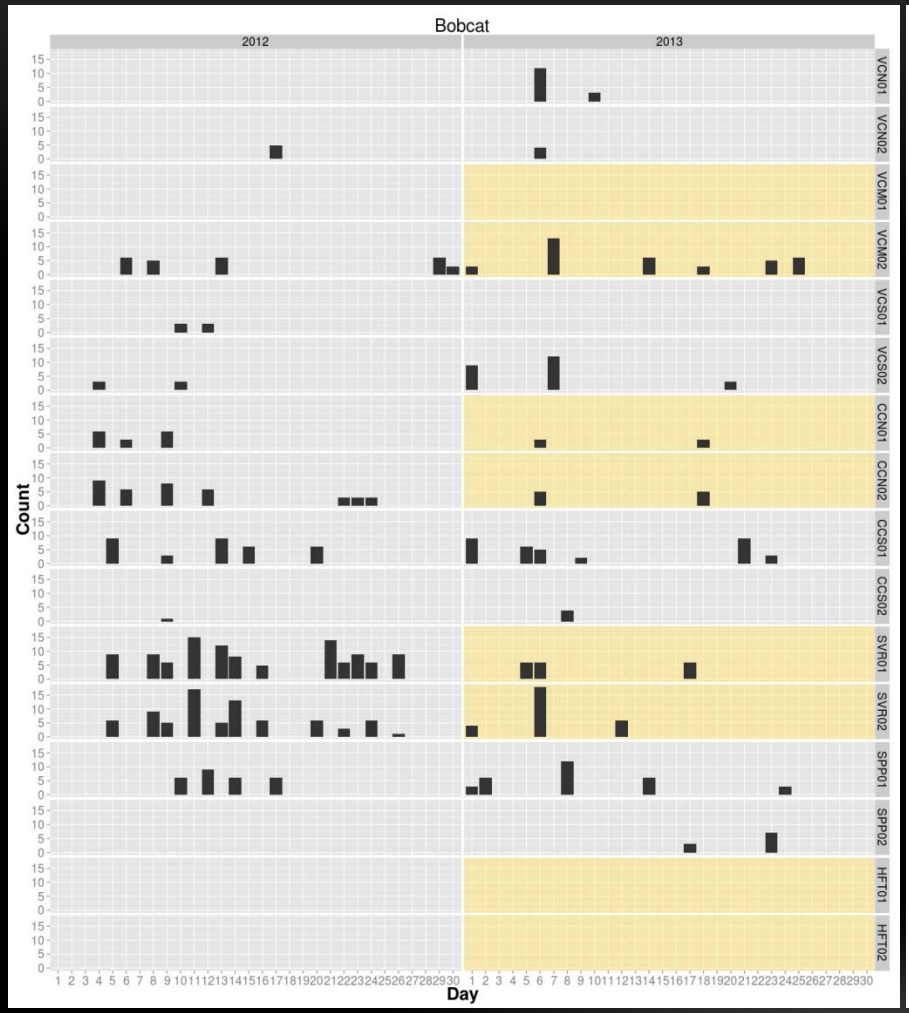
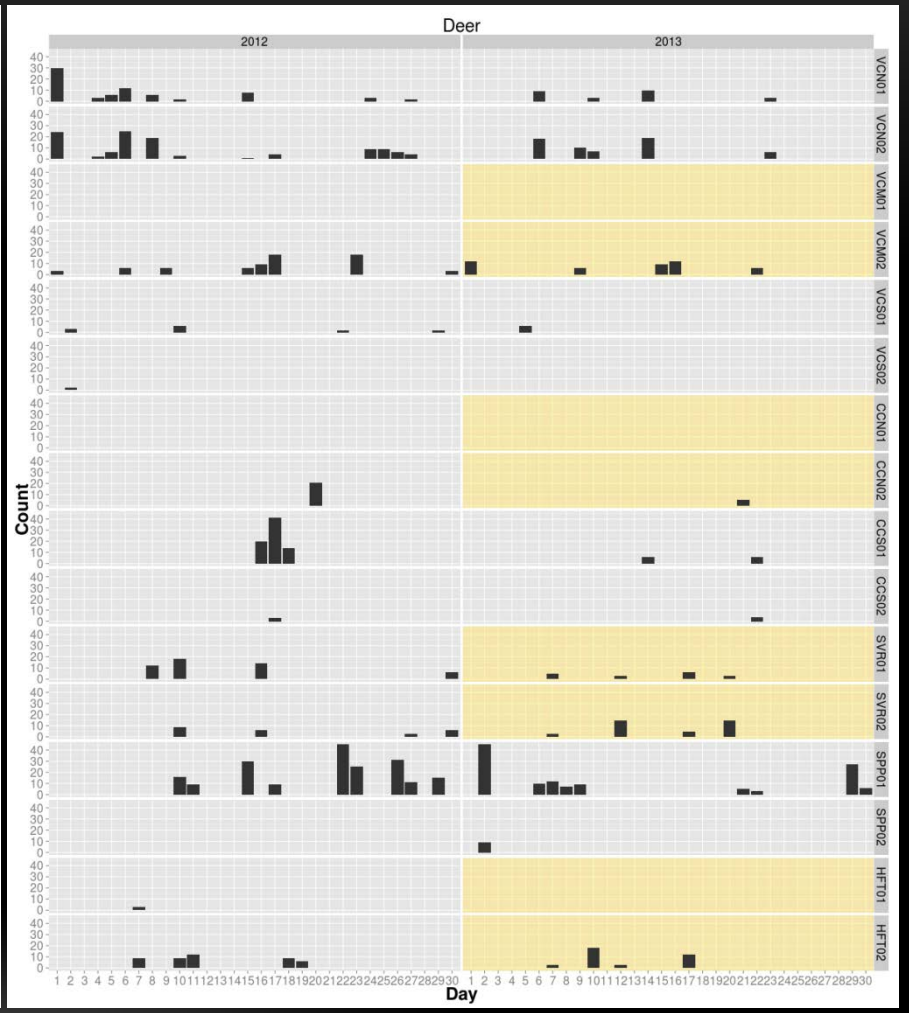
DATA SUMMARY FROM SPP





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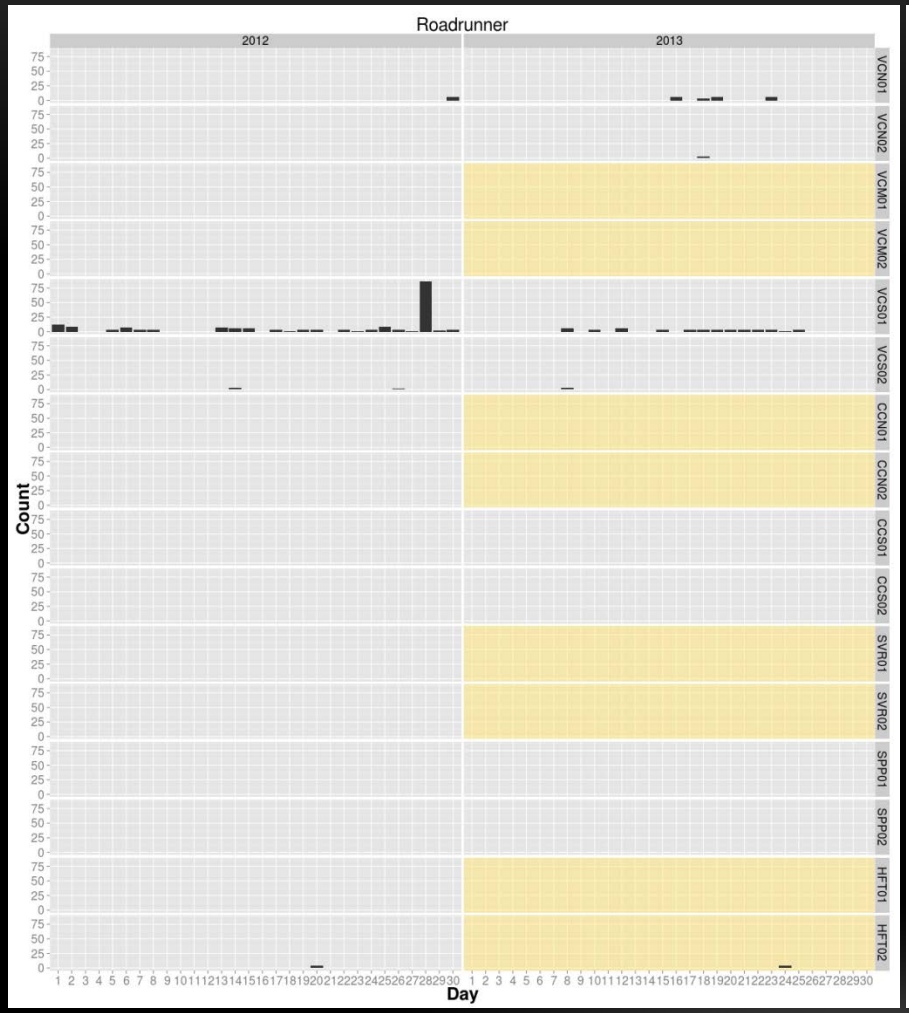
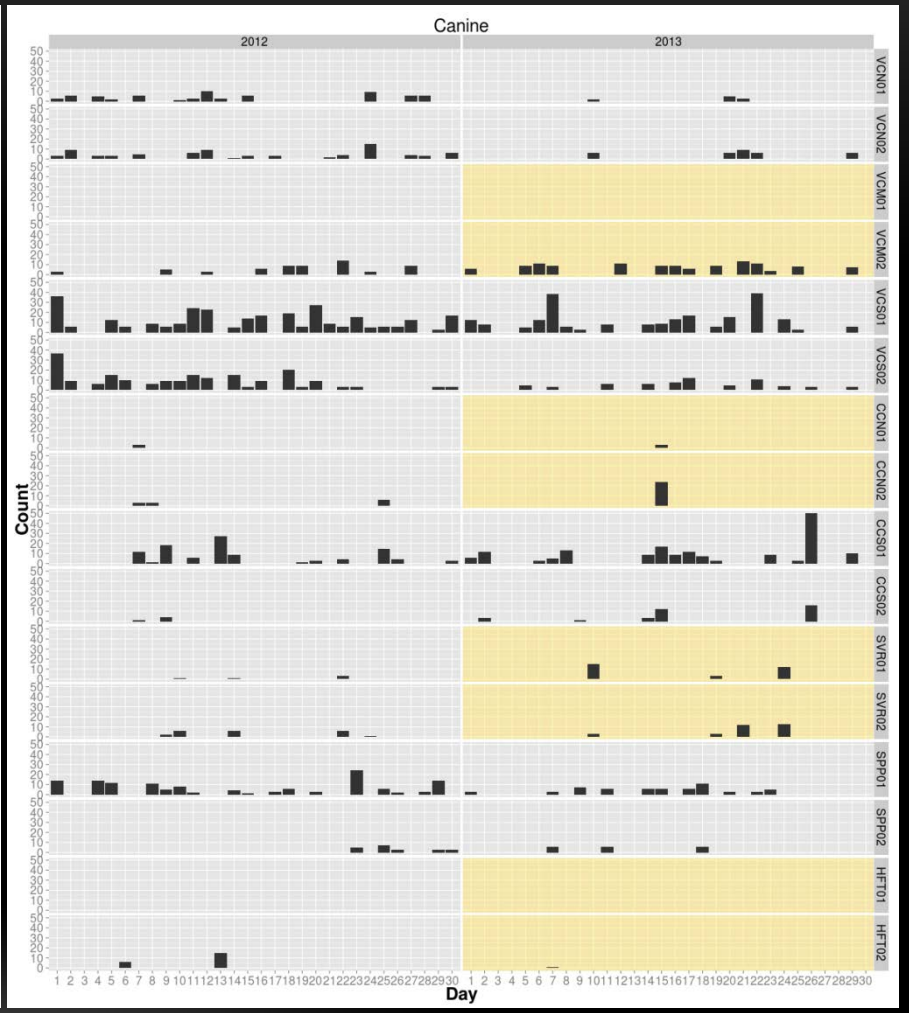
DATA SUMMARY FROM SPP





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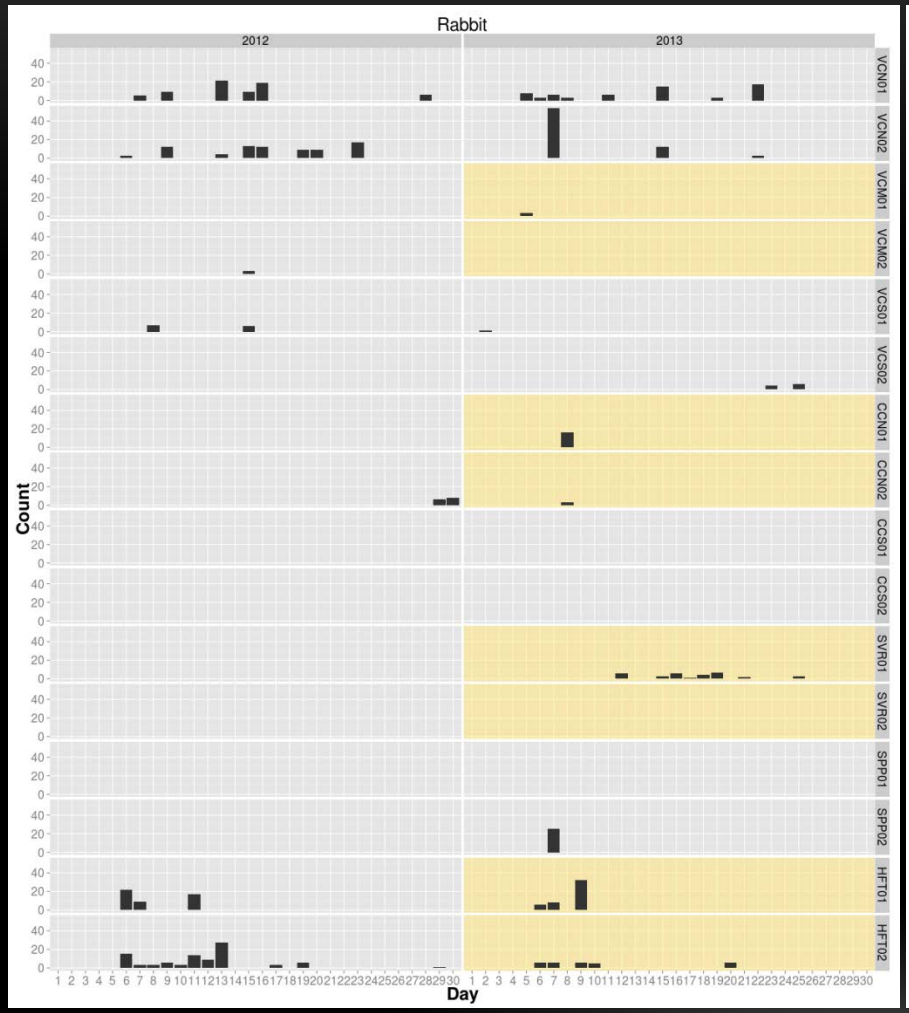
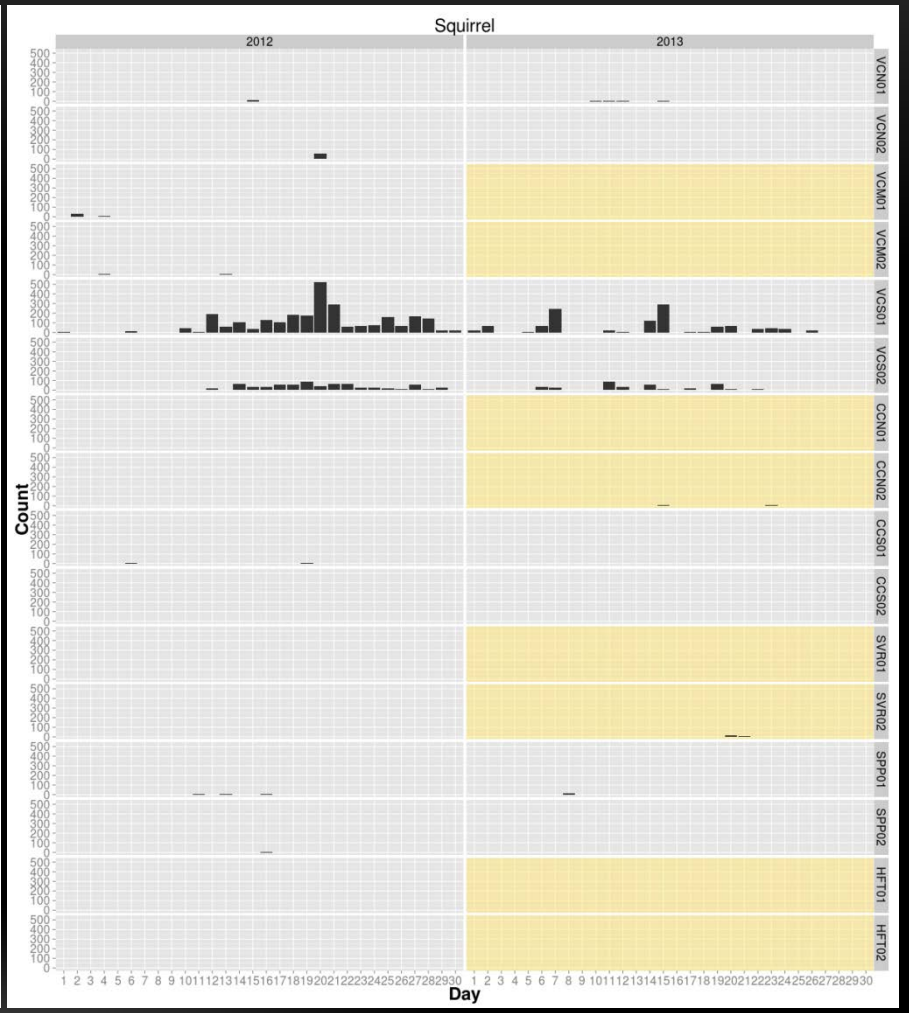
DATA SUMMARY FROM SPP





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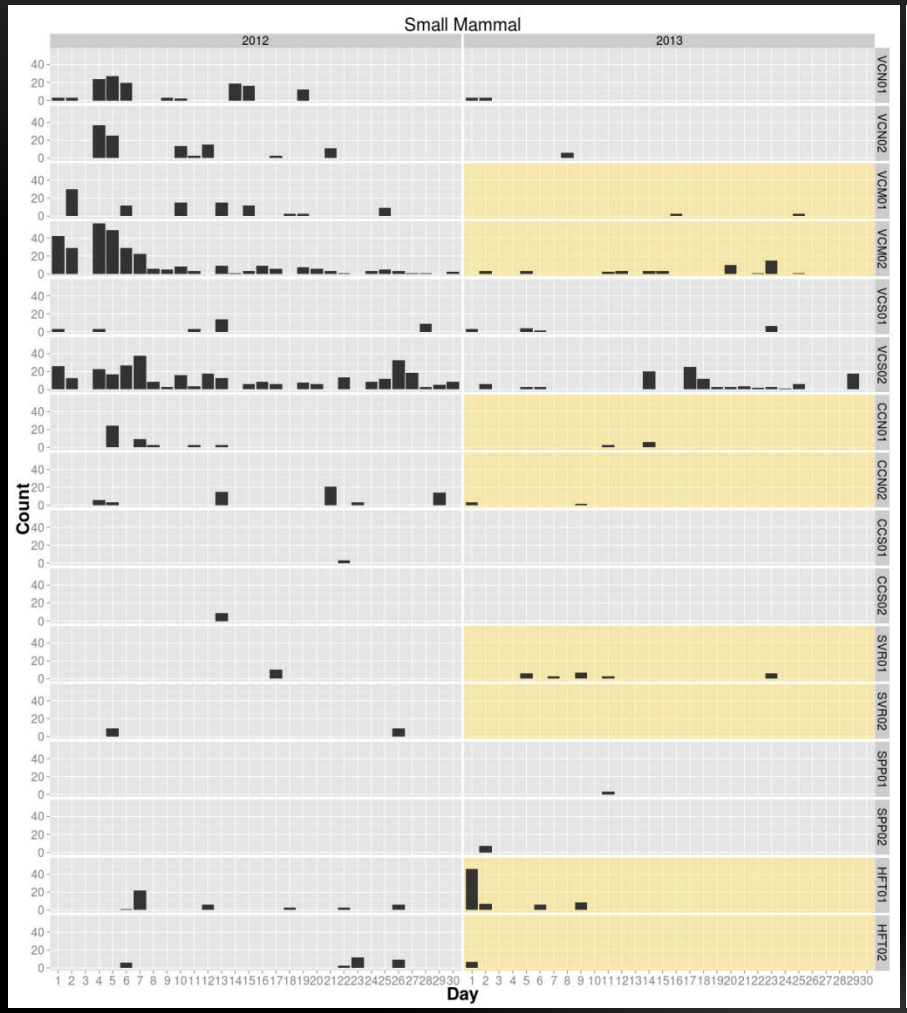
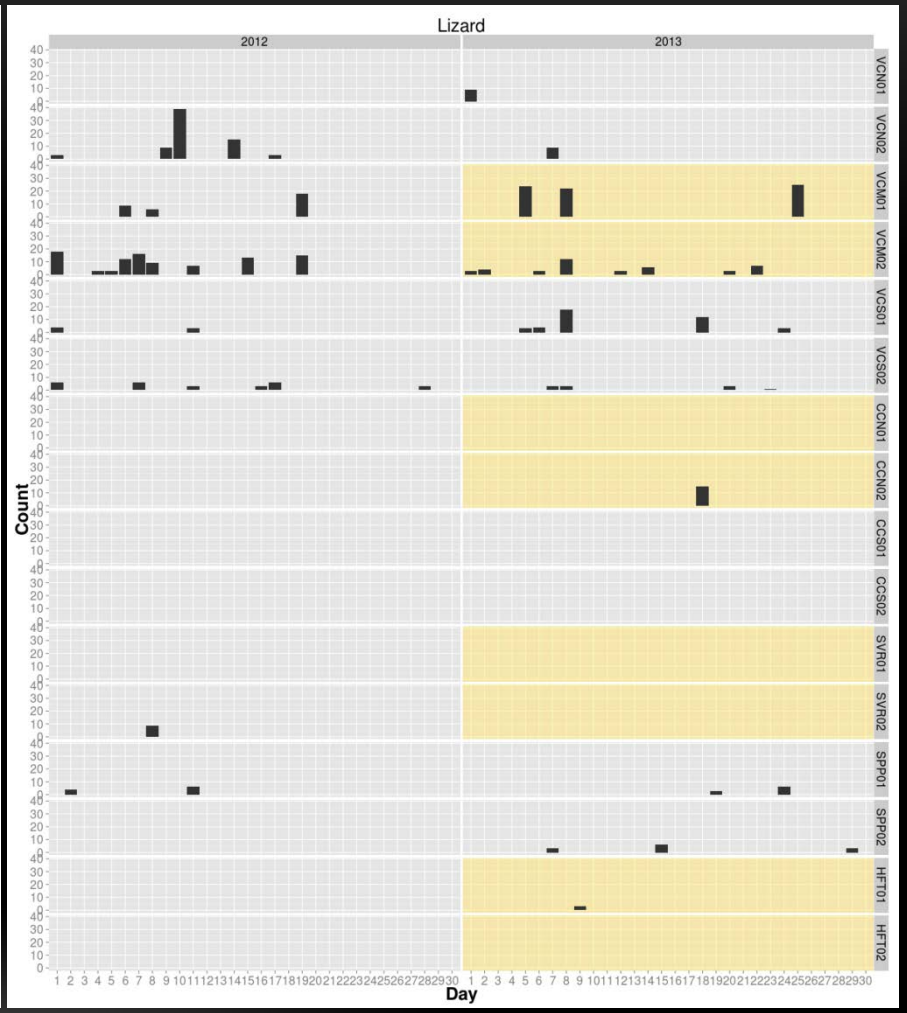
DATA SUMMARY FROM SPP





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$N_{i,g,2012} \sim Pois(\lambda_{i,g})$

$N_{i,g,2012} \sim Pois(\lambda_{i,g})$

MODELING CHANGE IN USE

Taxon	Model Structure		k	AIC	ΔAIC	AICwt
Bobcat	λ(Site 1)γ(Tx 1)ω(Tx 2)p(.)	1272.349	13	2570.697	0.000	0.385
Canine	λ (Site 1)γ(Tx 2)ω(Tx 2)p(.)	2795.599	13	5617.198	0.000	0.500
Deer	λ (Site 1)γ(Tx 2)ω(Tx 2)p(.)	2554.359	13	5134.719	0.000	0.790
Lizard	λ (Site 1)γ(Tx 2)ω(Tx 2)p(.)	1274.066	13	2574.131	0.000	0.967
Medium Mammal	λ (Site 1)γ(Tx 2)ω(Tx 1)p(.)	1811.359	13	3648.718	0.000	0.822
Rabbit	λ (Site 1)γ(Tx 1)ω(Tx 1)p(.)	1564.665	13	3155.329	0.000	0.709
Roadrunner	λ (Site 1)γ(Tx 1)ω(Tx 1)p(.)	606.530	13	1239.059	0.000	0.553
Small Mammal	λ (Site 1)γ(Tx 2)ω(Tx 2)p(.)	2946.148	13	5918.296	0.000	0.943
Snake	λ (Site 1)γ(.)ω(.)p(.)	122.998	11	267.996	0.000	0.337

N~Pois(λ), site as a covariate
S~Binom(N,ω), surviving usage, treatment as a covariate
G~Pois(γ), new usage, treatment as a covariate
Constant detection probability

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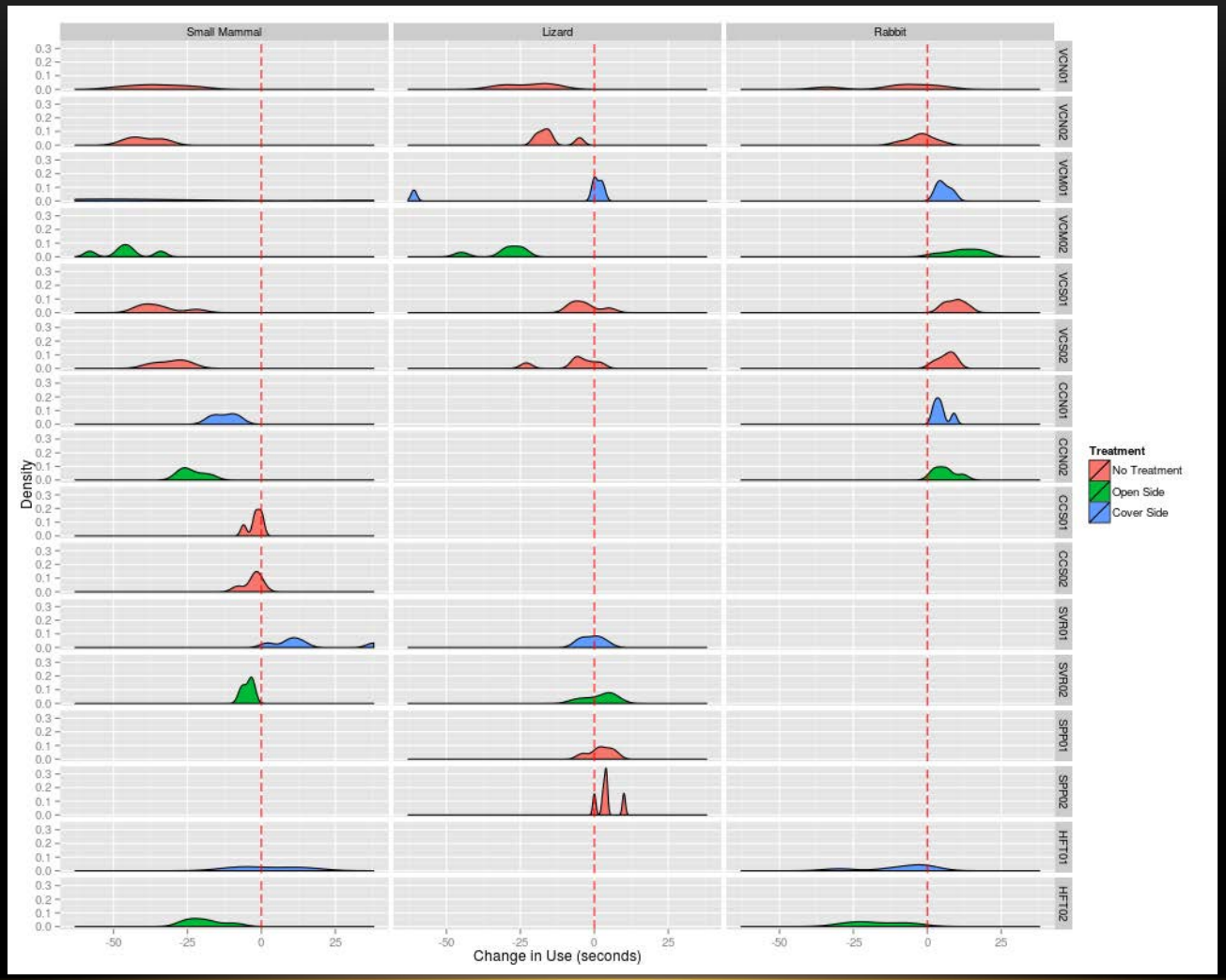
$N_{i,g,2012} \sim Pois(\lambda_{i,g})$

$N_{i,g,2012} \sim Pois(\lambda_{i,g})$

MODELING CHANGE IN USE



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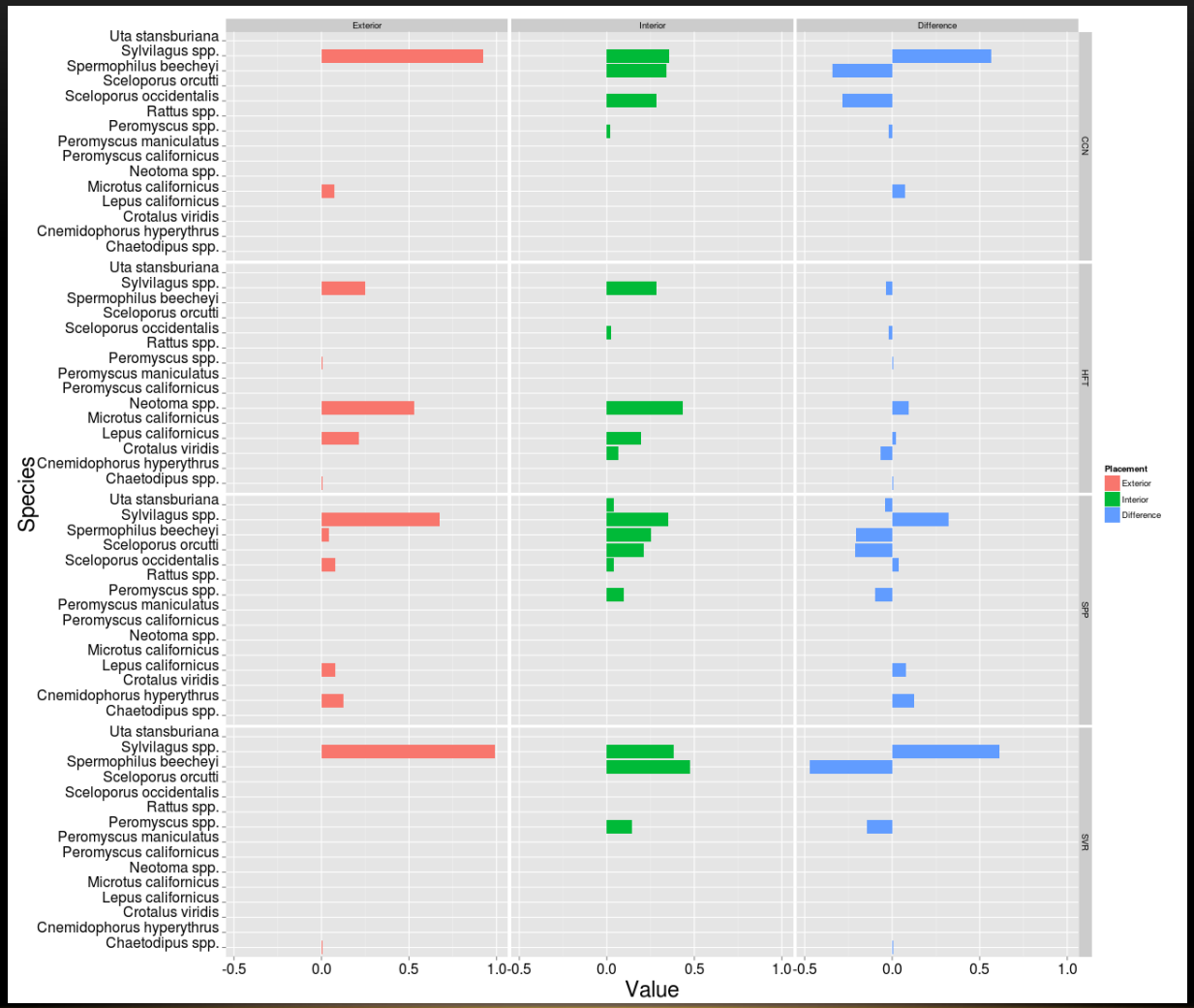
$$N_{i,g,2012} \sim Pois(\lambda_{i,g})$$
$$N_{i,g,2012} \sim Pois(\lambda_{i,g})$$

CAMERA PLACEMENT AND DETECTION



SMALL ANIMALS

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LARGER ANIMALS

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HUMAN USE

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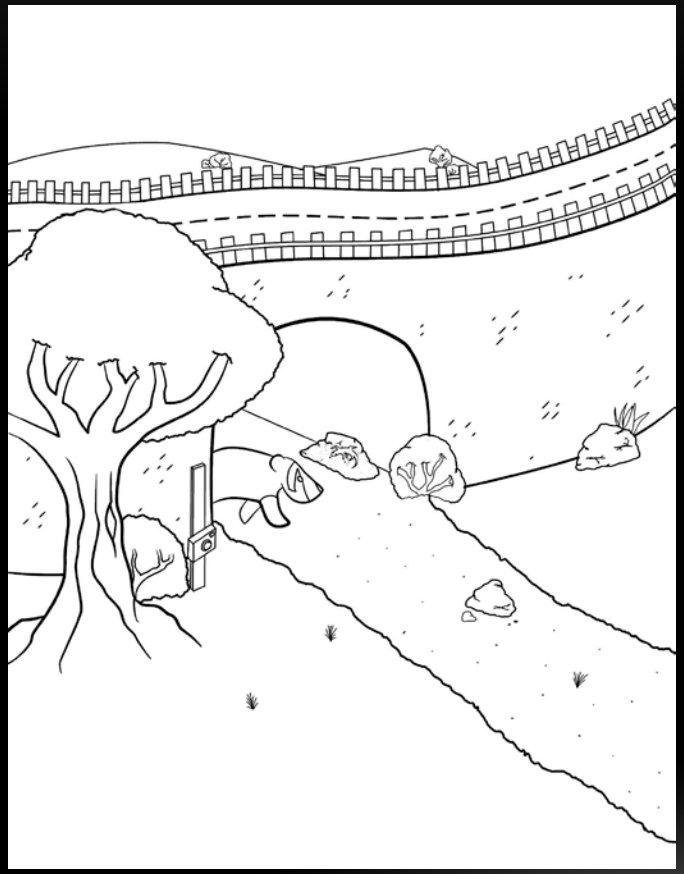
CONCLUSION:

- Some indication that the treatment was beneficial for some taxonomic groups
- May take a while for species to become habituated, further data collection may be helpful
- Detection affected by placement, need to study detection more in depth
- Other kinds of treatments

QUESTIONS



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  - CDFW (LAG)
  - SANDAG EMP/SDMMP
- Access Granted by:
  - City of San Diego
  - City of Escondido
  - County of San Diego
  - Mission Trails Regional Park
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  - Heidi Gutknecht, Ranger, MTRP