SMALL ANIMAL USE OF WILDLIFE UNDERPASSES

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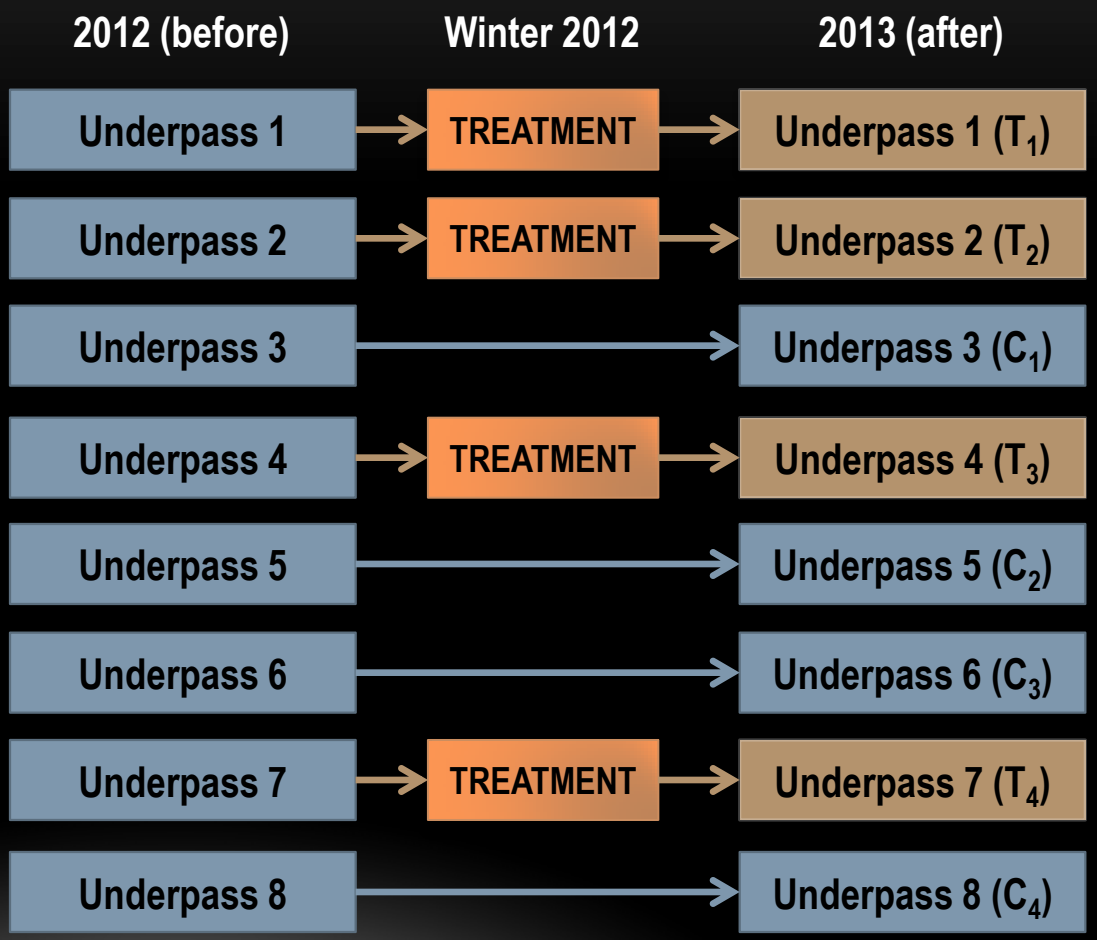
BACKGROUND

- Possibilities:
  - Road Mortality
  - Avoid/fail to cross
  - Cross at grade
  - Find and use crossing structure, if available
    - Successfully transit
    - Predators?
- Use
  - More focus on large animals
  - Life history, detection, perceived risk
  - Enhancement

OBJECTIVES AND APPROACH

Questions:

- Is large animal use a good indicator of small animal use?
- Which small animal species, of those in the surrounding area, use the underpasses?
- What is the effect, if any, of adding structure inside underpasses on small animal use of the underpasses?



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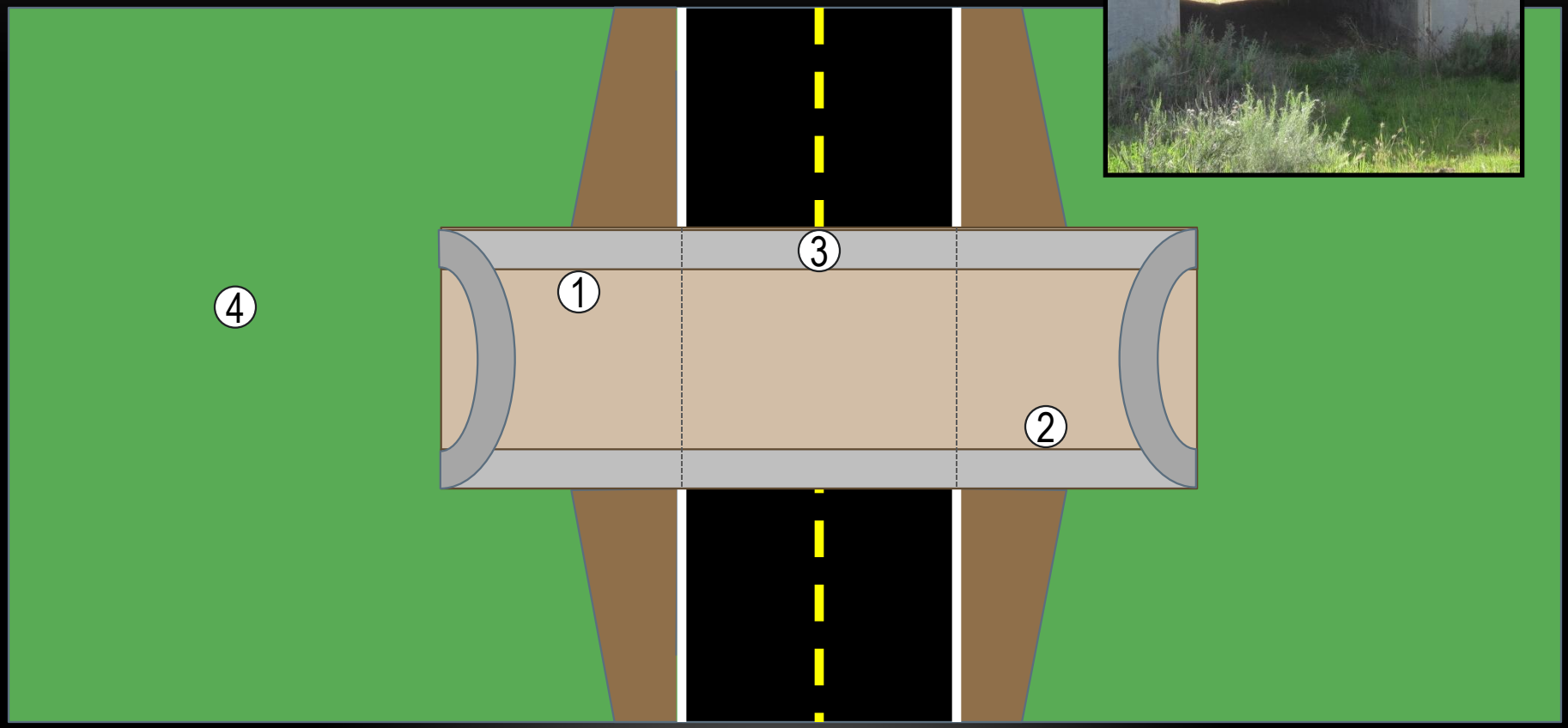
CAMERAS

- Reconyx PC800 HyperFire
  - IR flash
- Manufacturer
  - Increased sensitivity
  - Decreased focal length
- Placed close to the ground
  - Approx. 2 inches
- Trigger Mechanisms:
  - Motion Detection
  - Time Lapse

CAMERA PLACEMENT



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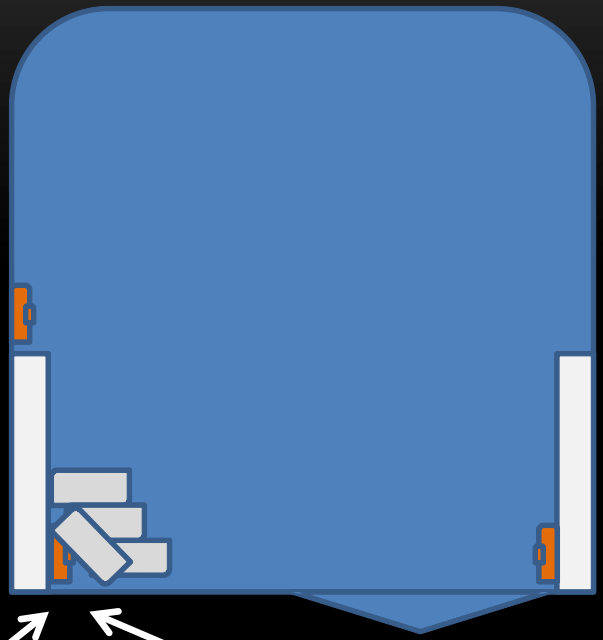
CAMERA INSTALLATION & PLACEMENT

TREATMENT



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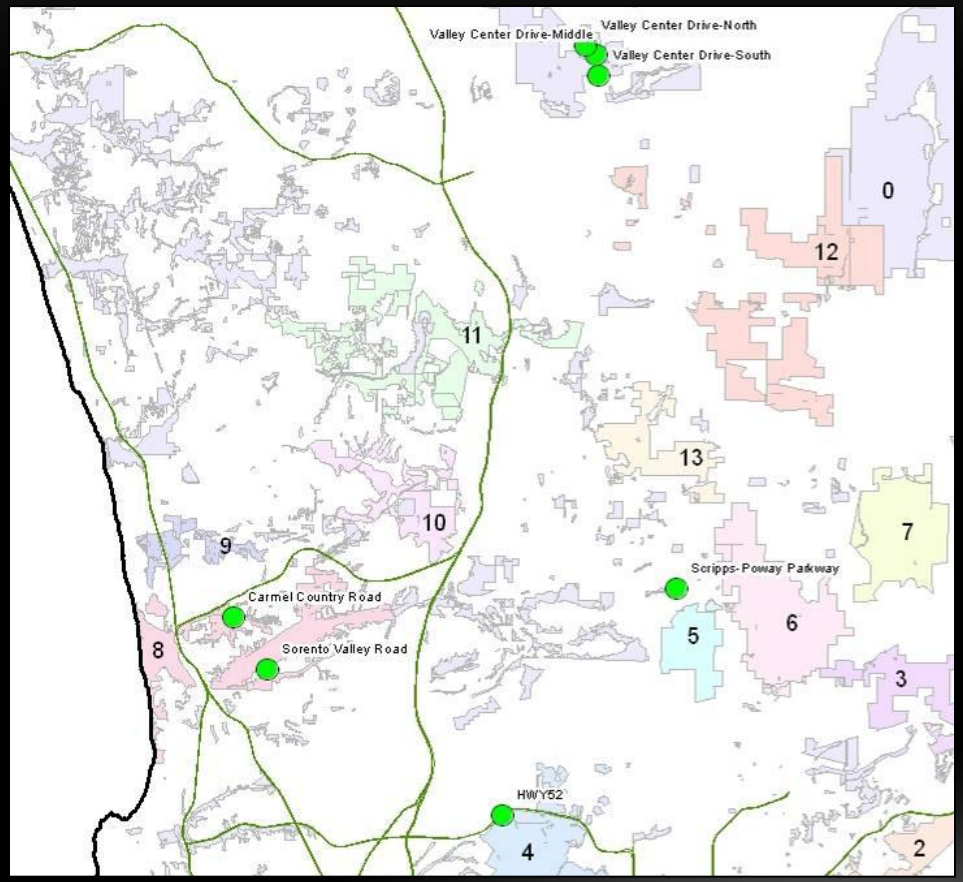
STUDY SITES



- 8 tunnels with cameras
  - SR-52 at Mission Trails (1)
  - Sorento Valley (1)
  - Carmel Country Road (2)
  - Scripps-Poway Parkway (1)
  - Valley Center Road (3)
- Tunnels
  - No roads
  - No riparian (water)

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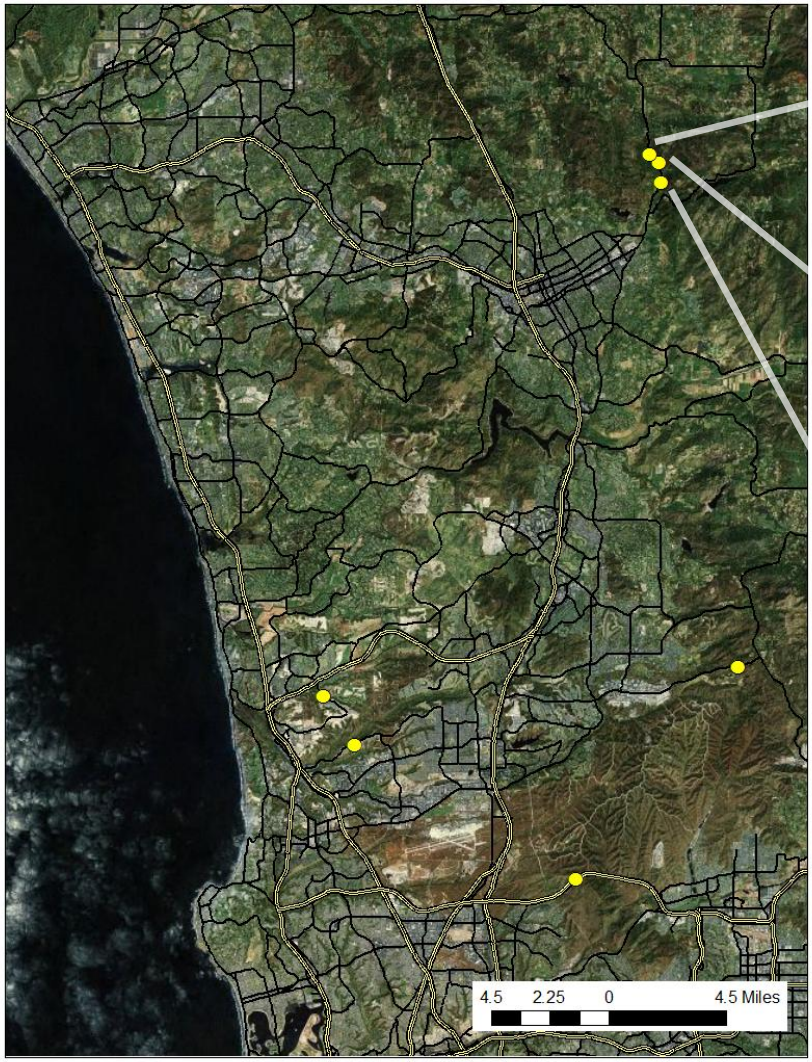
VALLEY CENTER ROAD



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SCRIPPS POWAY PARKWAY

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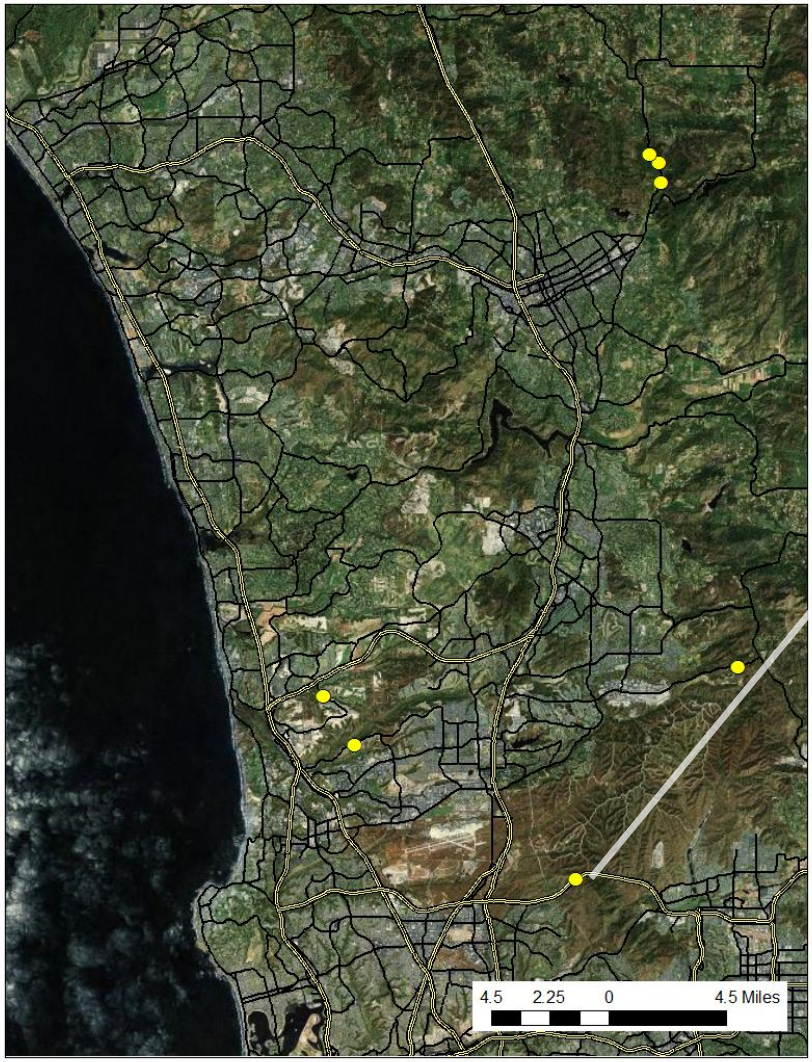
HIGHWAY 52



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CARMEL COUNTRY ROAD

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SORRENTO VALLEY ROAD

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PROGRESS SO FAR

- Installation:
  - Interior cameras: 5/15 – 7/2
  - Exterior cameras: 5/16 – 8/15
  - 26 cameras currently deployed
- Challenges with external cameras
- Total: 998,419 images, 350.9 GB (as of 9/20/12)
- At SPP: 96,693 images 34.9 GB (as of 9/20/12);
  - > 11,000 motion detection images with animals (incl. humans)
  - About 10% are motion detection

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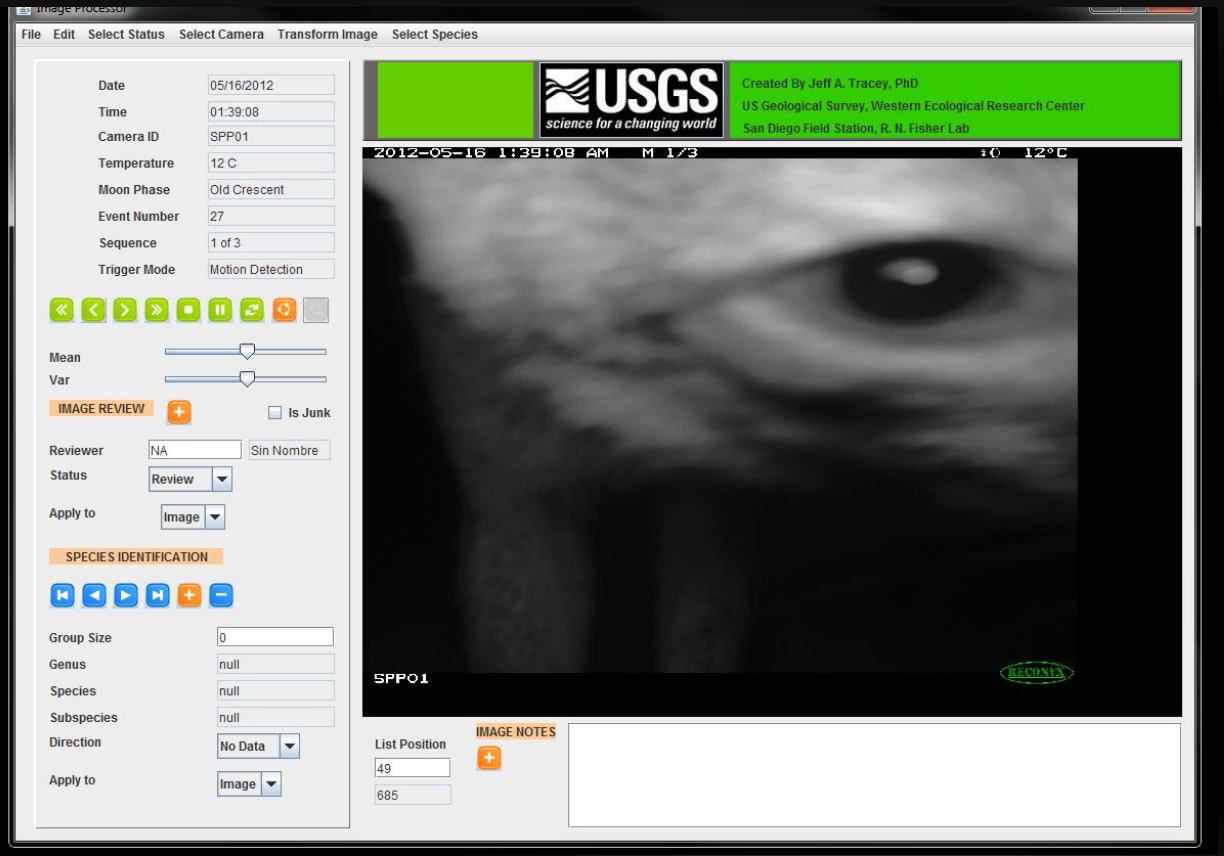
IMAGE PROCESSING



"Scanimals"

Logo Ideas?

- Java Program (in β testing; that is, *not ready for release*)
- Written by Jeff
- A lot of input on design specifications, desired features, and use cases by Cheryl and Carlton
- Testing and initial application by Derrick Miranda, Devin Adsit-Morris, and John Uzzardo

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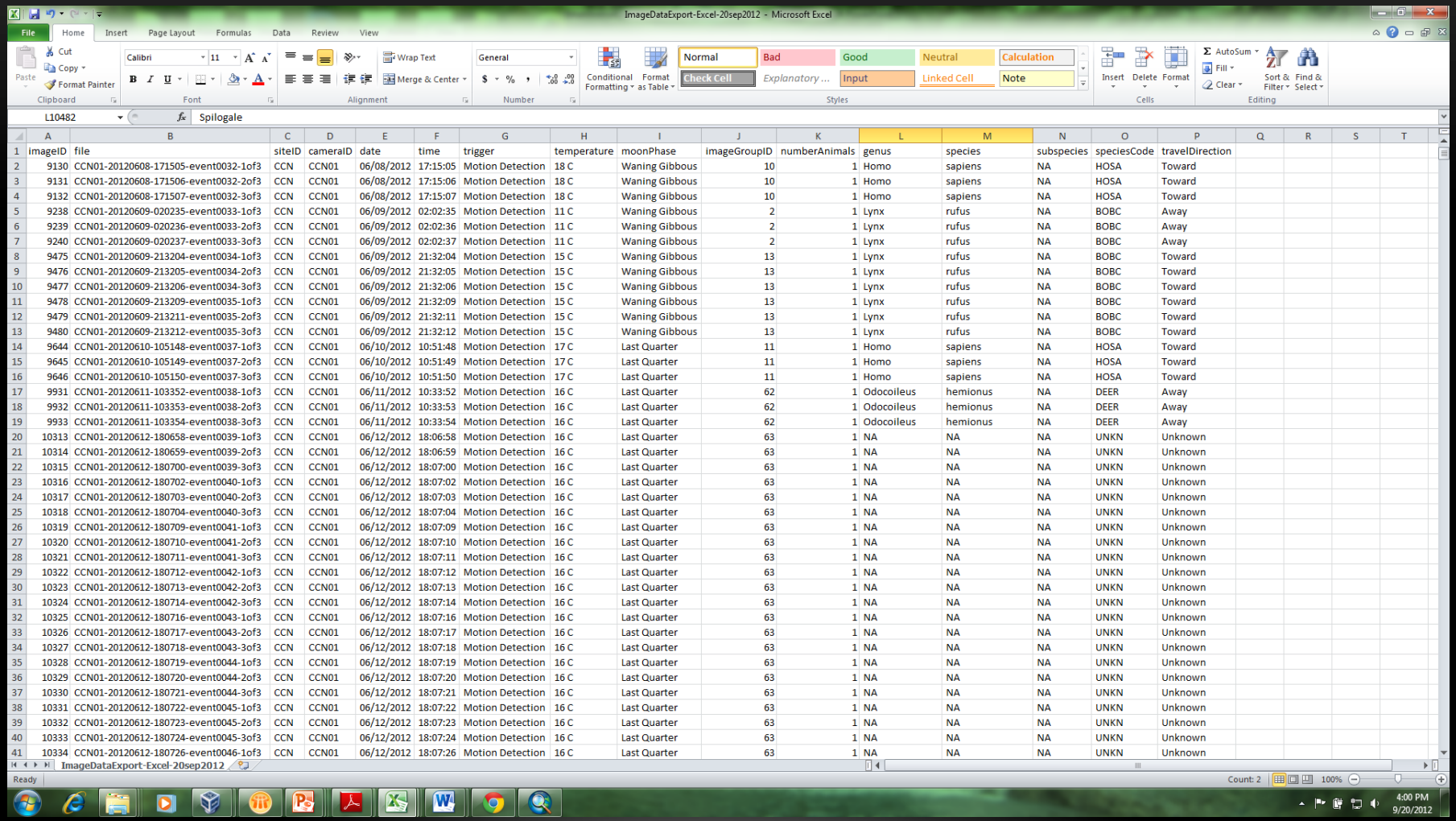
WHAT THE IMAGE PROCESSING PROGRAM DOES

- Preprocess Images
  - Extract metadata
  - Copy image to working folder with unique name
  - Add entry in data structure
- Select Subsets of the Images
- View, navigate, animate, transform images
- Assign an evaluation status to images
- Assign species identification to images from pull-down menu
  - Menu created from CSV file of species data
  - Carlton made our list
- Export data to CSV files
  - Later to Access and/or MySQL?

DATA EXPORT



ImageDataExport-Excel-20sep2012 - Microsoft Excel

imageID	file	siteID	cameraID	date	time	trigger	temperature	moonPhase	imageGroupID	numberAnimals	genus	species	subspecies	speciesCode	travelDirection
9130	CCN01-20120608-171505-event0032-1of3	CCN	CCN01	06/08/2012	17:15:05	Motion Detection	18 C	Waning Gibbous	10	1	Homo	sapiens	NA	HOSA	Toward
9131	CCN01-20120608-171506-event0032-2of3	CCN	CCN01	06/08/2012	17:15:06	Motion Detection	18 C	Waning Gibbous	10	1	Homo	sapiens	NA	HOSA	Toward
9132	CCN01-20120608-171507-event0032-3of3	CCN	CCN01	06/08/2012	17:15:07	Motion Detection	18 C	Waning Gibbous	10	1	Homo	sapiens	NA	HOSA	Toward
9238	CCN01-20120609-020235-event0033-1of3	CCN	CCN01	06/09/2012	02:02:35	Motion Detection	11 C	Waning Gibbous	2	1	Lynx	rufus	NA	BOBC	Away
9239	CCN01-20120609-020236-event0033-2of3	CCN	CCN01	06/09/2012	02:02:36	Motion Detection	11 C	Waning Gibbous	2	1	Lynx	rufus	NA	BOBC	Away
9240	CCN01-20120609-020237-event0033-3of3	CCN	CCN01	06/09/2012	02:02:37	Motion Detection	11 C	Waning Gibbous	2	1	Lynx	rufus	NA	BOBC	Away
9475	CCN01-20120609-213204-event0034-1of3	CCN	CCN01	06/09/2012	21:32:04	Motion Detection	15 C	Waning Gibbous	13	1	Lynx	rufus	NA	BOBC	Toward
9476	CCN01-20120609-213205-event0034-2of3	CCN	CCN01	06/09/2012	21:32:05	Motion Detection	15 C	Waning Gibbous	13	1	Lynx	rufus	NA	BOBC	Toward
9477	CCN01-20120609-213206-event0034-3of3	CCN	CCN01	06/09/2012	21:32:06	Motion Detection	15 C	Waning Gibbous	13	1	Lynx	rufus	NA	BOBC	Toward
9478	CCN01-20120609-213209-event0035-1of3	CCN	CCN01	06/09/2012	21:32:09	Motion Detection	15 C	Waning Gibbous	13	1	Lynx	rufus	NA	BOBC	Toward
9479	CCN01-20120609-213211-event0035-2of3	CCN	CCN01	06/09/2012	21:32:11	Motion Detection	15 C	Waning Gibbous	13	1	Lynx	rufus	NA	BOBC	Toward
9480	CCN01-20120609-213212-event0035-3of3	CCN	CCN01	06/09/2012	21:32:12	Motion Detection	15 C	Waning Gibbous	13	1	Lynx	rufus	NA	BOBC	Toward
9644	CCN01-20120610-105148-event0037-1of3	CCN	CCN01	06/10/2012	10:51:48	Motion Detection	17 C	Last Quarter	11	1	Homo	sapiens	NA	HOSA	Toward
9645	CCN01-20120610-105149-event0037-2of3	CCN	CCN01	06/10/2012	10:51:49	Motion Detection	17 C	Last Quarter	11	1	Homo	sapiens	NA	HOSA	Toward
9646	CCN01-20120610-105150-event0037-3of3	CCN	CCN01	06/10/2012	10:51:50	Motion Detection	17 C	Last Quarter	11	1	Homo	sapiens	NA	HOSA	Toward
9931	CCN01-20120611-103352-event0038-1of3	CCN	CCN01	06/11/2012	10:33:52	Motion Detection	16 C	Last Quarter	62	1	Odocoileus	hemionus	NA	DEER	Away
9932	CCN01-20120611-103353-event0038-2of3	CCN	CCN01	06/11/2012	10:33:53	Motion Detection	16 C	Last Quarter	62	1	Odocoileus	hemionus	NA	DEER	Away
9933	CCN01-20120611-103354-event0038-3of3	CCN	CCN01	06/11/2012	10:33:54	Motion Detection	16 C	Last Quarter	62	1	Odocoileus	hemionus	NA	DEER	Away
10313	CCN01-20120612-180658-event0039-1of3	CCN	CCN01	06/12/2012	18:06:58	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10314	CCN01-20120612-180659-event0039-2of3	CCN	CCN01	06/12/2012	18:06:59	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10315	CCN01-20120612-180700-event0039-3of3	CCN	CCN01	06/12/2012	18:07:00	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10316	CCN01-20120612-180702-event0040-1of3	CCN	CCN01	06/12/2012	18:07:02	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10317	CCN01-20120612-180703-event0040-2of3	CCN	CCN01	06/12/2012	18:07:03	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
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10322	CCN01-20120612-180712-event0042-1of3	CCN	CCN01	06/12/2012	18:07:12	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10323	CCN01-20120612-180713-event0042-2of3	CCN	CCN01	06/12/2012	18:07:13	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
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10325	CCN01-20120612-180716-event0043-1of3	CCN	CCN01	06/12/2012	18:07:16	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10326	CCN01-20120612-180717-event0043-2of3	CCN	CCN01	06/12/2012	18:07:17	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10327	CCN01-20120612-180718-event0043-3of3	CCN	CCN01	06/12/2012	18:07:18	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10328	CCN01-20120612-180719-event0044-1of3	CCN	CCN01	06/12/2012	18:07:19	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10329	CCN01-20120612-180720-event0044-2of3	CCN	CCN01	06/12/2012	18:07:20	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10330	CCN01-20120612-180721-event0044-3of3	CCN	CCN01	06/12/2012	18:07:21	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10331	CCN01-20120612-180722-event0045-1of3	CCN	CCN01	06/12/2012	18:07:22	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10332	CCN01-20120612-180723-event0045-2of3	CCN	CCN01	06/12/2012	18:07:23	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10333	CCN01-20120612-180724-event0045-3of3	CCN	CCN01	06/12/2012	18:07:24	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown
10334	CCN01-20120612-180726-event0046-1of3	CCN	CCN01	06/12/2012	18:07:26	Motion Detection	16 C	Last Quarter	63	1	NA	NA	NA	UNKN	Unknown

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DATA SUMMARY FROM THREE SITES

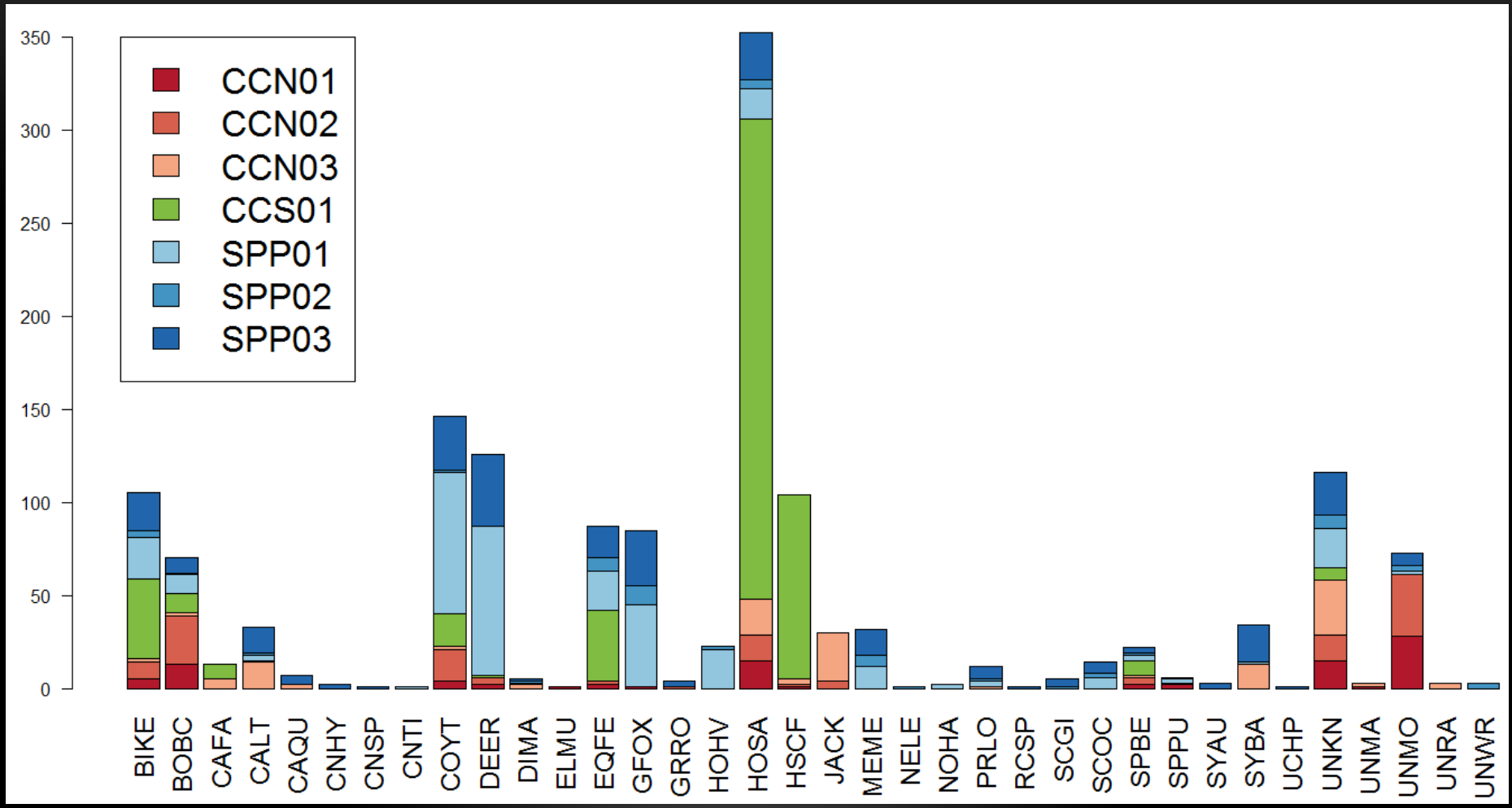

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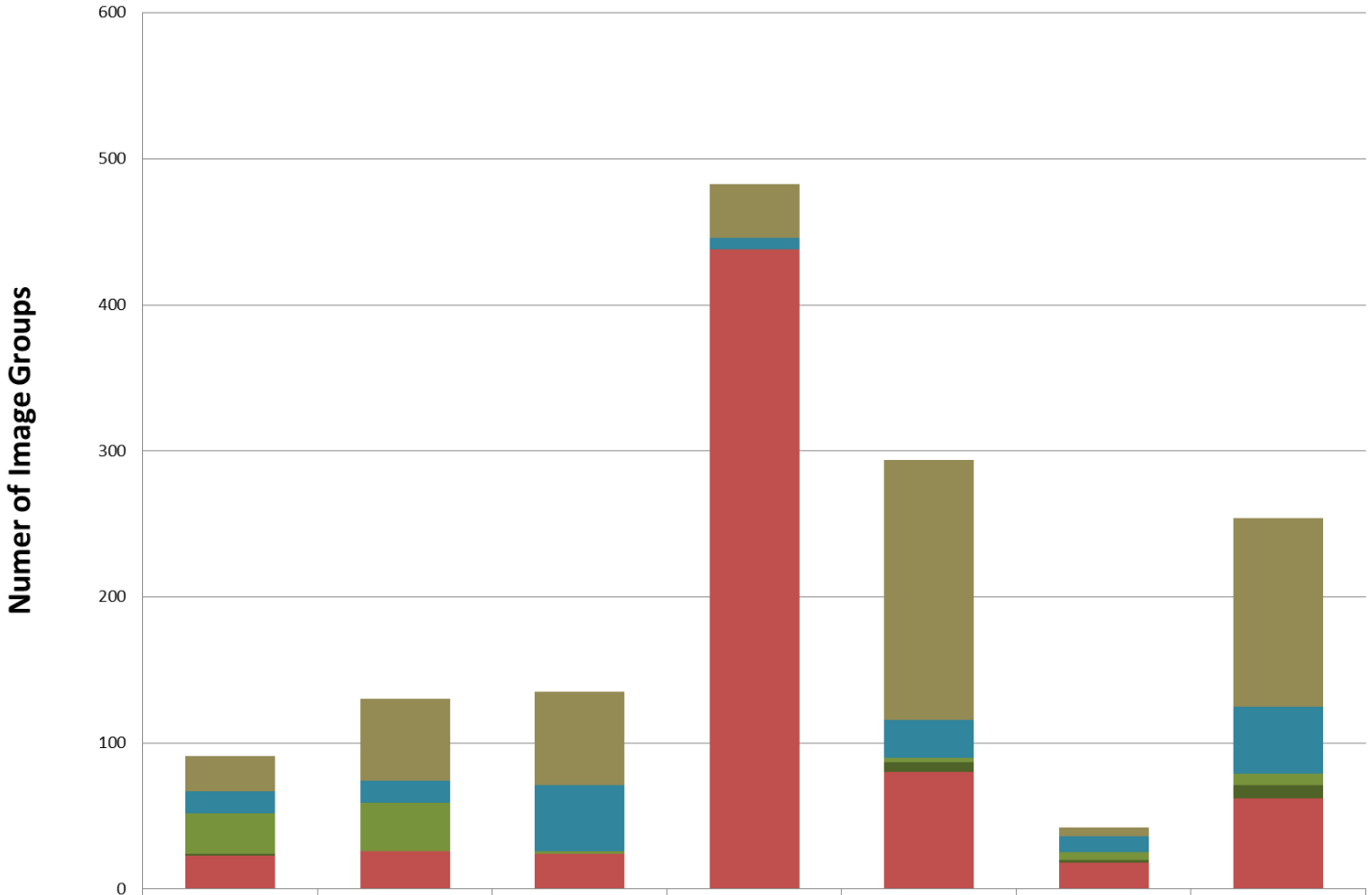
Image Groups by General Taxonomic Categories



	CCN01	CCN02	CCN03	CCS01	SPP01	SPP02	SPP03
Mammal	24	56	64	37	178	6	129
Bird	15	15	45	8	26	11	46
Small Mammal	28	33	2	0	3	5	8
Reptile	1	0	0	0	7	2	9
Human	23	26	24	438	80	18	62

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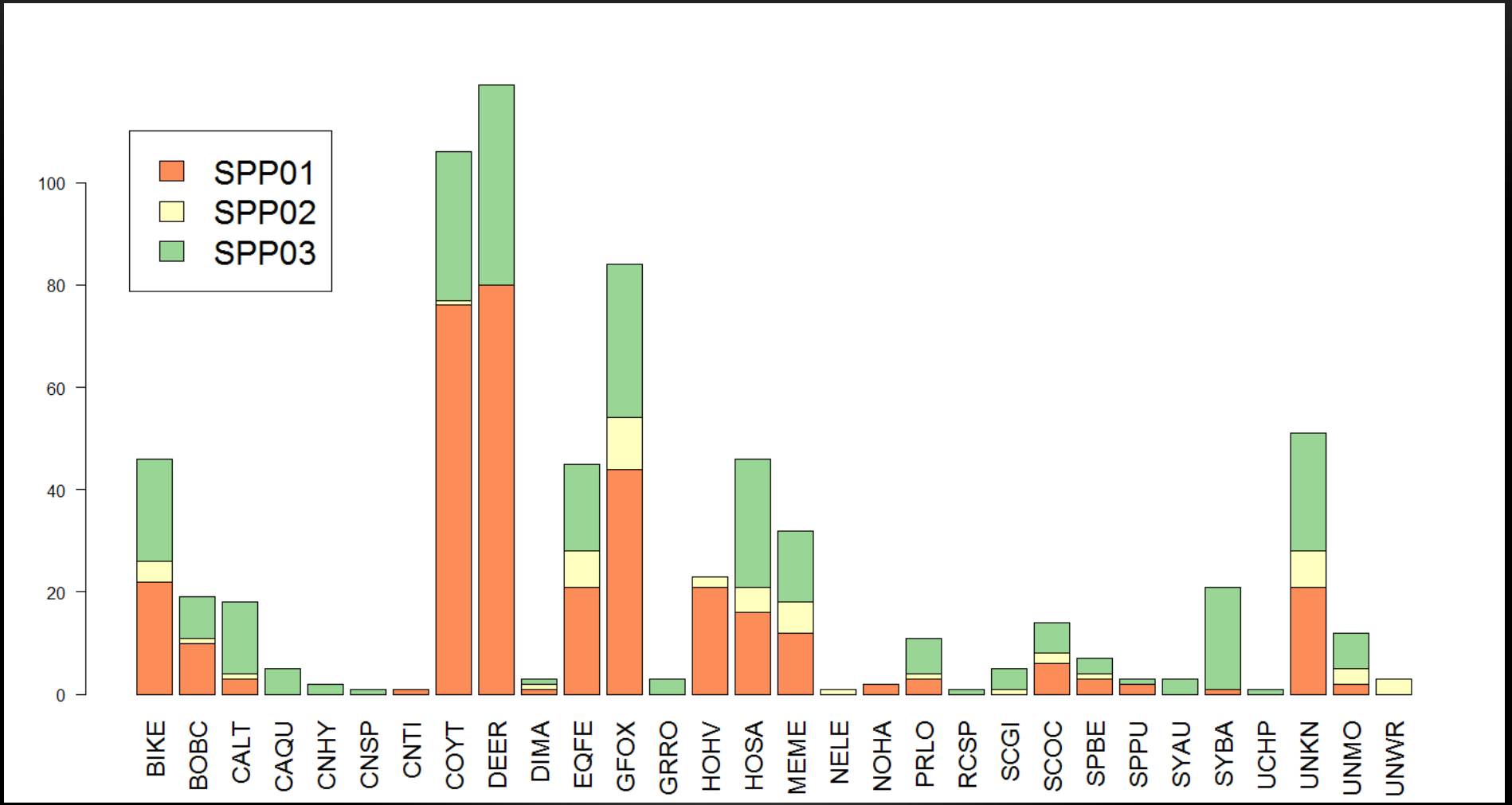
DATA SUMMARY FROM SPP



SMALL ANIMALS

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LARGER ANIMALS

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HUMAN USE

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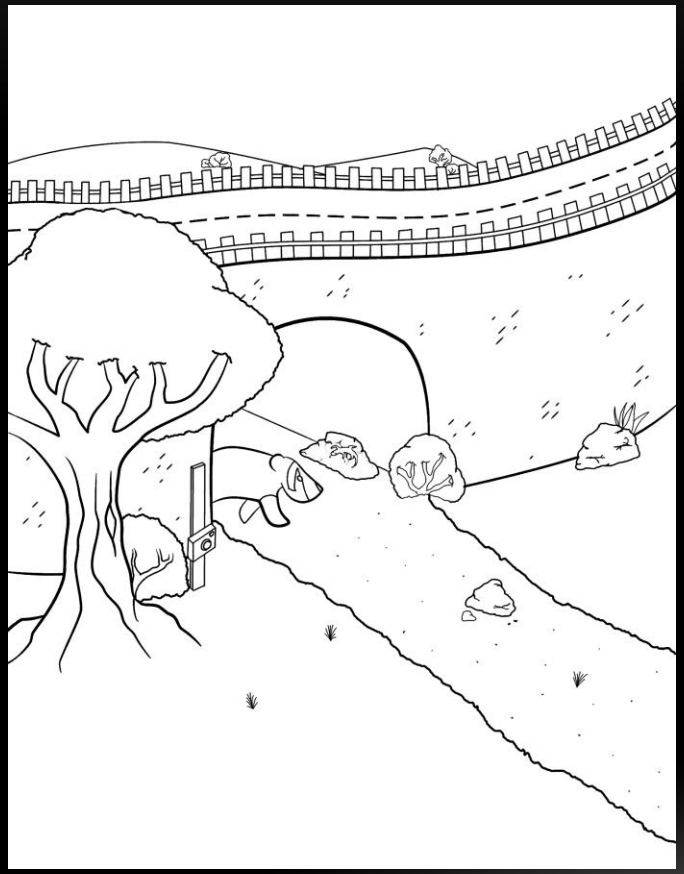
WHAT'S COMING UP NEXT

- Shutdown cameras for the winter
- Put structures in treatment underpasses and allow animals to become habituated
- Resume monitoring in the spring
- Image processing…including time lapse images
- Data analysis
- Report results

QUESTIONS



- Acknowledgements:
  - Funding: CDFG- Local Assitsance Grant
- Access Granted by:
  - City of San Diego
  - City of Escondido
  - County of San Diego
  - Mission Trails Regional Park
- Additional Thanks to:
  - Derrick Miranda
  - Megan Jennings, SDSU
  - San Diego Tracking Team
  - Heidi Gutknecht, Ranger, MTRP