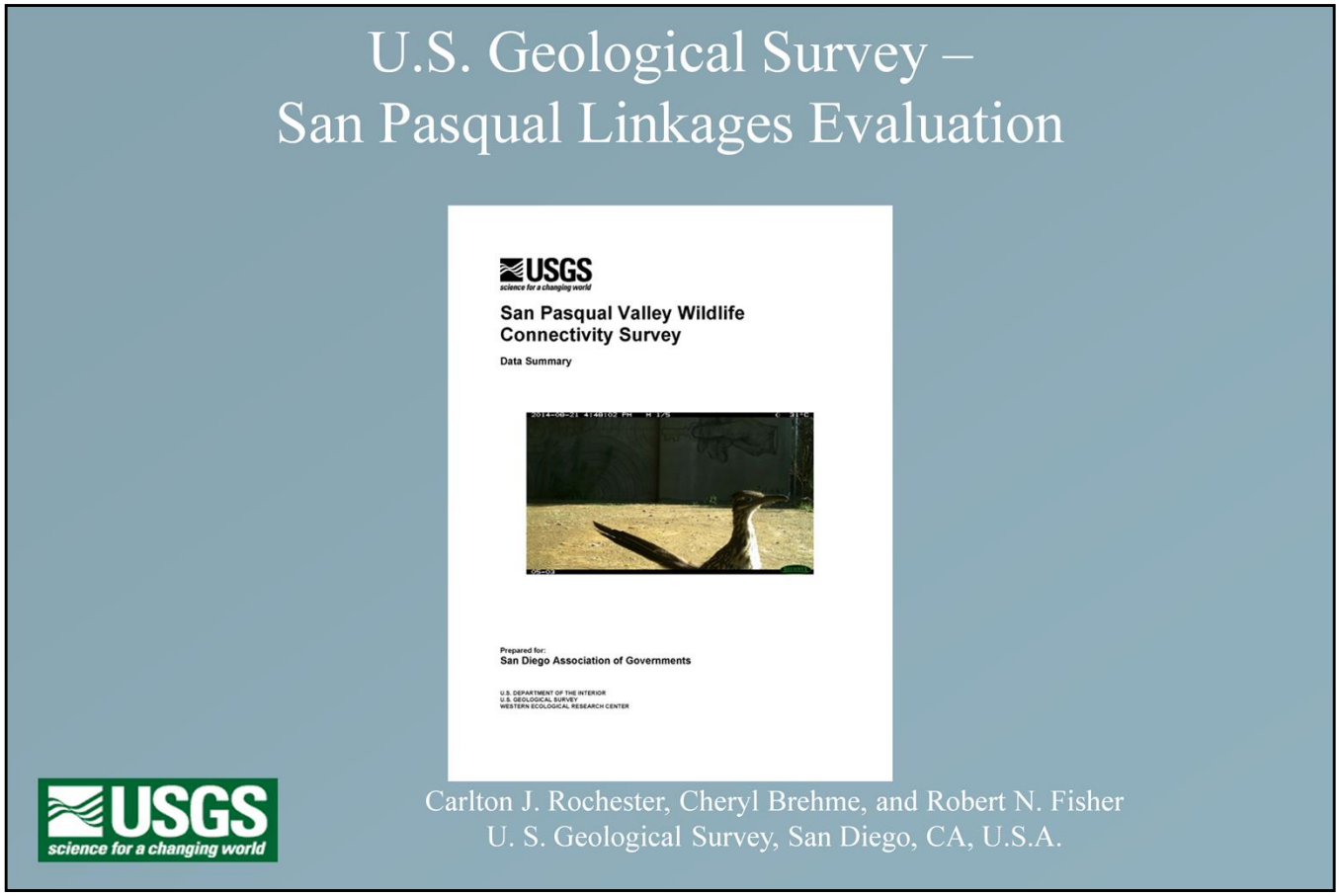

20181030 Camera Workshop: U.S. Geological Survey – Linkages Evaluation Title Slide

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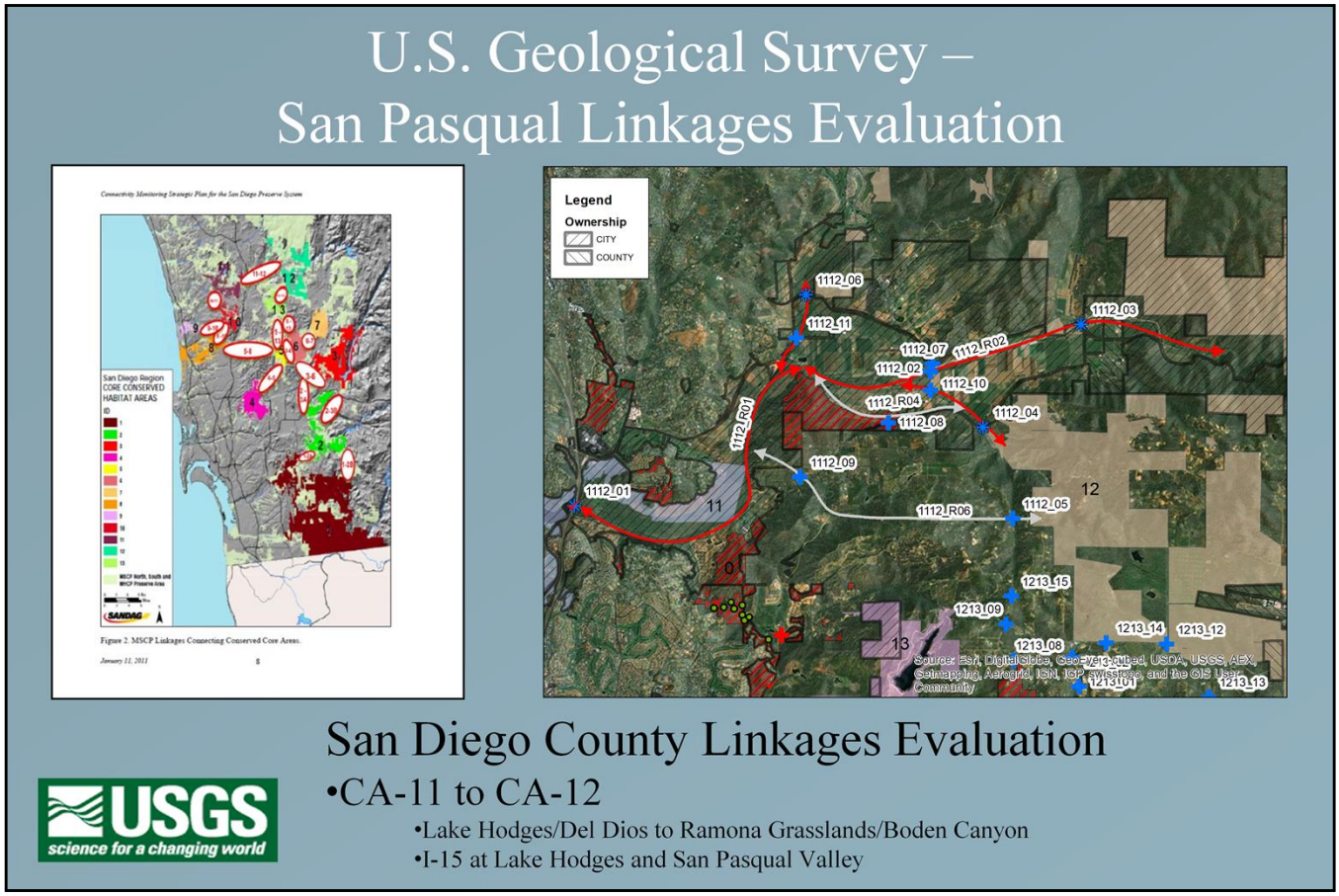
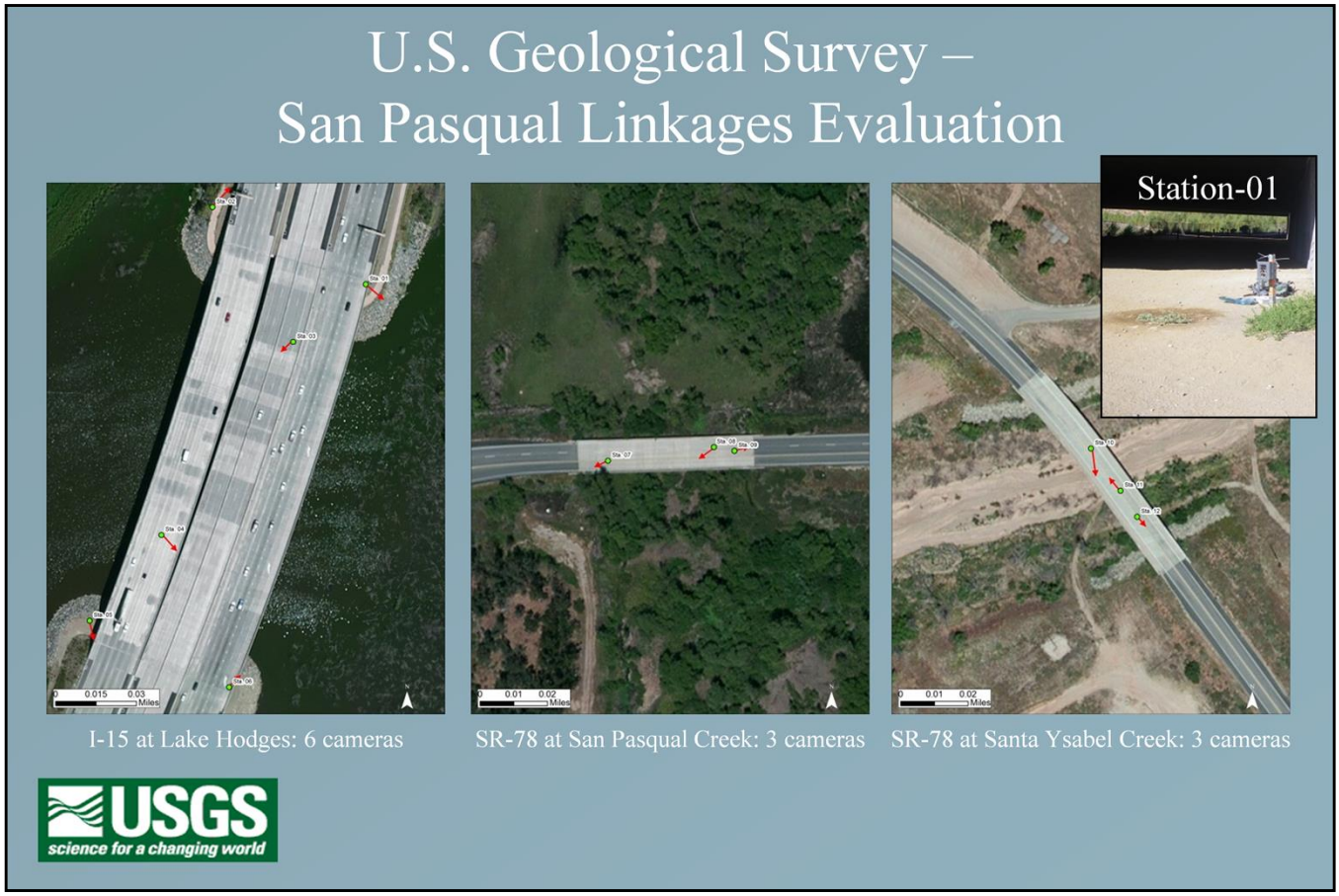


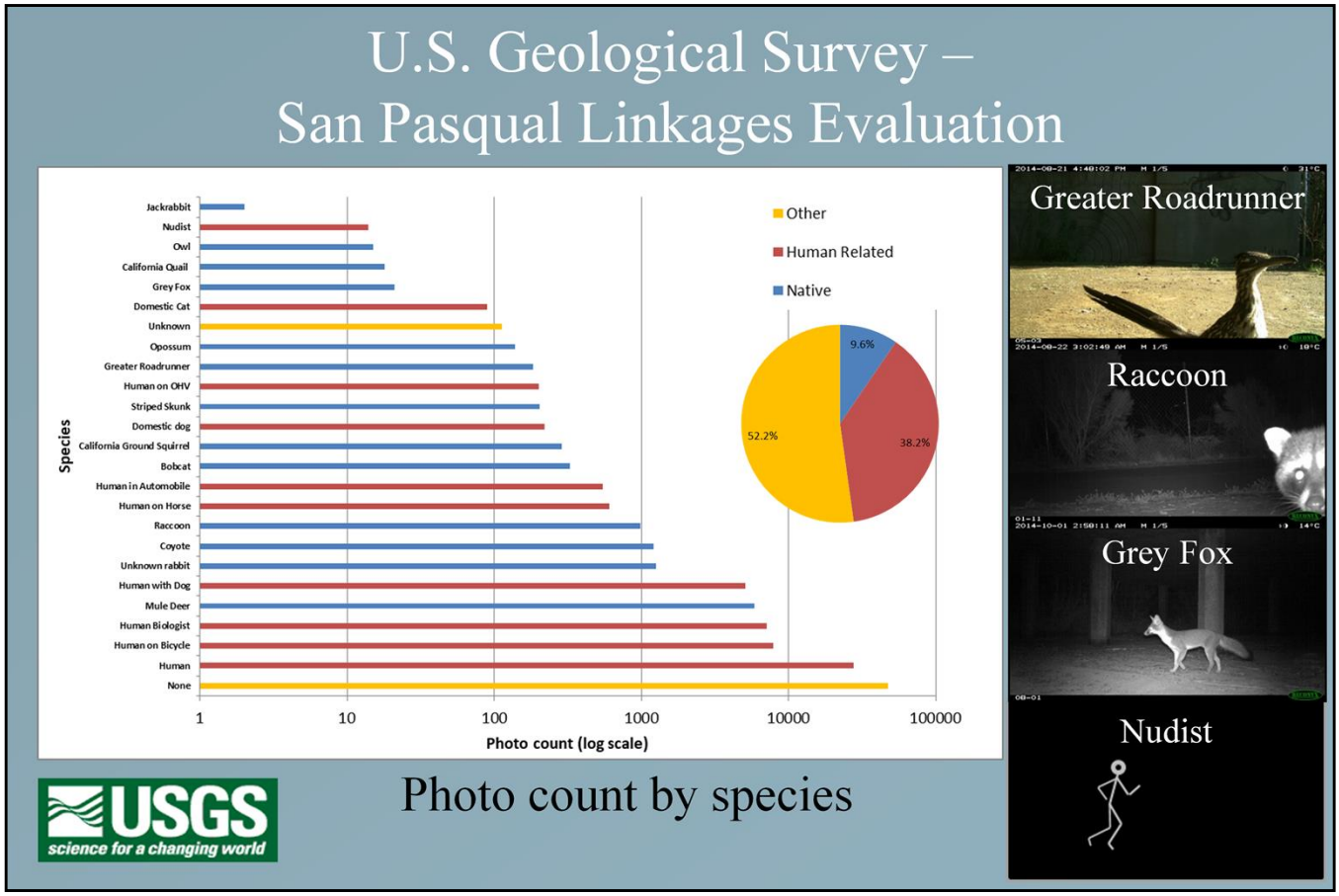
20181030 Camera Workshop: U.S. Geological Survey – Linkages Evaluation Objectives

Based on a linkage evaluation between Core Area-11 (Lake Hodges/Del Dios) and Core Area-12 (Ramona Grasslands/Boden Canyon), the I-15 bridge at Lake Hodges along the San Dieguito River is a potential choke-point for connectivity going east and west. There is limited opportunities for connectivity past the freeway and human development.



20181030 Camera Workshop: U.S. Geological Survey – Linkages Evaluation Methods

Reconyx cameras were installed at 12 stations along San Pasqual Valley, 6 at the I-15 and Lake Hodges, 3 at the SR-78 and San Pasqual Creek, and 3 at the SR-78 and Santa Ysabel Creek. The camera locations were selected based on signs of wildlife activity. Sampling lasted for 12 weeks between August and October 2014. The cameras were checked weekly and rotated through the site. Each camera spent one week at each of the 12 stations so that by the end of the field work, each camera spent one week at all 12 stations.



20181030 Camera Workshop: U.S. Geological Survey – Linkages Evaluation Results I

In total, there were 109,766 photos of wildlife species, human activities, and empty photos collected during the 12 weeks of field samples. The most frequently photographed wildlife was mule deer. Over 52% of the photos had nothing in them or were undetermined species. Less than 10% were of wildlife.

U.S. Geological Survey – San Pasqual Linkages Evaluation

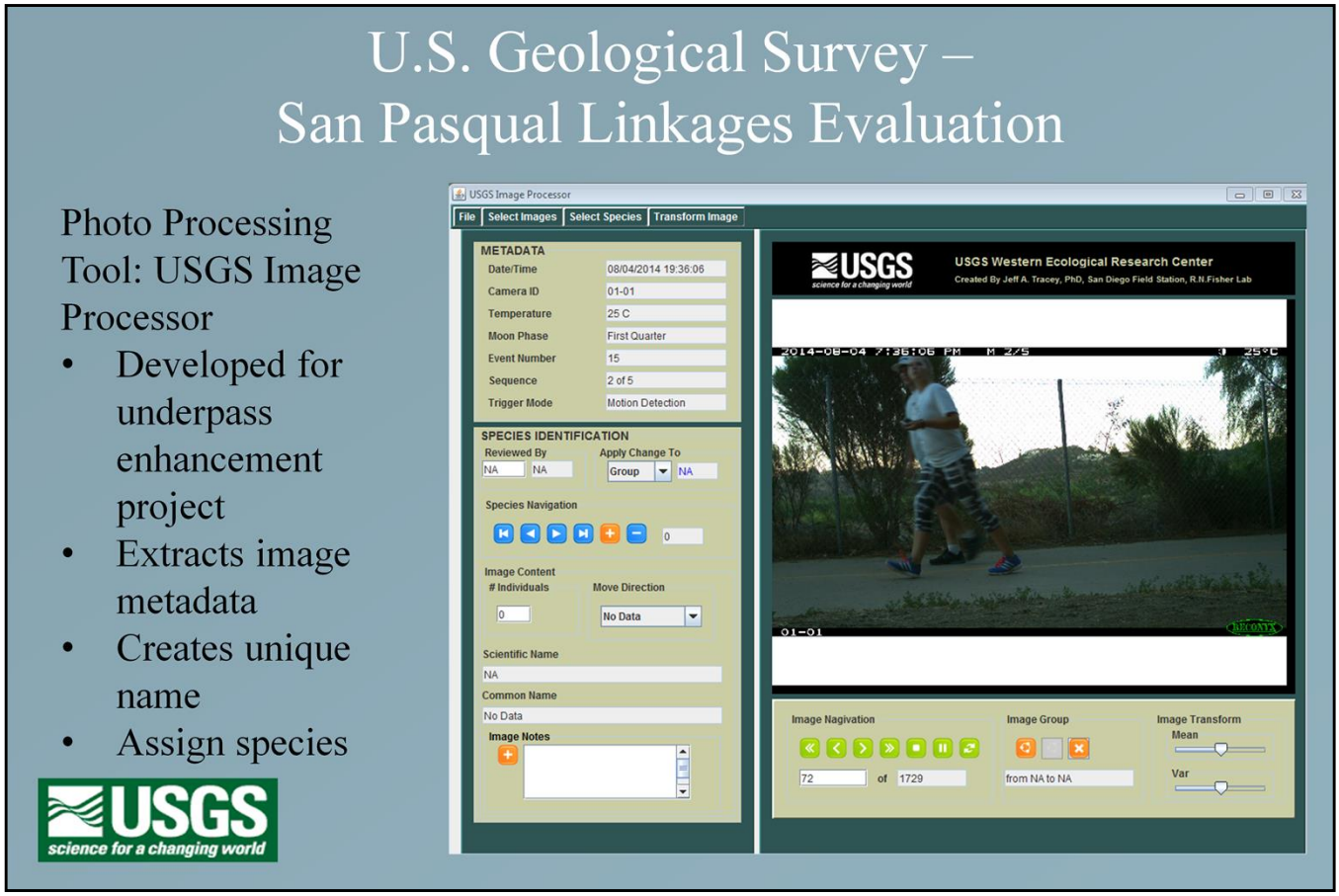
	Site and Camera Station																	
	Lake Hodges							San Pasqual Creek				Santa Ysabel Creek				Total Events	# of Stations	Total Events Rank	# of Stations Rank
Species	01	02	03	04	05	06	Total	07	08	09	Total	10	11	12	Total				
Bobcat		1	1	28	1	15	46	4	2		6			5	5	57	8	5	4
California Quail												1		1	2	2	2	11	10
Coyote	6	8	22	47		16	99	150	5		155	5	12	22	39	293	10	2	1
Mule Deer	1		23	429	3	3	459									459	5	1	7
Opossum		1			6	1	8						3	14	17	25	5	9	7
Grey Fox								1	1		2					2	2	11	10
Greater Roadrunner	3	7	1	1	8	3	23	2			2	1	2	8	11	36	10	8	1
Jackrabbit														1	1	1	1	13	12
Striped Skunk		2	2		1		5	12	5	7	24	8		8	16	45	8	7	4
Owl						5	5									5	1	10	12
Raccoon	4	5	14	5	10	69	107	1	1	3	5			1	1	113	10	4	1
California Ground Squirrel		9			41	5	55									55	3	6	9
Unknown rabbit	5		1		3		9	7	1		8	1	33	65	99	116	8	3	4
Total Events	19	33	64	510	73	117	816	177	15	10	202	16	50	125	191	1,209			
Species Count	5	7	7	5	8	8	10	7	6	2	7	5	4	9	9	13			
Shannon Diversity	1.490	1.695	1.371	0.582	1.424	1.345	1.448	0.645	1.543	0.611	0.872	1.230	0.914	1.481	1.446				

USGS science for a changing world

Native wildlife events by station

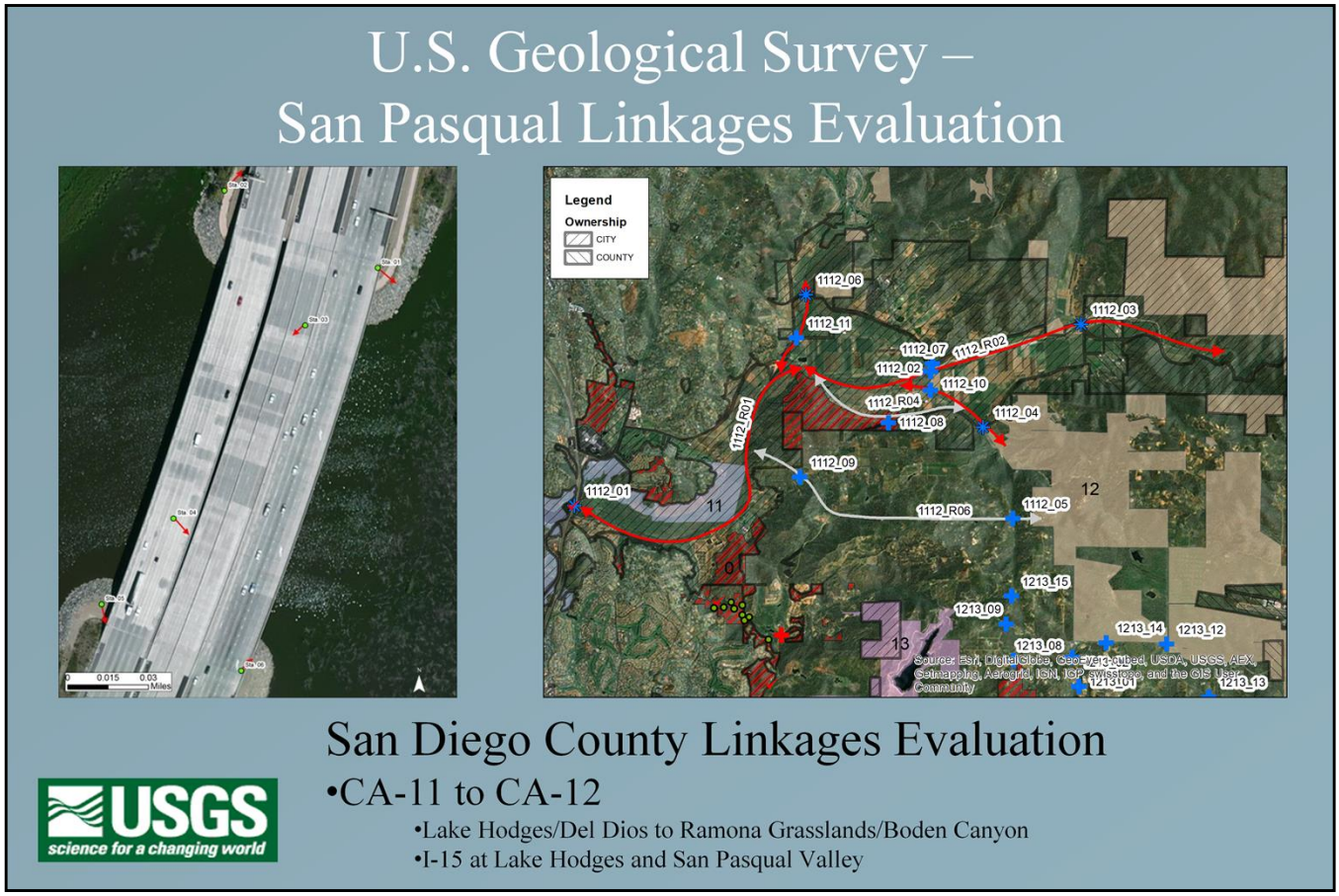
20181030 Camera Workshop: U.S. Geological Survey – Linkages Evaluation Results II

Wildlife observations per camera station across the 12 week study shown as the number of unique observations based on a 5-minute minimum separation time (photos of the same species within 5-minutes of the previous were considered the same observation). Deer were only detected at Lake Hodges and not the other two survey sites along San Pasqual Valley.



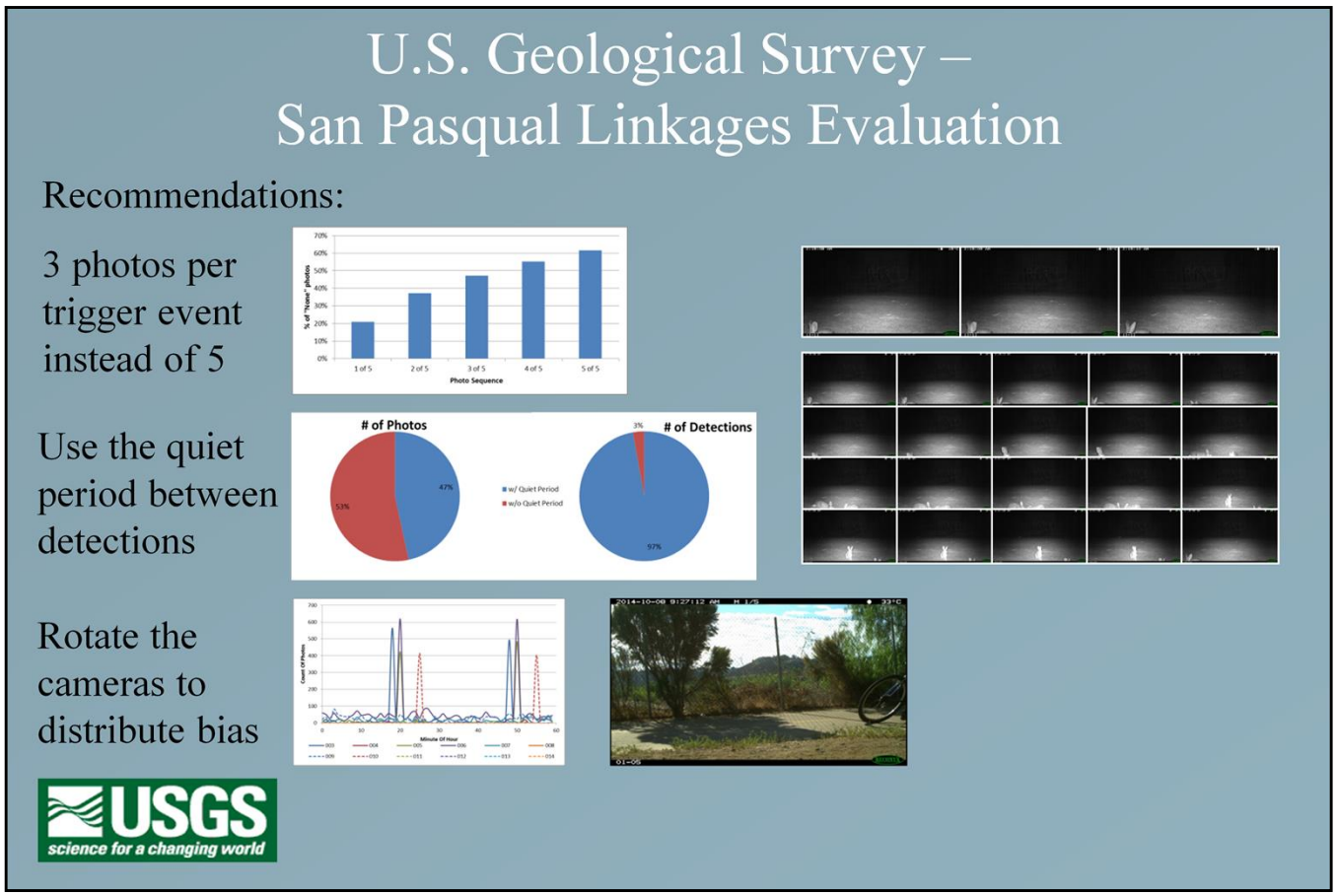
20181030 Camera Workshop: U.S. Geological Survey – Linkages Evaluation Data retrieval/management/photo review

The photos were processed and reviewed using the USGS Image Processor program. The program extracts the metadata for the photo, such as time and date, and allows the user to record the species present in the image.



20181030 Camera Workshop: U.S. Geological Survey – Linkages Evaluation Objectives

The purpose for the study was to evaluate connectivity past the I-15 along the San Pasqual Valley, between conserved lands to the east and west of this major freeway. Based on the level of activity detected for multiple species, habitat conditions at the time of the survey supports wildlife connectivity. The area under the bridge not only served as a movement route, but also habitat. Many animals frequently included this area in their regular activity patterns. No mountain lions or badgers were detected, two species commonly considered in connectivity issue, but the community of wildlife that was detected suggests there is potential for connectivity for these two species as well.



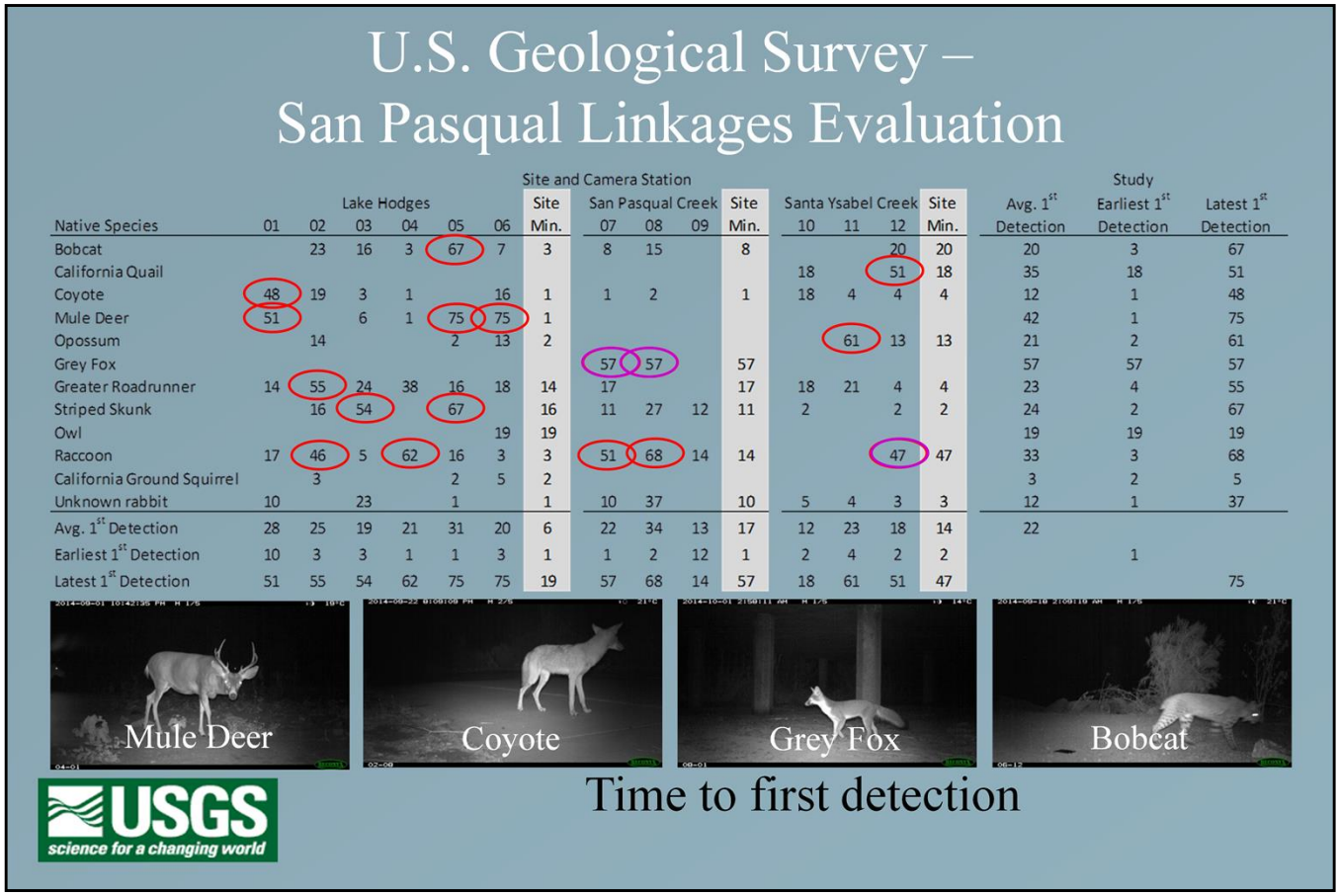
20181030 Camera Workshop: U.S. Geological Survey – Linkages Evaluation Recommendations 1

Recommendation #1: take 3 photos instead of 5 per trigger event. The 4th and 5th photos in this study were increasingly of nothing, 54% of the 4th photos were empty and 61% of the 5th were.

Recommendation #2: if your camera allows you to have a quiet period, where the trigger will be delayed following the previous trigger, use it. In this study, a 5 minute quiet period would reduced the # of photos to 47% while still producing 97% of the detections.

These two recommendations can be seen in the photos of the rabbit. With the camera set for 3 photos and a 5-minute quiet period, only 3 photos would have been taken. With 5 photos and no quiet period, the same rabbit resulted in 20 photos.

Recommendation #3: depending on your objective, rotate the cameras around the site if they are not calibrated to distribute any bias that might exist. Even cameras that are supposed to be the same can function slightly differently. 2 of 12 cameras on this project behaved different than the rest. Camera #10 liked taking pictures every half hour (randomly chosen on its own) as indicated by the spikes at certain times of the hours and camera #5 was faster than the rest and frequently detected bicycles that other cameras would have missed.



20181030 Camera Workshop: U.S. Geological Survey – Linkages Evaluation Recommendations 2

Recommendation #4: based on this project, a rapid survey could be done in 6 weeks, 42 days, and still detect most species at each of the three sites. That is a benefit of multiple cameras. If the cameras had been pulled from the field or moved to new locations, only 2 species would have been missed at a site: grey fox at San Pasqual Creek and raccoon at Santa Ysabel Creek. Moving the cameras to new sites may have been more informative than leaving them longer at the original sites. But this would also depend on your objective.