Quantifying Eagle Vehicle Strike Risk in the Western U.S.

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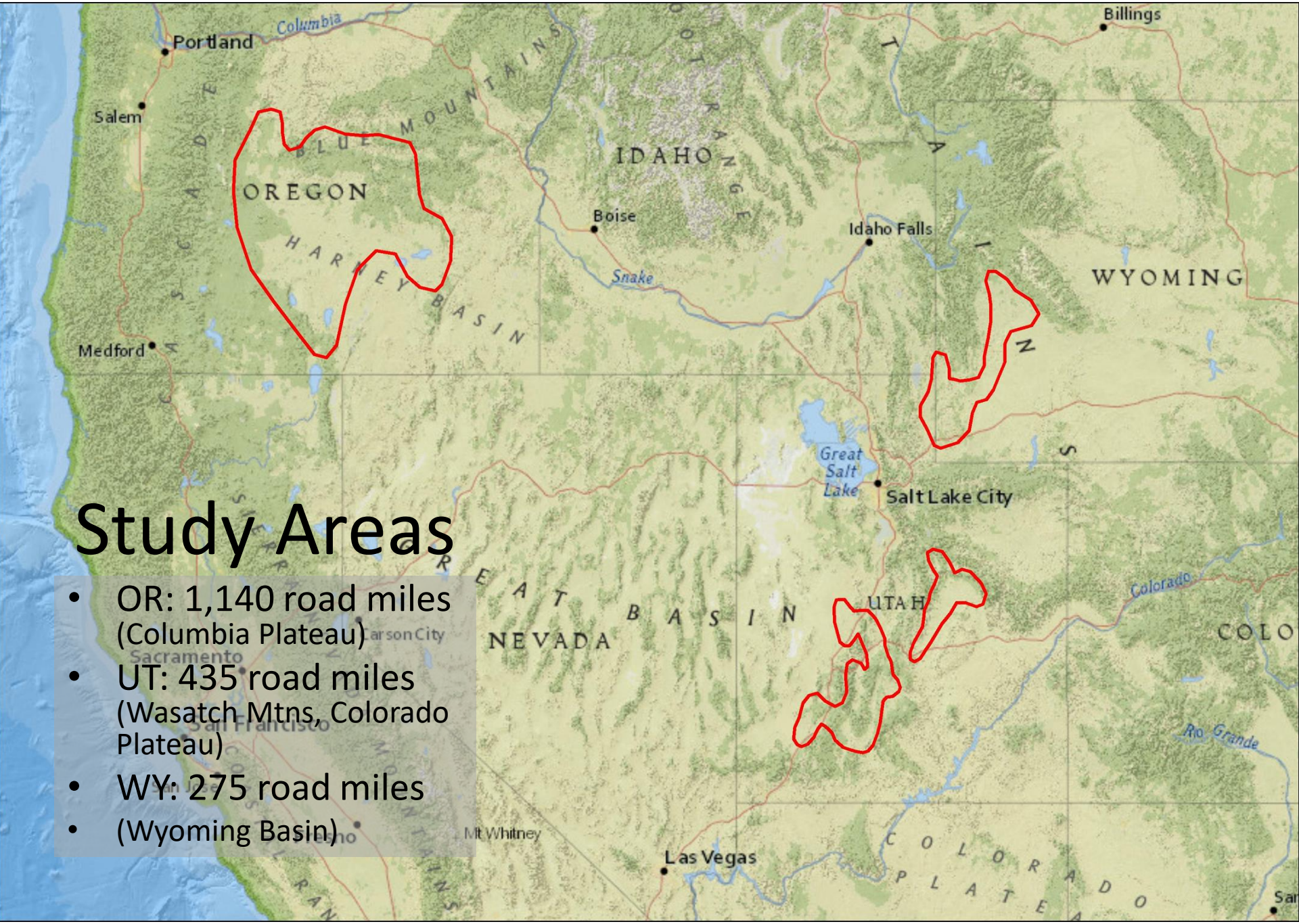
HAWK WATCH INTERNATIONAL
Conserving Raptors and Our Shared Environment

Acknowledgements

Research Objectives

- Quantify EVS risk in relationship to eagle density, carcass density, road characteristics, *annual variability*
- Quantify eagle behavior at carcasses, especially flush thresholds for both 2-axle and larger vehicles
- Provide correction factors for “apparent EVS” loss vs. actual mortality
- “Proof of concept” for EVS mitigation



Study Areas

- OR: 1,140 road miles (Columbia Plateau)
- UT: 435 road miles (Wasatch Mtns, Colorado Plateau)
- WY: 275 road miles
- (Wyoming Basin)

Methods

- 3-year field effort (fall/winter)
- 2 study areas: UT and OR
  - selected road segments driven repeatedly during fall/winter
  - subset ROW transects (2 x 2-mi) receive walking and dog searches (detection corrections)
  - camera traps deployed at fresh carcasses for 2-3 week periods
- WY study area: reduced effort for 2 years (AZ also 1-yr pilot effort)
- Record roadkill/road characteristics, live eagle observations, scavengers, and indices of live prey and traffic

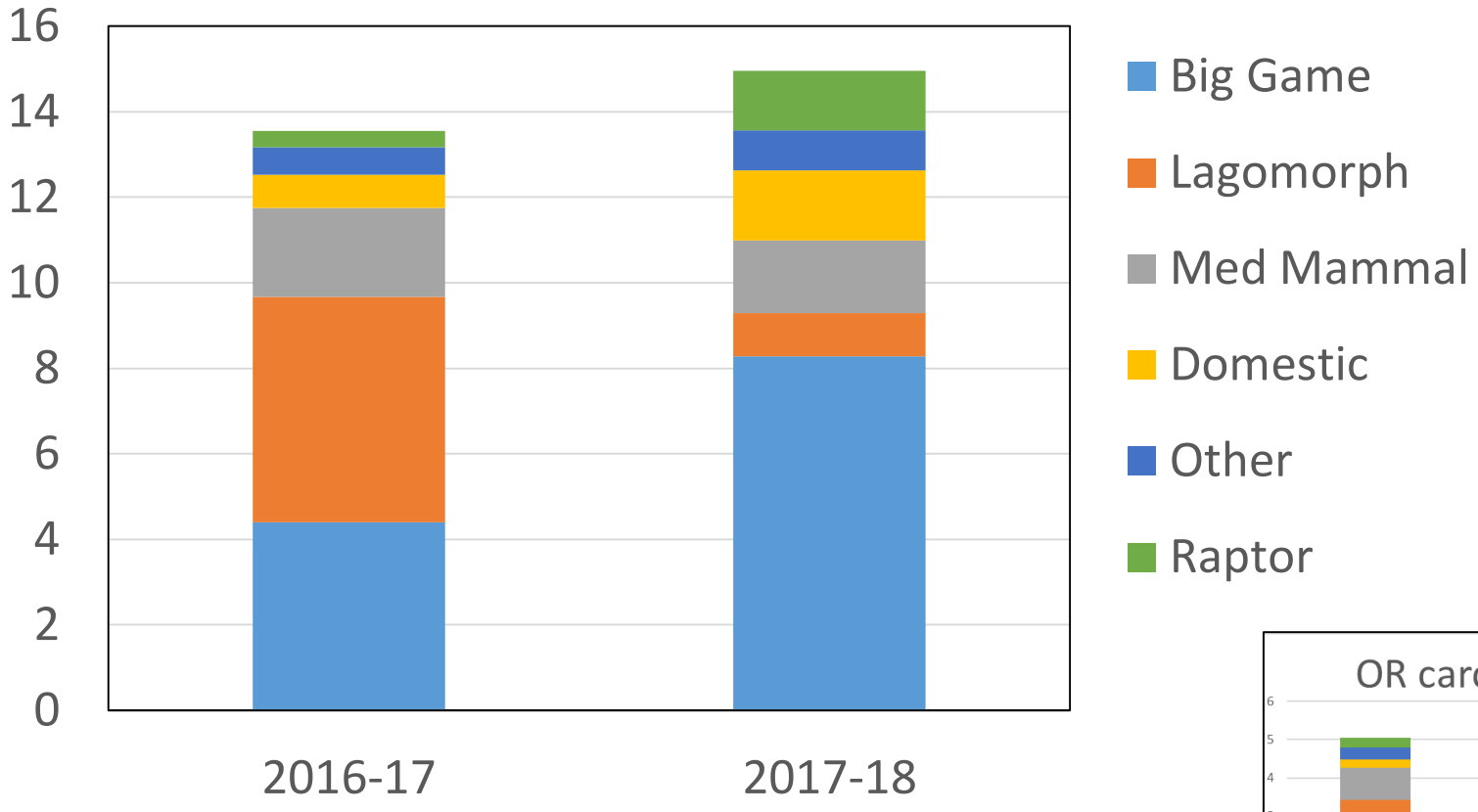
Results Overview (2 Seasons Combined)

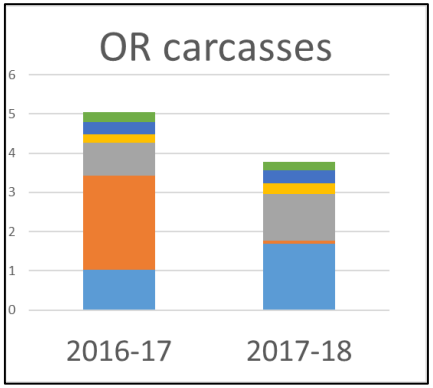
Measure	OR	UT
Driving Effort	**15,927 miles** (14 rounds)	**6,946 miles** (16 rounds)
Walking Effort*	**572 miles** (14 rounds)	**442 miles** (11 rounds)
Road Carcasses (per 100 mi)	**703** (4.4)	**995** (14.3)
Walk Carcasses (per 100 mi)	**386** (67.5)	**673** (152.3)
Eagles - live (per 100 mi)	**529** (3.3)	**907** (13.1)
Eagles near carcass (% obs)	**77** (14.6%)	117 (12.9%)
Eagles - dead (est. per 100 mi)	**7** (0.75)	**22** (3.9)

*Walking transects <10% of drive roads

- 15 “fresh” mortalities, 14 older carcasses
- Estimate of mortality/100 mi based on fresh only
- Likely underestimate (does not correct for extremely low road persistence)
- Eagle mortality, live eagle density, and mammal roadkill all **3-4X** higher in UT

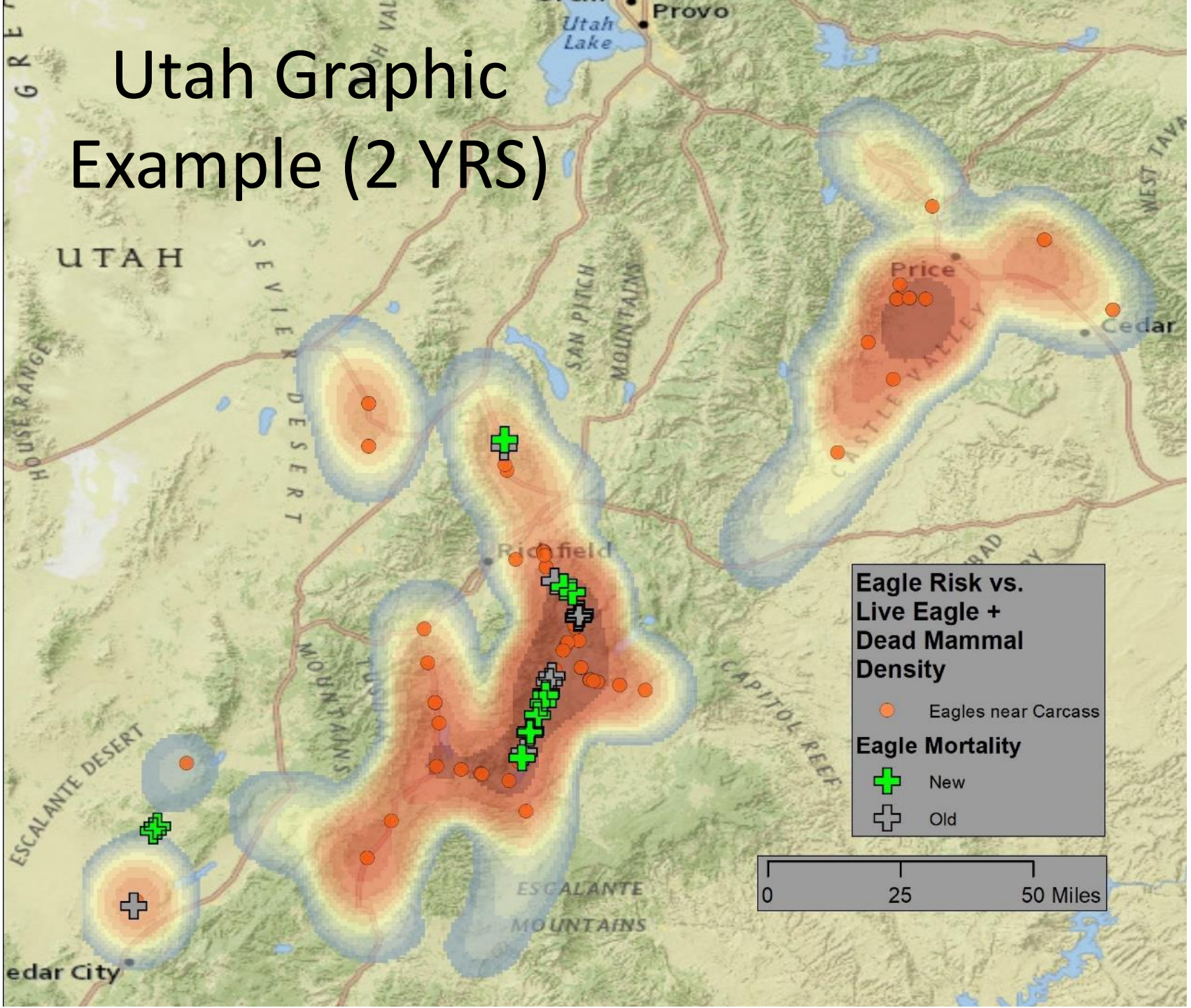
UT carcasses per 100 driving miles

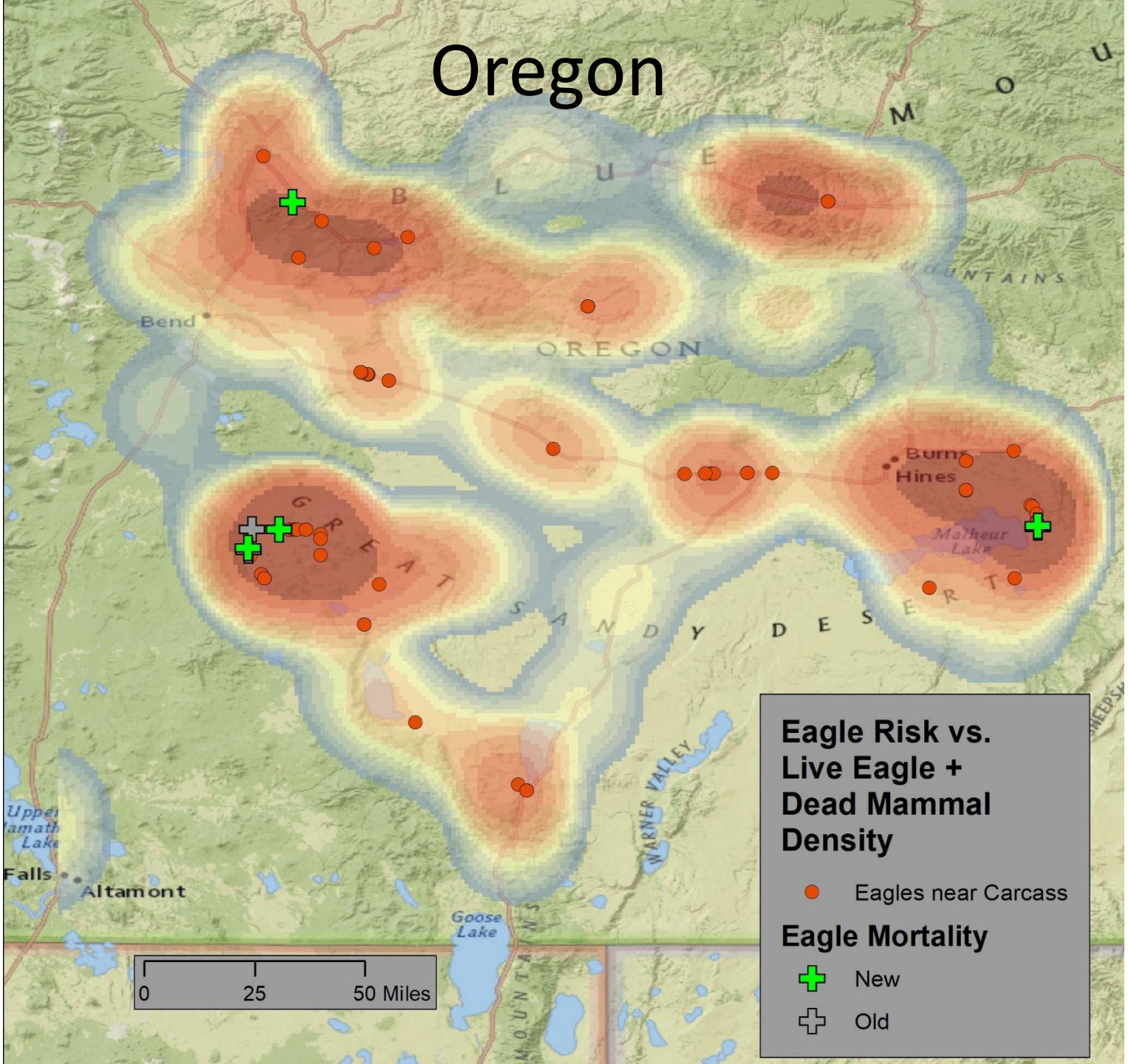




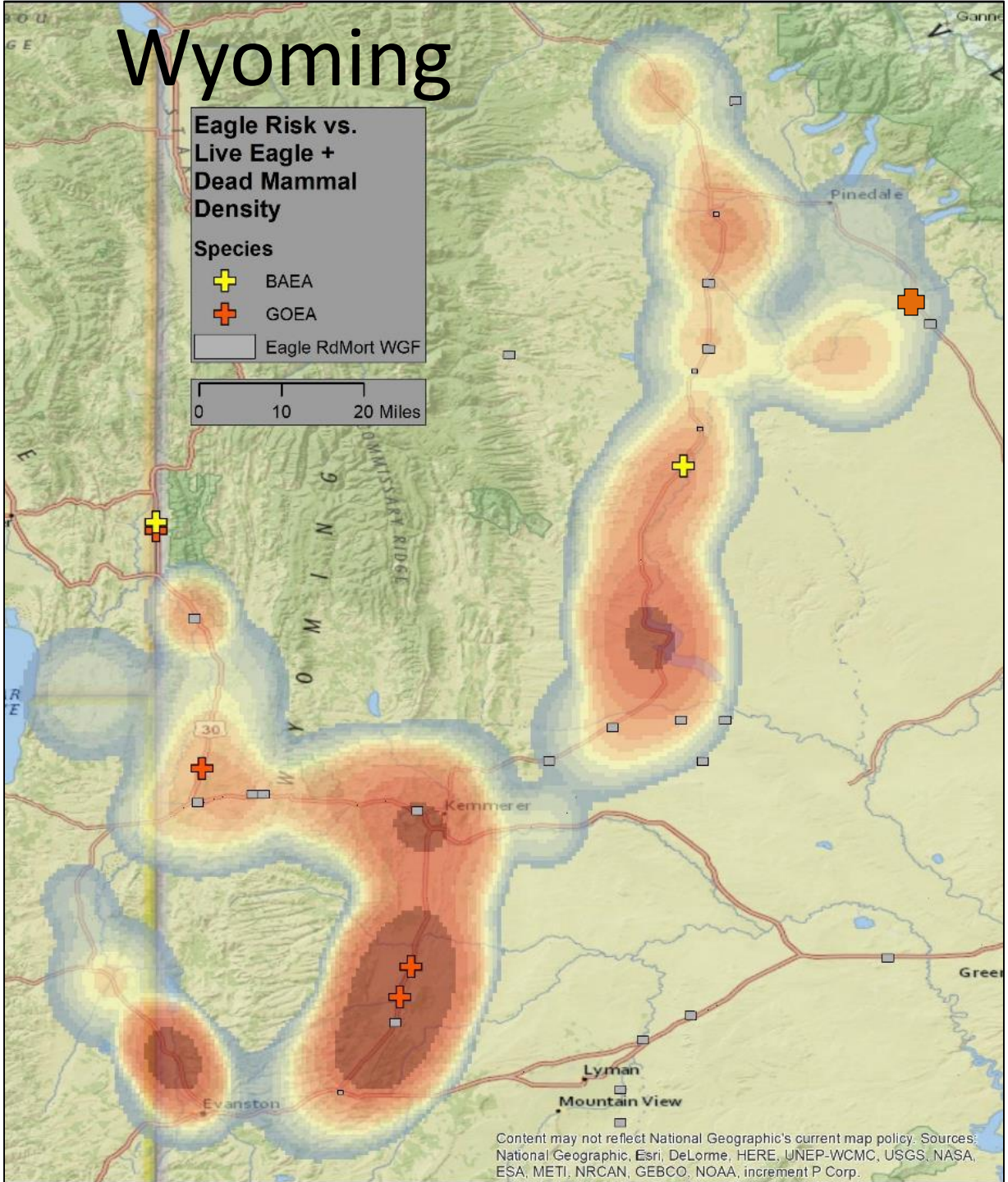
- UT rabbit roadkill went from 38.9% to 6.8% of total between years
- OR rabbit roadkill went from 47.4% to 2.0% of total between years

Utah Graphic Example (2 YRS)




Oregon
Bend
OREGON
Burns
Hines
Malheur Lake
GREAT SANDY DESERT
WARNER VALLEY
Goose Lake
Falls
Altamont
0
25
50 Miles
Eagle Risk vs. Live Eagle + Dead Mammal Density
Eagles near Carcass
Eagle Mortality
New
Old

Wyoming


Eagle Risk vs. Live Eagle + Dead Mammal Density
Species
BAEA
GOEA
Eagle RdMort WGF
0
10
20 Miles
WYOMING
Pinedale
Kemmerer
Evanston
Lyman
Mountain View
30
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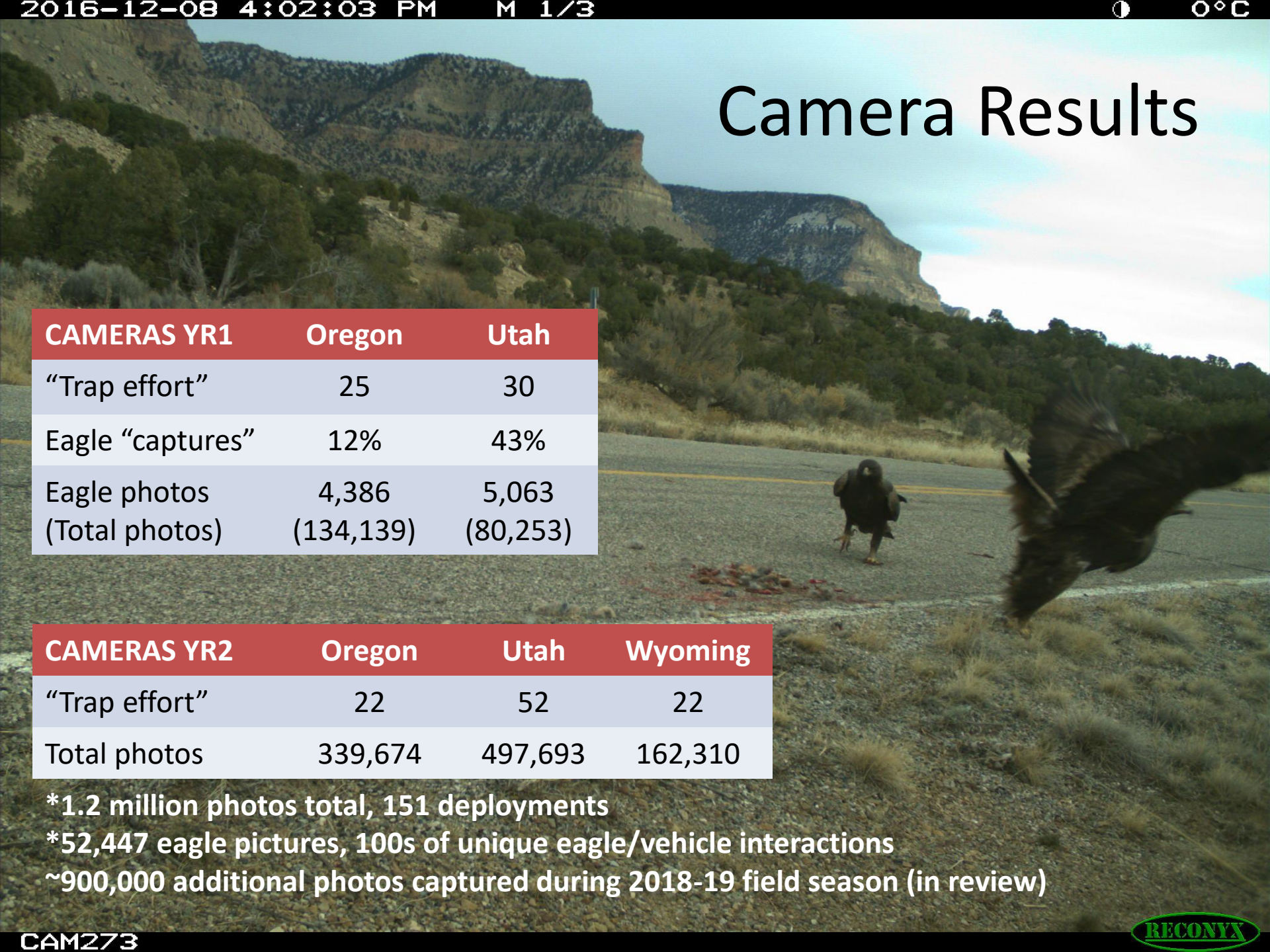
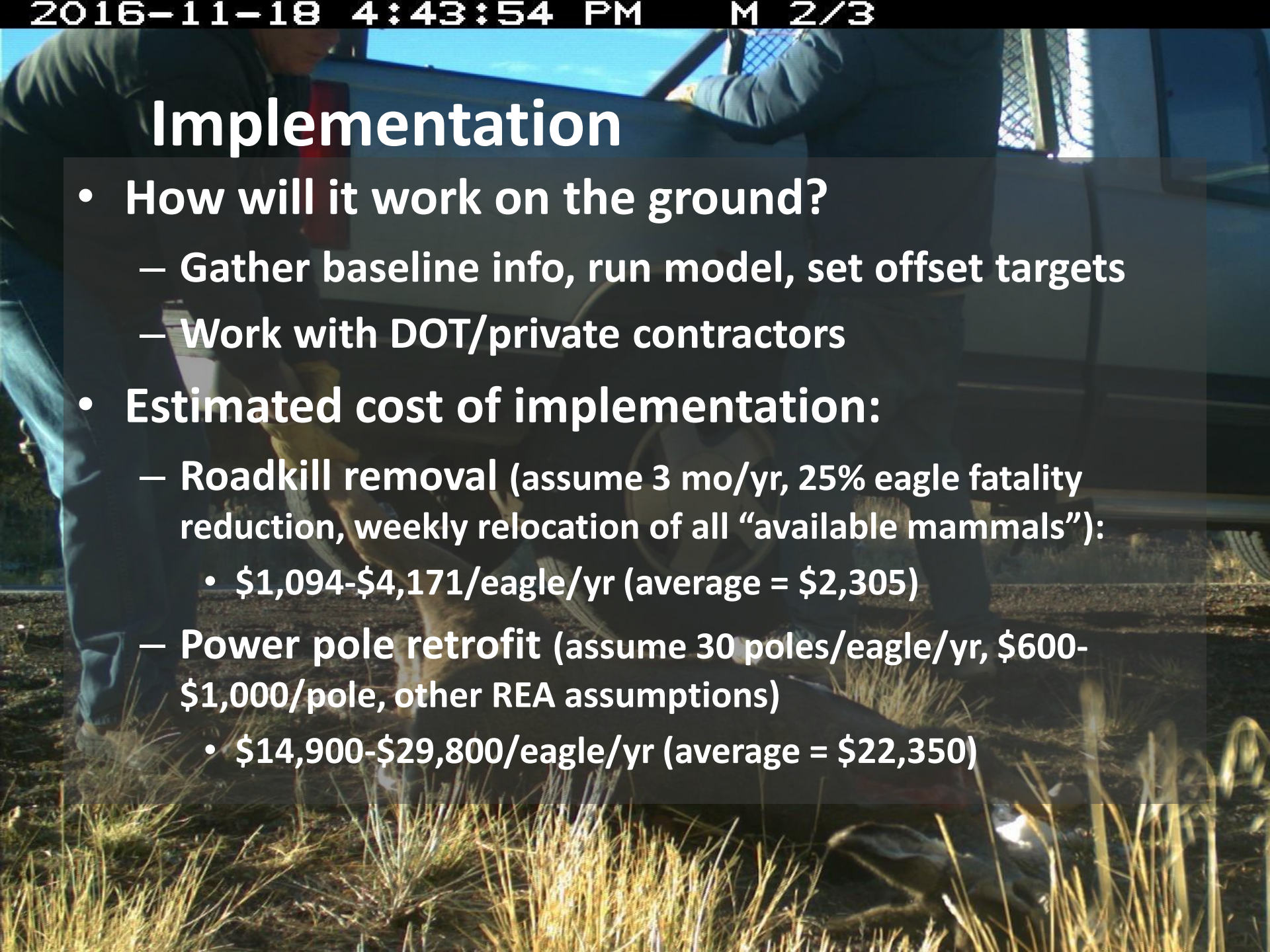


Camera Results

CAMERAS YR1	Oregon	Utah
"Trap effort"	25	30
Eagle "captures"	12%	43%
Eagle photos (Total photos)	4,386 (134,139)	5,063 (80,253)

CAMERAS YR2	Oregon	Utah	Wyoming
"Trap effort"	22	52	22
Total photos	339,674	497,693	162,310

***1.2 million photos total, 151 deployments**
***52,447 eagle pictures, 100s of unique eagle/vehicle interactions**
~900,000 additional photos captured during 2018-19 field season (in review)



Implementation

- How will it work on the ground?
  - Gather baseline info, run model, set offset targets
  - Work with DOT/private contractors
- Estimated cost of implementation:
  - Roadkill removal (assume 3 mo/yr, 25% eagle fatality reduction, weekly relocation of all "available mammals"):
    - $1,094-$4,171/eagle/yr (average = $2,305)
  - Power pole retrofit (assume 30 poles/eagle/yr, $600-$1,000/pole, other REA assumptions)
    - $14,900-$29,800/eagle/yr (average = $22,350)

Next Steps and Take Away

- **Work with USFWS, industry, DOTs, etc. to work out details of mitigation application**
- **Run data through expert elicitation vehicle collision model (Lonsdorf et al. [JWM 2018])**
- **Expand camera work and hotspot identification with partners!**
- **EVS risk IS going to be a tractable issue!**


2017-01-25 11:27:49 AM M 2/3
-2°C
CAM276
RECONYX


2016-11-22 9:36:10 AM M 1/3
4°C
SWIFT
CAM 277
RECONYX


2016-12-20 10:53:57 AM M 3/3
3°C
CAM74
RECONYX


2016-12-20 10:53:59 AM M 1/3
3°C
CAM74
RECONYX


2016-12-20 10:54:00 AM M 2/3
3°C
CAM74
RECONYX


2016-12-20 10:54:11 AM M 1/3
3°C
CAM74
RECONYX


2016-12-20 10:54:12 AM M 2/3
3°C
CAM74
RECONYX


2016-11-18 1:40:25 PM M 3/3
2°C
CAM74
RECONYX


2016-11-18 1:40:27 PM M 1/3
2°C
CAM74
RECONYX


2016-11-18 1:40:28 PM M 2/3
2°C
CAM74
RECONYX


2016-11-18 1:40:29 PM M 3/3
2°C
CAM74
RECONYX


2018-02-02 16:21:42 M 3/3 11°C
CBS011
RECONYX


2018-02-02 16:21:44 M 1/3 11°C
CBS011
RECONYX


2018-02-02 16:21:46 M 3/3 11°C
CBS011
RECONYX


2018-02-02 16:21:47 M 1/3 11°C
CBS011
RECONYX


2018-02-02 16:21:51 M 1/3 11°C
CBS011
RECONYX


2018-01-06 1:42:49 PM M 1/3
6°C
CAM 277
RECONYX


2018-01-06 1:42:50 PM M 2/3
6°C
CAM 277
RECONYX


2018-01-06 1:42:53 PM M 2/3
6°C
CAM 277
RECONYX


2018-01-06 1:42:54 PM M 3/3
6°C
CAM 277
RECONYX


2018-01-06 1:45:56 PM M 1/3
6°C
CAM 277
RECONYX


2018-01-14 2:41:22 PM M 2/3 24°C
CAM276
RECONYX


2017-01-25 2:33:57 PM M 2/3
13°C
CAM276
RECONYX


2016-11-22 3:11:35 PM M 1/3 8°C
PC900 PROFESSIONAL
RECONYX

2018-01-30 1:34:44 PM M 1/3
61°F
eagle
800-788-9442
eagle
RECONYX
12


2018-01-07 2:34:57 PM M 1/3
15°C
CAM 277
RECONYX


2018-01-20 14:14:49 M 1/3 1°C
CBS029
RECONYX


Bushnell
46°F7°C
01-04-2018 11:27:58


Bushnell
60°F15°C
11-21-2017 13:43:05

Questions/Feedback?