## URBAN AVOIDANCE BY GOLDEN EAGLES IN THE GREAT BASIN



Zachary Ormsby, Nevada Department of Conservation & Natural Resources Ken Nussear, University of Nevada Reno Scott Bassett, University of Nevada Reno Pete Bloom, Bloom Biological Inc. RESEARCH QUESTION HOW IS THE GOLDEN EAGLE POPULATION AROUND RENO NEVADA RESPONDING TO INCREASING PRESSURES FROM URBANIZATION

Golden Eagle Aquila chrysaetos



# Golden Eagles in Nevada



Documented Eagle presence



Presumed Eagle presence



Water

#### Nest Survey Methods

Nest Survey Study Area Results Discussion



#### Locality Data Methods

Movement Data Study Area Analysis Results Future Research



## NEST SURVEY METHODS STUDY AREA AND RESULTS















#### RESULTS

Four Golden Eagles nests within 1 mile of urbanization were monitored in 2015, 2016, 2017

Three of these breeding territories were unoccupied in 2016 and 2017 as development encroached within .5 mile of nest locations

The breeding territory protected by open space produced young in all three years of our project

Breeding attempts were inversely related to development encroaching upon territories



## LOCALITY METHODS STUDY AREA AND RESULTS





la

O

Reno

90 1

Pyramid Lake

Nixon

80



N









12 Golden Eagles affixed with GPS-GSM transmitters and nest locations in Nevada Nearly 96,000 GPS points from Golden Eagles 13 in Urban Boundary





Outline of the Reno/Sparks area represents the 2017 US Census Urban Boundary Shaded areas beyond the Urban Boundary denote Private Property

### RANDOM POINTS = PINK



#### RANKING FOR SELECTED MODELS

Model	Number of Selections (from 1000 Bootstrap runs)
Elevation * log(Distance to Urban) + log(Impervious Surfaces)	568
log(Distance to Urban) * log(Impervious Surfaces)	358
Urban + log(Distance to Urban)	74
Urban + Elevation	0
Urban * log(Distance to Urban)	0
Urban (binary 1,0)	0
log(Impervious Surfaces (% - continuous))	0
log(Distance to Urban) + log(Impervious Surfaces)	0
log(Distance to Urban)	0
Elevation + log(Impervious Surfaces)	0
Elevation + log(Distance to Urban)	0
Elevation * log(Impervious Surfaces)	0
Elevation * log(Distance to Urban)	0
Elevation	0
Intercept Only (null)	0

#### PERCENT OF IMPERMEABLE SELECTED



### DISTRIBUTION OF RANDOM AND GPS POINTS RELATIVE TO PERCENT OF IMPERMEABLE



#### > 20% IMPERVIOUS BY RANDOM AND GPS

Percent impervious	21	22	24	25-35	36-45	48-59	61-87
random	2	2	2	10	9	5	7
eagle	1	0	1	0	0	0	0

Example of percent impermeable comparison of randomly selected points within project extent and random eagle GPS points. 1 of 1000 iterations.

#### DISTANCE TO URBAN AREAS



#### ELEVATION SELECTED RANDOM VS GPS



#### CONCLUSIONS

These eagles are selecting locations closer to urban, but with, lower impermeable percentage and higher elevation compared to random points.

Eagles from this region show a strong aversion to urbanization and built human environments.

It is reasonable to assume that increasing development and sprawl in the Reno and Sparks area, will further reduce and or degrade eagle habitat

#### **FUTURE RESEARCH**

Monitor where displaced Golden Eagles go... migratory, nomadic, and settlement patterns.

Determine if urbanization is a primary driver for displacement, and if that burden is being shouldered by others, especially green energy producers.

Evaluate Golden Eagle prey in the 2500 meter buffer around urban areas to see if there is an edge effect.

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# Thank You! Questions?

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