Estimating Abundance of Golden Eagles in the DRECP Area 2013

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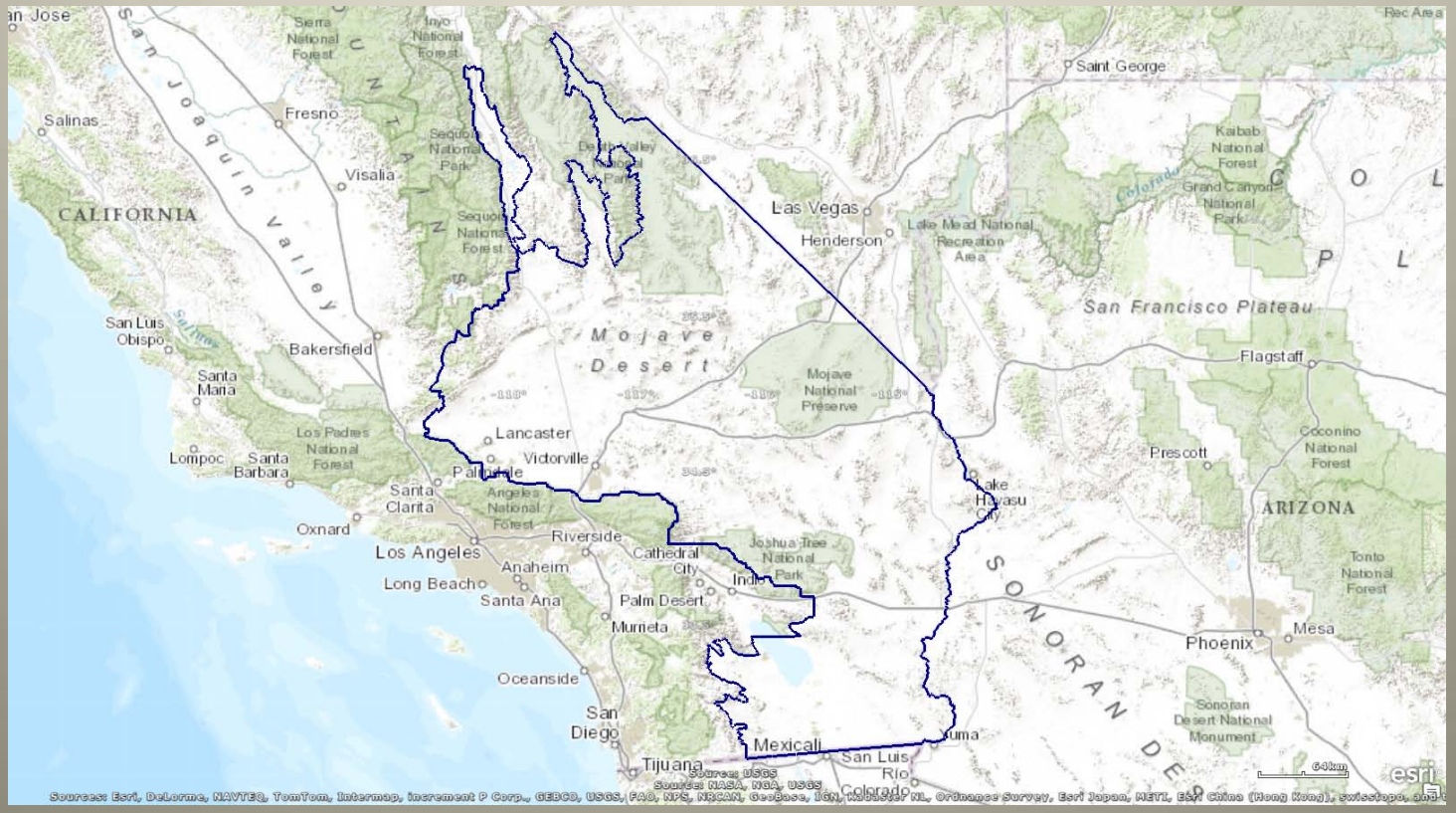
Introduction

- Summer of 2013 the CEC funded a proposal to conduct aerial surveys for golden eagles in the DRECP area (~9,172,281 ha)



Objectives

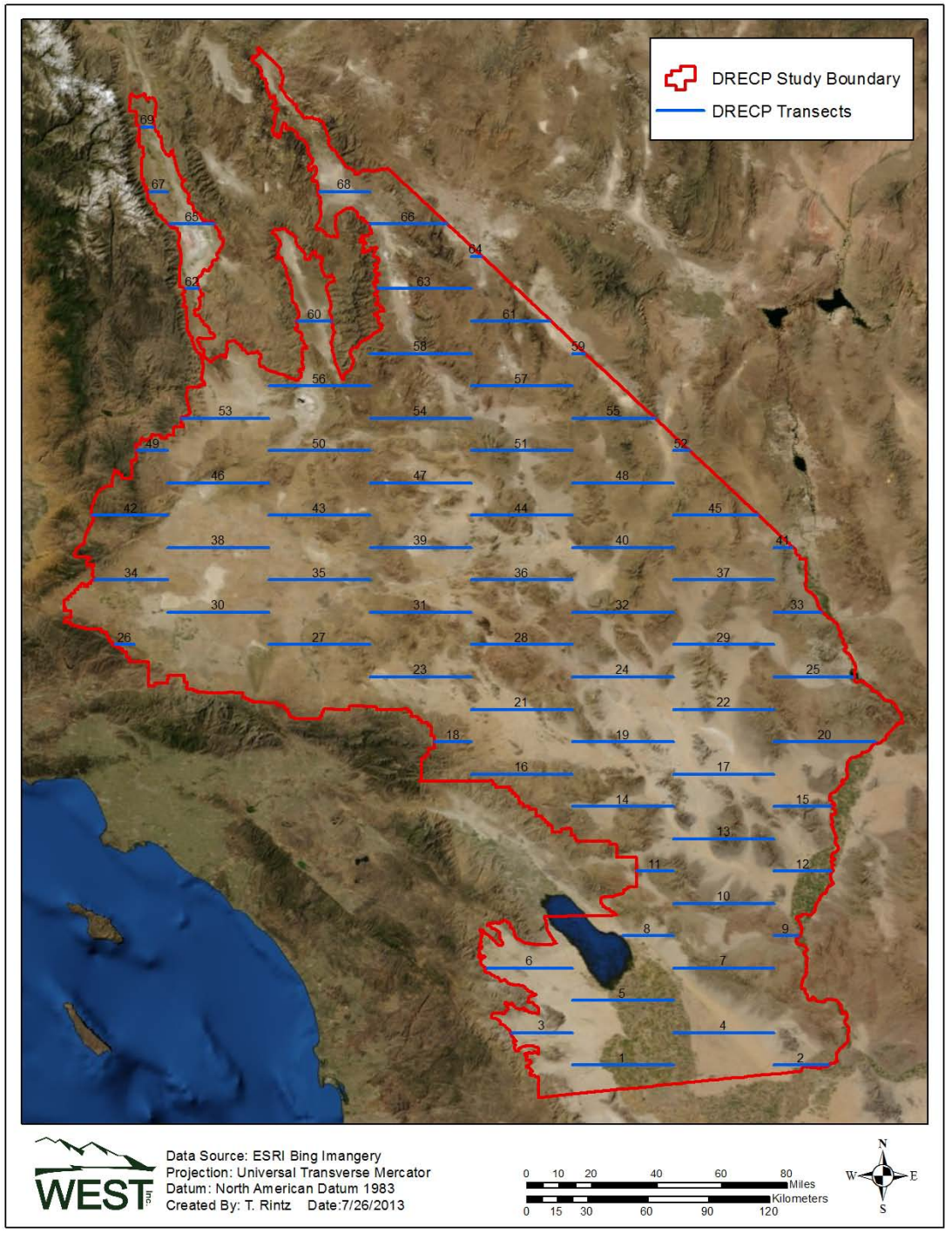
- Estimate GOEA abundance (including non-breeders, floaters, and juveniles) in the DRECP area using methods developed for the western-wide survey.
  - Post-fledging survey: 31 July – 6 August.
  - Winter survey: December 9 - 15.
- Full analysis of the results will be completed in June 2014.

Methods

- Sampling Effort:
  - Desired precision was not identified.
  - Budget allowed for a target of 2,700 km of transects
  - Systematic sample of 50-km long transects covering the area.
  - Transects were 50 km apart east-west and 25 km apart north-south.

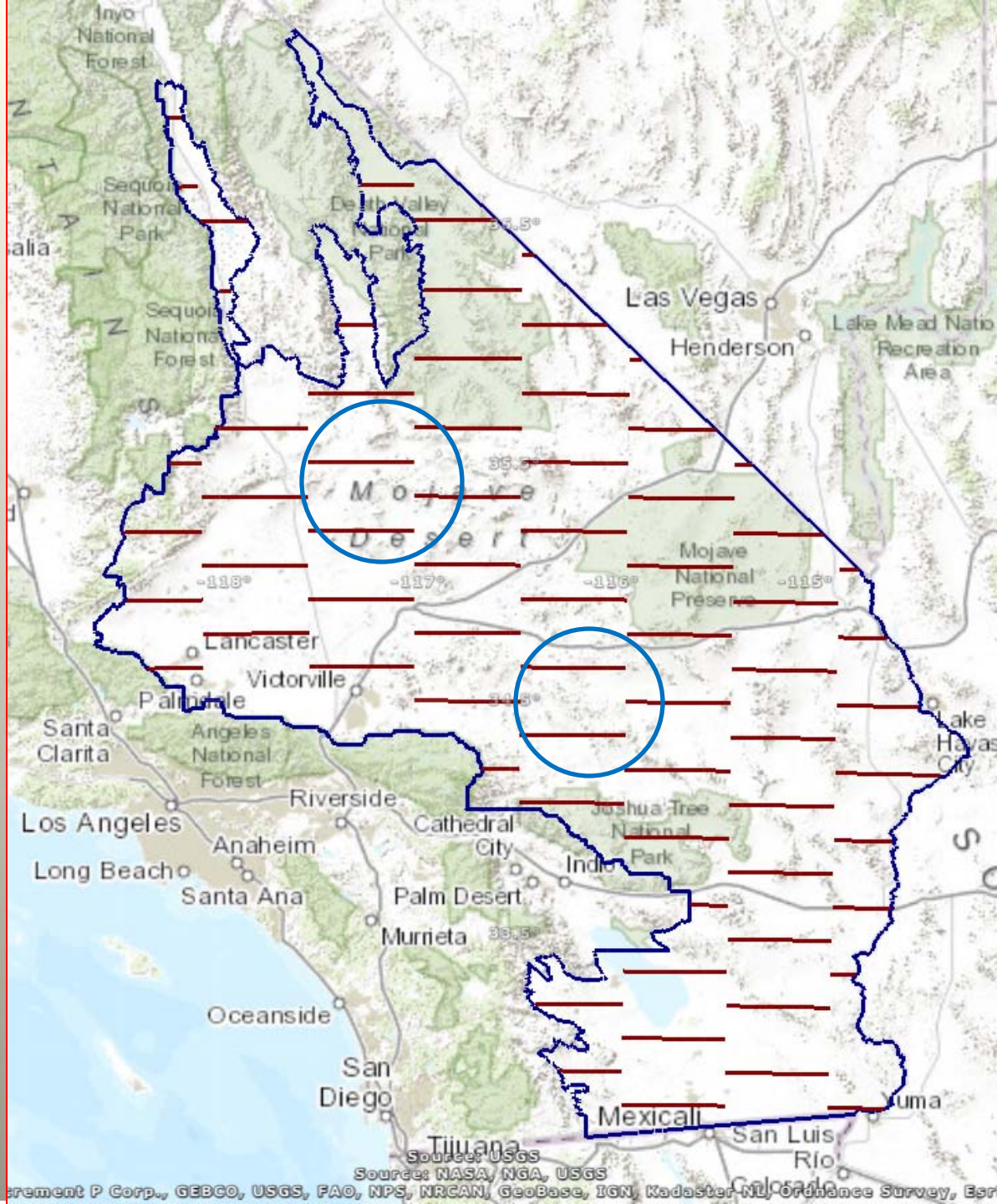
Methods

Proportion of area surveyed was ~3 times greater than the western-wide golden eagle survey



Methods

- Limitations on access
  - Many of the transects overlapped DOD or NPS lands.
  - Unable to fly 135 km of transects during summer survey (5%)
  - Unable to fly 241 km during the winter survey (9%)



Methods

We followed the protocol developed for the western wide golden eagle survey conducted 2003, and 2006 – 2013.

Good, R. E., R. M. Nielson, H. Sawyer, and L. L. McDonald. 2007. A Population estimate for golden eagles in the western United States. *Journal of Wildlife Management* 71:395–402.

Millsap, B. A., Zimmerman, G. Sauer, J. R., Nielson, R. M., Otto, M., Bjerre, E., and R. K. Murphy. 2013. Golden eagle population trends in the western United States: 1968 – 2010. *Journal of Wildlife Management* 77:1436 – 1448.

Nielson, R. M., L. McManus, T. Rintz, L. L. McDonald, R. K. Murphy, B. Howe, and R. E. Good. *In Review*. Monitoring abundance of golden eagles in the western United States. *Journal of Wildlife Management*.

http://west-inc.com/wildlifesurveys.html

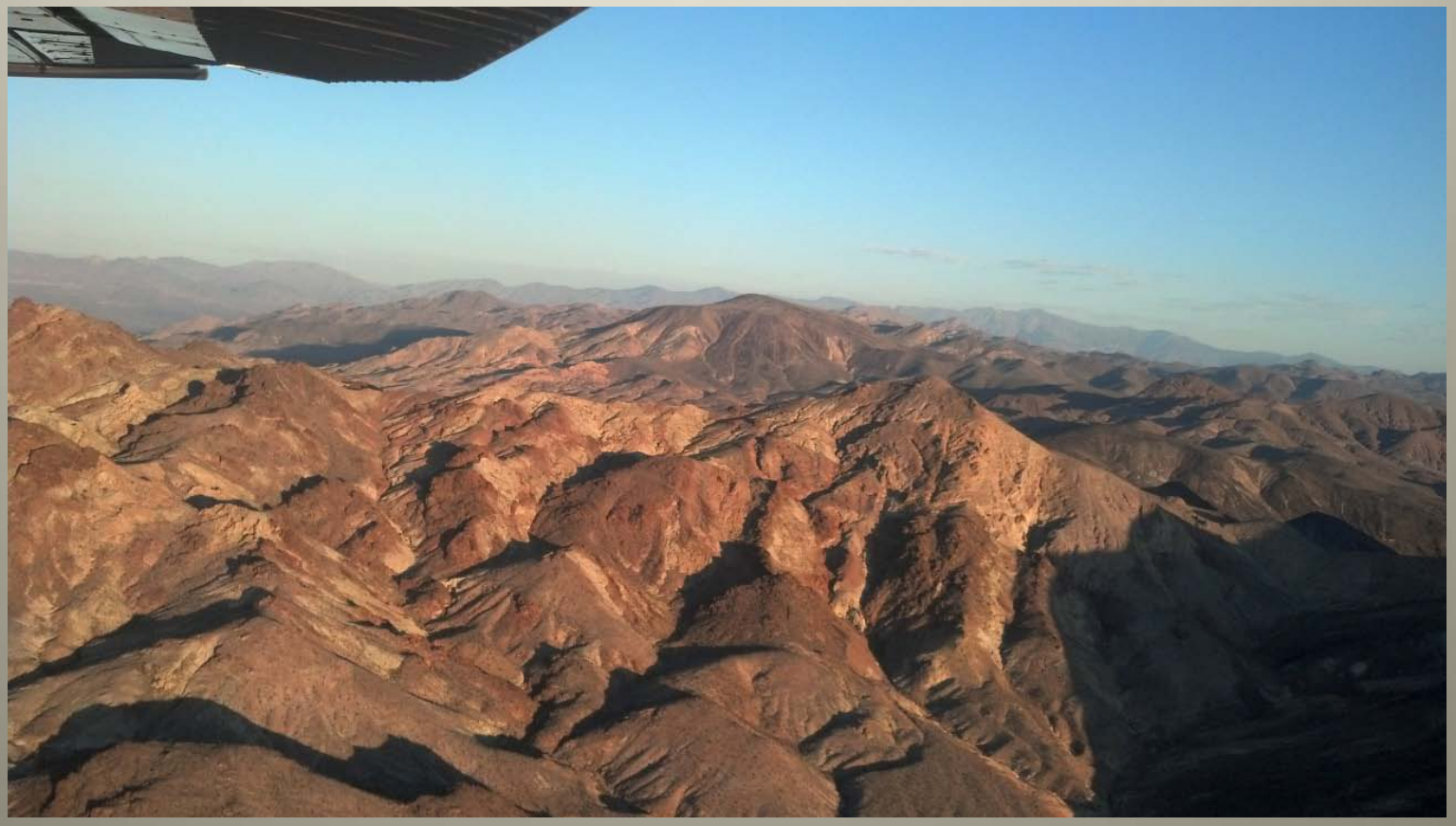
Methods

Methods

Gentle terrain = 107 m AGL

Methods

Rough terrain = 150 m AGL



Methods

- 1 back-left observer
- 2 observers on right side
- Mark-recapture on the right side to estimate P[detection]

Methods

- Flights began at first light
- Flights finished by 11:30 in summer and 13:00 in winter
- Record flight path (every few seconds)
  - Major habitat changes (AGL) for post-stratification of analysis
- Golden eagles seen
  - Observer
  - Activity
  - Group size
  - GPS location
  - Age class

Methods

- Initial intent – Bayesian approach
  - Utilize detection functions from the western-wide surveys coupled with the mark-recapture trials from DRECP surveys to estimate final probability of detection.
- Separate detection functions and density estimates for various types of observations:
  - Flying vs. Perched birds
  - Height above ground (AGL)
  - Observer position
- Final approach – due to low sample sizes, will use detection functions from western-wide surveys

Results: Post-fledging 2013

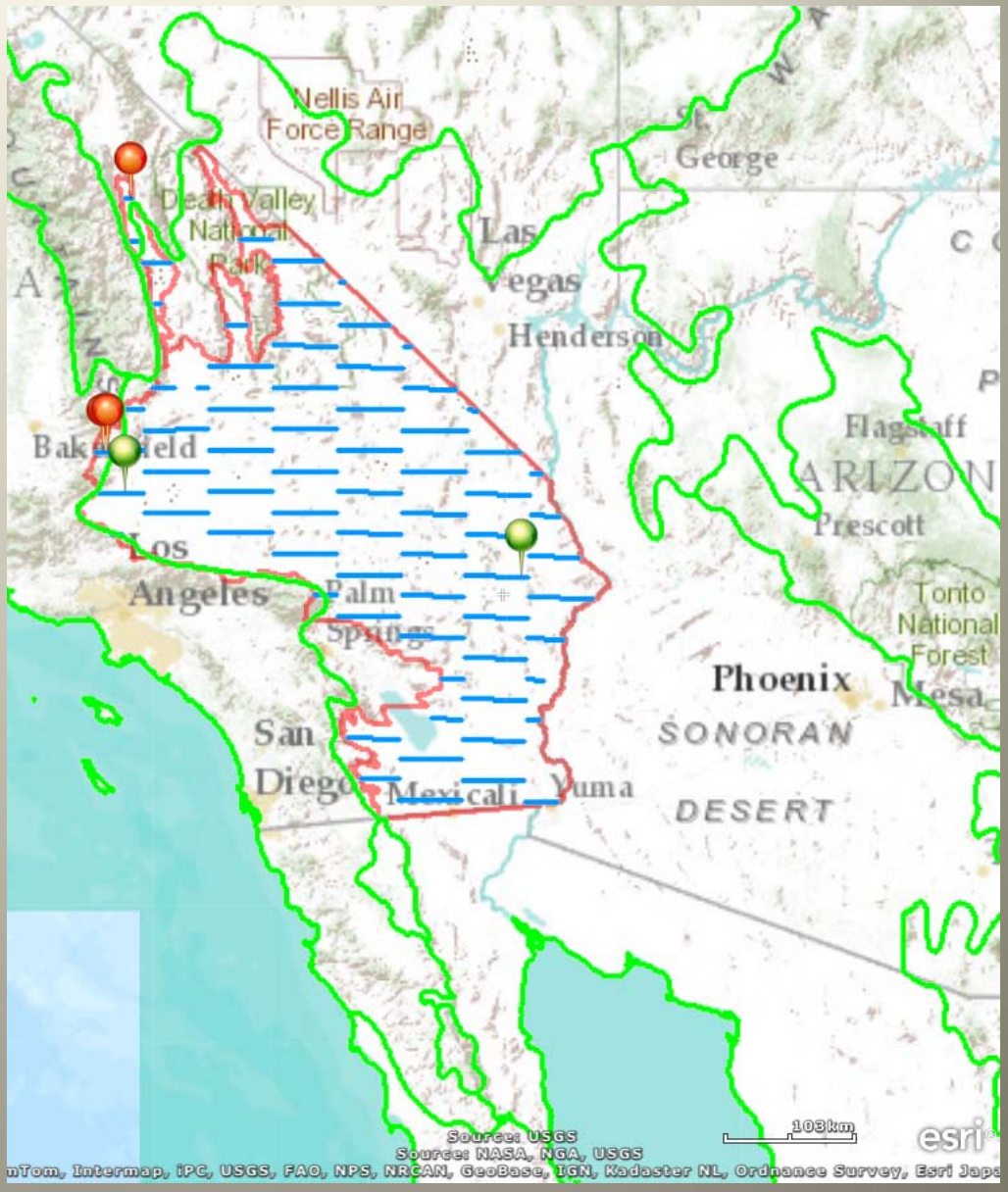
- 4 August
  - 1 eagle
  - ~400 m from transect
  - Flying
- 6 August
  - 1 eagle
  - ~100 m from transect
  - Perched

Results: Winter 2013

- 12 December
  - 1 Eagle
  - ~600 m from transect
  - Perched
- 14 December
  - 2 adult eagles
  - ~300 m from transect
  - Flying

Results: 2013

- DRECP is nearly (~95%) within BCR 33
- DRECP area is ~40% of US portion of BCR 33
- Millsap et al. 2013 estimated ~500-600 eagles in BCR 33
  - IF evenly distributed, we would expect to see 4-5 birds during each survey
  - We saw 2 during the summer and 3 during the winter
  - Likely to be within confidence intervals of Millsap et al.



Discussion

- Although we saw lots of topography and crossed many smaller mountain ranges, we barely entered the larger/higher ranges – almost no pine-juniper habitat.
- Summer survey was about a month later than desired.
- WEST is conducting several monitoring studies in a larger region containing the DRECP area, and we have observed relatively few golden eagles June – August, with greater numbers observed in the fall and winter.
- Conversations with eagle biologists suggested that the number of golden eagles in the region could be twice as high in winter versus summer.
- 2013 was the driest in over 100 years in CA. Did this lead to a reduction in the number of eagles using the area?

Future Considerations

- If it is decided aerial surveys should continue
  - Should the study area be expanded?
    - Include some buffer area that may detect birds that move in/out of the DRECP area.
  - Stratify the sample?
    - Devote more effort to potentially better habitat (e.g., mountainous areas and transition zones)?
    - 4 of 5 observations were in the far west and north areas in or adjacent mountainous (i.e., better?) habitats
  - Change timing?
    - Post-fledge earlier in season (June?)
    - Winter (December or ??)
  - More effort?
    - Increase transect density?
    - Fly more than once each season?