

Golden Eagle Science Team Notes

February 21, 2019

Rancho Cordova, CA 95670

- Background - Carie Battistone provided brief update on the background for formation of the Golden Eagle Science Team (GEST; association with the GEWG and Research Subgroup), the purpose statement of the GEST, and an overview of CDFW webpages related to GOEA.
- CDFW database - Carie Battistone provided an overview of the GOEA database that CDFW hosts, including history of development, what kind of data it houses (observational data, incl. nests), number of records it houses (+5,600), who has been involved in data compilation and entry (CDFW, NDOW, USFWS), methods for data submission (template or online entry tool) , where to obtain the data entry template (webpage or by request), overview of fields in the data entry template, data access (government CNDDDB subscribers or by request), process for requesting data (contact Carie or Kate), processing requests for sensitive data (only released after review by Carie), NV data inclusion and data requests (work with Joe Barnes), and contacts associated with CA and NV datasets. Effort coming soon to update the database again. Expect some contact with some of the folks doing this work in near future.
- NDOW database – Joe Barnes provided a brief overview of GOEA data that resides in the Nevada statewide raptor nest database. Notably, GOEA nest data is available on request to Jinna Larkin (jhlarkin@ndow.org) for various users (e.g., government agency, researcher, biological consultant, project proponent). Requests should include shapefiles of the project/survey area, and the time period of when subsequent surveys would be conducted, and a data sharing agreement with reciprocity clause is required before data is shared.
 - **ACTION ITEM:** Let Carie, Joe, Tom D. or Brian W know if you have any datasets (any format) for GOEA or know where to locate any.
- Golden Eagle Mortality Investigations - Krysta Rogers, CDFW Wildlife Investigation Lab (WIL), gave summary of disease and contaminant findings for GOEA in CA and NV, including number and county location of specimens submitted and specific findings for WNV, mange, lead, ARs, and other causes of death (vehicle collision, electrocution, wind turbine strikes). Krysta outlined steps for submission of carcasses to WIL. Next steps with mange is to further characterize mites, improve detection techniques, document new cases (fatal & non-fatal), evaluate social & environmental factors that may contribute to transmission. WIL will continue to monitor for exposure to contaminants (lead, ARs). For ARs, there is no apparent change in exposure rates following regulation change in 2014. CDPR currently considering re-evaluation of SGARs, so hoping to influence this evaluation based on supporting data. There is a need to evaluate different age classes to assess possible subclinical effects of ARs.
- National Eagle News – Brian Millsap gave overview of several topics being worked on at the national level. One recent effort is a desktop analysis to ID areas of low-risk to wind farm development and process for applicants to be classified as low-risk. States would be involved as

a local level to assess the model output and additional data at a local-scale once applicants qualify as low-risk according to model. PowerPoint available online that describes the low-risk option for permitting. Brian discussed USFWS eagle monitoring efforts that follow flyway designations for BAEA and BCR for GOEA. Timing of surveys differs between the two species. For BAEA, 1 flyway will be surveyed per year. The two species will be on a six-year rotation for surveying and updating population estimates. For GOEA, ½ BCR will be surveyed per year.

- Western Golden Eagle Team - Brian Woodbridge reviewed the model development and output for areas inclusive of CA and NV, and reviewed sources of data into the model. Asking for input regarding model output and areas where data may be available but missing.
 - **ACTION ITEM:** Brian will be sending out details of model outputs for review. Review model and let Brian know if there are areas model could be strengthened by additional data.
- David Wiens presented efforts in the Altamont and Diablo area to determine GOEA occupancy. Objectives of study are to (1) characterize spatial patterns in quality of breeding sites, as measured by site occupancy and reproduction of territorial pairs, (2) develop predictive spatial models of breeding site quality, and (3) provide recommendations to identify and monitor site quality of Golden Eagles in renewable energy landscapes. Study design was hexagonal grid system with random survey grid selection, with each grid surveyed 4 times during breeding season. Source variations considered were landscape conditions and climate/weather. Multistate state occupancy models and N-mixture models were used. Density of eagles in study area was very high, potentially highest in the world. Total pairs detected = 201. Survey plots with intermediate amounts of open grassland and more rugged landscapes had the highest likelihood of being occupied by territorial pairs. Survey plots with more rainfall during brood rearing had highest likelihood of being occupied by pairs that successfully produced young. Results may be used for ID'ing conservation hot spots for across the northern Diablo range. More investigations needed to determine if area is source or sink – do the subadult breeders indicate more adult mortality or recent colonization.
- Adam Duerr presented study assessing the influence of topographic variation on GOEA flight altitude in various areas across CA where eagles were fitted with transmitters. This is a data rich study with over 179K flight locations. Time of day, elevation, slope, aspect, topographic roughness, and topographic position factors considered in the model. Risk (low flight AGL) differs by region (steeper slopes, ridges), especially coastal CA and Sonoran/Mojave deserts. There is a risk only where turbines are sited, so recommended siting turbines where flight AGL is high. May refine risk model to incorporate other drivers of flight (weather, temporal patterns). Upcoming research: (1) Drivers of Movement in a 3-Dimensional Landscape (Sur et al. in review), and (2) Risk to Golden Eagles from Wind Turbines in CA (combined likelihood of eagle at a certain spot in landscape, eagle at a certain flight altitude at that spot and type of behavior of the eagle at that spot and altitude), (3) Foraging site selection (v. low flight) by GOEAs (Maitreyi Sur), and (4) Influence of weather (drought) on long-distance flights of GOEAs (Sharon Poessel).

- Jeff Tracey presented on movement patterns and habitat selection by GOEAs in coastal southern CA (San Diego County). Used data from 29 GOEAs captured and fitted with transmitters in San Diego County. Data from November 2014 to February 2017. Goal was to develop habitat selection models and quantifying habitat loss past and future. Data processing was heavy and may need to think of ways to simplify and speed up. With resulting model, we can compare the probability of GOEA use among and between polygons, or predict how likely a polygon is to be used pre- and post-development. We cannot quantify the number of eagles lost due to any particular development. Looking back in time just over 20% habitat loss (1490-1990) and 8% loss 1990-2014. Looking forward, nearly an 18% loss 2014-2050. Cumulatively, 46.5% loss 1490-2050. For future analyses, consider a larger set of predictor variables and alternative models (e.g., vegetation structure (from LiDAR), more topography metrics, NDVI (or EVI) and proxies for prey biomass, recreation, power lines, and other human impacts, weather, feature engineering).

- Steve Slater, Hawk Watch International, presented work in UT, OR and WY quantifying eagle vehicle strikes over 2-3 years. Understanding vehicle strikes has huge implications for conservation and a potential option for mitigation. The objectives were to (1) quantify risk in relation to GOEA density, carcass density, road characteristics and annual variability, (2) quantify eagle behavior at carcasses, (3) provide correction factors for apparent and actual mortality. In OR, estimated 0.75 eagles killed per 100 miles of road. In UT, estimated 3.9 eagles killed per 100 miles of road. Type of carcasses available (small mammal vs. big game) varied across years and likely impacts eagle mortality. Eagle risk based on live eagle detections and carcass density on roads. Estimated cost of implementation is low relative to power pole retrofitting. Would like to expand effort with other partners, perhaps in CA and NV. Steve suggested that the eagle working groups from different states get together to calibrate issues and topics each is dealing with.
 - **ACTION ITEM:** CA/NV GEWG and GEST coordinators to talk with Steve Slater, as well as other states (e.g. AZ) regarding a larger meeting.

- Doug Bell summarized East Bay Parks' volunteer-based GOEA monitoring effort. Volunteers must have a science/raptor background and must commit to 100 hours per season. Training includes online and field portions on identification, navigation, data entry, etc. Requires a coordinator, which is also a volunteer for this program. Coordinator recruits, trains, support volunteers, responsible for data integrity and report preparation, and overall improvements to the program, generally puts in 1200 hours per season. Includes monitoring 40-100 territories. *For background, the idea of implementing something similar at a broader scale was a topic group had previously discussed. Idea was to develop methodology to survey areas we do not know much (sierra foothills) and look into a volunteer program for monitoring nests we do know about. We have a draft proposal that outlines these two goals, but need more work.* Group recognized more time was needed to discuss how a volunteer program may be implemented more broadly in CA, say by region (e.g. San Diego), as well as the best method for conducting some type of survey design to target areas with data gaps.
 - **ACTION ITEM:** Joe and Carie will reach out to small group to work on formulating a statewide monitoring effort. Let them know if you are interested in participating.

- Group did not have time to discuss revisiting the 2012 research List.
 - **ACTION ITEM:** Joe and Carie will strategize way to address revisions to the 2012 research List via email and a call or two. They will reach out to group regarding this.

- Parking Lot items identified in meeting:
 - GBBO presentation
 - Conservation banking subgroup formation
 - Determining database priorities
 - Developing a telemetry map
 - Coordinating a physiological study with Purdue

- Next meeting was not discussed.
 - **ACTION ITEM:** Joe and Carie will reach out to group regarding timing, location and agenda items.

Adjourned – 5:15