

Hawaii Forest Bird Survey Data Analysis

Specifications Contact

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Description of Services

Approximate time frame: September 1, 2022 – December 31, 2022

Scope of work:

- Proof and analyze data from the 2021 and 2022 forest bird surveys conducted in the Pu'u Wa'a Wa'a Forest Reserve on Hawaii Island
- Proof survey data by randomly selecting 10% of the records and checking that the error rate is <1% and ensuring data is formatted to be included in our database
- Combine proofed 2021-2022 data with previously collected data to estimate abundance, population density (birds/ha), species-specific detection functions, and population trends (1990-2022) for six species of forest bird
- Abundance, population density, and species-specific detection functions for each species shall be calculated using program Distance using methods described in Camp et al. (2010, 2016)
- Population trends shall be assessed using time-varying rate of population change state-space models using methods described in Camp (2021)

Qualifications:

- Must have demonstrated experience (i.e. publication in a government technical report and/or peer-reviewed journal) using state-space models to analyze animal population trends using the methods described in Camp (2021).
- Must have demonstrated experience (i.e. publication in a government technical report and/or peer-reviewed journal) using program Distance to generate animal population density estimates and species-specific detection functions using the methods described in Camp et al. (2010, 2016).

Deliverables:

- Proofed data from 2021 and 2022 for entry into the Hawaii Forest Bird Database
- An Excel spreadsheet with density estimates calculated from Distance and State Spaces models, including coefficients of variation (CV), standard error (SE) and lower/upper estimates
- An Excel spreadsheet with results from state-space model for each species including trends (β , lower and upper 95% credible intervals), posterior probability of trends (decreasing, negligible or increasing) and interpretation of the trend as upward, stable, downward, or inconclusive

- Supplemental materials including:
 - Summary tables of survey effort, number of birds detected, indices of bird occurrence (occur; %), and relative abundance (birds/station) by year
 - A table with the detection function parameters used in Distance to derive population densities
 - A table with the models, number of parameters, Akaike's information criterion (AIC), and change in AIC (Δ AIC) values used to estimate forest bird populations
 - Figures of detection probability and probability density from program Distance of models used to estimate forest bird density
- All data and R scripts used in the analyses will be provided to DOFAW at the completion of the project

References:

Camp, R. J. 2021. Improved methods for estimating spatial and temporal trends from point transect survey data. PhD thesis submitted for the degree of Doctor of Philosophy in the School of Mathematics and Statistics, University of St Andrews, St Andrews, Scotland.

Camp, R. J., K. W. Brinck, P. M. Gorresen, and E. H. Paxton. 2016. Evaluating abundance and trends in a Hawaiian avian community using state-space analysis. *Bird Conservation International* 26:225-242.

Camp, R. J., T. K. Pratt, P. M. Gorresen, J. J. Jeffrey, and B. L. Woodworth. 2010. Population trends of forest birds at Hakalau Forest National Wildlife Refuge, Hawai'i. *Condor* 112:196-212.