

FOREST BIRD SURVEY OF THE HAWAIIAN ISLANDS

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Despite Hawai'i's relatively small size, much of its flora and fauna may still be undescribed or undiscovered. A new genus of bird was discovered as recently as 1973 (Casey & Jacobi 1974) and many plants and insects remain to be described. Basic information on distribution, abundance, and biology is lacking even for many of the most common birds. This lack of information, combined with the limited area of natural vegetation, multiple and often conflicting demands for the land, and the vulnerability of island ecosystems in general, makes it imperative that we learn as much as possible about the native birds of Hawai'i now.

A survey of the distribution and abundance of birds and their habitats on all the major islands was begun in 1976 by the U. S. Fish and Wildlife Service in cooperation with the Hawaii Division of Fish and Game, Hawaii Division of Forestry, U. S. Forest Service, National Park Service, and Private landowners. The objectives of the survey are to determine:

- 1) the distributional areas for all forest birds in the study area;
- 2) the density (birds/km²) by vegetation type and elevational strata for all birds within the study area;
- 3) the population size for all forest birds for each vegetation type, elevational strata, and study area;
- 4) habitat preferences for all forest birds in study area;
- 5) occurrence of major vegetation types relative to the distributional patterns of birds;
- 6) land use patterns and stability of habitats within each distributional area; and
- 7) areas in which more detailed studies can be undertaken to clarify distributional anomalies and to identify limiting factors for endangered species.

To accomplish the objectives of the survey, transects are laid at intervals of 3.2 km (2 miles) on the Island of Hawai'i (Fig. 1), and at 1.6 km (1 mile) intervals on the other major islands. Stations are placed every 134 m along these transects. The vegetation at each station is characterized according to tree height, canopy cover, species composition of the canopy and understory, and the presence of major habitat modifiers such as 'ohi'a dieback, pig damage, banana poka (Passiflora mollissima), browsing, grazing, and logging. In addition, the fruiting and/or flowering of the olapa (Cheirodendron spp.) and 'ohi'a (Metrosideros collina) is recorded for 10 plants at each station. The occurrence of birds at each station is determined during eight minute count periods conducted during the first 4 hours after first light. By recording all birds heard and seen at each station and their initial detection distance it is possible to determine the density for each species encountered at a station. The area surveyed is a circle whose diameter varies with the species being censused as well as with the observer and vegetation type (Ramsey & Scott 1979; Reynolds et al., in press). The information on the occurrence of birds is related to the vegetation; multivariate statistics are used to determine habitat correlates.

Additional information is obtained on the occurrence of rare plants and birds as a result of incidental observations made after the regular census period.

The forest bird survey is conducted by a team of six trail cutters, 11 avian biologists, four botanists, and one statistician. On site observations as well as aerial photographs and direct aerial observations are used to conduct the various studies. To date, 815 km of trail have been laid, censuses have been conducted at 6247 stations, the vegetation characterized at 3100 stations, and over 3000 man-days of work expended in our efforts to quantify the distribution and abundance of Hawai'i's birds and their habitats. Transects 1 to 75 (Fig. 1) have been censused and it is anticipated that all the islands will be surveyed by September 1981.

Preliminary analyses of the data have greatly changed our understanding of the distribution and abundance of the rare and endangered birds on Hawai'i. Revised priorities for research and management have been adopted as the result of these findings. Threats to native birds and their habitats have been identified as well as possible ways to reduce or eliminate their impact. Distributional anomalies for endangered birds have been identified which, when studied in detail, should assist us in determining the limiting factors for these species. New study areas are being located and important information on breeding biology and habitat preferences is being obtained. Additionally, it should be possible to stratify sampling effort in future studies of Hawai'i's plants and animals, thus significantly reducing the time and money necessary to complete future studies.

When analysis of the data is completed it will be possible to state, for each species, its habitat preferences, area occupied (ha), the acreage of each habitat type within its range, relative stability of habitat types within its range as well as the density and population size for any subdivision of elevation, vegetation, or geography that is of interest. It is hoped that all this information will be used by land managers as well as researchers in their efforts to better understand and protect the plants and animals of Hawai'i.

LITERATURE CITED

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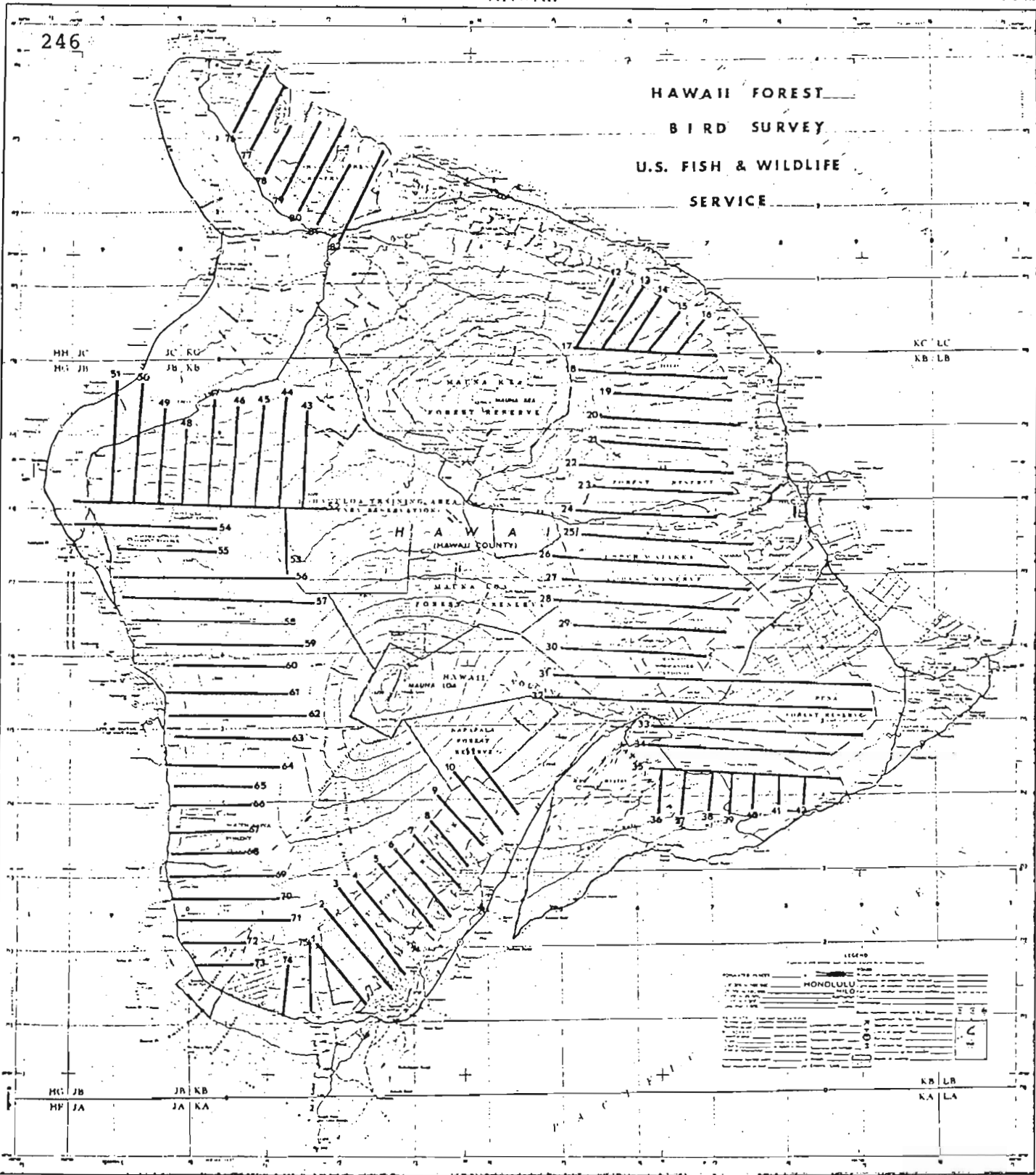


FIGURE 1. Map of the island of Hawai'i showing locations of transects used during Forest Bird Survey.