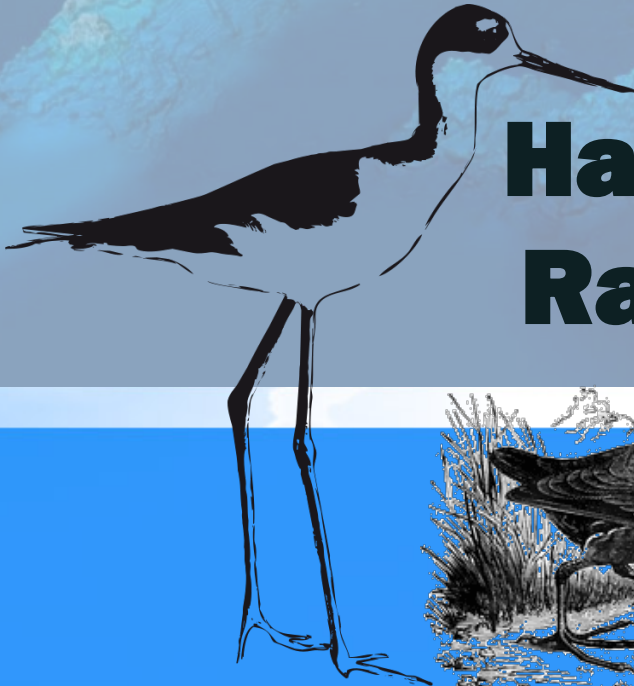




Hawai'i Waterbird Survey: Rationale and Objectives



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First Waterbird Surveys in Hawai'i

- 1940s: Counts started with Christmas Bird Counts on O'ahu, then expanded to other islands
- 1950s: James Donald Smith hired as first wildlife biologist for Hawai'i DOFAW (then Division of Fish and Game).
 - Initiated annual aerial and ground waterfowl survey to assess distribution of wintering waterfowl populations
 - Expanded during 1955 to include endemic waterbirds
 - This survey effort became the basis for future surveys



From: <https://birdlife.org.au>

Hawaiian Rice Patches, 1940. Photographer unknown; photo courtesy of Arleone Dibben-Young



Foundation for Current Survey

- 1970:
 - Survey increased to 2x per year (summer and winter) following listing of four species of endemic waterbirds as federally endangered.
 - Goal was to identify distribution and concentrations of native waterbirds
 - Formed the biological basis of core and supporting wetlands in Recovery Plan
- 1975: Data were collected in a more consistent manner to allow year-to-date comparisons

Expanded Survey Goals



- 1986: Counts synchronized and further standardized to achieve the following goals:
 - Simultaneously survey (census) suitable habitat on the main Hawaiian Islands
 - Track minimum population estimates of endemic and migratory waterbirds
 - Determine effect of management
 - Detect problems



Improving Survey Methods

- 2005: Updated survey instructions and datasheet
 - Survey instructions by each species or guild
 - Photographic identification guide
 - Improve identification
 - Improve utility of survey for monitoring populations of migratory shorebirds
- 2005–2007: Spatial data
 - Updated list of survey sites
 - Polygon shapefile
 - Route maps of survey sites, initiated standardization of wetland names
- **2015-2017: Updated datasheet, instructions, and maps**
 - **Standardized currently surveyed wetland site names**
 - **GIS matches Access database**




Waterbird Survey Objectives

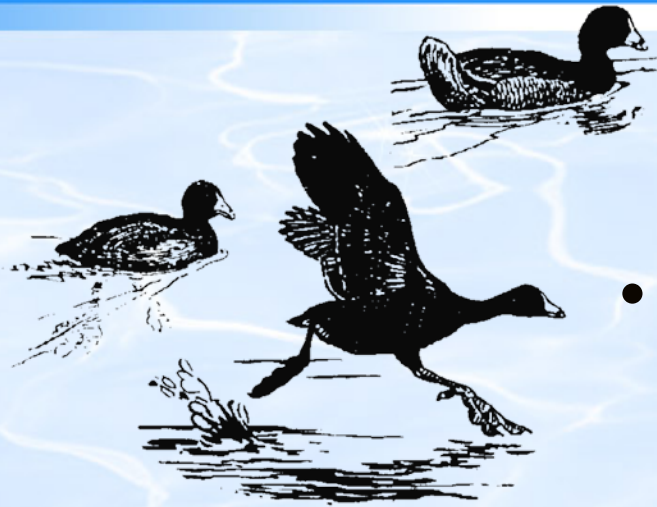
Survey objectives have evolved over time to meet changing biological and programmatic needs.



Waterbird Survey Objectives

- 
- A group of waterbirds in flight, silhouetted against a light blue background with a wavy, rippling pattern representing water. The birds are scattered across the upper and middle portions of the slide, with a larger, more detailed silhouette of a single bird in flight on the right side.
- Early 1950s: Assess distribution of wintering waterfowl.
 - 1955: Assess distribution of wintering waterfowl and endemic waterbirds.

Waterbird Survey Objectives (con't)



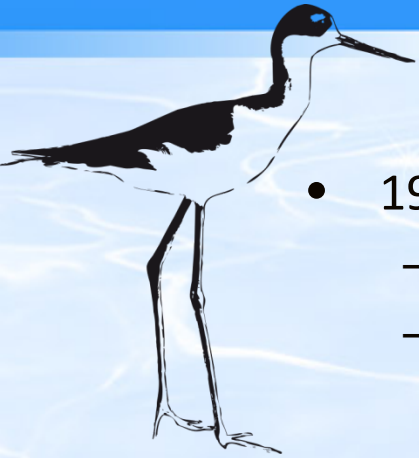
- 1970: Identify core areas for endangered waterbirds.
 - Distribution
 - *Relative abundance*
- 1975: Make year-to-date comparisons
 - *Population trend assessment*

Waterbird Survey Objectives (con't)



- 1986
 - Track minimum population estimates of endangered and migratory waterbirds.
 - *Population size (minimum)*
 - *Population trend*
 - Determine effects of management.
 - *No specific attribute*
 - Detect problems.
 - Wetland co-variates

Waterbird Survey Objectives (con't)



- 1992 Monitor status and trends
 - *Population trend*
 - *Minimum population size*
- 2005
 - Did not find explicitly stated survey objectives in available documentation.
 - Implied based on reports and data summaries in database
 - Uses of data
 - 1986 objectives still relevant

Current Waterbird Survey Objectives



- *CURRENT DRAFT WATERBIRD SURVEY OBJECTIVES*

1. Distribution and minimum population estimate of endangered, endemic waterbirds during the wet and dry seasons at multiple geographic scales.
2. Minimum wintering population estimate, distribution, and species composition of migratory waterfowl and shorebirds.
3. Population trends of endangered, endemic waterbirds over time at multiple geographic scales.
4. Distribution and minimum abundance of koloa-mallard hybrids.
5. Distribution of feral/domestic mallards to identify expansion of range where they may pose a risk to koloa maoli.

Recent Needs & Data Uses



- Analysis of state-wide and island population trends from 1986-2016 (USGS, *in prep.*)
- Population viability analysis (USFWS/Tufts University, *draft*)
- Evaluation of recovery criteria (USFWS Ecological Services)
- Analysis of waterbird count data and wetland management (USFWS Refuges, DOFAW managed areas)
- Distribution and use by endangered waterbirds for biological and programmatic needs (multiple management agencies)
- Spatial conservation prioritization for coastal wetlands (Pacific Birds Habitat Joint Venture)

**Improved survey effort to
meet recent and changing needs**

=

GOOD DATA

On-going Efforts to Improve the Survey

- Updated survey materials (**USE THEM**, give us feedback)
- Implement recommendations from previous analyses
 - **Biannual training**
 - **Pilot data collection on a subset of sites to improve co-variates**
- Incorporate current recommendations for objectives of biological monitoring programs (Elzinga et al. 2001. Monitoring plant and animal populations)
 - What? (resource or indicator) ✓
 - Where? ✓
 - Attribute (e.g., population size, distribution, etc.) **Partial**
 - Response (direction of change) ✗
 - Quantity (amount of change) ✗
 - When? ✗

- Improve efficiency of data management
- Data entered through 2017
- Provide annual reports with data summaries and graphs



MAHALO NUI LOA!!

