Innovating Automated Supplemental Feeders for the 2024 Maui Release of ʻAlalā (*Corvus hawaiiensis*)

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Background:

The ʻAlalā (Hawaiian crow, Corvus hawaiiensis) is a critically endangered corvid species endemic to Hawaiʻi. Extinct in the wild since 2002, ʻalalā once played a vital ecological role as native seed dispersers, with a diverse omnivorous diet that includes native fruits, arthropods, and occasionally forest bird eggs and nestlings. While past release efforts were concentrated in native forests on Hawaiʻi Island, recent efforts have expanded to Maui. A key goal of the Maui release is to develop and test automated supplemental feeding systems that support remote monitoring and promote post-release survival in rugged, hard-to-access terrain.

Figure 1: Feeder Hale exterior view (top) interior view (bottom). D - detachable blue cups, E - lid, F - scale with perch, G - repurposed automatic cat feeder, H_1 - hopper base front view, H_2 - hopper base interior view, I - 6V lithium battery

Figure 2: Alalā perched next to feeder at field site. A - stand, B - hale, C - rat baffle, J - cellular enabled game camera mounted with solar panel

Implementation/Monitoring:

Prior to release, ʻalalā housed at the Maui Bird Conservation Center (managed by San Diego Zoo Wildlife Alliance) are conditioned to use automated feeders as part of their pre-release evaluation. Upon release, feeder usage is tracked using remote cellular trail cameras, allowing monitoring teams to assess presence, behavior, and feeder interactions without direct disturbance. In addition to real-time observations, passive data collection—such as body weight and feeding frequency—is supported through camera footage and periodic retrieval of SD cards, which provide detailed video insights into individual bird behavior and feeder efficacy in the field. This monitoring approach enables managers to fine-tune support strategies based on observed trends and individual variability in feeder use, ultimately improving post-release outcomes.

Feeder Diet and Design:

Supplemental diet:

Wet – Fruit (melon, apple, papaya) 62.5 %, Vegetable (medley) 20.83%, Protein (mice) 16.67%

Dry – Full nutritional pellet and dried insects for extra protein

Exterior Components:

- **Stand + Hale** – designed to house and protect feeder components and food from the elements
- **Rat Baffle** – protect from rodent incursion
- **Detachable blue cups** – allow daily cleaning of components at camp and complete removal of wet diet once daily servicing is not being done
- **Lid** - provides further protection from the elements and prevents food from being consumed by non target species
- **Scale with perch** – allows for passive weight, health, and presence monitoring with the help of remote camera data (design carried over from previous release in Puʻu Makaʻala, Hawaiʻi island)

Interior components:

- **Repurposed automatic cat feeder** – automation of dry diet allows for food to be dispensed without personnel present
- **Custom designed hopper base** (Adam Elzinga at Parula Innovations) – allows for old food to be dispensed automatically each evening into a container in the hale
- **6V Lithium Battery** - powers cat feeder and hopper base

Challenges/Benefits:

Challenges:

- Feeders require regular servicing, even when not actively stocked with fresh food.
- Equipment is susceptible to damage from humidity, rain, and severe weather conditions.
- Weight and bulk of feeders make transport and setup difficult in remote, rugged terrain.
- Deployment requires coordinated field labor and logistical planning.

Benefits:

- Enables remote support of released birds with minimal human disturbance.
- Provides flexibility in managing translocations and adaptive field strategies.
- Improves survival during critical acclimatization periods post-release.
- Buffers against seasonal or unpredictable food shortages.
- Temporarily increases site carrying capacity to support higher bird densities.
- Supports establishment of source populations for future translocations.

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