795: Mongoose Population Assessment: Is there a breeding population on Kauaʻi

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Introduction

Photo 1: 1st Mongoose Captured on Kauai 5-23-2012

Mongooses were introduced to Oahu, Maui, and Hawaii Island during the 1880s. Fortunately, Kauai remained mongoose free when a planned introduction was aborted; however, there have been almost 350 reported sightings since 1968 and in 1976 a road-killed, lactating female was found on the island near Eleele. In 2012 and 2016, three mongooses were captured in Lihue, Kauai, illustrating the need for better biosecurity. The numerous sightings and four confirmed individuals have led to the perception among many persons on Kauai and in Hawaii that mongoose are now established on Kauai. While the 2012 and 2016 arrival of mongoose is troubling, there remains no biological evidence that a population of mongoose occurs on Kauai. Therefore, it was necessary to resolve the discrepancy between the perception and the evidence.

The USFWS-Pacific Islands Fish and Wildlife Office (PIFWO) in coordination with the Kauai Invasive Species Committee (KISC), a project of the Pacific Cooperative Studies Unit (PSCU) of the University of Hawaii, developed a Kauai Mongoose Management Strategy and standard operating procedures (SOPs) for addressing the issue of mongoose on Kauai. The SOPs are threefold. First, they were designed to determine if an incipient population of mongoose exists on Kauai, i.e. this population status assessment. Secondly, the SOPs were designed to serve as an implementation strategy to eradicate an incipient population if detected. Finally, the SOPs will be used for Early Detection & Rapid Response (EDRR) for reported incursions if a future response is warranted.

This population status assessment was not intended to detect a single individual on the island. The premise underlying this assumes one mongoose or a few widely dispersed individuals pose little to no risk of establishing a population. An incipient population has a high probability of expanding to a size that makes eradication expensive and very difficult. Furthermore, assessments designed to detect single individuals would greatly exceed any potential funding resources and are unfeasible to implement in both costs and logistics.

Methods

Map 1: Housing Density Survey Points Adjusted. Exclusion areas buffered at 250m for housing and 500m for trapping and High Risk Areas buffered at 2.2km overlaid over transects and grids of tracking tunnel stations spaced at 500m intervals.

Status assessment surveys were focused on areas where there was a reasonable probability of a mongoose reaching an area by being transported in cargo or escaping from captivity. The likelihood of a mongoose establishing was also included as a factor in determining where to conduct surveys, with areas ranked based on the localized food resources and available habitat. High risk areas (HRAs) were defined as areas where cargo, capable of concealing and containing a mongoose, is offloaded. To help prioritize and identify survey areas, some areas were excluded from the survey. High human density areas were defined as areas with housing density >25 / km2 and excluded from the survey based on the premise that if an incipient population of mongoose is already established, it would have been detected by local residents. Current or recent predator survey locations where entities have conducted trapping or other detection techniques for other predators (e.g. rats and feral cats) were also excluded from this survey. See Map 1: Housing Density Survey Points Adjusted

Photo 2: Tracking Tunnels, Track Boards, and Bait Cups

Tracking tunnels with standardized bait (fish paste) and ink pads to record footprints were placed on transects with a 500 m inter-station interval along designated roadways and in a grid pattern in determined HRAs. Station coordinates for 307 locations were determined using ArcGIS and parameters stated above; Garmin GPS units were used to locate station position in the field. For road transects, 266 stations were placed off the road as much as practicable and necessary to prevent tampering and vandalism, while staying within the road easement. 41 stations were placed in a grid pattern with a 1-1.5km buffer in designated HRAs. For HRAs, field staff attempted to adhere to the pre-determined GIS coordinates; however, it is recognized that on-the-ground conditions required modification of station position.

Tracking Tunnel Deployment


Map 2: Tracking tunnel locations by unit

The survey area was divided into 12 units and each unit was surveyed sequentially. Surveys in a given area were conducted for one consecutive week. When tracking tunnels were placed, the tunnel identification number, GPS coordinate, time, and habitat photo were recorded. Tracking tunnels were collected after one week; animal tracks were identified, photographed, and recorded. USDA-National Wildlife Research Center provided training to KISC's assessment staff to improve the ability to differentiate mongoose tracks from other species of mammals.


Photo 2: Reference tracks from Hawaii Island of Mongoose and Cat Compared

Surveys were repeated four times throughout the assessment year, March 2017 – May 2018. The assessment was extended from 12 months to 15 months due to weather conditions that limited survey point access. Each survey ran for 6 weeks. 307 survey points from the original proposed 449 survey points identified in the SOPs were completed during the assessment period. Throughout the 4 surveys, tunnel placement was altered or removed due to road safety, roadside accessibility, terrain conditions, weather conditions, as well as, the flooding that led to road closures on the north shore and west sides of Kauai.

Results


Map 3: Animal Detection by Station

1,030 tracking tunnels were deployed over 95 days at 307 stations with 936 tracking cards analyzed. There was a tunnel loss of 9% throughout the assessment. The loss is attributed to road maintenance, vehicles, humans, animals, and weather - including heavy winds and flooding.

No mongoose tracks were detected throughout the assessment. Track analysis identified the presence of cats, mice, rats, insects, and unknown. Tracks were marked unknown when footprints were unidentifiable or unreadable. 54 unknown tracks resembling unrecognized foot pads or toes were sent to USDA APHIS NWRC for confirmation. No mongoose tracks were identified.

Mice were detected at 63.84% of the 307 stations; rats at 30.94%; cats at 29.31%; and insects at 14.33% (see Map 3). There was no animal detection (i.e. no footprints) at 4.88% of the stations. The low percentage of locations with no animal detection indicates the bait attracted a variety of wildlife, sufficient to conclude that if mongooses were present on Kauai, track evidence would have been detected in the assessment.

Similar detection percentages were seen at the HRAs stations: mice at 68.29%, cats at 31.7%, rats at 29.26%, insects at 21.95%, and no animal detected at 12.19% (see Map 4).


Map 4: Animal Detection by Station in Lihue High Risk Area

Conclusion

The assessment found no evidence constituting a confirmed mongoose detection. It should be noted that areas excluded from the assessment included locations where entities, such as KISC, NWR, USDA, DLNR, have conducted management or surveys using trapping and other detection techniques (e.g. cameras) and no mongoose has been detected. No mongoose detections throughout this assessment indicates with a degree of certainty that mongoose have not established a breeding or viable population on Kauai.

A confirmed detection of a mongoose during the assessment survey would have initiated an Early Detection Rapid Response as defined in the SOPs. However, credible sightings reaching the “response threshold” can also initiate a rapid response. The threshold, as defined in the SOPs, is three sightings within a two-week period that are enclosed inside a circle of a 0.5km radius. KISC will maintain a sufficient field crew to mobilize a rapid response throughout 2019. The capture of a mongoose during a response would initiate further communication and coordination with PIFOW and DOFAW to determine what level of management response is warranted. KISC will maintain all response components (e.g., materials, land owner permissions, personnel) necessary to implement a response in a timely manner.

It is important to note that this assessment was just one part of an overall management strategy to ensure Kauai remains mongoose free. It is essential that this mongoose population status assessment, and any management response, is followed by a strengthening of biosecurity procedures to minimize the risk of transporting mongooses to Kauai from elsewhere in Hawaii.

This population status assessment was completed by KISC with the oversight of USFWS-Pacific Islands Fish and Wildlife Office and in coordination with Hawaii's Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW). Excerpts from: "Kauai Mongoose Standard Operating Procedures to Conduct an Island-wide Status Assessment & Early Detection Rapid Response." (Phillips & Lucey, 2015)