

Appendix F

**Survey of Avian and Terrestrial Mammalian
Species
Rana Productions, Ltd.
September 2006**

A Survey of Avian and Terrestrial Mammalian
Species on TMK (3) 7-3-09:17, 25, 26, and 28, at
Kaloko, and Kohanaiki, North Kona District,
Island of Hawai'i.

DRAFT

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Introduction

This report summarizes the findings of avian and mammalian surveys conducted on an approximately 1,151-acre parcel of land identified as TMK (3) 7-3-09:17, 25, 26, and 28. The property is located in the Kaloko, and Kohanaiki *Ahupua'a*s, in the North Kona District, Hawai'i (Figure 1).

The primary purpose of the surveys was to determine if there were any avian or mammalian species currently listed as endangered, threatened, or proposed for listing under either the federal or the State of Hawai'i's endangered species programs on, or within in the immediate vicinity of the site. Federal and State of Hawai'i listed species status follows species identified in the following referenced documents (Division of Land and Natural Resources (DLNR) 1998, Federal Register 2005, U. S. Fish & Wildlife Service (USFWS) 2005, 2006). Fieldwork was conducted between September 7 and 11, 2006.

Avian phylogenetic order and nomenclature follows *The American Ornithologists' Union Check-list of North American Birds 7th Edition* (American Ornithologists' Union 1998), and the 42nd through the 47th supplements to *Check-list of North American Birds* (American Ornithologists' Union 2000; Banks et al. 2002, 2003, 2004, 2005, 2006). Mammal scientific names follow *Mammals in Hawaii* (Tomich 1986). Higher native and naturalized plant names follow *Manual of the Flowering Plants of Hawaii* (Wagner et al. and Wagner and Herbst, 1990, 1999). Place names follow *Place Names of Hawaii* (Pukui et al. 1974).

Hawaiian and scientific names are italicized in the text. A glossary of technical terms and acronyms used in the document, which may be unfamiliar to the reader, are included at the end of the narrative text on Page 14.

General Site Description

The approximately 1,151-acre parcel of land is located in Kaloko, in the North Kona District. The site is transected by the existing Hina Lani Street, and is located immediately upslope (*mauka*) of the Kaloko Light Industrial Park. The site is bound to the northeast, east and south by undeveloped land. The northwest boundary of the site is along Queen Ka'ahumanu Highway, the southwest corner is bound by the Kaloko Light Industrial Park, and the northwest by the Kohanaiki Industrial Park (Figure 1). The site gently slopes from east to west from a maximum elevation of ~740-feet above mean sea level (ASL) at the northeastern boundary, down to ~60-feet ASL at the northwestern boundary, located along Queen Ka'ahumanu Highway (USGS 1996). The project area consists to three distinct lava flows, the oldest is an 'a'ā flow disgorged from Mount Hualālai between 5,000 and 10,000 years ago, most of this flow has been covered by a mix of weathered broken pūhoehoe, and 'a'ā flows deposited some 3,000 to 5,000 years ago, much of this flow has since been covered by newer flows laid down between 1,500

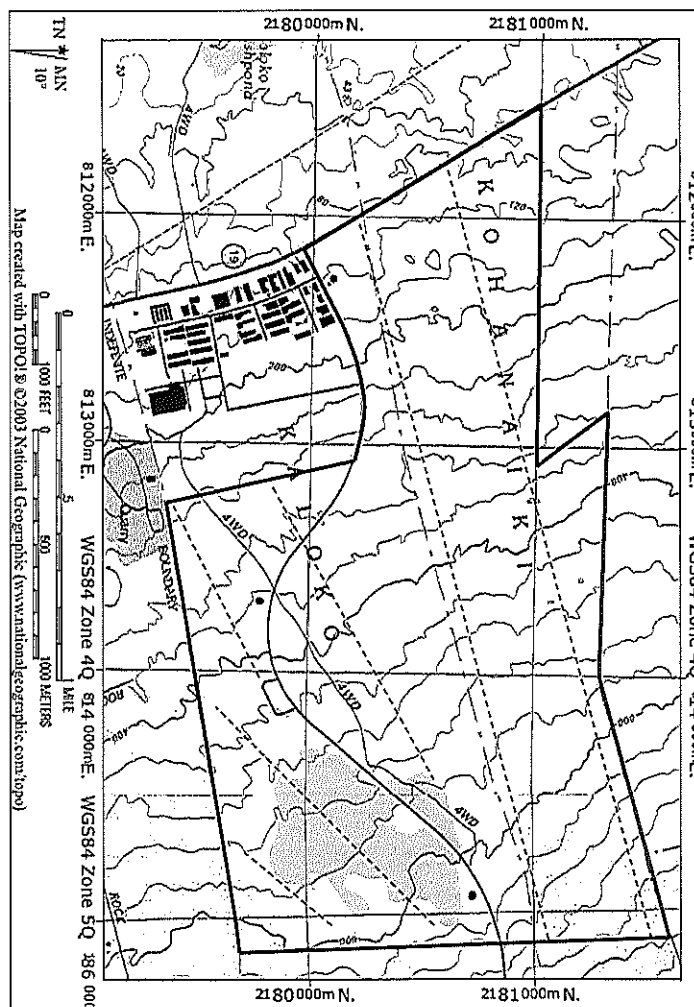
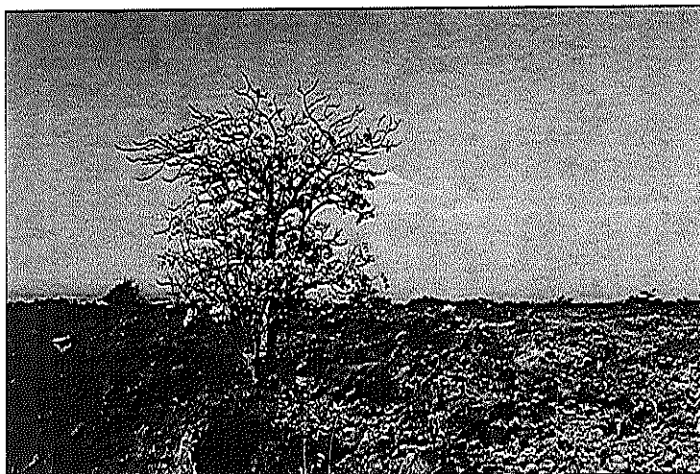


Figure 1 – Kaloko Properties Study Site
Red Line Represents Approximate Boundaries of the Site – Blue Dotted Lines Indicate Avian Transects

and 3,000 years ago (Wolfe and Morris 1996, USGS 1996).

The vegetation present on the oldest 'a'a flows not covered by newer flows has a high degree of native components remaining, including several rare and endangered species (Figure 2). The bulk of the site, however, is dominated by alien vegetation. This dominant vegetation can be best characterized as a Fountain Grass/ Koa Haole Grassland subtype of a Lowland Dry Grassland Community as described in Gagne and Cuddihy (1990) (Figure 3).

Figure 2
Dryland Forest Vegetation on 'A'a Flows,
'ohe makai (*Reynoldsia sandwicensis*) in the foreground



Avian Survey Methods

Thirty-two avian count stations were sited at approximately 300-meter intervals along six linear transects running from east-to-west through the project area (Figure 1). One six-minute point count was conducted at each station. Field observations were made using Leitz 10 X 42 binoculars to sight birds and by listening for vocalizations. Counts took place between 06:30 a.m. and 10:30 a.m., the peak of daily bird activity. In an attempt to detect nocturnally flying seabirds over-flying the project area. An additional two hours were spent within the project area on the evenings of September 7th, 8th and 9th on the

mornings of September 8th, 9th, and 10th, 2006. Time not spent counting was used to search the study site for species and habitats that were not detected during count sessions.

Figure 3
Typical Fountain Grass/ Koa Haole Grasslands



Avian Survey Results

A total of 881 individual birds of 20 different species, representing 11 separate families were recorded during station counts. Additionally, one other species, Barn Owl (*Tyto alba*) was recorded as an incidental observation on the evening of September 7, 2006. One of the species recorded, Pacific Golden-Plover (*Pluvialis fulva*) is an indigenous migratory shorebird species that nests in the high Arctic, returning to Hawaii and the Tropical Pacific to spend the fall and winter months each year. The remaining 18 species detected are considered to be alien to the Hawaiian Islands, with one of them, Red Junglefowl (*Gallus gallus*) a domestic species, not currently considered to be established in the wild on the Island of Hawai'i (Table 1).

No avian species currently listed as endangered, threatened, or proposed for listing under either the federal or the State of Hawai'i's endangered species programs were detected during the course of this survey.

Avian diversity and densities were relatively low, though in keeping with the extremely dry habitat present on the site. Three species, House Finch (*Carpodacus mexicanus*), Zebra Dove (*Geopelia striata*), and Japanese White-eye (*Zosterops japonicus*), accounted for 43% of the total number of individual birds recorded. House Finches were the most frequently recorded species, accounting for slightly more than 17% of the total number of individual birds recorded during station counts. An average of 27 birds were recorded per station count.

Table 1

Avian Species Detected Within the Kaloko Properties Study Site			
Common Name	Scientific Name	ST	RA
GALLIFORMES			
PHASIANIDAE - Pheasants & Partridges			
Phasianinae - Pheasants & Allies			
Gray Francolin	<i>Francolinus pondicerianus</i>	A	0.84
Black Francolin	<i>Francolinus francolinus</i>	A	0.56
Erckel's Francolin	<i>Francolinus erckelii</i>	A	0.06
Red Junglefowl	<i>Gallus gallus</i>	D	0.06
Kalij Pheasant	<i>Lophura leucomelanos</i>	A	0.09
CHARADRIIFORMES			
CHARADRIIDAE - Lapwings & Plovers			
Charadriinae - Plovers			
Pacific Golden-Plover	<i>Pluvialis fulva</i>	IM	0.34
COLUMBIFORMES			
COLUMBIDAE - Pigeons & Doves			
Spotted Dove	<i>Streptopelia chinensis</i>	A	2.22
Zebra Dove	<i>Geopelia striata</i>	A	3.66
STRIGIFORMES			
TYTONIDAE - Barn Owls			
Barn Owl	<i>Tyto alba</i>	A	I-1
PASSERIFORMES			
ZOSTEROPIDAE - White-eyes			
Japanese White-eye	<i>Zosterops japonicus</i>	A	3.44
MIMIDAE - Mockingbirds & Thrashers			
Northern Mockingbird	<i>Mimus polyglottos</i>	A	0.22
STURNIDAE - Starlings			
Common Myna	<i>Acridotheres tristis</i>	A	2.25
EMBERIZIDAE - Emberizids			
Saffron Finch	<i>Stalioa flavicola</i>	A	1.31

Common Name	Scientific Name	ST	RA
Yellow-billed Cardinal	<i>Paroaria capitata</i>	A	0.88
CARDINALIDAE - Cardinals Saltators & Allies			
Northern Cardinal	<i>Cardinalis cardinalis</i>	A	1.56
FRINGILLIDAE - Fringilline and Cardueline Finches & Allies			
Carduelinae - Carduline Finches			
House Finch	<i>Carpodacus mexicanus</i>	A	4.75
Yellow-fronted Canary	<i>Serinus mozambicus</i>	A	1.31
PASSERIDAE - Old World Sparrows			
House Sparrow	<i>Passer domesticus</i>	A	0.66
ESTRILDIDAE - Estrildid Finches			
Estrildinae - Estrildine Finches			
African Silverbill	<i>Lonchura cantans</i>	A	2.03
Nutmeg Mannikin	<i>Lonchura punctulata</i>	A	0.66
Java Sparrow	<i>Padda oryzivora</i>	A	1.13

KEY TO TABLE 1

ST Status

A Alien - Introduced to the Hawaiian Islands by humans

D Domestic Species - Not considered to be established in the wild on the Island of Hawai'i

IM Indigenous Migratory Species

RA Relative Abundance - Number of birds detected divided by the number of count stations (32)

I- Incidental - Species detected incidentally, followed by the number of individuals recorded

Mammalian Survey Methods

All observations of mammalian species were of an incidental nature. With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or 'ope'ape'a as it is known locally, all terrestrial mammals currently found on the Island of Hawai'i are alien species, and most are ubiquitous. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. A running tally was kept of all vertebrate species observed and heard within the study area. Visual and electronic scans, using a Broadband AnaBat II[®] ultrasonic bat detector, were made for bats during crepuscular periods on the evening of September 7, 8 and 9, 2006.

Mammalian Survey Results

A total of nine mammalian species were detected while on the site. Seven European house mice (*Mus musculus domesticus*) were seen within the study area (Table 1). A total of five small Indian mongooses (*Herpestes a. auro-punctatus*) were seen at various locations within the study site, as were two cat (*Felis catus*), one pig (*Sus s. scrofa*) and 35+ goats (*Capra h. hircus*). Additionally, skeletal remains were encountered of small

Indian mongoose, cat, pig, cattle (*Bos Taurus*), goat and sheep (*Ovis aries*). Tracks and sign of dogs (*Canis f. familiaris*), was encountered in several locations within the study area.

Hawai'i's sole endemic terrestrial mammalian species, the endangered Hawaiian hoary bat, was not detected during the survey, though I did record one bat as an incidental observation on the evening of September 15, 2006, while driving up Hina Lani Street. All of the alien mammalian species recorded during this survey are deleterious to avian and floristic components of the remaining native ecosystems present on the Island.

Table 2

Mammalian Species Detected Within the Kaloko Properties Study Site		
Common name	Scientific name	Status
CHIROPTERA - BATS		
VESPERTILIONIDAE - Common Bats		
Hawaiian hoary bat	<i>Lasurus cinereus semotus</i>	EE
RODENTIA - GNAWERS		
Muridae - Old World Rats & Mice		
European house mouse	<i>Mus musculus domesticus</i>	A
CARNIVORA- FLESH EATERS		
Canidae - Wolves, Jackals & Allies		
Domestic dog	<i>Canis f. familiaris</i>	A
Viverridae - Civets & Allies		
Small Indian mongoose	<i>Herpestes a. auropunctatus</i>	A
Felidae- Cats		
House cat	<i>Felis catus</i>	A
ATRIDACTYLA - EVEN-TOED UNGULATES		
Suicidae - Old World Swine		
Pig	<i>Sus s. scrofa</i>	A
Bovidae- Hollow-horned Ruminants		
Domestic cattle	<i>Bos taurus</i>	A
Domestic goat	<i>Capra h. hircus</i>	A
Domestic sheep	<i>Ovis aries</i>	A

KEY TO TABLE 2

A Alien - Introduced to the Hawaiian Islands by humans

EE Endangered Endemic - Native and unique to the Hawaiian Islands

Discussion

Avian Resources

Avian diversity and densities detected during this survey were in keeping with the results of at least one previous survey conducted on a portion of this site (David 1995), and with several other surveys conducted on lands immediately adjacent to it (David 2000a, 2000c, 2004a, 2004c) and with several other surveys conducted on various parcels of land, with like habitat, in the lowland areas in the North Kona District within the recent past (David 1999, 2000b, 2000d, 2001, 2003, 2004b, 2005b, 2005c, 2006a, 2006b).

All but one of the 21 avian species detected during the course of this survey are considered to be alien to the Hawaiian Islands. The lone native species detected, Pacific Golden-Plover is a common indigenous migratory shorebird species, seen throughout the state between July and late April each year. Avian diversity and densities were low, as is to be expected given the fountain grass dominated xeric habitat present on the site and the surrounding property.

Although not detected during this survey it is possible that small numbers of the endangered endemic Hawaiian Petrel (*Pterodroma sandwichensis*), or *ua'u*, and the threatened Newell's Shearwater (*Puffinus auricularis newelli*), or *'a'o*, over-fly the project area between the months of May and November (Banko 1980a, 1980b, Day et al. 2003a, Harrison 1990).

Hawaiian Petrels were formerly common on the Island of Hawai'i (Wilson and Evans 1890-1899). This pelagic seabird reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle area between Mauna Loa and Mauna Kea (Henshaw 1902), as well as at the mid to high elevations of Mount Hualālai. It has, within recent historic times, been reduced to relict breeding colonies located at high elevations on Mauna Loa and, possibly, Mount Hualālai (Banko 1980a, Banko et al. 2001, Cooper and David 1995, Cooper et al. 1995, Day et al. 2003, Harrison 1990, Hue et al. 2001, Simons and Hodges 1998).

Newell's Shearwaters were formerly common on the Island of Hawai'i (Wilson and Evans 1890-1899). This species breeds on Kaua'i, Hawai'i and Moloka'i in extremely small numbers. Newell's Shearwater populations have dropped precipitously since the 1880s (Banko 1980b, Day et al., 2003b). This pelagic species nests high in the mountains in burrows excavated under thick vegetation, especially *uluhe* (*Dicranopteris linearis*) fern.

The primary cause of mortality in both Hawaiian Petrels and Newell's Shearwaters is thought to be predation by alien mammalian species at the nesting colonies (U.S. Fish & Wildlife Service 1983, Simons and Hodges 1998, Ainley et al. 2001). Collision with man-made structures is considered to be the second most significant cause of mortality of these seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on

their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds often collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley 1961, Telfer 1979, Sincock 1981, Reed et al. 1985, Telfer et al. 1987, Cooper and Day 1998, Podolsky et al. 1998, Ainley et al. 2001). There is no suitable nesting habitat within or close to the proposed project site for either of these pelagic seabird species.

Mammalian Resources

The findings of the mammalian survey are consistent with the results of at least one previous survey conducted on a portion of this site (David 1995), and with several other surveys conducted on lands immediately adjacent to it (David 2000a, 2000c, 2004a, 2004c) and with several other surveys conducted on various parcels of land, with like habitat, in the lowland areas in the North Kona District within the recent past (David 1999, 2000b, 2000d, 2001, 2003, 2004b, 2005b, 2005c, 2006a, 2006b).

One Hawaiian hoary bats was detected as an incidental observation flying down-slope, (*makai*), from above the eastern boundary of the site towards the ocean. This finding was not unexpected as bats are regularly seen *mauka* of the project site and also below the subject property in the Kaloko-Honokōhau National Historical Park and above the Honokōhau small boat harbor on a seasonal basis (Jacobs 1994, David 2006c). Unlike nocturnally flying seabirds, which often collide with man-made structures, bats are uniquely adapted to avoid collision with most obstacles, man-made or natural. They navigate and locate their prey primarily by using ultrasonic echolocation, which is sensitive enough to allow them to locate and capture small volant insects at night.

Very little research into the life cycle, distribution, or population estimates of this species, has been conducted; and much of what has been studied, were small, disconnected, or anecdotal studies as opposed to coherent controlled experiments. Fundamental research into this species distribution and life cycle has just begun (Bonaccorso et al. 2005).

Although only European house mice were detected during the course of this survey it is probable that the other three established *muridae* known from the Island of Hawai'i, roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), and possibly Polynesian rat (*Rattus exulans hawaiiensis*) use resources within the subject property at least occasionally. Especially since the site is bound to the north and south by light industrial developments that likely harbor these commensal species.

Potential Impacts to Protected Species

Hawaiian Hoary Bat

As previously discussed, it is likely that Hawaiian hoary bats over-fly the general project area on a seasonal basis. The planting of trees and ornamental vegetation following

development may increase the presence of prey items for this insectivorous bat, and thus may in fact enhance foraging resources for this species in the area.

Hawaiian Petrel and Newell's Shearwater

The principal potential impact that the development of this site poses to Hawaiian Petrels and Newell's Shearwaters is the increased threat that birds will be downed after becoming disoriented by external lights associated with the new development.

Endangered Waterbirds

Although there is no standing water, streams or other water features on the property, and thus the habitat present does not support waterbirds, two listed waterbird species Hawaiian Coot (*Fulica alai*), and the Hawaiian endemic sub-species of the cosmopolitan Black-necked Stilt (*Himantopus mexicanus knudseni*), are resident breeding species within the Kaloko-Honokōhau National Historical Park, which is located directly across the Queen Ka'āulāmanu Highway from the northwestern terminus of the project site. The development of this site does not pose direct threats to these species or their habitat, although, the potential exists that the development could pose secondary threats to the National Park and to it's endangered birds if noxious substances such a petroleum, oils lubricants, sewage and the like were to migrate downslope (*makai*) from the project into the Park.

Conclusions

The modification of the current habitat on the site is not expected to result in significant impacts to any avian or mammalian species currently listed as threatened, endangered or proposed for listing under either the Federal, or State of Hawai'i endangered species programs. Furthermore, the development of the site is not expected to have a significant deleterious impact on native faunal resources found within the North Kona District, with the one possible caveat that if noxious substances such a petroleum, oils lubricants, sewage and the like were to migrate downslope, from the project either during construction, or following build-out, into the Kaloko-Honokōhau National Historical Park, the possibility exists that such an event could result in deleterious impacts to two listed waterbird species, Hawaiian Coot and Black-necked Stilt and/or their habitat.

Recommendations

- To reduce the potential for interactions between nocturnally flying Hawaiian Petrels and Newell's Shearwaters with external lights and man-made structures, it is recommended that any external lighting that may be required in conjunction with development of the project be shielded (Reed et al. 1985, Telfer et al. 1987). This mitigation would serve the dual purpose of minimizing the threat of disorientation and downing of Hawaiian Petrels and Newell's Shearwaters, while at the same time complying with the Hawaii County Code § 14 – 50 *et seq.* which requires the shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting to the astronomical observatories located on Mauna Kea.

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- To address potential runoff issues and possible secondary impacts to listed waterbird species and their habitat found within the Kaloko-Honokōhau National Historical Park, it is recommended that once a conceptual Master Plan has been developed that the project, consult with both the USFWS and the National Park Service to ensure that implementation of the Master Plan will not result in deleterious impacts to listed waterbird species and their habitat, which is present within the Park.

Glossary:

'A'a – Clinker lava formed by slow moving lava flows.

Alien - Introduced to Hawai'i by humans.

Ahupua'a – Traditional Hawaiian land division, usually extending from the uplands to the sea.

Commensal – Animals that share humans' food and lodgings, such as rats and mice.

Crepuscular – Twilight hours.

Diurnal – Daytime

Domesticated – Feral species, not considered established in the wild on the Island of Hawai'i.

Endangered – Listed and protected under the ESA as an endangered species.

Endemic – Native and unique to the Hawaiian Islands.

Indigenous - Native to the Hawaiian Islands, but also found elsewhere naturally.

Muridae – Rodents, including rats, mice and voles, one of the most diverse families of mammals.

Mauka – Upslope, towards the mountains

Makai – Down-slope, towards the ocean.

Nocturnal – Nighttime, after dark.

Pāhoehoe – Sheet lava formed by relatively fast moving lava flows.

Ruderal – Disturbed, rocky, rubbishy areas, such as old agricultural fields and rock piles

Threatened - Listed and protected under the ESA as a threatened species.

Volant – Flying, capable of flight - as in flying insect.

Xeric – Extremely dry conditions or habitat.

ASL – Above mean sea level.

DLNR – Hawaii State Department of Land & Natural resources.

ESA – Endangered species act of 1973, as amended.

TMK – Tax Map Key.

USFWS – U.S. Fish & Wildlife Service

Literature Cited

- Ainley, D. G., R. Podolsky, L. Deforest, G. Spencer, and N. Nur. 2001. The Status and Population Trends of the Newell's Shearwater on Kaula: Insights from Modeling. In: Scott, J. M., S. Conant, and C. Van Riper III (editors) *Evolution, Ecology, Conservation, and Management of Hawaiian Birds: A Vanishing Avifauna*. Studies in Avian Biology No. 22. Cooper's Ornithological Society, Allen Press, Lawrence, Kansas. (Pg. 108-123)
- American Ornithologist's Union. 1998. *Check-list of North American Birds*. 7th edition. AOU. Washington D.C. 829pp.
- _____. 2000. Forty-second supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 117:847-858.
- Banks, R. C., C. Cicero, J. L. Dunn, A. W. Kratter, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, and D. F. Stotz. 2002. Forty-third supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 119:897-906.
- _____. 2003. Forty-fourth supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 120:923-931.
- _____. 2004. Forty-fifth supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 121:985-995.
- _____. 2005. Forty-sixth supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 122:1031-1031.
- _____. 2006. Forty-seventh supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 123:926-936.
- Banko, W. E. 1980a. Population Histories- Species Accounts Seabirds: Hawaiian Dark-rumped Petrel ('Ua'u). Cooperative National Park Resources Studies Unit, University of Hawaii at Manoa, Department of Botany, Technical Report #5B.
- _____. 1980b. Population Histories- Species Accounts Seabirds: Newell's Shearwater ('A'o). Cooperative National Park Resources Studies Unit, University of Hawaii at Manoa, Department of Botany, Technical Report #5A.
- Banko, P. C., R. E. David, J. D. Jacobi, and W. E. Banko. 2001. Conservation Status and Recovery Strategies for Endemic Hawaiian Birds. In: Scott, J. M., S. Conant, and C. Van Riper III (editors) *Evolution, Ecology, Conservation, and Management of Hawaiian Birds: A Vanishing Avifauna*. Studies in Avian Biology No. 22. Cooper's Ornithological Society, Allen Press, Lawrence, Kansas (Pg. 359-376).
- Bonaccorso, F. J., C. M. Todd and, A. C. Miles. 2005. Interim Report on Research to Hawaiian Bat Research Consortium for The Hawaiian Hoary Bat, Ope'ape'a, *Lasiurus cinereus semotus*. 1 September 2004 to 31 August 2005.
- Cooper, B. A. and R. E. David. 1995. Radar and Visual Surveys of Seabirds in the HELCO SSP

Unit 71, Puna, Hawaii, During July 1995. Prepared for R. M. Towill Corporation & Hawaii Electric Light Co.

- Cooper, B.A., R.E. David, and R.J. Blaha. 1995. Radar and Visual Surveys of Endangered Seabirds and Bats in the Pohakuloa Training Area, Hawaii, During Summer 1995. Prepared for R.M. Towill Corporation and the U.S. Army Corps of Engineers, Pacific Division (POD).
- Cooper, B. A. and R. H. Day. 1998. Summer Behavior and Mortality of Dark-rumped Petrels and Newell's Shearwaters at Power Lines on Kauai. *Colonial Waterbirds*, 21 (1): 11-19.
- David, R. E. 1995. Faunal Survey for the Kaloko Town Center, Environmental Impact Statement, District of North Kona, Island of Hawaii, Hawaii. Prepared for: Tokyo Green Hawaii, Inc. & Pacific Land Services, Inc. 23 pp.
- David, R. E. 1999. Faunal Survey of Terrestrial Vertebrate Species, within the Proposed University of Hawaii Center at West Hawaii Site, North Kona, Hawaii. Hawaii Community College Long Range Development Plan. Prepared for: Wil Chee Planning.
- _____. 2000a. Faunal Survey of Avian and Mammalian Species within the Proposed Kaloko-Honokohau Business Park Site, Ka-loko, North Kona District, Island of Hawaii. Prepared for: William L. Moore Planning & Lanikai Partners, L.P.
- _____. 2000b. Faunal Survey of Avian and Mammalian Species, Kona International Airport Master Plan Update. Keahole, North Kona, Hawaii. Prepared for: Edward K. Noda & Associates & Department of Transportation Airports Division (HDOT-AIR).
- _____. 2000c. Faunal Survey of Avian and Mammalian Species Kaloko Industrial Park, Phases III & IV, Kaloko, North Kona, Hawaii. Prepared for: Wilson Okamoto & Associates and TSA International, Ltd.
- _____. 2000d. A Survey of Avian and Mammalian Species, Various Sites at Ka'upulehu. North Kona District, Island of Hawaii. Hawaii. Prepared for: Belt Collins Hawaii, Ltd.
- _____. 2001. Faunal Survey of Avian and Mammalian Species on the DHHL Commercial / Industrial Development Project Site at Kealakehe, North Kona District, Hawaii. Prepared for: PBR Hawaii, Inc. and The Department of Hawaiian Homes.
- _____. 2003. A Survey of Avian and Terrestrial Mammalian Species on the Verizon Hawaii, Inc. Lot TMK: 3/7-4-08:20, at Keahuolu, North Kona District, Hawaii. Prepared for: Blu Croix Ltd., and Verizon Hawaii, Ltd.
- _____. 2004a. A Survey of Avian and Terrestrial Mammalian Species on TMK: 7-3-08:47, North Kona District, Island of Hawaii. Prepared for: Smith & Collins L.L.C., Dallas, Texas.

- David, R. E. 2004b. A Survey of Avian and Terrestrial Mammalian Species, Keauhou Mauka Lands, Keauhou, North Kona District, Island of Hawai'i. Prepared for: Geometrician Associates, LLC and Kamehameha Investment Corporation.
- _____. 2004c. A Survey of Avian and Terrestrial Mammalian Species for the Proposed Hina Lani Reservoir and Transmission Line, North Kona District, Island of Hawai'i. Prepared for: Wilson Okamoto Corporation & Hawaii County Department of Water Supply.
- _____. 2005a. A Botanical Survey of an Eight Acre Portion of TMK(7)3-09:28, North Kona District, Island of Hawai'i. Prepared for: Wilson Okamoto Corporation, Ltd.
- _____. 2005b. A Survey of Avian and Terrestrial Mammalian Species, La'aloa Avenue Extension, North Kona District, Island of Hawai'i. Prepared for: Geometrician Associates L.L.C. and Towne Development Corporation.
- _____. 2005c. A Survey of Avian and Terrestrial Mammalian Species for the Proposed UH-West Hawaii, Collector Road. Prepared for: AECOS Consultants and Wil Chee Planning.
- _____. 2006a. A Survey of Avian and Terrestrial Mammalian Species, Kona Kai Ola at Kealahou, lands of KeahouLū, North Kona District, Island of Hawai'i. Prepared for: Oceanit Laboratories, Inc. and Jacoby Development, Inc.
- _____. 2006b. Biological Surveys of TMK(7)3-10:003, 051, 052, 053 & 054, as well as Portions of the Proposed Homestead Road Conducted for the Lokahi Ka'u Development, North Kona District, Island of Hawai'i. Prepared for: Westpro Holdings, LLC.
- _____. 2006c. Unpublished Field Notes – Island of Hawai'i: 1985-2006.
- Day, R. H., B. Cooper, and R. J. Blaha. 2003a. Movement Patterns of Hawaiian Petrels and Newell's Shearwaters on the Island of Hawai'i. *Pacific Science*, 57, 2:147-159.
- Day, R. H., B. Cooper, and T. C. Telfer. 2003b. Decline of Townsend's (Newell's Shearwaters (*Puffinus auricularis newelli*) on Kauai, Hawaii. *The Auk* 120: 669-679.
- Department of Land and Natural Resources. (DLNR). 1998. Indigenous Wildlife, Endangered and Threatened Wildlife and Plants, and Introduced Wild Birds. Department of Land and Natural Resources. State of Hawaii. Administrative Rule §13-134-1 through §13-134-10, dated March 02, 1998.
- Federal Register. 2005. Department of the Interior, Fish and Wildlife Service, 50 CFR 17. Endangered and Threatened Wildlife and Plants. Review of Species That Are Candidates or Proposed for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petition; Annual Description of Progress on Listing Actions. Federal Register, 70 No. 90 (Wednesday, May 11, 2005): 24870-24934.
- Gagne, W. C. and L. W. Cuddihy. 1990. In: Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai'i*. University of Hawaii Press, Honolulu, Hawaii 1854 pp.

- Hadley, T. H. 1961. Shearwater calamity on Kauai. *Elepaio* 21:60.
- Harrison, C. S. 1990. *Seabirds of Hawaii: Natural History and Conservation*. Cornell University Press, Ithaca, N.Y. 249 pp.
- Henshaw, H.W. 1902. *Complete list of birds of the Hawaiian Possessions with notes on their habits*. Thrum, Honolulu. 146 pp.
- Hue, D., C. Glidden, J. Lippert, L. Schnell, J. MacIvor and J. Meisler. 2001. Habitat Use and Limiting Factors in a Population of Hawaiian Dark-rumped Petrels on Mauna Loa, Hawai'i. In: Scott, J. M., S. Conant, and C. Van Riper III (editors) *Evolution, Ecology, Conservation, and Management of Hawaiian Birds: A Vanishing Avifauna*. Studies in Avian Biology No. 22. Cooper's Ornithological Society, Allen Press, Lawrence, Kansas (Pg. 234-242).
- Jacobs, D. S. 1994. Distribution and Abundance of the Endangered Hawaiian Hoary Bat, *Lasiurus cinereus semotus*, on the Island of Hawai'i. *Pacific Science*, Vol. 48, No. 2: 193-200.
- Podolsky, R., D.G. Ainley, G. Spencer, L. de Forest, and N. Nur. 1998. "Mortality of Newell's Shearwaters Caused by Collisions with Urban Structures on Kauai". *Colonial Waterbirds* 21:20-34.
- Pukui, M. K., S. H. Elbert, and E. T. Mookini. 1976. *Place Names of Hawaii*. University of Hawaii Press. Honolulu, Hawai'i. 289 pp.
- Reed, J. R., J. L. Sincoc, and J. P. Hailman 1985. Light Attraction in Endangered Procellariiform Birds: Reduction by Shielding Upward Radiation. *Auk* 102: 377-383.
- Simons, T. R., and C. N. Hodges. 1998. Dark-rumped Petrel (*Pterodroma phaeopygia*). In A. Poole and F. Gill (editors). *The Birds of North America*, No. 345. The Academy of Natural Sciences, Philadelphia, PA. and the American Ornithologists Union, Washington, D.C.
- Sincoc, J. L. 1981. Saving the Newell's Shearwater. Pages 76-78 in Proceedings of the Hawaii Forestry and Wildlife Conference, 2-4 October 1980. Department of Land and Natural Resources, State of Hawaii, Honolulu.
- Telfer, T. C. 1979. Successful Newell's Shearwater Salvage on Kauai. *Elepaio* 39:71
- Telfer, T. C., J. L. Sincoc, G. V. Byrd, and J. R. Reed. 1987. Attraction of Hawaiian seabirds to lights: Conservation efforts and effects of moon phase. *Wildlife Society Bulletin* 15:406-413.
- Tomich, P.Q. 1986. *Mammals in Hawaii*. Bishop Museum Press. Honolulu, Hawaii. 37 pp.
- U.S. Fish & Wildlife Service (USFWS) 1983. Hawaiian Dark-Rumped Petrel & Newell's Manx Shearwater Recovery Plan. USFWS, Portland, Oregon. February 1983.

U.S. Fish & Wildlife Service (USFWS). 1998. Recovery Plan for the Hawaiian Hoary Bat. U.S. Fish & Wildlife Service, Portland, Oregon.

_____. 2005. Endangered and Threatened Wildlife and Plants. 50CFR 17:11 and 17:12 (Tuesday, November 1, 2005).

_____. 2006. USFWS Threatened and Endangered Species System (TESS), online at http://ecos.fws.gov/tess_public/StartTESS.do

United States Geological Survey (USGS). 1996. Keahole Point Quadrangle, Hawaii, Hawaii Co. 7.5 minute series (Topographic). Denver, Colorado.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai'i*. University of Hawaii Press, Honolulu, Hawaii 1854 pp.

Wagner, W.L. and D.R. Herbst. 1999. *Supplement to the Manual of the flowering plants of Hawai'i*, pp. 1855-1918. In: Wagner, W.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawaii Press and Bishop Museum Press, Honolulu.

Wilson, S. B., and A. H. Evans. 1890-1899. *Aves Hawaiiensis: The birds of the Sandwich Islands*. R. H. Porter, London.

Wolfe, E. W., and J. Morris. 1996. Geological Map of the Island of Hawaii. U.S. Department of the Interior, U.S. Geological Survey.