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CPSU/UH Avian History Report 10

HISTORY OF ENDEMIC HAWAIIAN BIRDS

Part 1. POPULATION HISTORIES--SPECIES ACCOUNTS Forest Birds: Maui Parrotbill, 'O'u, Palila, Greater Koa Finch, Lesser Koa Finch and Grosbeak Finch

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ABSTRACT

Pseudonestor xanthophrys is a small, short-tailed, olive-green forest bird with a yellowish superciliary stripe and large, thick hooked bill. It is endemic to the island of Maui. Exhaustive search of literature and field journals uncovered some 41 observational notes, collection records, reports and related statements on relative abundance and geographical distribution from 1892 to 1979. All records are serially numbered, arranged in geographical and chronological order, referenced, and systematically analyzed. Analysis of records reveals severe to complete depopulation of P. xanthophrys in their principal 4000 to 5000 feet elevation range on the northwest flank of Haleakalā, with survival of lesser numbers at 6000 to 7000 feet elevation on the north and eastern slopes.

42. Pseudonestor xanthophrys

Maui Parrotbill

The Maui Parrotbill is a small (ca. 5 to 6 inches long), short-tailed, olive-green forest bird with a yellowish superciliary stripe and enormously hooked maxilla with very broad mandible (Rothschild 1900). Endemic to the island of Maui, P. xanthophrys was first described by Rothschild (1893) from specimens secured by H. C. Palmer in 1892. Except for its heavy parrot-like bill, which caused it to be placed in a separate genus, it is similar in structure and color to Hemignathus lucidus (Rothschild 1900).

Numbers and principal repositories of 34 specimens are as follows: 11 (including the type) in American Museum of Natural History, 8 in British Museum of Natural History, and 6 (1 mounted) in the Bernice Pauahi Bishop Museum (Banko 1979 report).

Almost everything known of the habits and behavior of P. xanthophrys was recorded from field observations by Perkins (1895, 1903). Berger (1972) provides a recent overview of the little that is known of this species.

In the following historical account, one or two digit numbers in parentheses refer to specific records in the Appendix. Sources cited in the Appendix may be traced to complete references in the bibliography.

Early Notes and Records (1892-1901):

In the first mention of collecting locality Rothschild (1900) states that on 1 August (1892) H. C. Palmer collected two specimens and saw two more while encamped "5,000 feet high on the mountain," probably above Olinda on Haleakalā, in a "not very dense" forest of "small ohias, a few koas" and "a sprinkling of Mamane...along a trail right up to the top" (8). Rothschild (1900), no doubt based on Palmer's notes, recorded the taking of two more specimens on 15 August, apparently in the same locality, plus the fact that this species appeared to be "rather rare" there and that only a small number of specimens were procured (4, 5). In his diary Palmer noted seeing a Parrotbill on 22 September 1892 in Kīpahulu Valley, "I think about 7000 to 8000 feet high" (Rothschild 1900) (29). Of a total of eight specimens taken by Palmer seven were collected in August (Banko 1979 report) (6). S. B. Wilson had missed observing the Maui Parrotbill on his visit to the Islands in 1887 and 1888 and followed Perkins 1895) in terming it "local and rare" at 5000 feet elevation of Haleakalā in his later account of this species (Wilson & Evans 1896) (3).

While staying at "Mr. Payne's (Paine's) mountain house (ca. 4000 ft elev.), considerably higher up than Olinda" (ca. 3500 ft elev.), Perkins (field journal) recorded collecting seven of eight specimens in March and April 1894, two at elevations of 5000 feet and one at about 7000 feet, and seeing or hearing a few others (9-15). During a recent survey of museums, only three of Perkins' eight specimens taken in 1894 were found to be labeled as to date (Banko 1979 report) (16,17). From his 1894 observations and collections Perkins (1895) concluded that P. xanthophrys seemed to be confined to the highest forest on Haleakalā at ca. 5000 feet elevation, and that it was "local" and "rare" (18). Returning to Maui in 1896, apparently to the same locality, Perkins collected 13 specimens, five at 5000 feet elevation in May and October (Banko 1979 report) (19, 20). Afterwards, Perkins (1903) stated that this species was "seen and heard...scores of times" though "restricted to a small portion of the forest on the northwest slope of Haleakala" between 4000 and 5000 feet elevation (21).

H. W. Henshaw collected six specimens of Pseudonestor in June 1901, two near Olinda, three at Ukulele (a Portuguese dairy at 5207 ft elev. on the trail to the summit of Haleakalā), and one at an unspecified location (Banko 1979 report) (23-25). From observations made on this visit Henshaw (1902) stated that this species was "rare" and he never saw more than two "in a long day's search, more frequently none at all...less than 10 seen altogether," and that it was "very local and confined to the high forest from an elevation of about 4000 feet upwards" (26).

Besides the specimens identified by data on their labels with Palmer, Perkins, and Henshaw, three specimens were found in museum collections which were taken probably during the 1892-1901 period by undesignated collectors on unspecified dates (Banko 1979 report) (22). All three were probably taken by Perkins in 1894.

Later Observations and Notes (1902 to 1979):

There seem to be no reports of the Maui Parrotbill from 1902 to 1926 due, no doubt, to an absence of observers. Munro (1941) failed to find it after "careful search" between 4000 and 5000 feet elevation on the northwest slope of Haleakalā in November 1927, and during 9 days in February (1928) when he searched "the forest between, above, and below...trails along the Kula ranch pipeline...to the end of the flume at the Haepuaena stream...and Haleakala Ranch pipeline (to) the Waiakamoi stream" (Gregory 1929) (27, 28). It was apparently during this visit that Munro (1944) (Gregory 1929) was told by a (?N.P.S.) workman of a "boring bird" seen in the Kaupō Gap area that matched the description of this species (30, 31). In 1936 Munro traversed "miles of new CCC trails in the Hana forests" but "saw nothing of this bird" (Munro 1944) (41).

Richards (field journal) (Richards & Baldwin 1953) reported collecting one Parrotbill and possibly seeing another on 4 December 1950 at 6400 feet elevation near the upper limits of the forest 0.5 mile NW of Pu'u'alaea on the north slope of Haleakalā Crater (32, 33). Ward (field journal) conducted an unsuccessful search for this species in the Pu'u'alaea area "overlooking the (? Kipahulu) valley" from 1045 to 1215 hours on 15 May 1964 (34). Banko (1968) (Warner 1968 report) saw a single Parrotbill at 6562 feet elevation in Kīpahulu Valley on 29 August 1967 during a month-long biological reconnaissance of the valley sponsored by The Nature Conservancy (35).

There are apparently only four published reports of this species in the 1970's. Shallenberger (1974) observed three and heard others in the Upper Ko'olau Forest Reserve during a 6 to 13 April 1974 field trip in and around the Hāna Rain Forest Project base camp area (36). Marshall (1975), speaking for the U. S. Fish and Wildlife Service, commented that this species was known to occur only in the rain forests at higher elevations on the northeastern slopes of Haleakalā, but that no estimate was available and densities might be very low (37). On 30 April and 1 May 1975 Scott and Sincock (1977) conducted 18 half-hour censuses on various stations located from 6100 to 7200 feet elevation in the upper edge of the Ko'olau Forest Reserve, observing none on station but one outside census period parameters, terming this species "rare" (38). S. Conant (pers. comm.), R. Pyle, O. Bussen, and M. Stemmermann watched one sing at about 6600 feet elevation approximately 1/3 mile NE of Pu'u'alaea on 18 June 1977 (39). On 25 March 1979 Conant (op. cit.) and Stemmermann saw two about 25 minutes apart at ca. 7000 feet elevation near Wai'ānapanapa (40).

In the last published summary of this species, Atkinson (1977) stated that P. xanthophrys "survives in very low numbers.

CHRONOLOGICAL DISTRIBUTION OF RECORDS

Distribution of 41 records of P. xanthophrys, including reference and negative reports, is shown in Table 1. Numbers shown for each decade during the historical period reflect the large number of positive records established during the 1890's, scarcity of observations due to lack of ornithological interest during the early 1900's, and increased number of records from 1950 to 1979.

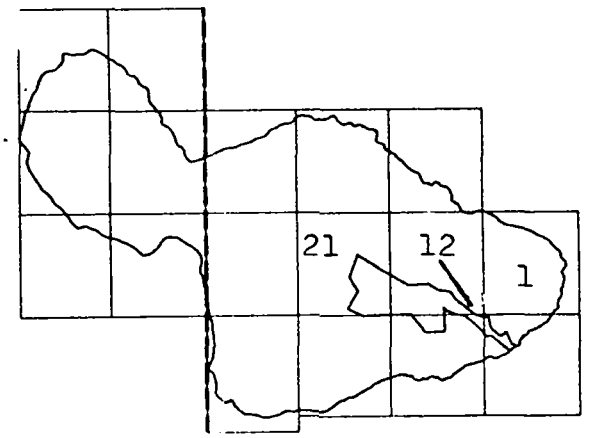
TABLE 1. Distribution of 41 Pseudonestor xanthophrys records by decade.

1770's - 0	1840's - 0	1910's - 0
1780's - 0	1850's - 0	1920's - 4
1790's - 0	1860's - 0	1930's - 1
1800's - 0	1870's - 0	1940's - 0
1810's - 0	1880's - 1	1950's - 2
1820's - 0	1890's - 20	1960's - 3
1830's - 0	1900's - 4	1970's - 6

GEOGRAPHICAL DISTRIBUTION OF RECORDS

All area-specific records of P. xanthophrys on Maui range from the northwest sector of Haleakalā (Olinda) through the northern slopes (Pu'u'alaea) to the southeastern flank (Kīpahulu) at elevations from ca. 5000 to 7000 feet elevation. While place names were not inscribed on tags of all specimens collected, dates correspond with localities visited by early-day ornithologists and listed above. Geographical distribution of records is shown in Figure 1.

FIGURE 1. Distribution of 34 observations, reports (including negative), and museum records of Pseudonestor xanthophrys, per quadrangle, on Island of Maui, 1892-1979.



SUMMARY AND CONCLUSIONS

Ornithologists from 1892 to 1901 found the Maui Parrotbill scarce to moderately common from 4000 to 5000 feet elevation in the Olinda area on the northwest slope of Haleakalā, and rare in the upper Kīpahulu Valley on the east flank of the volcano. A gap in reports from 1902 to 1949 reflects the few ornithologists afield during this long period. Since 1949, intermittent observations on the northern and eastern slopes of Haleakalā, coupled with a lack of reports from other localities, suggest severe to complete depopulation of the species range on the northwest slope of Haleakalā. Survivors appear to be found only within a small area in the Upper Ko'olau Forest Reserve and in the contiguous upper reaches of the Kīpahulu Valley in Haleakala National Park.

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(2) Banko, W. E. 1979 report. Specimens in museum collections. History of Endemic Hawaiian Birds. CPSU/UH Avian History Report 2. Dept. of Botany,...University of Hawaii. 80 pp.

(3) Conant, S. May 1980. Personal communication.

(4) Perkins, R. C. L. 1892-1895 field notes.

(5) Richards, L. P. 1950-1951 field notes.

(6) Ward, V. ca. 1965 field and editing notes for sound tape on "Birds of Hawaii" (on deposit B. P. Bishop Museum).

(7) Warner, R. E. (editor). 1968 Scientific Report of the Kipahulu Valley Expedition. Nature Conservancy. 184 pp.

APPENDIX I

1. Observations, reports, and specimen records are organized by island group, island, district, and/or quadrangle map. Order of listing, names and locations of district, and quadrangle boundaries are explained and illustrated in CPSU/UH Avian History Report 4: Introduction to Part I, Population Histories--Species Accounts.

2. Acronyms composed of the first three letters of the author's (or senior author's) last name, the first letter of the first name, and the last two digits of the year of publication represent sources found in the bibliography under References Cited. For example, BRYW01 = Bryan, W. A., and A. Seale; 1901. Notes on the birds of Kauai. Bishop Museum Occas. Papers. 1(3): 129-137. In cases where it is necessary to distinguish between two or more articles published by an author in any given year, letters are added to the acronym in alphabetical sequence. For example, BRYW01a = Bryan, W. A. 1901a. A key to the birds of the Hawaiian group. Bishop Museum Press. 76pp.

3. Place-names are cited in original form.

4. Parenthetical information is qualified.

Pseudonestor xanthophrys - Southeastern Hawaiian Islands

	Relative Abundance/Locality	Elev. (ft.)	Date	Source
ISLANDWIDE INFERENCE				
1	HDFG: officially classed as endangered / (islandwide)		(1969)	(1)
2	...survives in very low numbers / (islandwide)		(1977)	ATKI77
UNDESIGNATED LOCALITY				
3	local and rare / confined to the highest forest on Haleakala	ca. 5000	(1887-1888)	WILS96
4	Palmer: collected two specimens / unspecified place(s)		15 Aug (1892)	ROTW00
5	procured small number of specimens; appeared to be rare / unspecified place(s)		Jul-Oct 1892	ROTW00
6	Banko: Palmer collected only 8 specimens (7 in August) / undesignated place(s)		1892	(2)
7	Banko: Perkins collected 1 specimen / unspecified locality (?Haleakala)		(?1894)	(2)
KILOHANA				
8	Palmer: collected 2 specimens, saw 2 more; rather rare / encamped 5,000 feet high on the mountain; forest not very dense...small ohias, a few koa trees, and a sprinkling of Mamane; trail right up to the top is excellent...thanks to Mr. Mossman, Makawao store, whose sketch of the crater and trail was most useful to me		1 Aug (1892)	ROTW00

Pseudonestor xanthophrys - Maui

9	Perkins: collected 1 specimen / stayed at Mr. Payne's (Paine's) mountain house considerably higher up than Olinda	ca. 5000	13 Mar (1894)	(4)
10	Perkins: collected 1 / up (from Mr. Payne's place) to about 7000 feet then east into wet forest		16 Mar (1894)	(4)
11	Perkins: collected 1 / vicinity Mr. Payne's place	ca. 5000	22 Mar (1894)	(4)
12	Perkins: saw 2, collected 1 / went first upwards and then down into the forest from Mr. Payne's place		1 Apr (1894)	(4)
13	Perkins: collected 1, saw another / within two miles Mr. Payne's place		4 Apr (1894)	(4)
14	Perkins: heard / vicinity Mr. Payne's place		6 Apr (1894)	(4)
15	Perkins: heard twice / forest below Mr. Payne's place		8 Apr (1894)	
16	Banko: Perkins collected 2 specimens / (Haleakala)	5000	Mar, Apr 1894	(2)
17	Banko: Perkins collected 1 specimen / Haleakala (unspecified locality)		1894	(2)
18	rare / local...seems to be confined to the highest forest on Haleakala	ca. 5000	(Mar-May 1894)	PERR95
19	Banko: Perkins collected 6 specimens / Haleakala	5000	May, Oct 1896	(2)
20	Banko: Perkins collected 7 specimens / Haleakala (unspecified locality)		May, Oct 1896	(2)
21	seen and hear...scores of times / restricted to a small portion of the forest on the north-west slope of Haleakala	4000-5000	(1896)	PERR03

Pseudonestor xanthophrys - Maui

22	Banko: undesignated collector(s) obtained 3 specimens / unspecified locality		(? 1890's)	(2)
23	Banko: Henshaw collected 2 specimens / Olinda, Haleakala		Jun 1901	(2)
24	Banko: Henshaw collected 3 specimens / Ukulele, Haleakala		Jun 1901	(2)
25	Banko: Henshaw collected 1 specimen / unspecified locality (?Haleakala)		Jun 1901	(2)
26	rare...never saw more than two in a long day's search, more frequently none at all...less than ten seen altogether / very local...confined to the high forest from an elevation of about 4,000 feet upward		(1901)	HENH02
27	failed to find it after careful search / on the northwest slope of Haleakala	4000-5000	Nov 1927	MUNG41
28	Munro: careful search...failed to reveal any trace / the forest between, above, and below... trails along the Kula ranch pipeline...to the end of the flume at the Haepuaena stream...and Haleakala Ranch pipeline (to) the Waiakamoi stream		9 days in February (1928)	GREH29

NAHIKI

29	Palmer: saw 1 / I think about 7,000 to 8,000 feet high (Kipahulu Valley)		22 Sept (1892)	ROTW00

Pseudonestor xanthophrys - Maui

30	failed to find it...but was told by a workman of a bird he called "boring bird"...his description tallied with the action of this bird / seen when he camped with surveyors in the Kaupo Gap...this would indicate that it inhabited the forest of Hana and Kipahulu Forest Reserve		1928	MUNG44
31	Munro: former survey hand reported a bird, evidently Pseudonestor; not found...time was limited for a careful search / grove of trees near the Kaupo Gap, where there is a spring of water on the pali side		unspecified (1928)	GREH29
32	Richards: saw...alive for the first time in my life...possibly one other, 0830-1800 hours / in forest down slope between Puu Alaea and small hill just west of it continuing for about ½ mile on hike from Paliku cabin, Haleakala		4 Dec 1950	(5)
33	1 specimen collected, another seen / ½ mile NW Puu Alaea, north slope, Haleakala	6400	4 Dec 1950	RICL53
34	Ward: unsuccessful search 1045-1215 hours / overlooking valley (Puu Alaea vicinity)		15 May 1964	(6)
35	1 seen / Kipahulu Valley	6562	29 Aug 1967	BANW68 (7)
36	three observed and others heard on several occasions / Upper Koolau Forest Reserve (Hana Rain Forest Project base camp area)		6-13 Apr 1974 field trip	SHAR74
37	no estimate available...population densities may be very low / known to occur only in the rain forests at higher elevations on the northeastern slopes of Haleakala		(1975)	MARD75

Pseudonestor xanthophrys - Maui

38	total of 1 seen...but not during 18 half-hour periods and stations...rare / at upper edge of forest...Koolau Forest Reserve	6100-7200	30 Apr 1975 (0800-1230 hours) 1 May 1975 (0800-1330 hours)	SCOJ77
39	Conant et al: watched 1 sing / approximately 1/3 mile NE of Puu Alaea	ca. 6600	18 June 1977	(3)
40	Conant and Stemmerman: saw 2 about 25 minutes apart / near Wai Anapanapa	ca. 7000	25 Mar 1979	(3)

HANA

41	saw nothing of the bird / traversed miles of new CCC trails in the Hana forests...fairly good foraging grounds in the large koas		1936	MUNG44

ABSTRACT

Psittirostra psittacea is a small, olive-green, yellow-headed (adult males only) forest bird having a parrot-like bill. It was originally found on the islands of Kaua'i, O'ahu, Moloka'i, Lāna'i, Maui, and Hawai'i. Exhaustive search of literature and field journals uncovered some 300 observational notes, collection records, reports, and related statements on relative abundance and geographical distribution from 1779 to 1977. All information is serially numbered, arranged in geographical and chronological order, referenced, and systematically analyzed.

In the 1890's 'Ō'ū were observed to be common to abundant over broad areas on Kaua'i, Moloka'i, Lāna'i, Maui, and Hawai'i, and extremely rare on O'ahu. This species was last reported on O'ahu in 1899, on Moloka'i in 1907, on Lāna'i in 1931, and on Maui in 1901.

Today, 'Ō'ū on Kaua'i are known only from a 5 square mile area where they are regarded as very rare. On Hawai'i, in the Kohala, Kona, and leeward Ka'ū districts, 'Ō'ū have been reported only once (in 1933) since 1896. Surveys in these areas in recent years detected none.

In windward forests, 'Ō'ū have declined significantly in and near Hawaii Volcanoes National Park in the past 20 to 30 years, apparently reflecting continued widespread depopulation in windward Ka'u, Kīlauea, and Mauna Kea districts. After expending 1,300 man-days of census effort in 221,669 acres of windward habitats in 1977, U. S. Fish and Wildlife Service surveys detected 'Ō'ū only 61 times (preliminary account).

It is concluded that long-term decline of remnant populations on Kaua'i and Hawai'i is continuing.

43. Psittirostra psittacea

'ō'ū

The 'ō'ū is a small (ca. 6 to 7 inches long), olive-green, yellow-headed (adult males only), highly variable but monotypic forest species having a bill more slender and parrot-like than in congener species (Amadon 1950). Found originally on all six forested islands, the 'ō'ū was one of the birds collected in 1779 by Captain Cook's naturalists, presumably near Ka'awaloa, Kona, Hawai'i. It was first described by J. G. Gmelin in 1789 (Bryan & Greenway 1944; Stresemann 1950). A long and somewhat involved synonymy of this species is traced by Wilson and Evans (1891) who incorrectly credited Latham as being the first to describe this species in 1783. Taxonomists later recognized varieties from O'ahu (Rothschild), Moloka'i (Bangs), and Lāna'i (Perkins) as species or subspecies distinct from that on Hawai'i, but after close examination of representative specimens from all the islands Amadon (1950) concluded that they were all conspecific.

Numbers and principal repositories of 323 'ō'ū specimens are as follows: 77 in B. P. Bishop Museum, 55 in American Museum of Natural History, and 33 in British Museum of Natural History (Banko 1979 report).

Henshaw (1902) and Perkins (1903) noted most of what is known of the habits and behavior of the 'ō'ū from field observations when the species was very abundant. Berger (1972) provides a contemporary overview of this species from such early, and later, accounts.

In the following historical account, one, two, or three digit numbers in parentheses refer to specific records in the Appendix. Sources cited in the Appendix may be traced to complete references in the bibliography.

Southeastern Hawaiian Islands

Kaua'i-O'ahu-Moloka'i-Lāna'i-Maui-Hawai'i

Ornithologists familiar with the forested islands from 1887 to 1896 recorded the comparative abundance of 'ō'ū variously. Wilson (1890) expressed the view that, except on O'ahu, this species was "perhaps the most noticeable of the forest birds of the islands" (after the 'I'iwi, Vestiaria coccinea), stating that it was generally distributed throughout the group where it ranged "from the lowest forest zone up to 3000 feet" elevation (1).

Rothschild (1900), no doubt prompted by his collector, H. C. Palmer, stated that 'ō'ū inhabited " the lower portions of the

mountain forests of all the islands except O'ahu," being "commonest" on Kaua'i and Hawai'i and "rarer" on Moloka'i, Lāna'i, and Maui (2-4). Munro (1944), who obtained his early impressions during and immediately following Palmer's collecting trips of the early 1890's, recalled years later that 'ō'ū were "extremely common on all the forested islands except O'ahu from which it had nearly disappeard...strange that is should disappear from O'ahu and remain common on the other islands, but it has since disappeared from all the other islands as well" (6, 7).

Perkins (1903), perhaps the best qualified ornithologist of the 1890's to make an objective judgment, stated that "alone of the thick-billed, finch-like Drepanids the 'ō'ū is of general distribution over the islands excepting on Oahu where it is nearly or quite extinct," adding that this species was "common on Kauai, Molokai, Lanai, Maui and Hawaii...a most abundant bird in many localities" (5).

Kauai

Early Notes and Records (1888-1901):

Although he made no direct reference to the relative abundance and distribution of 'ō'ū on Kaua'i, S. B. Wilson collected five specimens (one at 4000 elev.) in unspecified localities, sometime during August and/or September 1888 (Banko 1979 report) (11, 12). By contrast, Palmer collected 20 'ō'ū in unspecified localities, all in January 1891 except one (undated) (Banko 1979 report) (13, 14). A single specimen dated 26 January 1893, obtained in an undesignated locality, was collected by "G. B." (? G. R., Gay and Robinson) (Banko 1979 report) (15).

Visiting Kahōluamanu Plateau in the area of F. Gay's mountain house on 15 April 1895, Perkins (field journal) noted 'ō'ū to be "very numerous" (26). Revisiting this locality in October that same year, Perkins (field journal) collected two specimens (Banko 1979 report), noted that they were "common," and later (1903) stated that 'ō'ū were "found at all seasons above the range of the Ieie (Freycinetia arborea)...on parts of the high plateau" (16, 27,-29). During this same period Perkins (field journal) also noted the presence of this species "at a good elevation" in the mountains "some miles west of Līhu'e where there were dense masses of staghorn fern" (52), later (1903) terming the 'ō'ū "common" on Kaua'i as a whole (8).

Four other specimens, presumably taken in the 1890's, were collected in undesignated localities: two by (V.) Knudsen, one by (Prof.) Collett, and one by G. R. (? Gay and Robinson) (Banko 1979 report) (17-19).

Bryan and Seale (1901, 1915) paid a 3-week collecting visit (12 April to 4 May 1900) to Kahōluamanu during which time they secured two 'ō'ū specimens above 4000 feet elevation on 30 April (30, 31). During this visit they quote (F.) Gay as stating the

'ō'ū were "far more plentiful" in the valleys where they fed on the guava, often coming down lower than 300 feet elevation after them, it being the local impression that "they would come down almost to sea level if food was more plentiful there" (21).

Later Observations (1902-1959):

There is a 40 year gap of 'ō'ū records on Kaua'i after Bryan and Seale finished their 1901 investigations. Donaghho (1941) noted seeing a pair of 'ō'ū in the upper Wai'alae Valley on 6 October 1941, but this was apparently overlooked or forgotten by Munro (1944) who stated without qualification that this species had disappeared from all the islands (7, 32). Another long gap in 'ō'ū sightings (18 years) followed Donaghho's note.

Recent Sightings and Surveys (1960-1980):

Richardson and Bowles (1964) document the sighting by (D.) Woodside of two 'ō'ū at 4250 feet elevation near the high eastern end of the Kawai Iki Ridge country on 21 July 1960 and later, while conducting a broad-gauged survey, reported seeing one or more on 17 August in the canyon of the Koai'e River at over 4000 feet elevation just west of the Wainiha Pali (about 1.5 miles north of the eastern end of Kawai Iki Ridge) (33, 34).

A spate of sightings followed the records of the two 'ō'ū observations incorporated into the 1964 report by Richardson and Swamp, presumably along the Mōhihi and Koai'e Rivers, on 4 March 1961, and Ord (1963) reported seeing two on a hike he made, presumably into the same area, on 1 and 2 September 1963 (35, 36). (W.) Ward (field journal), stopping every 100 yards or so to listen and watch on a 2 or 3 mile hike from Koai'e cabin toward Wai'ale'ale, with side trips into the deep valley on either side of the plateau, recorded three 'ō'ū on 21 February 1964 (37). Walker (1964) logged two or possibly three seen "along a ridge deeper and deeper into the swamp" past Koai'e cabin during a 21 to 23 February 1964 visit which overlapped the date cited by Ward (38).

In 1965, Huber (1966) watched an 'ō'ū 12 to 15 minutes on the Koai'e-Wai'alae Trail about 1 mile past the Koai'e cabin, and saw another (probably an immature) the next day in the same location during an undated March visit (39). Later, on 5 May 1965, Ward (field journal) saw two of this species along the ridge beyond Koai'e cabin (40). In August 1965, Donaghho (1965) commented that the range of the 'ō'ū was bounded by the Koai'e to the west and the Olokele to the east (41).

Banko (field journal) saw two 'ō'ū and possibly heard another on 13 May 1966 near the terminus of the ridge before the trail drops down to Koai'e cabin from Mōhihi trailhead (42). Anonymous (1966) stated that this species was "quite rare" and reported three pairs seen in the Alaka'i Swamp (? Koai'e cabin area) during a 28 to 30 May 1966 trip (43).

There was only one report logged during 1967, Donaghho (1967) reporting this species "not found" on a hike he made in to the Alaka'i on 28 August 1967 when he "got back two miles from the Koai'e gulch" (44). But early in 1968 Anonymous (1968) reported seeing a pair on a trip into Alaka'i Swamp on 17 February (45).

Gauthey, Atkinson and Huddleston (1968) made a number of observations during their two-day survey in 1968, as follows: on 31 May--one seen about a mile along the ridge extending south-southeast from the Koai'e cabin paralleling Koai'e stream, two seen at the Koai'e stream source, and one seen within 200 yards of the Koai'e cabin part-way up the ridge to the south-southeast and on 1 June--one heard on Kohua ridge on the way to Koai'e cabin from Koai'e stream source and 25 sightings of at least nine individuals (six seen together) actively flying back and forth along a ridge in the vicinity of the Koai'e stream source (46-50).

Hawaii Division of Fish and Game (1969 report) officially classed the 'ō'ū as an endangered species (9). On 1 May 1971, van Riper (field notes) noted three seen in one group, and two seen in another in the Kawaikōī Stream Valley (24). Mull and Mull (1971) logged a male seen twice "with the distinct possibility that two different individuals were involved" on 17 September 1971 at an elevation of about 3900 feet on a sharp east-west spur of Kohua Ridge about 1 mile along the trail to Alaka'i Swamp from the end of Camp 10 road (51). Berger (1972) termed the 'ō'ū rare in the Alaka'i Swamp (22). Hart (1974), returning from an undated 4-day field trip, reported that 'ō'ū were the eighth most numerous endemic bird seen in the West Alaka'i Swamp, but did not identify the first ranking seven species, the number of 'ō'ū detected, nor localities visited (25).

Marshall (1975), U. S. Fish and Wildlife Service, summarizing island-wide surveys by biologist John Sincock, from 1968 to 1975, stated that 'ō'ū were seen at six of 54 stations, the remaining population was found to be restricted to an area about 1 mile wide and 5 miles long in the Alaka'i Swamp, and were judged to be "very rare" even in these habitats (23); however, locations, dates, and numbers of 'ō'ū censused seem to have gone unreported, leaving the 17 September 1971 report of one or two birds seen by Mull (1971), the last detailed observational record published (51).

In his historical review Atkinson (1977) noted that Munro (1944) judged the 'ō'ū to be "extremely common" in the 1890's but termed it "now rare" (10).

O'ahu

Labels on two 'ō'ū specimens taken on O'ahu are inscribed with the name of the collector, (F.) Deppe, and the date, January 1837. Another undated example was secured by J. K. Townsend,

perhaps in Nu'uanu Valley (Honolulu) where he and Deppe collected birds together (Banko 1979 report) (66). Professor Behn is credited by Rothschild (1900) with taking "quite a series" of 'ō'ū specimens on O'ahu in October 1846 (67, 68) and although labels of none mention the name of the collecting locality, at least four of Behn's specimens are still extant (Banko 1979 report) (69). The label of an additional single specimen, also without name of locality, bears the inscription "skinned out of alcohol H. Mann 1869" (Banko 1979 report) (70). The origin of Mann's specimen is obscure.

'ō'ū on O'ahu largely disappeared during the 40-year period from 1846 when the last series of specimens was collected, to 1887/1888 when S. B. Wilson arrived. Wilson (1890) and Wilson and Evans (1891) concluded from travels about the island that there was "good reason to believe (this species had) become extinct or else extremely scarce" (53, 54).

Perkins (field journal) observed a pair of 'ō'ū on Ka'ala at ca. 3000 feet elevation sometime in March 1893 (71), and Bryan (1901) mentioned that he saw one in the Moanalua Valley in October 1899 (55). These appear to be the only eyewitness accounts of 'ō'ū on O'ahu, and substantiate statements by Rothschild (1900), Henshaw (1902), and Perkins (1903) that the 'ō'ū was extinct, or practically so, on O'ahu at the turn of the century (56, 57, 59). Rothschild (1900) added that "Palmer was told by several persons that it was formerly (prior to 1891) not uncommon" (58).

Later statements confirm early records. Bryan (1915) stated that this species had been "extinct for many years" (60). Munro (1944) stated that it "has been seen (referring to early records) but no specimen has been taken for a long time" (61). Donaghho (1963) recorded "no reports"; Hawaii Division of Fish and Game (1969 report) stated that it was "thought to be extinct or extirpated"; and Marshall (1975) wrote that it was "presumed extinct" (62-64). Atkinson (1977) recognized statements by Rothschild (1893-1900) that the 'ō'ū was formerly not uncommon, by Perkins (1803) that it had nearly disappeared by 1893 and by Henshaw (1903) that it was last seen on O'ahu in 1899 (65).

Moloka'i

Wilson (Banko 1979 report) collected at least one 'ō'ū specimen on Moloka'i in June 1888 (locality unspecified), and later (1890) added that 'ō'ū were found to be "most plentiful" and "in the greatest numbers (anywhere in the Islands) among the trees clothing the abrupt sides of the deep ravine which runs down to the leper settlement" (Kalaupapa) (76, 85, 86).

H. C. Palmer collected six specimens of 'ō'ū on Moloka'i in 1893, but unfortunately left no record of their relative abundance or distribution on that island (Banko 1979 report)

(77). Rothschild (1900) noted that "only a few were seen" in the "hills above Halawa in forest much higher than near Pukoo" (96).

R. C. L. Perkins obtained three 'Ō'ū specimens in 1893 (Banko 1979 report) (78), perhaps when he (Perkins field journal) recorded them on 18 July 1893 to be "extremely abundant...cleaning out the guavas up the valley on way from Pelekunu village to Kamalo" (87). Perkins later (1903) termed the 'Ō'ū "common" in its habitat on Moloka'i (72).

(O. D.) Flood collected four 'Ō'ū specimens on Moloka'i in February 1895 (Banko 1979 report), but made no mention of the locality on their labels (79).

Schauinsland (1900) found 'Ō'ū on his visit to Moloka'i in 1896/1897 "in grosserer Menge" (in greater numbers, specifically crowds = hordes) "nur an dieser Stelle der Insel" (only at this section of the Island, viz. along trail down pali (cliff) from Kala'e to leper colony at Kalaupapa) (88).

Bryan (1908) spent the two-month period of 15 April to 15 June 1907 traveling about on Moloka'i studying and collecting bird specimens. During this period he states that he obtained a total of 16 specimens, found the 'Ō'ū "in a ratio of about one to twenty as compared with the Amakihi" (Loxops virens), and observed it making long sustained flights (like the 'Apapane) from the palis of the large valleys that carried them readily from one valley to another (82, 83). Additionally, Bryan (1908) states that the 'Ō'ū was "not, relatively speaking, the abundant species its size and song would seem to make it," that "at all the stations visited in the forest area (Waikolu, Pelekunu, Hālawa and Wailau Valleys)...the Halawa forest makes an ideal hone for this Ieie loving bird," and that this species was "always to be found in the more dense Ohia forests, even though the amount of Ieie is small, or wanting entirely" (82). Localities inscribed on labels of 14 specimens collected by Bryan (Banko 1979 report) show that he obtained examples in the following places: Kilohana (4), "Puualu" (Pu'u Alu/Pu'uali'i) (2), Pelekunu trail (1), Wailau (Valley) (1), Pelekuna (Pelekunu Gulch) (1), Hālawa (2), Moanui (2), Brown's Rnach (Pu'u o Hoku) (1), and one in an undesignated locality (80, 89-93, 97-99). The name of (G. C.) Munro is also on the labels of four specimens taken in unspecified localities during the same period on Moloka'i where he was then resident (81).

Munro (1944) included Moloka'i in a general implication that 'Ō'ū had disappeared from all the islands by 1944, later stating that he saw none in his 1936 survey on both east and west sides of the forest (7, 84). Atkinson (1977), from information in Bryan (1908) and in unpublished letters from Munro to Director, B. P. Bishop Museum, stated that although formerly widespread according to Bryan (1908) this species disappeared on Moloka'i between 1907 and 1923, and presumably was extinct (75). Pekelo (1967) stated that he was certain he saw an 'Ō'ū on the

Pelekunu-Waikalo (Waikolu) plateau in 1965, "but until I verify this, I will make no claims" (94); however, Pekelo's possible sighting of this species was never confirmed. Hawaii Division of Fish and Game (1969 report) listed this species as extinct or extirpated from Moloka'i (73). Marshall (1975) presumed 'ō'ū to be extinct on Moloka'i (74), possibly basing his statement on a negative report of a limited survey by Scott, Woodside and Casey (1977) (95).

Lāna'i

Wilson collected at least three specimens of 'ō'ū at undesignated places (one "near ranch") on Lāna'i in June 1888 (Banko 1979 report (102, 103). Rothschild (1900) states that "Palmer saw them arise in a flock" but does not designate the locality (105). Labels on three specimens taken in November 1892 bear Palmer's name (Banko 1979 report) (104).

Perkins (1903) termed the 'ō'ū "common" on Lana'i (100), noting (field journal) that this species was "very abundant" up from his camp near head of gulch behind Kō'ele during the period late June to 4 July 1894 (106) and may be credited with the taking of three in undesignated places that same year (108).

Munro (1944) states that Perkins found this species to be "excessively common...in hundreds" in Kaiholena Valley in 1894 (107). Munro (1944) collected a single specimen in the Kaiholena Valley on 22 February 1913, and noted one farther up the same valley on 16 March 1916 (109, 110). Another was seen at Waikeakua near the southwest end of the forest on 12 August 1918 (Munro 1944) (111). Labels of two specimens dated November 1923, and one secured in an undesignated month that year were taken by Munro in unspecified locations on Lāna'i (Banko 1979 report) (113, 114). Another undated specimen without collector's name on the label was probably taken during the 1888 to 1923 period (117). Munro obtained one specimen at Kaiholena Gulch on 10 Nov. 1923 (112), and (1944) (Gregory 1924) expressed the view, as the result of a survey, that 'ō'ū were on the increase in 1923 (115, 116), but this was never verified. As far as is known Munro collected his last 'ō'ū on Lāna'i at Lāna'ihale on 28 February 1927 (Banko 1979 report) (118). By 1931, Munro (Gregory 1933) reported that this species was rarely seen (119).

Atkinson (1977), accepted Munro's testimony that the 'ō'ū was "exteremely common in the 1890's and up until 1923 (Munro 1924)" and fixed the probable period of extinction on Lāna'i "sometime between 1921 and 1931 (Munro 1921-1935)" (101, 120). Munro (1944) (Gregory 1933) reported that the 'ō'ū had not been seen "for some time" (in often visited forests) (121, 122).

Hawaii Division of Fish and Game (1969 report) stated that this species was "thought to be extinct or extirpated" on Lāna'i (123) and Marshall (1975) also presumed it extinct there (124).

Maui

The first reference to 'ō'ū on Maui seems to be that of Finsch (1880) who states that he observed this species "repeatedly" about 5400 feet elevation in the vicinity of Olinda in July 1879 (132).

Wilson seems not to have collected the 'ō'ū on Maui but states (1891) that Randall Von Tempsky saw several in Ukumehame Gulch in 1890 (Banko 1979 report (131).

Palmer collected at least eight examples of 'ō'ū on Maui, all in undesignated locations, during his visit in August and September 1892, taking two about 5000 feet elevation on 2 August and on the northwest slope of Haleakalā, apparently above Olinda (Rothschild 1900 Banko 1979 report) (128, 133). On 18 September 1892 Palmer (diary) also noted hearing one in the somewhat drier middle 'ōhi'a forest at about 4000 feet elevation near his fifth camp in Kīpahulu Valley, on the eastern flank of Haleakalā (Rothschild 1900) (138).

On 31 March 1894 Perkins (field journal) noted this species "singing much more than usual, otherwise I should not have supposed it was so abundant here or has there been a sudden incursion" up from "Mr. Payne's" (Paine's) mountain house about 5000 feet elevation, and "considerably higher up than Olinda" (134).

In May 1896 Perkins (field journal) noted that this species was seen during his ascent from the neighborhood of Waihe'e on West Maui, to the top of the mountain (130). Later, Perkins (1903) added that the 'ō'ū was to be "found at all seasons" in the forests of East Maui "above the range of the Ieie" (129).

H. W. Henshaw collected three 'ō'ū specimens at "Ukelele" (Ukulele, a Portuguese dairy), and four examples at Olinda from 6 to 21 June 1901 (135, 136). Baldwin (field journal) noted possibly hearing 'ō'ū between Hōlua Cabin and 4500 feet elevation in Keanae Valley from 20 to 25 November 1945, but this possibility was never confirmed (137).

Hawaii Division of Fish and Game (1969 report) officially listed the 'ō'ū as endangered on Maui (126). Marshall (1975) presumed this species to be extinct on that island (127). Atkinson (1977), from Munro (1944), termed this species "extremely common" on Maui in the 1890's and last recorded on that island in 1901 citing Banko (1971) (125).

Hawai'i

Early Notes and Records (1977-1901):

Captain James Cook's March 1779 observation of "a very common" yellow-headed bird with a "parroquet"-like bill, and

subsequent description of the 'ō'ū by (Gemlin) in 1888 from specimens collected by Cook's naturalists (Stresemann 1950), in Kona District is taken to mean that P. psittacea was the bird to which Cook (1784) referred (166, 167).

The next record of this species on the island of Hawai'i seems to be that of Sclater (1881) who, in reporting ornithological results of the cruise of the H. M. S. Challenger, stated that two 'ō'ū specimens were collected in August 1875 within 8 miles of Hilo, apparently in the direction of Kea'au toward which some expedition members travelled (299).

Wilson and Evans (1891) collected a good number of examples in the outskirts of a forest in the district of Kona (168, 169, 176), four of which (three labeled Ka'awaloa) still survive (Banko 1979 report). Wilson also took single specimens at 'ōla'a (Puna District), and Pā'auhau (near Honoka'a) during this early period (Banko 1979 report) (294, 307).

Palmer collected some 30 'ō'ū specimens, all in undesignated localities in January, February, and September 1891, and November 1892 (Banko 1979 report) (149). Rothschild (1900) reports that Palmer, in an undisclosed locality, saw them arise "like a flock," and reported them to be "very numerous" during his encampment in the Kohala Mountains in January 1892; "pretty numerous" after a 6-hour, 45-minute hike up the Wailuku River out of Hilo; and "very plentiful" 11 hours upslope out of Hilo on 13 and 14 April 1892 (148, 162, 300, 301). According to Rothschild (1900), Palmer also heard this species between his December 1891 camp on Hualālai and the broad band of koa (Acacia koa) above it, and noted them "up to about 7000 feet elevation above the sea" in an unspecified locality (147, 175).

R. C. L. Perkins traveled and collected birds widely on the island of Hawai'i during visits in 1892, 1894, 1895, and 1896; however, he appears to have taken but one specimen, in Ka'ū in July 1895 (Banko 1979 report) (178). During his June to October 1892 visit to Kona, most of which was spent in the Pulehua Ranch area, Perkins (field journal 1893; 1903) reported "great numbers of young" in the middle forest, "in great abundance" at ca. 2500 feet elevation, "countless numbers" throughout the wet belt, and "large numbers" which habitually strayed below the range of Freycinetia (arborea), especially frequenting the clumps of Kukui (Aleurites moluccana) trees in middle Kona (163-165, 170). Perkins (field journal) also reported 'ō'ū "in great numbers" at 3000 feet elevation in March 1896, presumably in the Pulehua Ranch area, about the same time S. B. Wilson (on his second trip to the Islands) secured a specimen in Kona (possibly in the same area) (Banko 1979 report) (172, 173).

On the east slope of Mauna Loa, Perkins (19 Septmeber 1947 letter to Otto Swezey) stated that this species was "not common" 1.5 to 2 miles of the Volcano House toward Mauna Loa, and that only "2 or 3 could be seen on most days, rarely more" except at certain times of the year when they were "abundant," a "large

incursion" being witnessed "in the koa woods above Kilauea on the Kau side" in August 1895 (Perkins 1903) (236-238). He expressed the view that this species was "probably more numerous at all seasons" in the forests on the 'Ōla'a side of Kīlauea (284), noting (field journal) that they were "very numerous" at about 1500 to 1600 feet elevation during his extended June to September 1895 visit (295).

Perkins (1893) summarized his 1892 observations in Kona by stating that the 'Ō'ū was the "most abundant and wide ranging of the Finches" (Psittirostra ssp.), often being seen "in little companies," wandering "quite below the true forest, being partial strictly to the lower district" (1700 to 3000+ feet elev.), although it "strays even up to 4000." (140). Perkins (1903) included the island of Hawai'i with other forested islands (except O'ahu) where he termed the 'Ō'ū "common." (139).

'Ō'ū specimens were also commonly taken or reported by several casual collectors or observers in the late 1890's (Banko 1979 report). A. Koebele took an example in Kona in February 1894 (30), and E. Weiske secured two specimens in unspecified location(s) that same year (150). B. Arnold obtained one specimen in Ka'u District on 11 July 1898 (179). J. Parker secured one example, and unspecified collectors obtained five specimens all undated and unlabeled as to locality, but presumably taken during the era when this species was abundant (151, 152). Baldwin (field journal) cites a "forest ranger" at Keanakolu as reporting 'Ō'ū seen upslope of Opihihaele (Opihihali, Hōnaunau quadrangle) in South Kona up until 1895 when he left the area (177). From his historical research, Atkinson (1977), citing Perkins (1903) termed this species as occurring in countless numbers in 1892 in Kona, but rare in west-Hawai'i after 1896 (154, 156).

In last Hawai'i, H. W. Henshaw collected at least 105 specimens of P. psittacea from 1898 to 1901 in the following locations: 72 in 'Ōla'a; 13 in Kaūmana; 8 in Kauiwiki; 6 in Kea'au; 3 in Kuaia (near Laupāhoehoe); and 3 in Honomū (296, 297, 302-304, 306). Based on these and other observations Henshaw (1902) stated that the 'Ō'ū was "common...generally found in small companies, never singly," and was "generally distributed...in ohia forests...from about 1000 feet upwards" in elevation (141). Atkinson (1977) termed this species "rare" in east Hawai'i after 1900, citing Henshaw (1901) (154).

Later Observations (1902-1949):

'Ō'ū appear not to have been recorded on the island of Hawai'i for a period of more than 30 years after Henshaw's collections in 1901. Munro (1944b) states that this species was seen in Kona in 1933 but did not furnish any details (33).

Records of 'Ō'ū in Hawaii Volcanoes National Park appear to start with that of Williams (1936) (Baldwin 1941), that in 1936 this species was to be seen "in numbers" at Kāne-nui-o-Hamo

(north rim of Makaopuhi Crater) "where the Ieie vine grows in some profusion" (251, 252). On 13 July 1937 Donaghho (1951) (report to Park Superintendent), stated that although he had never seen the 'ō'ū he identified one or two by their singing "like a canary...easy to recognize" along the trail constructed by the Civilian Conservation Corps from the end of Haunani Road in Volcano, to Pu'u Kūlani (187-189). Their presence in that area was confirmed by Craddock (report to Park Superintendent) who, probably companioning with Donaghho, saw an 'ō'ū that same day somewhere along the first 5 miles, beginning at the end of Haunani road (190). Although not citing any personal observations, Donaghho (report to Park Superintendent) states that this species occurred "in the lower forest region...especially around Kāne-Nui-O-Hamo" during the June to August 1937 periods (253).

On 7 August 1938 Baldwin (field journal) detected three 'ō'ū along the Haunani Road (volcano) - Kūlani Trail, one seen immediately (100 yards) past the trailhead, a second one observed at 3800 feet elevation 1 mile along the trail, and a third bird heard at 4000 feet elevation 1.125 miles distant from trailhead (191-193). Returning to this area on 24 November 1938 Baldwin (field journal) tentatively identified (from calls and song) several 'ō'ū on a 3-mile hike along the same trail (194-197). According to his field journal, Baldwin recorded similar results on a 2-hour hike (1530-1730 hours) two days later on 26 November (198).

In the lower forests of the Park, in the area of Makaopuhi Crater, Baldwin (field journal) heard one or more on an overnight cross-country hike from the Nāpau Crater Trail to the summit of Kāne-nui-o-Hamo on 21 August 1938, but detected none on a return trip the next day, August 22 (254, 255). Later, in referring to detection of 'ō'ū at Kāne-nui-o-Hamo, Baldwin (1941) stated that he and D. Abbott had difficulty and heard only one (257). On 29 December 1938, a mile or so west of Kāne-nui-o-Hamo, Baldwin (field journal) "heard an ascending call which made me think 'ō'ū immediately" while on the summit of Pu'uhuluhulu, a small steep-sided volcanic cone, although he recalled no other records in the Chain-of Craters region (233, 256). Baldwin (field journal) reported that he was unable to fing 'ō'ū in the Kāne-Nui-O-Hamo area when he returned on 5 January 1939 (258).

On 7 and again on 8 February 1939, Baldwin field journal noted that he may have heard ascending calls of 'ō'ū along the Haunani Road - Kūlani Trail in the Upper 'ōla'a Forest Reverve (199-202). Later, apparently after confirming his impression, Baldwin (1941) stated that he had located "several individuals" in the Upper 'ōla'a Forest Reserve during the summer and winter of 1938 and 1939 (203).

In 1940, Baldwin (field journal) recorded seeing 'ō'ū on a hike to the Nāpau Crater, hearing from two to four individuals (sighting two) in 1 hour on 1 May, hearing and seeing one on 8 May, logging two on 14 May, and noting one on 21 May, all in the

Lava Trees census plot about 0.5 mile west of Nāpau Crater (259-262). Baldwin (1941) later stated that two 'ō'ū were seen in 1940 in the Nāpau Crater area (263), a conservative estimate it would appear. Baldwin (field journal) also "quite possibly heard" an 'ō'ū in the middle of the Twin Craters census plot (3850 ft elev.) on 13 September 1940, apparently the first of several records of this species in the Thurston Lava Tube area (244). Baldwin (1941) termed the 'ō'ū "rare" in the Park as a result of his early survey work (229).

H. Baldwin (letter) and E. Tomoguchi (letter) reported an 'ō'ū seen sometime in 1940 in the State Forest Reserve above Pepe'ekeo in lands of Kawai Nui and Makahana (305). R. C. MacGregor collected one 'ō'ū specimen on 16 January 1940 but left no clue on the label as to the locality (Banko 1979 report) (153).

'ō'ū were not reported from 1941 to 1943. Baldwin (field journal) looked and listened without success for this species on his 16 July 1941 hike from Nāpau Crater (2750 ft elev.) down the Puna Rift to 2250 feet elevation and return (264).

Baldwin (field journal) mentions six 'ō'ū seen or heard on 25 November 1944 in the stretch of tree fern forest just to the east as well as just to the west of the "alley" between Nāpau Crater and a small unnamed crater lying 0.25 mile from it on the south-southwest side (266). A report by the Park Superintendent covering this period stated that there were "three seen and several more heard" on a hike, apparently by Baldwin, completely around Nāpau Crater on the same date (265). Richards (Richards & Baldwin 1953) evidently accompanied Baldwin on that trip, as he later reported that he saw approximately six in one day at 2650 to 2800 feet elevation southwest of Nāpau Crater in November 1944 (267).

The foregoing records of 'ō'ū in and near Hawaii Volcanoes National Park from 1936 to 1944 were not widely publicized and hence apparently unknown to Munro (1944) who stated in 1944 that the 'ō'ū had disappeared from all the islands (7).

In 1945 Baldwin (field journal) stated that he "possibly" heard an 'ō'ū in tall 'ōhi'a forest at 2980 feet elevation in Waiākea (Kūlani Forest), near 'Ōla'a on 13 April (288).

There were apparently no reports of 'ō'ū recorded in in 1946 and 1947. Baldwin (field journal) logged the sighting of this species by a "bird watcher" at the end of the trail to Nāpau Crater's Overlook, sometime during the summer of 1948 (268). On 4 October 1948 Baldwin (field journal) wrote that he "may have heard" the 'ō'ū at 4025 feet elevation in an undisturbed fern forest in the Kīlauea Forest Reserve near the north rim of Kīlauea Crater (204). On 23 December 1948 Baldwin (field journal) "seemingly heard" the 'ō'ū at the Nāpau Crater Overlook but seemed positive that this species was detected that same day between Nāpau Crater and the small crater to the south (269-270).

In 1949 Baldwin (field journal) censusing the Lava Trees plot 0.5 mile west of Nāpau Crater, "possibly" recorded one on 22 March, "possibly" heard and saw this species on 5 August, and heard one near that area on 18 August (271-273). Concluding the results of surveys extending, with some interruptions, from 1940 to 1949, Baldwin (1953) calculated from many repetitive counts that one could expect to record 'Ō'ū in his 12 census plots (ranging in the Park from 2300 to 7500 ft elev.) only in the Nāpau Trees plot, and there only on 22 out of every 100 days (230).

Recent sightings and Survey Results (1950-1978):

Richards (field journal) observed and collected 'Ō'ū in a variety of locations, sometimes in or near the Park, from August 1950 to January 1951. On 19 August 1950 Richards (field journal) conducted an unsuccessful search for this species in the Park along the trail from Makaopuhi Crater to Nāpau Crater, the Lava Trees census plot area and return to Makaopuhi (274). On 28 August Richards (field journal) "possibly" heard one in the tall 'ohi'a forest about 0.5 mile west of where the Flume Road crosses Stainback Highway (apparently the same area visited by Baldwin on 13 April 1945 with the same questionable result) (289). Another 'Ō'ū was "possibly" heard in Puna District by Richards (field journal) during a short 21 September 1950 hike in the Keauohana Forest Reserve downslope from the Pāhōa - Kauimū Highway with the 'Ie'ie in "full bloom" (298).

In the Upper 'Ōla'a Forest Reserve, along the Haunani Road - Pu'u Kūlani Trail, from October 1950 to January 1951, Richards (field journal) on 12 October "possibly" heard one ("a canary-like song") at 3700 feet elevation between 1 and 2 miles from the trailhead; on 15 October saw and collected one and confirmed the canary-like song as that of 'Ō'ū in the same approximate location (4000 ft elev.) as that of the 12th; on 24 October saw one at 4000 feet elevation in the same location; on 1 November heard one "almost at the same spot" (3900 to 4000 ft. elev.) where one was collected on the 15th of October; on 14 January 1951 saw three and estimated between eight and 12 from call notes and songs about 1.25 miles to about 1.5 miles along the trail from the trailhead; on 14 January saw two and heard 8 others; on 16 January saw three, collected two, and "must have heard about 10 or more singing between the 1.5 mile point and 2-mile marker"; and on 17 January heard "about eight," finally seeing one and possibly its mate, on a hike to the 2-mile marker (205-207, 209-213). Presumably due to the proximity of Richard's observations to the 'Ōla'a Tract (administered by the National Park Service), some of his findings were mentioned in various monthly reports of the Park Superintendent (208, 271, 214). Publishing his observations later, Richards and Baldwin (1953) stated that as many as eight to 12 were heard and three were seen in one day in the upper 'Ōla'a Forest Reserve at an elevation of 4000 feet on 15 October 1950 and 14, 16, and 17 January 1951 (285).

'Ō'ū on the island of Hawai'i seem to have gone largely unnoticed from 1952 to 1958. Two yellow-headed, stout-billed birds slightly larger than apapane (erroneously believed to be palila) seen near the end of wright Road in (January) 1953, possibly 'Ō'ū, were reported by Pyle in a letter to Mrs. Helen Baldwin. A report by the Park Superintendent stated that this species was seen in June 1955, presumably in or near the Park, but details regarding observer, location, and date were not furnished (231). Anonymous (1956) stated that 'Ō'ū were "found" on the 31 December 1955 Christmas Count (30 minutes on foot, 30 minutes by car) on Wright Road (in the Volcano area), but no specific location along the miles long Wright Road was given (279). Berger (1970) stated that this species was last reported seen on the island of Hawai'i in 1955, perhaps referring to the Christmas Count records, but made no mention of several reports logged from 1959 to 1961 (142).

Hill (1960) "had excellent studies of a pair...with parrot like bills and yellow heads" near Thurston Lava Tube in April 1960 (246). Apparently the same observation noted by the Natioal Park Service (245). Eisenmann (1961) "watched a pair" in a recently cleared area in a very humid section off the Hilo Highway just below the Park (near 'Ōla'a Tract) on 17 June 1960 (286).

Dunmire (1962) completed a series of systematic bird surveys in and near the Park from 1959 to 1961, reporting negative results in the Park proper, including four trips totaling 14.75 hours along the trail between Makaopuhi and Nāpau Craters in July 1959, and April and October 1960 (275). Outside the Park proper, in or near 'Ōla'a Tract (administered by the National Park Service), Dunmire (1962) recorded three seen in six trips totaling 16.75 hours spent in October and November 1959; May, June and July 1960; and April 1961 (225); summarizing a total of 9 sightings variously, and apparently repetitively reported earlier (216-224). Dunmire (1961) had earlier termed the 'Ō'ū "rare" in the wet tree-fern jungle, with Thurston Lava Tube being within its range, almost exactly the same phraseology as that used later by van Riper (1973) although neither apparently ever saw this species at Thurston Lava Tube (Baldwin's Twin-Craters census plot) (247-248).

'Ō'ū on the island of Hawai'i seem to have gone unreported from 1962 to 1966 when Doty and Mueller-Dombois (1966) reported that this species was "observed recently," inferring June 1966, near Nāpau Crater (276). National Park Service wildlife observation card file contains a report (by G. C. Morrison) of four 'Ō'ū, probably all males, sighted "in thick fuchsia and tree fern" along the National Park Boundary 0.25 mile from U.S. Geological Survey Bench Mark 3828 near Māmalahoa Highway just below Park Headquarters toward Hilo on 15 December 1967 (249).

There seem to be no reports of 'Ō'ū detected in the field on Hawai'i in 1968 and 1969. Hawaii Division of Fish and Game (1969

report) officially classed this species as endangered in 1969 (143), but added no reports to the record.

In 1970, on 19 July, Banko (field journal) recorded a female 'Ō'ū seen and heard in the 'Ōla'a Tract, 0.25 mile north of the University Ag. Exp. Station, the sole report for that year (226). Two casual bird watchers, Smith and Smith (1971), observed for several minutes at 10 to 15 feet range, "a greeny beige colored bird, larger than a house sparrow or house finch, with a light colored finch-type bill, resembling a grosbeak's in size...feeding on lehua blossom" but could not see a hook in the upper mandible, reporting after "much cogitation" that they might have seen a female 'Ō'ū (239). Almost exactly a year later, on 2 May 1972, (J.) Jacot (National Park Service) saw a male 'Ō'ū at 0730 hours between the Volcano House and Kīlauea caldera (240). Berger (1970) presumed the 'Ō'ū to be extinct on Hawai'i (145), but later reported this species "seen" in 1970 (Berger 1972) (144). After concluding his survey of birds in the Park, Berger (1972 report) noted the "apparent disappearance" of the 'Ō'ū from the Park since the 1940's (232).

'Ō'ū seem not to have been recorded in 1973, but in 1974 on 12 April, Smith and Jacobi (1974) stated that they saw and heard a male and possibly a second individual in the 'Ōla'a Tract (indirectly acknowledged in Jacobi and Warshauer 1975 report) (227, 280). In the only other field observation in 1974 Stevenson (pers. comm.) reported seeing a "plump yellow-headed bird with finch-like bill" near Thurston Lava Tube on 11 August (250).

Jacobi and Warshauer (1975 report), after a 23-day bioecological survey of 'Ōla'a Tract from January 1974 to January 1975, reported finding no 'Ō'ū (281), although one was reported nearby, in from the Volcano Ag. Exp. station (227). Marshall (1975), apparently unaware of some reports, stated that the "only recent reports" of 'Ō'ū were from 'Ōla'a Tract and adjacent forests and that this species was "perhaps the rarest honeycreeper" on the island of Hawai'i (146, 228, 282).

Conant (pers. comm.) reported finding no 'Ō'ū during systematic bird surveys of the Kalapaha Extension in 1976 and 1977, although expressing the view based on "recent observations in other locations that this species could still be found" (very rarely) in the northern-most parts of the Extension (277). On 4 September 1977 van Riper (1978) reported that he observed an 'Ō'ū at 1530 hours (on the rim of Kīlauea Crater) 0.8 km (0.5 mile) southeast of Park Headquarters (3900 ft elev.) but failed to locate it on five subsequent visits (241).

In a historical review, Atkinson (1977) recognized the status of 'Ō'ū in "countless numbers" at Kona in 1892 from Perkins (1903), that this species was "now rare" in W. Hawai'i after 1896 (Perkins (1903) and in E. Hawai'i after 1900 (Henshaw 1901) (146).

The U. S. Fish and Wildlife Service conducted an intensive survey of birds in windward forests from near the northern boundary of Hawaii Volcanoes National Park north along the slopes of Mauna Loa, Mauna Loa - Mauna Kea Saddle, and Mauna Kea to above Laupāhoehoe from May or June through August 1977. The preliminary results of this survey were reported variously, as shown in the Appendix (157-161). By combining information from these accounts it is known that survey team members spent a total of 1,300 man-days along some 204 miles of trail covering 261,669 acres of forest habitat located along the eastern flanks of Mauna Loa and Mauna Kea, from Hawaii Volcanoes National Park on the south to above Laupāhoehoe on the north. The survey team recorded only 31 'Ō'ū during a total of 4,896 8-minute count periods (30 at other times) on five of 21 transects surveyed (USFWS 1978) (161). Other than "rediscovery" of 'Ō'ū on 21 April near Kūlani Cone, the distributional details, termed "spotty," were not reported.

The 2 January 1978 Christmas Count was wide-ranging with many observers; however, negative reports were filed by Katahira (1978 Anon. 1978) of 'Ō'ū undetected in the following areas: Kīlauea Forest Reserve (Keauhou Ranch); Keauhou Ranch; Keauhou Ranch Transect 29; Kīlauea Forest Reserve (Keauhou Ranch Transect 30); Keauhou Ranch Transect 30; Kīlauea Forest Reserve (Transect 31); Keauhou Ranch (Transect 31); Mauna Loa Road (4000-6600 ft elev.); Mauna Loa Trail (6600-8200 ft elev.); Kīpukapuaulu (Bird Park) and adjacent area; north rim of Kīlauea Crater; Stainback Highway and Pu'u Maka'ala; Kūlani Project Transect 28 makai (downslope); Kūlani Project Transect 29 mauka (upslope); Waiākea Forest Reserve Transect 27; and Volcano Community area (180-186, 234, 235, 242, 243, 287, 290-293). Only two 'Ō'ū were found on the 2 January 1978 Christmas Count, by diligent searchers in the 'Ōla'a Tract (283).

On 11 April 1979, according to a report in National Park Service wildlife card files, D. Reeser, D. Gardner and C. Furukawa heard "whistles" of two or three 'Ō'ū along trail from Royal Gardens Subdivision to an unnamed pig-free kīpuka in Kalapana, Hawaii Volcanoes National Park, identification of calls as 'Ō'ū being confirmed by listening to a magnetic tape recording (278).

CHRONOLOGICAL DISTRIBUTION OF RECORDS

Distribution of some 312 records of P. psittacea, including negative reports, is shown in Table 2. Rapid increase and decline of observations before and after the 1890's is typical of other forest birds which survived, albeit in dwindling numbers, until the 1970's. Paucity of records from 1780's to 1860's, and from 1910's through 1920's, appears to be representative of the widely distributed species with a few collections or sighting of 'Ō'ū recorded during these periods.

TABLE 2. Distribution of 312 Psittirostra psittacea records by decade.

1770's - 2	1840's - 3	1910's - 4
1780's - 0	1850's - 0	1920's - 8
1790's - 0	1860's - 2	1930's - 33
1800's - 0	1870's - 3	1940's - 26
1810's - 0	1880's - 19	1950's - 20
1820's - 0	1890's - 63	1960's - 46
1830's - 1	1900's - 34	1970's - 48

GEOGRAPHICAL DISTRIBUTION OF RECORDS

Of a total of 192 records, positive or negative, which are traceable to a single quadrant, 113 (59%) are referable to Hawai'i, 29 (15%) are traceable to Kaua'i, 24 (13%) originated on Lāna'i, with the balance of 26 (14%) having been reported from Moloka'i (15), Maui (9), and O'ahu (2). The geographical distribution of records referable to a single quadrant in shown in Figures 2 and 3.

COMPLETENESS OF DATA, BIAS, ERRONEOUS AND DOUBTFUL RECORDS

Foregoing records do not include detailed results of ongoing comprehensive surveys initiated by the U. S. Fish and Wildlife Service on Kaua'i in 1968, and on Hawai'i in 1976; however, summary statements covering these efforts are cited when available.

It should be recognized that various degrees of bias exist in the chronological and geographical distribution of 'Ō'ū as determined from the historical record. Some of these sources have been mentioned, others are more or less obvious to trained analysts. Due to the limited value of most records for direct comparative work the significance of bias receives no more than passing mention here.

Given the distinctive appearance and vocal characteristics of 'Ō'ū, the number of erroneous and doubtful occurrence records included in this report is believed small. Most doubtful records were noted by qualified ornithologists before they became fully familiar with this species, confirmation almost without exception being made in the same area later.

FIGURE 2. Distribution of 79 observations, reports, and museum records of Psittirostra psittacea, per quadrangle, on islands of Kaua'i, O'ahu, Moloka'i, Lāna'i, and Maui, 1837-1979.

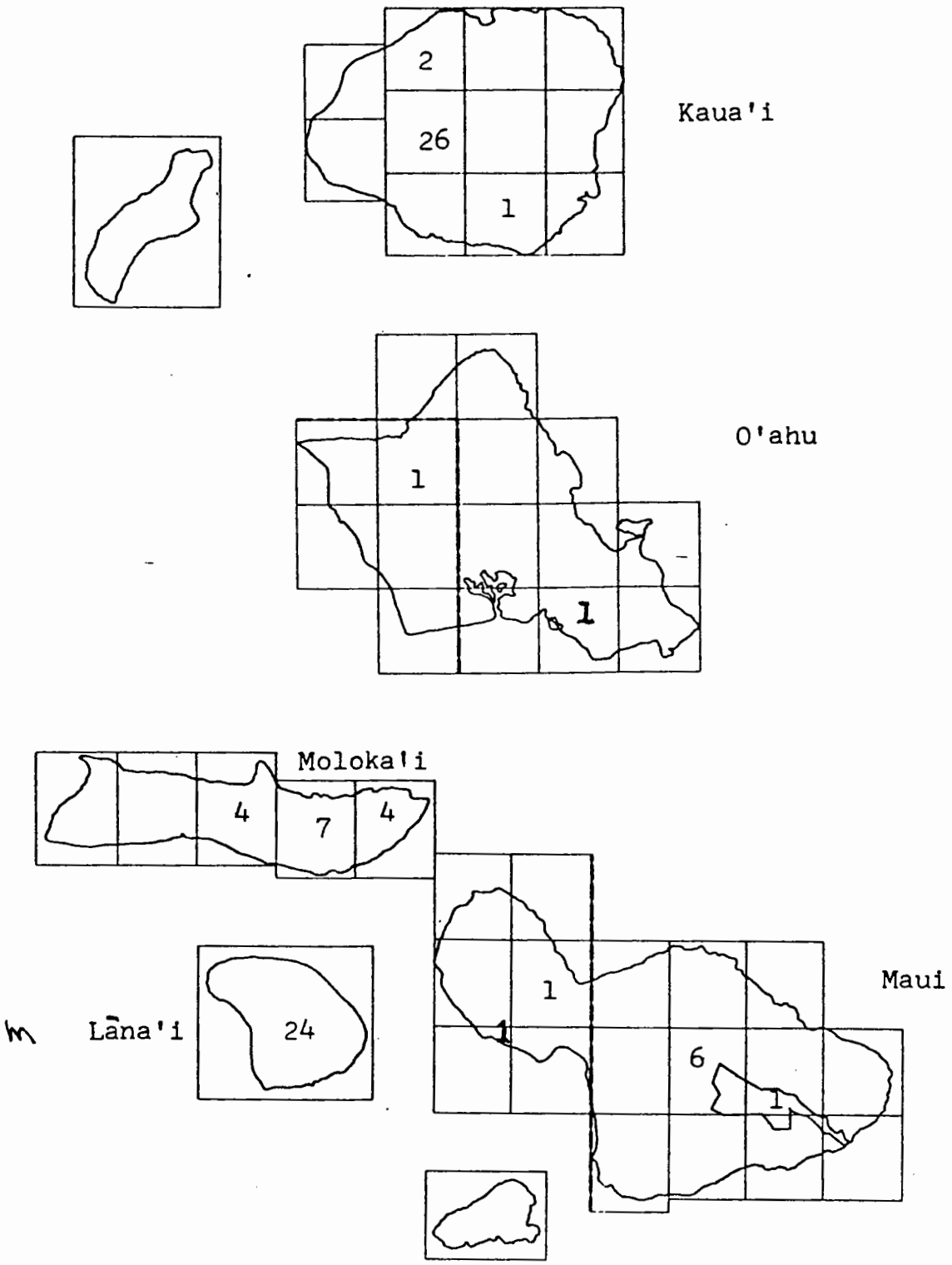
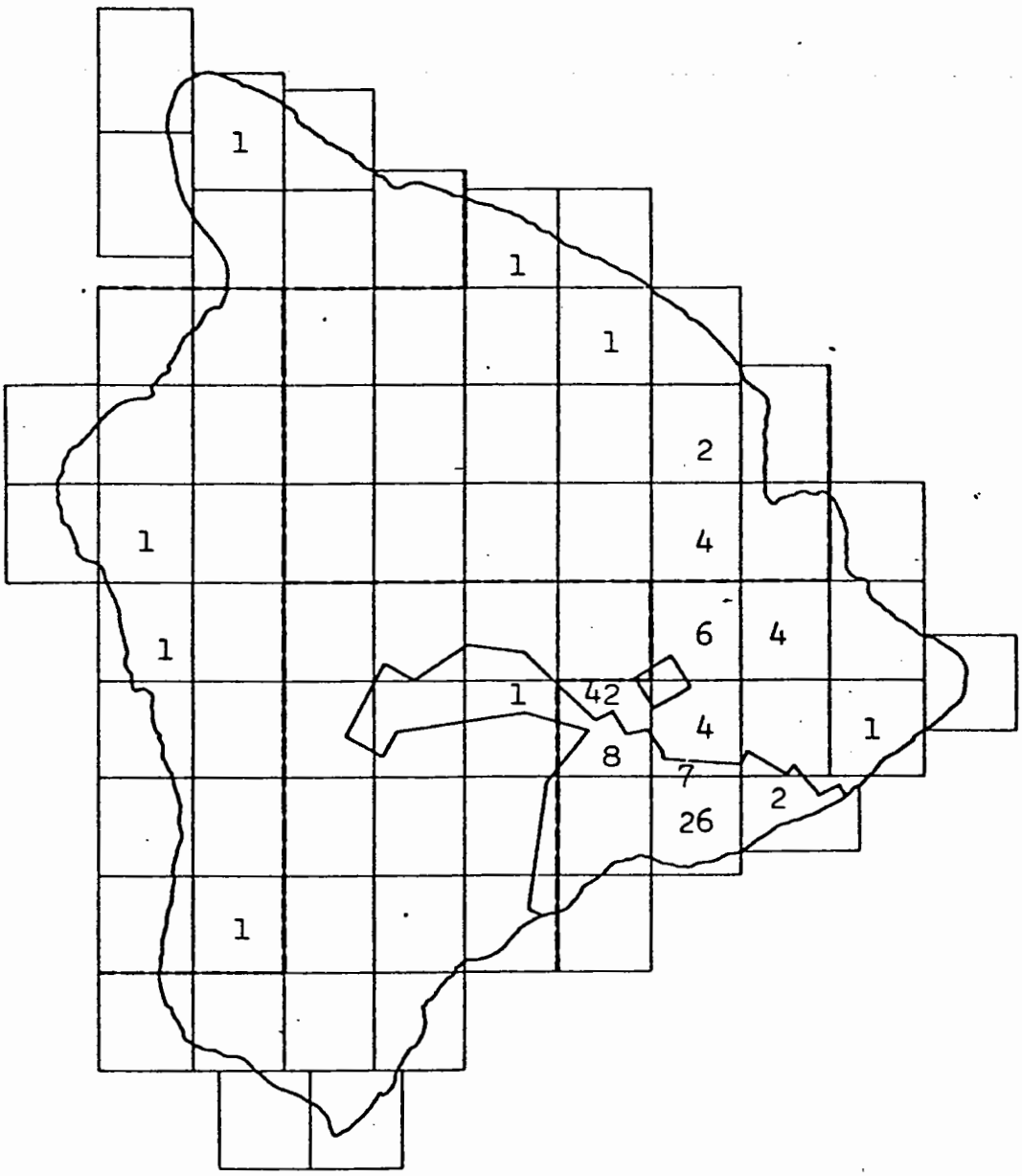


FIGURE 3. Distribution of 113 observation, reports, and museum records of Psittirostra psittacea, per quadrangle, on Island of Hawai'i, 1779-1979.



SUMMARY

From 1887 to about 1900 the 'Ō'ū was common, even locally abundant, on all forested islands except O'ahu where it was extremely rare and practically extinct. After 1900, the chronology and geography of depopulation, including its apparent extinction on O'ahu, Moloka'i, Lāna'i, and Maui, is masked by a gap in representative records.

On the island of Hawai'i, in and near Hawaii Volcanoes National Park, 'Ō'ū were detectable only as a result of progressively greater expenditure of observer energy from the late 1930's until the late 1970's. Island-wide surveys by the U. S. Fish and Wildlife Service 1976 resulted in only 61 detections of this species after 1,300 man-days of census effort (21 man-days effort per detection) in a 221,669-acre windward area in 1977, results in 1976, 1978, and 1979 being negative.

On Kaua'i an extensive one-man survey over a recent eight-year period (1968-1975) resulted in detection of 'Ō'ū at only six of 54 stations, the species being termed "very rare" even within its presently restricted 5 square-mile range.

CONCLUSIONS

Although fragmentary with notable gaps, some 300 records of 'Ō'ū from 1779 to 1977 indicate that this species has been declining without pause or resurgence on all six forested islands from at least about 1900 until the present time. 'Ō'ū are apparently already extinct on O'ahu, Moloka'i, Lāna'i, and Maui. Despite progressively greater effort in recent years, detection of 'Ō'ū on Kaua'i and Hawai'i is increasingly infrequent and of fewer individuals. It is difficult to escape the conclusion that depopulation is still in progress.

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APPENDIX II

1. Observations, reports, and specimen records are organized by island group, island, district, and/or quadrangle map. Order of listing, names and locations of district, and quadrangle boundaries are explained and illustrated in CPSU/UH Avian History Report 4: Introduction to Part I, Population Histories--Species Accounts.

2. Acronyms composed of the first three letters of the author's (or senior author's) last name, the first letter of the first name, and the last two digits of the year of publication represent sources found in the bibliography under References Cited. For example, BRYW01 = Bryan, W. A., and A. Seale; 1901. Notes on the birds of Kauai. Bishop Museum Occas. Papers. 1(3): 129-137. In cases where it is necessary to distinguish between two or more articles published by an author in any given year, letters are added to the acronym in alphabetical sequence. For example, BRYW01a = Bryan, W. A. 1901a. A key to the birds of the Hawaiian group. Bishop Museum Press. 76pp.

3. Place-names are cited in original form.

4. Parenthetical information is qualified.

Psittirostra psittacea - Southeastern Hawaiian Islands

	Relative Abundance/Locality	Elev. (ft.)	Date	Source
1	perhaps the most noticeable of the forest-birds of the islands (next to Iiwi); in no districts does it seem to be abundant / generally distributed throughout the group; vertical range...extends from the lowest forest zone up to 3,000 feet		(1887-1888)	WILS90
2	inhabits now / the lower portions of the mountain-forests of all the islands except Oahu...		(1900)	ROTW00
3	commonest on / Kauai and Hawaii		(1900)	ROTW00
4	rarer on / Molokai, Lanai and Maui		(1900)	ROTW00
5	alone of the thick-billed, finch-like Drepanids the Ou is / of general distribution over the islands except on Oahu where it is nearly or quite extinct...common on Kauai, Molokai, Lanai, Hawaii...a most abundant bird in many localities...		(1903)	PERR03
6	extremely common / on all the forested islands except Oahu from which it had nearly disappeared... strange that it should disappear from Oahu and remain common on the other islands		(1890's)	MUNG44
7	has disappeared (since 1890's) / from all the other islands (besides Oahu) as well		(1944)	MUNG44

Psittirostra psittacea - Kauai

ISLANDWIDE INFERENCE

8	common...		1890's	PERR03
9	HDFG: officially classed as endangered / (islandwide)		(1969)	(2)

UNDESIGNATED LOCALITY

10	extremely common in the 1890's (Munro 1944); now rare / (islandwide)		1977	ATKI77
11	Banko: Wilson collected 1 specimen / unspecified locality	4000	Aug-Sept 1888	(1)
12	Banko: Wilson collected 4 specimens / unspecified place(s)		Aug-Sept 1888	(1)
13	Banko: Palmer collected 19 specimens / unspecified place(s)		Jan 1891	(1)
14	Banko: Palmer collected 1 specimen / unspecified locality		undated	(1)
15	Banko: G.B. (? G.R., Gay & Robinson) collected 1 specimen / undesignated locality		26 Jan 1893	(1)
16	Banko: Perkins collected 1 specimen / unspecified locality		Oct 1895	(1)
17	Banko: Knudsen collected 2 specimens / undesignated place(s)		(? 1890's)	(1)

Psittirostra psittacea - Kaua'i

18	Banko: Collett collected 1 specimen / undesignated locality	(? 1890's)	(1)
19	Banko: G.R. (? Gay and Robinson) collected 1 specimen / undesignated locality	(? 1890's)	(1)
20	Banko: Seale collected 1 specimen / undesignated locality	Apr 1900	(1)

MULTIQUADRANGLE

21	Gay: far more plentiful / in the valleys, where it feeds on the guava, often coming down lower than 300 ft. elevation after them; and it was our impression that in favorable localities they would come down almost to the sea level if food was more plentiful there	(12 Apr to	BRYW15
22	rare / in the Alakai Swamp	(1972)	BERA72
23	seen at 6 of 54 stations surveyed island-wide 1968-1975 / presently restricted to an area about 1 mile wide and 5 miles long in the Alakai Swamp...very rare even in these habitats	(1975)	MARD75

HAENA

24	van Riper: 3 seen in one group, 2 seen in another / Kawai Koi Stream Valley	1 May 1971	(4)
25	eighth most numerous endemic bird seen / West Alakai Swamp	undated 4-day field trip (1974?)	HARA74

Psittirostra psittacea - Kaua'i

WAIMEA CANYON

26	Perkins: very numerous / Kaholuamanu Plateau (F. Gay's mountain house)		15 Apr (1895)	(3)
27	Banko: Perkins collected 1 specimen / Kaholuamanu		Oct 1895	(1)
28	Perkins: common / high plateau above Waimea revisited (? vicinity of F. Gay's mountain house)		Oct 1895	(3)
29	found at all seasons / above the range of the Ieie (vine)...on parts of the high plateau (above Kaholuamanu)		(1894-1896)	PERR03
30	single specimen taken / upwards of 4,000 ft. elevation (above Kaholuamanu)		30 Apr (1900)	BRY01
31	single specimen taken / upwards of 4,000 ft. elevation (? above Kaholuamanu)		30 Apr (1900)	BRYW15
32	pair seen / upper Waialae Valley		6 Oct (1941)	DONW41
33	2 seen by Woodside / near the high eastern end of the Kawaiiki Ridge country	4250	21 Jul (1960)	RICF64
34	1 or more seen / in the canyon of the Koaie River at over 4,000 ft., and just west of the Wainiha Pali		17 Aug (1960)	RICF64
35	1 seen on two-day trip / Alakai Swamp		4 Mar 1961	KINB61
36	2 noted / Alakai Swamp		1-2 Sept 1963	ORDW63
37	Ward: three recorded...stopped every 100 yards or so to listen and watch / along trail from Koaie cabin toward Waialeale about 2 or 3 miles...side trip into deep valley on other side of plateau... and return		21 Feb 1964	(5)

Psittirostra psittacea - Kaua'i

38	two seen...one seen later in same area may have been one of same / along ridge deeper and deeper into the swamp (past Koaie cabin)	21-23 Feb 1964	WALR64
39	1 watched...total observation time twelve to fifteen minutes...another seen same place the next day...probably an immature / close to one mile past the Koaie Cabin, on the Koaie - Waialae Trail	Mar 1965	HUBL66
40	Ward: two seen / along ridge beyond Koaie cabin	2 May 1965	(5)
41	its range now / bounded by the Koaie to the west and the Olokele to the east	Aug 1965	DONW65
42	Banko: saw 2 and possibly heard another / near terminus of ridge before drop down to Koaie Stream cabin from Mohihi trailhead	13 May 1966	(6)
43	quite rare...saw 3 pairs / Alakai Swamp area	28-30 May 1966	ANON66
44	not found / on a trip in to the Alakai...got back two miles from the Koaie Gulch	28 Aug 1967	DONW67
45	pair seen / trip into Alakai Swamp	17 Feb (1968)	ANON68
46	1 seen / about a mile along the ridge...extending SSE from the (Koaie) cabin paralleling Koaie stream	31 May 1968	GAUJ68
47	2 seen / Koaie stream source	31 May 1968	GAUJ68
48	1 seen / within 200 yards of the (Koaie) cabin, part way up the ridge (to SSE)	31 May 1968	GAUJ68
49	1 heard / Kohua ridge on way to Koaie cabin from Koaie stream source	1 Jun 1968	GAUJ68

Psittirostra psittacea - Kaua'i

50	actively flying back and forth along the ridge...at least 25 sightings made...six seen together...felt that at least (9) individuals seen / vicinity of Koaie stream source	1 Jun 1968	GAUJ68
51	male seen twice...distinct possibility that we saw two different individuals...none seen next day in 1½ hour vigil at same location / on Kohua Ridge about one mile along trail to Alakai Swamp from end of Camp 10 road...elevation of about 3,900 feet, on a sharp east-west ridge that drops off steeply on either side	17 Sept 1971	MULW71

KOLOA

52	Perkins: present / at a good elevation...in the mountains some miles west of Lihue... dense masses of staghorn fern	Jul/Aug 1896	(3)

Psittirostra psittacea - O'ahu

ISLANDWIDE INFERENCE

53	...good reason to believe it has become extinct or else extremely scarce / (islandwide)	(1887-1888)	WILS90
54	...good reason to believe it has become extinct or else extremely scarce / (islandwide)	(1891)	WILS91
55	saw one / Moanalua Valley	Oct 1899	BRYW01
56	regarded as practically extinct	(1901)	HENH01
57	we may safely suppose that it is extinct now / (islandwide)	(1900)	ROTW00
58	Palmer was told by several persons that it was formerly not uncommon / (islandwide)	(1900)	ROTW00
59	extinct or nearly so / (islandwide)	(1903)	PERR03
60	extinct for many years / (islandwide)	(1915)	BRYW15
61	has been seen but no specimen has been taken for a long time / (islandwide)	(1944)	MUNG44
62	no reports / (islandwide)	(1963)	DONW63
63	HDFG: thought to be extinct or extirpated from this particular island / (islandwide)	(1969)	(2)
64	presumed extinct / (islandwide)	(1975)	MARD75
65	formerly not uncommon (Rothschild 1893-1900); nearly disappeared by 1893 (Perkins 1903); last seen in 1899 (Henshaw 1903)	1977	ARKI77

Psittirostra psittacea - O'ahu

UNDESIGNATED LOCALITY

66	Banko: Deppe (2) in January and Townsend (1) collected 3 specimens / undesignated place(s) (? Nuuanu Valley)		1837	(1)
67	quite a series collected by Prof. Behn / undesignated place(s)		Oct 1846	ROTW00
68	few specimens collected by Behn / undesignated place(s)		(? 1846)	ROTW00
69	Banko: Behn collected 4 specimens / undesignated place(s)		1846	(1)
70	Banko: Mann collected 1 specimen / undesignated locality		(? 1869)	(1)

HALEIWA

71	Perkins: pair seen / on Kaala	ca. 3000	Mar (1893)	(3)

Psittirostra psittacea - Moloka'i

ISLANDWIDE INFERENCE

72	common	1890's	PERR03
73	HDFG: thought to be extinct or extirpated from this island	(1969)	(2)
74	presumed extinct / (islandwide)	(1975)	MARD75
75	widespread in 1907 (Bryan 1908); presumed extinct (Munro 1921-1935)	1977	ATKI77

UNDESIGNATED LOCALITY

76	Banko: Wilson collected 1 specimen / unspecified locality	Jun 1888	(1)
77	Banko: Palmer collected 6 specimens / unspecified place(s)	1893	(1)
78	Banko: Perkins collected 3 specimens / unspecified place(s)	1893	(1)
79	Banko: Flood collected 4 specimens / unspecified place(s)	Feb 1895	(1)
80	Banko: Bryan collected 1 specimen / unspecified locality	Apr-Jun 1907	(1)
81	Banko: Munro collected 4 specimens / unspecified place(s)	Apr-Jun 1907	(1)

Psittirostra psittacea - Moloka'i

MULTIQUADRANGLE

82	met with...in a ratio of about one to twenty, as compared with the Amakihi...not, relatively speaking, the abundant species its size and song would seem to make it...16 skins secured / at all the stations visited in the forest area (Waikolu, Pelekunu, Halawa, Wailau Valleys)...the Halawa forest makes an ideal home for this Ieie-loving bird...it is, nevertheless, always to be found in the more dense Ohia forests, even though the amount of Ieie is small, or wanting entirely.	(15 Apr to 15 Jun 1907)	BRY08
83	observed...making long sustained flights (like the Apapane) / from the palis of the large valleys, that carried them readily from one valley to another	(15 Apr to 15 June 1907)	BRY08
84	none seen / bird survey on both east and west sides of the forest	1936	MUNG63

KAUNAKAKAI

85	found...in the greatest numbers / among the trees clothing the abrupt sides of the deep ravine which runs down to the leper settlement	(1887-1888)	WILS90
86	most plentiful / deep ravine above leper settlement	(1887-1888)	WILS91
87	Perkins: extremely abundant / cleaning out the guavas up the valley on way from Pelekunu village to Kamalo	(16 Jul 1893)	(3)
88	"ingrosserer Menge" (ingreater numbers, specifically crowds = hordes) / "nur an dieser Stelle der Insel" (only at this section of the Island, viz. along trail down pali from Kalae to leper colony at Kalaupapa)	(1896/1897)	SCHH00

Psittirostra psittacea - Moloka'i

KAMALO

89	Banko: Bryan collected 4 specimens / Kilohana	Apr-Jun 1907	(1)
90	Banko: Bryan collected 2 specimens / "Puualu"	Apr-Jun 1907	(1)
91	Banko: Bryan collected 1 specimen / Pelekunu	Apr-Jun 1907	(1)
92	Banko: Bryan collected 1 specimen / Wailau	Apr-Jun 1907	(1)
93	Banko: Bryan collected 1 specimen / Pelekuna	Apr-Jun 1907	(1)
94	I am certain that I have seen an Ou...but until I verify this, I will make no claims / Pelekunu - Waikalo (Waikolu) plateau	(1965)	PEKN67
95	survey failed to detect / high forested area from Puu Kolekole cabin at 3800 ft. elevation, north to Papaala Pali at ca. 4300 ft. elevation, northwest to Pepeopae and east to Uapa	21-25 July 1975	SCOW77

HALAWA

96	only a few were seen / hills above Halawa in forest much higher that near Pukoo	Jan 1893	ROTW00
97	Banko: Bryan collected 2 specimens / Halawa	Apr-Jun 1907	(1)
98	Banko: Bryan collected 2 specimens / Moanui	Apr-Jun 1907	(1)
99	Banko: Bryan collected 1 specimen / Brown's Ranch (Pu'u o Hoku)	Apr-Jun 1907	(1)

Psittirostra psittacea - Lāna'i

ISLANDWIDE INFERENCE

100	common	1890's	PERR03
101	extremely common in the 1890's and up until 1923 (Munro 1924); probably extinct (Munro 1921-1935)	1977	ATKI77
102	Banko: Wilson collected 1 specimen / near (unspecified) ranch	1 Jun 1888	(1)
103	Banko: Wilson collected 2 specimens / undesignated place(s)	Jun 1888	(1)
104	Banko: Palmer collected 3 specimens / undesignated place(s)	Nov 1892	(1)
105	Palmer saw them arise in a flock / (undesignated locality)	(1892)	ROTW00
106	Perkins: very abundant / up from camp near head of gulch behind Koele	late Jun to 4 Jul (1894)	(3)
107	Perkins: excessively common...in hundreds / Kaiholena Valley	1894	MUNG44a
108	Banko: Perkins collected 3 specimens / undesignated place(s)	1894	(1)
109	collected specimen / Kaiholena Valley	22 Feb 1913	MUNG44
110	saw 1 / farther up Kaiholena Valley	16 Mar 1916	MUNG44
111	saw 1 / at Waiakeakua, at the southwest end of the forest	12 Aug 1918	MUNG44

Psittirsotra psittacea - Lāna'i

112	Banko: Munro collected 1 specimen / Kaiholena Gulch	10 Nov 1923	(1)
113	Banko: Munro collected 2 specimens / undesignated place(s)	Nov 1923	(1)
114	Banko: Munro collected 1 specimen / undesignated place	1923	(1)
115	Munro survey: probably increasing / (islandwide)	(1923)	GREH24
116	probably increasing / (islandwide)	(1923)	MUNG44
117	Banko: undesignated collector obtained 1 specimen / undesignated locality	undated	(1)
118	Banko: Munro collected 1 specimen / Lanaihale	28 Feb 1927	(1)
119	Munro: rarely seen / (islandwide)	(1931)	GREH32
120	probably (became) extinct / (islandwide)	1928-1931	ATKI77
121	Munro: has not been seen in some time...forests often visited / (islandwide)	(1932)	GREH33
122	has not been seen for some time / (islandwide)	(1932)	MUNG44
123	HDFG: thought to be extinct or extirpated on this particular island / (islandwide)	(1969)	(2)
124	presumed extinct / (islandwide)	(1975)	MARD75

Psittirostra psittacea - Maui

ISLANDWIDE INFERENCE				
125	extremely common in the 1890's (Munro 1944); last recorded in 1901 (Banko 1971)		1977	ATKI77
126	HDFG: officially classed as endangered / (islandwide)		(1969)	(2)
127	presumed extinct / (islandwide)		(1975)	MARD75
UNDESIGNATED LOCALITY				
128	Banko: Palmer collected 8 specimens / undesignated place(s)		Aug-Sept 1892	(1)
MULTIQUADRANGLE				
129	found at all seasons / forests of E Maui above the range of the Ieie (vine)		(1894, 1896)	PERR03
WAILUKU				
130	Perkins: seen / ascent from the neighborhood of Waihee...to top of the mountain		May 1896	(3)
OLOWALU				
131	Randall Von Tempsky: saw several / Ukumehame Gulch		1890	WILS91
KILOHANA				
132	seen repeatedly / vicinity Olinda	ca. 5400	(Jul 1879)	FINO80

Psittirostra psittacea - Maui

133	Palmer: shot two / encamed 5,000 feet high on the mountain; forest not very dense...small ohias, a few koa trees, and a sprinkling of Mamane; trail right up to the top is excellent... thanks to Mr. Mossman, Makawao Store, whose sketch of the crater and trail was most useful to me		2 Aug (1892)	ROTW00
134	Perkins: singing much more than usual, otherwise I should not have supposed it was so abundant here, or has there been a sudden incursion / about 1½ miles (up from "Mr. Payne's" mountain house considerably higher up than Olinda	ca. 5000	31 Mar (1894)	(3)
135	Banko: Henshaw collected 3 specimens / Ukelele (Ukulele)		6-21 Jun 1901	(1)
136	Banko: Henshaw collected 4 specimens / Olinda		6-21 Jun 1901	(1)
137	Baldwin: possibly heard / between Holua Cabin and 4500 ft. elevation, Keanae Valley		20-25 Nov 1945	(7)

NAHIKI

138	Palmer: heard 1 / camp no. 5...somewhat drier middle ohia forest, Kipahulu Valley	ca. 4000	18 Sept (1892)	ROTW00

Psittirostra psittacea - Hawai'i

ISLANDWIDE INFERENCE

139	common	1890's	PERR03
140	most abundant and widely-ranging of the Finches ...often in little companies / (often) wanders quite below the true forest, being partial to the large Kukui trees; it belongs strictly to the lower district (1,700 to somewhat over 3,000 feet); strays even upwards to 4000 ft.	(Jun/Oct 1892)	PERR93
141	common...generally found in small companies, never singly / generally distributed...in the ohia forests...from about 1,000 feet upwards	(1894-1902)	HENH02
142	last reported seen / (islandwide)	1955	BERA70
143	HDFG: officially classed as endangered / (islandwide)	(1969)	(2)
144	seen / (islandwide)	in 1961...but not again until 1970	BERA72
145	presumed to be extinct / (islandwide)	(1970)	BERA70
146	perhaps (the) rarest honeycreeper / (islandwide)	(1975)	MARD75

UNDESIGNATED LOCALITY

147	Palmer has seen it up to about 7000 ft. above the sea / (unspecified locality)	(1891/1892)	ROTW00

Psittirostra psittacea - Hawai'i

148	Palmer saw them arise in a flock / (unspecified locality)	(1891/1892)	ROTW00
149	Banko: Palmer collected 30 specimens / undesignated place(s)	Jan,Feb,Sept 1891; Nov 1892	(1)
150	Banko: Weiske collected 2 specimens / undesignated place(s)	1894	(1)
151	Banko: unspecified collectors obtained 5 specimens / undesignated place(s)	(? 1890's)	(1)
152	Banko: Parker collected 1 specimen / undesignated locality	(1890's)	(1)
153	Banko: McGregor collected 1 specimen / undesignated locality	16 Jan 1940	(1)

MULTIDISTRICT

154	rare / east Hawaii (Henshaw 1901)	after 1900	ATKI77
155	countless numbers at Kona (Perkins 1903)	in 1892	ATKI77
156	rare / west Hawaii (Perkins 1903)	after 1896	ATKI77
157	unreported for about six years...FWS census crews rediscovered it near Kulani Cone on 21 April...at least 60 sightings recorded / scattered over about 35 miles between HVNP and area above Laupahoehoe	(May-Aug 1977)	PYLR77
159	USFWS survey ream counted almost 40 (others heard) / from Hawaii National Park to NE slope of Mauna Kea; 2,7000 observation stops; 204 transect miles	May Aug 1977	WHIH77
160	Scott: 61 observed by survey teams / in Hilo, Waiakea and Olaa forests	1977	VANC78

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160	recorded 61 times by survey team members in 39,168 minutes (8 minute periods) of observations; 4,896 count periods; 2,452 sampling stations along 329 km (204 miles) of trail (1,300 man-days in the field) ...the largest number seen in a single year since the turn of the century / 105,938 ha (261,669 acre) study area, windward Hawaii	(Jun-Aug 1977)	USGW78
161	Scott, Kepler, Krindler: survey team recorded 31 during 4,896 8-minute count periods and 30 at other times...observed on 5 of 21 transects surveyed and during .31 percent of the census periods...distribution spotty...but 61 observations represents by far the largest number of records during a single year since the turn of the century / 105,938 ha (261,669 acre) area, windward Hawaii	(Jun-Aug) 1977	(24)

Kohala District

HAWI

162	Palmer: very numerous / (encamped in Kohala Mountains day's travel from Kohala)	(Jan 1892)	ROTW00

Kona District

DISTRICTWIDE

163	great numbers of...young / middle forest of Kona	(1892)	PERR03
164	countless numbers / throughout the wet belt... in middle Kona	(1892)	PERR03

165	large numbers habitually strayed / below the range of Freycinetia, especially frequenting the clumps of Kukui trees (middle Kona)		(1892)	PERR03

UNDESIGNATED LOCALITY

166	very common (bird w/yellow head with "parroquet"-like bill) / (? Kealakekua area)		Mar 1779	COOJ84
167	specimens obtained / during several days excursion from Kealakekua Bay into the interior		Jan/Fob 1779	STRE50
168	shot a good number of examples / outskirts of a forest, in the district of Kona		(1887-1888)	WILS91
169	Banko: Wilson collected 1 specimen / Kona		1887/1888	(1)
170	Perkins: in great abundance / (? Pulehua)	ca. 2500	Jun 1892	(3)
171	Banko: Koebele collected 1 specimen / Kona District		Feb 1894	(1)
172	Banko: Wilson collected 3 specimens / Kona		1896	(1)
173	Perkins: in great numbers / unspecified locality (? Pulehua)	3000	Mar 1896	(3)
174	seen / in Kona		1933	MUNG44b

KAILUA

175	Palmer: 1 heard / (between camp on Mount Hualalai and broad belt of Koa trees above)		Dec 1891	ROTW00

Psittirostra psittacea - Hawai'i

KEALAKEKUA

176	Banko: Wilson collected 3 specimens / Kaawaloa		

PAPA

177	Baldwin: Forest Ranger at Keanakolu: reported seen / mauka at Opihihaele (Opihihali, Honaunau quadrangle) in South Kona	"up till 1895, when he left"	(8)

Ka'ū District

UNDESIGNATED LOCALITY

178	Banko: Perkins collected 1 specimen / Kau	Jul 1895	(1)
179	Banko: Arnold collected 1 specimen / Kau District	11 Jul 1896	(1)
180	O censused Christmas Count / Kilauea Forest Reserve (Keauhou Ranch)	2 Jan 1978	ANON78
181	O censused Christmas Count / Keauhou Ranch	2 Jan 1978	KATL78
182	O censused Christmas Count / Keauhou Ranch Transect 29	2 Jan 1978	KATL78
183	O censused Christmas Count / Kilauea Forest Reserve (Keauhou Ranch Transect 30)	2 Jan 1978	KATL78
184	O censused Christmas Count / Kilauea Forest Transect 30	2 Jan 1978	KATL78
185	O censused Christmas Count / Kilauea Forest Reserve (Keauhou Ranch Transect 31)	2 Jan 1978	KATL78

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186	O censused Christmas Count / Keauhou Ranch Transect 31		2 Jan 1978	KATL78

KILAUEA CRATER

187	heard one sing / just after entering the koa forest along Kulani Cone trail from Volcano area		13 Jul 1937	DONW51
188	Donaghho: have never seen this bird, but I heard it...sings like a canary and thus easy to recognize / in the koa forest of the Upper Olaa forest reserve (along trail from end of Haunani Road to Puu Kulani)		13 Jul 1937	(9)
189	heard two start singing / along trail from Kulani Cone (to Volcano area)...constructed by C.C.C.		13 Jul 1937	DONW51
190	Craddock: saw 1 / 29 Mile Road (first 5 miles of trail from end of Haunani Road to Puu Kulani)		13 Jul 1937	(10)
191	Baldwin: seen / upper Olaa Forest Reserve; 1 mile beyond end of road along Kulani trail	ca. 3800	7 Aug 1938	(8)
192	Baldwin: first bird I saw on the trail / Kulani trail, 100 yards past the Forest Reserve gate from end of road		7 Aug 1938	(8)
193	Baldwin: 1 heard / Kulani trail 1 1/8 mile from end of road, upper Olaa Forest Reserve	ca. 4000	7 Aug 1938	(8)
194	Baldwin: heard what anybody would call a canary - it must be an Ou...occasionally (1530 hours) returning along Kulani Cone trail near 2 mile marker		24 Nov 1938	(8)

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195	Baldwin: heard 1 singing / (1550 hours) returning along Kulani Cone trail near 2 mile marker		24 Nov 1938	(8)
196	Baldwin: tentatively identified several from calls and song from (0945 to 1530 hours) / on 3-mile hike along Kulani Cone trail from Volcano area		24 Nov 1938	(8)
197	Baldwin: 1 possibly heard / (1415 hours) near 3-mile mark Kulani Cone trail		24 Nov 1938	(8)
198	Baldwin: tentatively identified several / hike from (1530 to 1730 hours) along Kulani Cone trail from Volcano area		26 Nov 1938	(8)
199	Baldwin: heard the song which may be the Ou's twice during the morning and the ascending calls about 6 times / Kulani Cone trail		7 Feb 1939	(8)
199	Baldwin: possibly heard song twice...ascending calls about 6 times / Kulani Cone trail		7 Feb 1939	(8)
200	Baldwin: heard 1 or 2 distant ascending calls this morning. Ou? / ½ mile south of upper Olaa Forest Reserve	3750	8 Feb 1939	(8)
201	Baldwin: heard 1 or 2 distant ascending calls this morning...Ou? / Kulani Cone trail to one mile marker (and ½ mile south of the Forest Reserve?)		8 Feb 1939	(8)
202	several individuals were located / in the Upper Olaa forest reserve		summer and winter of 1938 and 1939	BALP41
203	Baldwin: may have heard / undistrubed fern forest Kilauea Forest Reserve near N rim Kilauea Crater	4025	4 Oct 1948	(8)

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205	Richards: one possibly heard, canary-like song (1130-1830 hours) / between 1 and 2 mile markers from end of Haunani St., Volcano, along trail to Puu Kulani, Upper Olaa Forest Reserve	3700	12 Oct 1950	(11)
206	Richards: one seen, collected...now positive that the bird I heard singing on the 12th was the ou / between 1 and 2 mile markers, along trail to Puu Kulani from end of Haunani St., Volcano	4000	15 Oct 1950	(11)
207	Ricahrds: one seen / between 1 and 2 mile markers on trail from end of Haunani Street, Volcano, to Puu Kulani	4000	24 Oct 1950	(11)
208	N.P.S.: one seen / on the Kulani trail near the Park		(Oct 1950)	(12)
209	Richards: one heard / almost the same spot where Ou 298 was collected October 15...in first 1½ miles along trail to Puu Kulani from end of Haunani St., Volcano	3900-4000	1 Nov 1950	(11)
210	Richards: 3 seen...between 8 and 12, or more... estimated...from call notes and songs (1300-1745 hours) / on both sides of the trail from about 1¼ mile mark to about 1½ mile up trail to Puu Kulani from end of Haunani Street, Volcano		14 Jan 1951	(11)
211	N.P.S.: Richards: saw 2...heard 8 others / on the trail to Kulani which leaves the 29-mile district		14 Jan (1951)	(12)
212	Richards: saw 3...2 collected...must have heard about 10 more...many heard singing (1115-1745 hours) / between 1½ mile point and the 2 mile marker on trail to Puu Kulani from end of Haunani Street, Volcano		16 Jan 1951	(11)

Psittirostra psittacea - Hawai'i

213	Richards: about 8 heard...finally 1 and possibly its mate were seen (0900-1700 hours) / hike to 2 mile marker on trail to Puu Kulani from end of Haunani Street, Volcano	17 Jan 1951	(11)
214	N.P.S.: Richards: 1 seen...heard 6 others / on the trail to Kulani which leaves the 29-mile district	17 Jan (1951)	(12)
215	Pyle: two yellow-headed, stout billed birds slightly larger than apapane seen (erroneously believed to be palila) / end of Wright Road	(Jan) 1953	(16)
216	N.P.S.: 1 female seen / 100 yards E. of Wright Road on boundary of Olaa tract	17 May 1960	(14)
217	N.P.S.: 1 male seen / 100 yards E. of Wright Road on boundary of Olaa tract	20 May 1960	(14)
218	N.P.S.: 1 seen / 100 yards within the Park since 1948 / at the edge of the Olaa tract of the Park	20 May 1960	(12)
219	Dunmire: one seen and/or heard / ½ mile north northwest of south corner of 10,000 acre NPS Olaa Tract	20 May 1960	(17)
220	watched a pair / in the center of a clearing, Olaa Tract (N.P.S.)	17 Jun (1960)	DUNW60
221	Dunmire: 2 seen and/or heard / 0.6 mile north northwest of south corner of 10,000 acre NPS Olaa Tract	17 Jun 1960	(17)
222	Dunmire: 1 seen and/or heard / near southwest boundary 10,000 acre NPS Olaa Tract 1 mile from south corner	22 Jul 1960	(17)

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223	N.P.S.: 1 seen / Olaa Tract 2 miles NE of 1st left turn on Wright Road		22 July 1960	(17)
224	Dunmire: 1 seen and/or heard / ½ mile north left turn on Wright Road		1 Apr 1961	(17)
225	3 seen in 6 trips...16 3/4 hours / Olaa Tract (from Wright Road)		Oct,Nov 1959; May,Jun,Jul 1960; Apr 1961	DUNW62
226	Banko: 1 female heard and seen / ½ mile north of University of Hawaii Ag. Exp. Station in Olaa Tract		19 Jul 1970	(6)
227	Jacobi & Warshauer: 1 seen / in closed Metrosideros forest in from the Volcano Ag. Exp. Station, Olaa Tract (NPS)	4100	Jan 1974 to Jan 1975 (23 days)	(18)
228	only recent reports of this species on the island of Hawaii / Olaa Tract and adjacent forests		(1975)	MARD75

Hawaii Volcanoes National Park

PARKWIDE INFERENCE

229	rare / (Hawaii National Park)	(1940)	BALP41
230	determined from extensive series of repetitive counts that, in a hundred days of censusing, species could be expected to be recorded / twelve census plots in Hawaii National Park ranging 20 miles on the flanks of the volcanoes Kilauea and Mauna Loa - continued -	(1940-1949)	BALP53

Psittirostra psittacea - Hawai'i

	(Total Count Days)			
0 days in...	Plot 1 (Kipuka Keana Bihopa)	2300	(64)	
0 days in...	Plot 2 (Kipuka Nene No. 2)	3000	(73)	
0 days in...	Plot 3 (Kipuka Nene No. 3)	3000	(73)	
22 days in...	Plot 4 (Napau Lava Trees)	2850	(23)	
0 days in...	Plot 6 (Kipuka Kulalio)	5500	(110)	
0 days in...	Plot 7 (Kipuka Puaulu)	4050	(92)	
0 days in...	Plot 8 (Twin Craters)	3650	(100)	
0 days in...	Plot 10 (Mauna Loa)	7500	(41)	
0 days in...	Plot 12 (Kipuka Kulalio)	5900	(53)	
0 days in...	Plot 13 (Ainahou Gate)	3050	(54)	
0 days in...	Plot 17 (Kalanaokuaiki Pali)	3300	(61)	
0 days in...	Plot 18 (Lua Manu)	3650	(66)	

231	N.P.S.: seen / (? Hawaii National Park)		Jun 1955	(12)
232	Berger: apparent disappearance since 1940's / from Hawaii Volcanoes National Park		1970-1972	(19)

MULTIQUADRANGLE

233	Baldwin: know of no occurrence records / Chain of Craters region		29 Dec 1938	(8)
234	O censused Christmas Count / Mauna Loa Road	4000-6600	2 Jan 1978	KATL78

KIPUKA PAKEKAKE

235	O censused Christmas Count / Mauna Loa Trail	660-8200	2 Jan 1978	KATL78

KILAUEA CRATER

236	large incursion / Koa woods above Kilauea on the Kau side		Aug 1895	PERR03
237	Perkins: not common...2 or 3 could be seen on most days, rarely more / 1½-2 miles of Volcano House (toward Mauna Loa)		up to 1896	(20)

Psittirostra psittacea - Hawai'i

238	Perkins: abundant at certain times of year / 1½-2 miles of Volcano House (toward Mauna Loa		up to 1896	(20)
239	for several minutes, at 10-15 feet range, we observed a greeny beige colored bird, larger than house sparrow or house finch, with a light colored finch-type bill, resembling a grosbeak's in size... feeding on lehua blossom...could not see a hook in the upper mandible, after much later cogitation we could only conclude that we might have seen a female Ou / trail down into the caldera...few yards below Volcano House		(6 May 1971)	SMIS71
240	Jacot: male seen 0730 hours / between Volcano House and Kilauea Crater		2 May 1972	(15)
241	one observed at 1530 hours but not found on 5 subsequent visits / .8 km (.5 mile) SE Hdqs. Hawaii Volcanoes National Park	3900	4 Sept 1977	VANC78
242	O censused Christmas Count / Kipuka Puaulu and adjacent areas, HVNP		2 Jan 1978	KATL78
243	O censused Christmas Count / rim of Kilauea crater, HVNP		2 Jan 1978	KATL78

VOLCANO

244	Baldwin: quite possibly heard / middle strip of Twin Craters census plot, Kau-Puna boundary, Hawaii National Park	3850	13 Sept 1940	(8)
245	N.P.S.: 2...seen well and at length / Thurston Lava Tube		15 Apr 1960	(14)
246	had excellent studies of a pair...with parrot-like bills and yellow heads / Thurston Lava Tube		(Apr 1960)	HINL60

Psittirostra psittacea - Hawai'i

247	rare / in the wet tree-fern jungle...Thurston Lava Tuve is within its range (Hawaii Volcanoes National Park)	(1958-1960)	VANC73
248	rare / in the wet tree-fern jungle...Thurston Lava Tube...within its range	(1961)	DUNW61
249	N.P.S.: four individuals sighted...all probably males...in thick fuchsia and tree fern / Park Boundary Line, ½ mile from BM 3828 (along Mamalahoa Highway) (just below Park Hdqs.)	15 Dec 1967	(14)
250	Stevenson: plump yellow-headed bird with finch-like bill / near Thurston Lava Tuve (HVNP)	11 Aug 1974	(13)

MAKAOPUHI CRATER

251	Williams: seen in numbers / Kane-Nui-o-Hamo (north rim Makaopuhi Crater) (Hawaii National Park)	(1936)	BALP41
252	can be seen in numbers / on the hill Kane-Nui-o-Hamo, behind Makaopuhi Crater, where the Ieie (Freycinetia arborea) vine grows in some profusion	(1936)	WILK36
253	Donaghho: found / in the lower forest region... especially around Kane-Nui-o-Hamo	Jun-Aug 1937	(9)
254	Baldwin: one or more possibly heard on overnight trip (field notes later confirm identity) / cross-country trip from Napau Crater trail to summit of Kane-Nui-o-Hamo and return	21 Aug 1938	(8)
255	Baldwin: saw or heard none / on hike from Kane-Nui-o-Hamo to Napau Crater trail	22 Aug 1938	(8)

Psittirostra psittacea - Hawai'i

256	Baldwin: heard an ascending call which made me think Ou immediately (unable to confirm) / on rim of small, steep-sided forested crater on top of Puu Huluhulu		29 Dec 1938	(8)
257	Baldwin and Abbott: had difficulty in finding it and heard only one / Kane-Nui-o-Hamo		(1938)	BALP41
258	Baldwin: none this trip / Kane-Nui-o-Hamo		5 Jan 1939	(8)
259	Baldwin: probably 2 - 4 individuals heard in one hour, glimpsed 2 / Lava Trees trail, Napau Crater (census plot #4)		1 May 1940	(8)
260	Baldwin: 1 heard and seen / Lava Trees trail, Napau Crater (census plot #4)		8 May 1940	(8)
261	Baldwin: recorded 2 / Lava Trees census plot, ½ mile west of Napau Crater	2850	14 May 1940	(8)
262	Baldwin: recorded 1 / Lava Trees census plot, ½ mile west of Napua Crater	2850	21 May 1940	(8)
263	2 were seen / Napau Crater area (Hawaii National Park)		1940	BALP41
264	Baldwin: looked and listened for it, but no sign / hike from Napau Crater 2,750 ft. el. down Puna Rift to 2,250 ft. el., and return		16 Jul 1941	(8)
265	N.P.S.: 3 seen and several more heard / hike completely around Napau Crater		25 Nov 1944	(12)
266	Baldwin: 6 seen or heard / in the stretch of tree fern forest...just to the east as well as just to the west of the alley between...Napau and the small crater ½ mile from it on the SSW side		25 Nov 1944	(8)

Psittirostra psittacea - Hawai'i

267	saw approximately 6 in one day / SW Napau Crater	2650-2800	Nov 1944	RICL53
268	Baldwin: seen by a bird watcher / Napau Crater lookout, at end of NPS trail		summer of 1948	(8)
269	Baldwin: seemingly heard / near Napau Crater lookout, at end of NPS trail		23 Dec 1948	(8)
270	Baldwin: heard only / between Napau Crater and small crater to south		23 Dec 1948	(8)
271	Baldwin: recorded possibly 1 / Lava Trees census plot ½ mile west of Napau Crater		22 Mar 1949	(8)
272	Baldwin: 1 possibly heard and seen / on the census plot at the trail, Lava Trees, ½ mile west Napau Crater		5 Aug 1949	(8)
273	Baldwin: 1 heard / near Lava Trees census plot		18 Aug 1949	(8)
274	Richards: unsuccessful search / along trail (from Makaopuhi Crater), to Napau Crater, Lava Trees, return to Makaopuhi		19 Aug 1950	(11)
275	not seen in 4 trips totaling 14 3/4 hours / (along trail) between Makaopuhi and Napau Craters		Jul 1959; Apr (2 trips), Oct 1960	DUNW62
276	observed recently / near Napau Crater		(Jun 1966)	DOTM66

KALAPANA

277	none observed during systematic surveys... recent observations in other locations suggest that this species could still be found, very rarely, in the northern-most parts of Kalapana Extnsion / Hawaii Volcanoes National Park		1976, 1977	(23)

Psittirostra psittacea - Hawai'i

278	N.P.S.: D. Reeser, D. Gardner, C. Furukawa: whistles of 2 or 3 heard...none seen (identification of species confirmed by listening to magnetic tape recording of call / along trail from Royal Gardens Subdivision to pig-free kipuka, Kalapana, HVNP	11 Apr 1979	(14)

Kīlauea District

MULTIQUADRANGLE

279	found (Christmas Count) / Wright Road (½ hour on foot, ½ hour by car)	31 Dec 1955	ANON56
280	heard and saw a male and possibly a second individual / Olaa Tract	12 Apr (1974)	SMIH74
281	Jacobi & Warshauer: not recorded / in 23 days of surveys covering open Metrosideros forest beyond the end of Wright Road and in the Small Tract Section, Cibotium forest along trail to the koa forest and beyond the end of Olaa Back Road or in A. koa forest in Large Tract Section, Olaa Tract (NPS)	Jan 1974 to Jan 1975	(18)
282	only recent reports from (island of) Hawaii are from / Olaa Tract and adjacent forests	(1975)	MARD75
283	2 censused Christmas Count / Olaa Tract, NPS	2 Jan 1978	KATL78

VOLCANO

284	probably numerous at all seasons / forests on the Olaa side (of Kilauea)	(1895/1896)	PERR03

Psittirostra psittacea - Hawai'i

285	as many as 8-12 heard, 3 seen in one day / Upper Olaa Forest Reserve	4000	15 Oct 1950; 14,16,17 Jan 1951	RICL53
286	watched a pair / recently cleared area in a very humid section off the Hilo Highway just below the Park (near Olaa Tract)		(17 Jun 1960)	EISE61
287	O censused Christmas Count / Volcano community		2 Jan 1978	KATL78

PUU MAKAALA

288	Baldwin: possibly heard / Kulani Forest, Waiakea, near Olaa	2980	13 Apr 1945	(8)
289	Richards: 1 possibly heard / tall ohia forest about ½ mile west of where Flume Road crosses Stainback Highway		28 Aug 1950	(11)
290	O censused Christmas Count / Stainback Highway and Puu Makaala		2 Jan 1978	KATL78
291	O censused Christmas Count / Kulani Project Transect 28 makai		2 Jan 1978	KATL78
292	O censused Christmas Count / Kulani Project Transect 28 mauka		2 Jan 1978	KATL78
293	O censused Christmas Count / Waiakea Forest Reserve Transect 27		2 Jan 1978	KATL78

MOUNTAIN VIEW

294	Banko: Wilson collected 1 specimen / Olaa		1887/1888	(1)
295	Perkins: very numerous / Olaa District	1500 or 1600	Jun-Sept 1895	(3)
296	Banko: Henshaw collected 72 specimens / Olaa		1898-1901	(1)

Psittirostra psittacea - Hawai'i

297	Banko: Henshaw collected 6 specimens / Keaau	1898-1901	(1)

PAHOA SOUTH

298	Richards: 1 possibly heard on short hike / Keauohana Forest Reserve, makai Pahoa-Kaimu highway, "ieie in full bloom"	21 Sept 1950	(11)

Mauna Kea District

UNDESIGNATED LOCALITY

299	2 specimens obtained / within 8 miles of Hilo	Aug 1875	SCLP81

PIIHONUA

300	Palmer: pretty numerous / 6 hours 45 minutes hike out of Hilo headed up Wailuku River for "palm region"	13 Apr 1892	ROTW00
301	Palmer: seems very plentiful here / 11 hours hike out of Hilo headed for "palm region"	14 Apr 1892	ROTW00
302	Banko: Henshaw collected 13 specimens / Kaumana	1898-1901	(1)
303	Banko: Henshaw collected 8 specimens / Kaiwiki	1898-1901	(1)

AKAKA FALLS

304	Banko: Henshaw collected 3 specimens / Honomu	1898-1901	(1)
305	H. Baldwin, Manu Iki Society: E. Tomoguchi: reported seeing 1 / in Forest Reserve above Pepeekeo in lands of Kawanui (Kawai Mui) and Makahana	(1940)	(21) (22)

Psittirostra psittacea - Hawai'i

KEANAKOLU

306 Banko: Henshaw collected 3 specimens / Kuaia (near Laupahoehoe) 1898-1901 (1)

HONOKAA

307 Banko: Wilson collected 1 specimen / Paauhau 1887/1888 (1)

ABSTRACT

Psittirostra bailleui is a small, yellow and gray forest bird with a short, thick, brown bill. It is endemic to the island of Hawai'i. Exhaustive search of literature and field journals uncovered some 100 observational notes, collection records, reports, and related statements on relative abundance and geographical distribution from 1876 to 1978. All records are serially numbered, arranged in geographical and chronological order, referenced, and systematically analyzed.

In the 1890's Palila were observed to be common to abundant in upper elevation forests along the western flank of Mauna Loa, and on the north, northeast, and southeast slopes of Mauna Kea. One 1950 record indicates that they also ranged the western slopes of the saddle connecting these two volcanoes. This species was last recorded on the western flank of Mauna Loa in 1896 when they were noted to be fewer than in 1892. On Mauna Kea, Palila were last observed on the north slope in 1903, and after an observational gap of about 40 years, were rediscovered on the southeastern slope in 1937, and on the northeast slope in 1950. They were reported for the first time on the southwestern flank of Mauna Kea in 1943. Intensive surveys on Mauna Kea by the U. S. Fish and Wildlife Service and cooperating agencies in 1975 resulted in finding a population of about 1,600 individuals on all except the northwest and north slopes at which time they were estimated to occupy only about (9%) of their former historic range. A few observational clues since 1950 suggest that Palila population and range continue to decline long-term.

44. Psittirostra bailleui

Palila

The Palila is a small (ca. 6 to 7 inches long), yellow and gray forest bird with a short, thick, brown bill (Rothschild 1900). First collected by (T.) Ballieu in 1876 and described and placed in a monotypic genus (Loxioides) by Oustalet a year later, the Palila was later reclassified and placed with five other thick-billed Drepanidids in the genus Psittirostra by Amadon (1950). Endemic to the island of Hawai'i the Palila is known only from the māmane forests of Kona and Mauna Kea.

Numbers and principal repositories of 101 Palila specimens are as follows: 21 in American Museum of Natural History, 18 in B. P. Bishop Museu, and 12 in British Museum of Natural History (Banko 1979 report).

Perkins (1903) wrote the most complete early account of the habits and behavior of the Palila as he observed it in Kona. Berger (1972) provides a contemporary overview of this species. van Riper (1978) studied the breeding ecology of the Palila (and that of Loxops virens), and van Riper, Scott and Woodside (1978) reported on the current distribution and abundance patterns of this species on the slopes of Mauna Kea.

In the historical account which follows, one, two, or three digit numbers in parentheses refer to specific records in the Appendix. Sources cited in the Appendix may be traced to complete references in the bibliography.

Early Notes and Records (1876-1903):

The first Palila specimens of record (two) were collected by (T.) Ballieu, the French consul in Honolulu, while visiting "Dr. Trousseau's mountain cottage" (Pulehua), North Kona District, in 1876 (Wilson 1890, Banko 1979 report) (7-9). In addition, labels of an additional six specimens are inscribed with Ballieu's name, three designated "Mauna Hualalai 1877," and three merely "1877." Hualālai being proximate to Pulehua Ranch it is probable that all eight of Ballieu's specimens came from the Hualālai - Pulehua area (10, 11).

(S.) Wilson collected a total of 23 specimens of Palila, all in undesignated localities on unspecified dates (Banko 1979 report) (12-14). Thirteen of Wilson's specimens were taken in June and July 1887 and two in March 1888, the dates of collection being absent from labels of the remaining eight specimens. From a rough itinerary pieced together from dates on specimens of other birds taken by Wilson, it can be shown that the 13 specimens collected in June and July 1887 came from Kona, and the two taken in March 1888 were obtained near Mānā, Hāmākua. Wilson

(1890) summed up his knowledge of the relative abundance and distribution of the Palila by terming it "singularly local...found...I believe only in the upland districts of Kona and Hamakua" (15).

H. C. Palmer is credited with taking 11 specimens of Palila in September and October 1891 when in Kona; and G. C. Munro, his assistant, is credited with collection of one additional example during this period, plus another on 2 February 1892 in Hāmākua District (Banko 1979 report) (18, 19, 34). Rothschild (1900) states that Palmer took half a dozen specimens "not very far from the mountain-house in which Mr. Scott Wilson had stayed for some time" at ca. 5000 feet elevation in "upper Kaawaloa district" (no doubt Pulehua), but the localities in which the remaining six examples were secured are unknown (17).

Rothschild (1900) credited Palmer with saying that this species was "frequently met with...often seen in flocks of about half a dozen individuals...seldom found off the 'mamane' trees (Sophora chrysophylla)...in the upper forest region... between 4000 and 6000 feet elevation in Kona and Hamakua Districts...and in Hilo District, on the slopes of Mauna Kea they were seen even higher, at about 7000 feet (4). Rothschild (1900) also noted that Palmer saw Palila while on a horseback trip up to 9000 feet elevation from Hōnaunau, "a dairy belonging to a Mr. Johnson about 6000 feet elevation" some 20 miles south of Pulehua (probably Ka'ohe Ranch, 5350 ft elev., South Kona) in November 1891 (31). Later, Munro (1944) noted on 18 September 1891 that Palila were "common, tame and easy to collect" in Kona at ca. 4000 feet elevation (16).

One specimen, inscribed "C. H. Townsend" on the label, was taken in November 1891, perhaps by Palmer or Munro who were then in Kona (20).

On his first collecting trip to Kona, extending from June to September 1892, Perkins (1893) noted that this species ranged to "a considerable height up the mountains...up to 6000 feet elevation on Hualalai," and (field journal) reported seeing them "in numbers" everyday at Pulehua at this season (August) (5, 21, 28). However, Perkins took no specimens that year (Banko 1979 report). Returning to Kona in August 1894, Perkins (field journal) concluded from his visit that this species was "now almost totally absent" from Pulehua, reporting "only two males seen" (29). Perkins collected two specimens on his 1894 visit, one at 4000 feet and the other at 5000 feet elevation, both in undesignated localities (Banko 1979 report) (22). Perkins (field journal) excluded Kona from his travels on the island of Hawaii in 1895. Returning to Kona for the third and last time in March 1896 Perkins (field journal) (Banko 1979 report) collected but two specimens, both at 4000 feet elevation, noting that this species was "hardly to be found at all" in the vicinity of his 1892 camp (23, 24). In conclusion, Perkins (1903) stated that although Palila were "extremely numerous in the Mamane belt of the middle and North Kona district, from rather below 4000 feet

to at least 6000 feet..." and "found abundantly" in Hāmākua District, he had "some reason to believe that it has become less common of late years" (6, 27).

Perkins (field journal) also collected extensively in Puna and/or Ka'ū Districts in 1894, 1895, and 1896, particularly upslope from the Volcano House in what is now in or near Hawaii Volcanoes National Park, but noted "none found" upslope from Kīlauea "where the Mamane grows quite freely" (32). The absence of Palila from the māmane belt on the east slope of Mauna Loa is also inferred from the account of Henshaw (1902) who made no mention of seeing this species anywhere in Ka'ū, a district where he made extensive collections of other forest birds from 1898 to 1901.

There are no field records of Palila seen or collected anywhere from 1897 to 1901. Miller (field journal) collected some 13 specimens on the northeast slopes of Mauna Kea in 1902, eight examples on 27 December in the māmane belt from 7500 to 8000 feet elevation in the Pohiki area, "up from the Chester Blacow ranch house," and five on unspecified dates and months at 8200 feet elevation on Horner's Ranch ('Umikoa) (Pa'auilo) (98, 99). Bryan (1903) logged the collection of seven specimens taken on 26 December 1902 at 7000 to 8000 feet elevation in the vicinity of Horner's Ranch (100). (Perhaps he and (L.) Miller collected in concert.) H. W. Henshaw took some 23 specimens in Hāmākua in April 1903 but the labels bear no clue as to specific location (35). C. Blacow secured six specimens at Horner's Ranch ('Umikoa) in July, August, September, and December 1903, collecting four at 8000, and one each at 7800 and 7000 feet elevation (101).

In addition to the foregoing specimen records, there are four examples labeled without reference to collector or date (Banko 1979 report) (25, 26). One of these was secured at an unspecified locality in Kona, almost certainly before 1897. Although details surrounding the taking of the remaining three examples are obscure, the overall pattern of collection activity also favors the taking of the remaining three examples in Kona before 1897.

Later Reports and Observations (1904-1959):

There seems to be a complete lack of field observations or collection records of Palila for 33 years, from 1904 through 1936.

Donaghho (1952), on a long ramble 14 September 1937 on the slopes of Mauna Kea, reported seeing two pairs of Palila and then three more in māmane forest above grassy pastures from Laumaili CCC Camp to Lake Waiau, hearing one upon approaching the forest on descent of Pōhakuloa gulch, and audibly detecting others "now and then" farther down the gulch in "thick mamane and naio" (90-92). In May 1940 Donaghho (1940), counting 28 on two lists,

termed the Palila "not uncommon" on the upper slopes of Mauna Kea, "mostly in the Mamane belt" (36).

Baldwin (1944 field journal) "found none" of this species on a survey he conducted of Pulehua Ranch in November 1942 (30), the first record of this area being searched since H. W. Henshaw's negative findings in 1901. On the dry northwestern flank of Mauna Loa, in the Pu'ukole area (7341 ft elev.), Baldwin (field journal) searched fruitlessly for Palila on 17 April 1943, concluding that there were "not enough mamane trees to support them" (55). A few days later (on 19 April 1943), on the southwestern flank of Mauna Kea, Baldwin (field journal) saw one in māmane forest at the lower edge of the Forest Reserve (7250 ft elev.) about 1 mile northwest of Pu'u Lā'au; another about 2 miles northwest of Pu'u Lā'au, terming this species "evidently not common here"; and on 20 April "watched several" in Pu'u Lā'au forest about a mile northwest of the cabin (56-58). A few years later, on 6 November 1948, Baldwin returned to Pu'u Lā'au to collect a Palila specimen at 7750 feet elevation (Banko 1979 report) (59).

On 15 December 1950, Richards (field journal) collected a Palila specimen on the northeastern flank of Mauna Kea at about 7000 feet elevation a couple of hundred yards upslope of the (Forestry) cabin, and approximately 1 mile northwest from Hopuwai (94). The next day, on 16 December, Richards (field journal) found this species at 8500 feet elevation, collecting two specimens (Banko 1979 report), on a hike from Hapuwai cabin to the Pu'ukanakaleonui area and return (95, 97). The following day (17 December), Richards (field journal) saw about 10 Palila on a trip covering much the same ground (96). From these and previous observations by Baldwin, Richards and Baldwin (1953) reported that this species was "locally not uncommon" on the western and northeastern slopes of Mauna Kea from 7750 to 8300 feet elevation (44).

On the northwestern slope of Mauna Loa, L. W. Bryan (pers. comm.) reported on 19 September 1950 seeing "at least a dozen" Palila in an old pāhoehoe māmane-naio-'ōhi'a kīpuka (ca. 6000 feet elev., Kīpuka 'Alalā) in the U. S. Army Pohakuloa Training Area some 13 miles along a jeep trail from the Saddle Road (54). The sighting of Palila in this dry, seldom-visited area in 1950 by State Forester Bryan marked the final observational record of this species on Mauna Loa, a gap of more than half a century since this species was last seen on Mauna Loa, in 1896.

On a five-hour hike up the south slope of Mauna Kea from Pōhakuloa in January 1953, R. Pyle (letter to H. Baldwin) reported seeing "a flock" of Palila, but gave no indication of elevation (93).

In the sole report of Palila on the east flank of Mauna Loa, Eastman and Eastman (1958) stated that they saw one in Kīpukapuaulu (Bird Park), Hawaii Volcanoes National Park, during

their 23 March to 14 April 1958 casual bird watching tour of the Island (33). Judging from the lack of previous or subsequent observational evidence, the report by the Eastmans apparently represents a case of mistaken identity.

Recent Records and Surveys (1906-1978):

Dunmire (1960) and Eisenmann (1961), reporting on an 18 June 1960 visit to Mauna Kea, apparently to the Pu'u Lā'au area, saw several small groups of four to five Palila totaling 20 to 30 in one hour, Dunmire terming this species "actually common" (37, 38).

Ward (field notes) found "a few" Palila near Pu'u Lā'au on 20 June 1961 (60). King and Bratley (1964) saw five in the Ka'ohe Game Management Area, probably in the vicinity of Pu'u Lā'au, sometime during the period 18 to 20 April 1964 while touring bird habitats on the island of Hawai'i (39). Walker (1962), reporting on a game survey in the māmane belt around Mauna Kea by Hawaii Sate Division of Fish and Game during the summer of 1962, logged sighting of Palila at Pu'u Lā'au, Pōhakuloa gulch and in the lower Halepōhaku regions and termed this species "quite common," expressing the belief that there had been a population increase "during the past five years" (45).

There seems to have been no observations of Palila recorded in the sources examined for 1963, 1964, 1965; however, some 13 sightings and statements were logged in the three-year period 1966 through 1968.

Banko (field journal) saw three in the Pu'u Lā'au horse pasture area on 8 February 1966 (62). Ord (1967a) counted six near the Pu'u Lā'au cabin on 4 October 1966, then went on that same day to estimate that 100 were seen or heard on a 1-mile hike along a jeep road downslope from Pu'u Lā'au cabin, with "almost the same count" being tallied on the return trip (63, 64). Ord (1967a) counted as many as 12 in a single tree on this brief survey (64). Returning on a "flying tour" of the Pu'u Lā'au area sometime during the period 16 to 23 November 1966, Ord (1967b) noted that Palila were "seen extremely well" (65).

In 1967 Orenstein (1968) noted the presence of one flock of three or four, and one solitary bird in the Pu'u Lā'au area on 28 December (66), while Donaghho (1968) reported that this species was "very likely seen" that same day "down the road from the Pu'u Ahumoa - Pu'u Lā'au road junction" (67).

Walker (1968) recorded that three, and probably others, were seen in māmane trees at 8000 to 9000 feet elevation on a 23 to 25 January 1968 hike from Halepōhaku to Pu'u Lā'au (68). Berger (1970a) stated that Palila were located on each of 15 successive field trips made to the Kaohe Game Management Area (surrounding Pu'u Lā'au) between October 1967 and May 1968, including the finding of one nest (69, 70). Kaigler (1968) noted "one doubtful

sighting" during the approximately eight hours spent in that area on 25 and/or 26 September 1968 (71). Morrison (field journal) recorded one "possible seen at 6400 feet elevation along the jeep road to Pu'u Lā'au on 19 November 1968, and one seen at 7411 feet elevation in the same aea at Pu'u Ulala (Pu'u'ula'ula) the same day (72, 73). A month later, on 19 December 1968, Donaghho (1969) logged seven seen along a dirt road running east of Pu'u Lā'au cabin (74).

Hawaii Division of Fish and Game (4) officially recognized the Palila as an endangered species in 1969 (1). Berger (1970b) noted that the Palila was "now known" only in the māmane-naio forests on Mauna Kea over 6500 feet elevation, between 7000 to 9500 feet elevation (46, 79).

On 14 July 1970, Banko (field journal) saw a male fly across the jeep road in the first māmane Kīpuka south of Pu'ukanakaleonui, a mile or so away (75). On 8 December 1970 van Riper (field journal) observed three at 8000 feet elevation from 1400 to 1730 hours in the Pu'u Lā'au area, and on the following day in the same area observed one from 0630 to 0800 hours and two from 1400 to 1730 hours (76-78).

Four sightings of Palila were logged in 1971. Banko (field journal) noted the sighting by Giffin of two ca. 10,000 feet elevation around 5 May 1971 at Pu'u Naha (?Pu'unānā, ?Pu'u Nanaha) above Pu'u La'au (J. Giffin, pers. comm.) (80). van Riper (field journal) saw five Palila on 15 August some 2.5 miles southwest of Pu'u Lā'au cabin, two on 21 August 0.5 mile south of Pu'u Lā'au cabin and five in the Pu'u Lā'au area on 16 November, all in 1971 (81-83).

There seem to be no sightings of Palila logged in 1972, but Berger (1972) defined the distribution of this species as follows: "now found only in the mamane - naio forests on Mauna Kea...only rarely, apparently do the birds descend as low as 6,500, but they are common from 7,000 upwards nearly to tree line, which...now ends at approximately 9,300, varying somewhat around the mountain" (2).

On 14 November 1973 Banko (field journal) noted four or five Palila, and possibly two others, seen near the north sheep enclosure gate at Pu'u Lā'au to 0.25 to 0.5 mile farther north along the road (84). Anonymous (1973) found a flock "easily" in the māmane forest 100 yards from the Pu'u Lā'au cabin on an undated visit (85). van Riper (1973) stated that a "localized" population could be founed in the dry māmāne-naio forest on Mauna Kea (41).

From March 1973 to October 1974, van Riper (1975 report), while carrying out surveys in a study area at 6500, 6700, and 7500 feet elevation in the Pu'u Lā'au area, recorded Palila mostly at 7400 feet elevation where māmane is most common, but rarely below 7100 feet elevation (86). Mull (1974) stated that this species occurs (now) only on Mauna Kea (3).

In a preliminary announcement of a comprehensive survey carried out in the māmane-naio forest ringing Mauna Kea, Marshall (1975) stated that a 392 transect-mile census produced 256 confirmed sightings, Palila being found in greatest abundance near tree line (48). van Riper, Scott, and Woodside (1978), in a technical version of the same survey conducted 13 to 17 January 1975, reported that 17 census party members recorded 307 (252 seen) on 597 kilometers (370 miles) of transect covering 2,185 ha (5,400 acres), and statistically projected (95% Confidence Interval = 1,146 - 2,049 using a mean density of 36 birds per km^2 a total population of 1,595 Palila present in all the high māmane and naio forest on Mauna Kea (49). Palila were found on this survey on the southwest slope and in three disjunct areas on the south and southeastern slopes, but not on the north slope from above Pu'u Lā'au past Kemole and Pu'u Mali to Kanakaleonui (van Riper 1978). The same habitat on the south and eastern slopes of Mauna Kea was recensused from 15 to 19 September 1975, the 17 census party members recording 177 (141 seen) on 586 km (364 miles) of transect covering 715 ha (1766 acres); van Riper, Scott and Woodside (1978) statistically projecting (95% Confidence Interval = 1,643 - 2,237 using a mean density of 38 birds per km^2 a total population of 1,940 Palila (50). On this second (breeding season) survey (van Riper 1978) Palila again were found on the southwestern slope of Mauna Kea and in four disjunct areas on the south and southeast slopes but, again, not on the north slope.

These authors stated that the different results obtained from the two surveys indicated that there were approximately 1600 Palila on the mountain, and that the variances of population estimates were too large to draw any conclusions (51). In addition, some 27 Palila per km^2 (0.62 $mile^2$) were censused on a 2,380 m (7807 ft) elevation transect between Puu O Kauha and approximately 1.6 km (1 mile) north of Pu'u Lā'au cabin on 17, 23, 25, and 26 September 1975 (van Riper, 1978) (52). In obvious reference to the results of preceding survey, Anonymous (1975) noted that approximately 308 were counted on Mauna Kea in a week's time (40). Concluding 714 days of field work from 1969 to 1975 on the southwestern slope of Mauna Kea, van Riper (1978) estimated in a separate report that there had been a 91% reduction in historical range, decrease in population size to approximately 1,600 individuals with effective breeding population perhaps being even smaller, and speculated as to possible causes (47).

Beginning in January 1975 Shallenberger (1977) conducted a series of extended surveys in the military Pōhakuloa Training Area and reported sightings of Palila on Mauna Kea at or above the upslope boundary of U. S. Army Area 6 (87). Shallenberger (1977) reported that no Palila were detected in the drier lowlands "though drought conditions may have affected results significantly," but mentioned that some Pōhakuloa Trainig Area lands north of the Saddle Road within the upper elevations of Army Area 6 were included in the "critical habitat proposal" for

Palila (53), evidently where one was counted on or near Puu Kalua (PUU KOLI?, PUU OO?), Areal, in January 1975 (42).

In reporting a casual observation Mull (1977) stated that she "promptly" located three Palila feeding (presumably in māmane trees) at Halepōhaku (9200 ft elev.) on the southeast slope of Mauna Kea on 8 May 1977 (88). Atkinson (1977) stated that Palila were "now very local," presumably referring to their limited distribution on Mauna Kea (43). Pyle (1978) reported that 20 of this species were found at Pu'u Lā'au on 12 September 1977 by R. Erickson (89).

CHRONOLOGICAL DISTRIBUTION OF RECORDS

Distribution of some 98 records of P. bailleui, including negative findings, is shown in Table 3. The gap of records prior to the 1870's represents the era preceding discovery of the Palila. Paucity of records in the early 1900's reflects the lack of ornithological observers afield during this period. The total of 28 records shown for the 1970's includes only summaries of census results rather than numbers of sightings or audible detections.

TABLE 3. Distribution of 98 Psittirostra bailleui records by decade

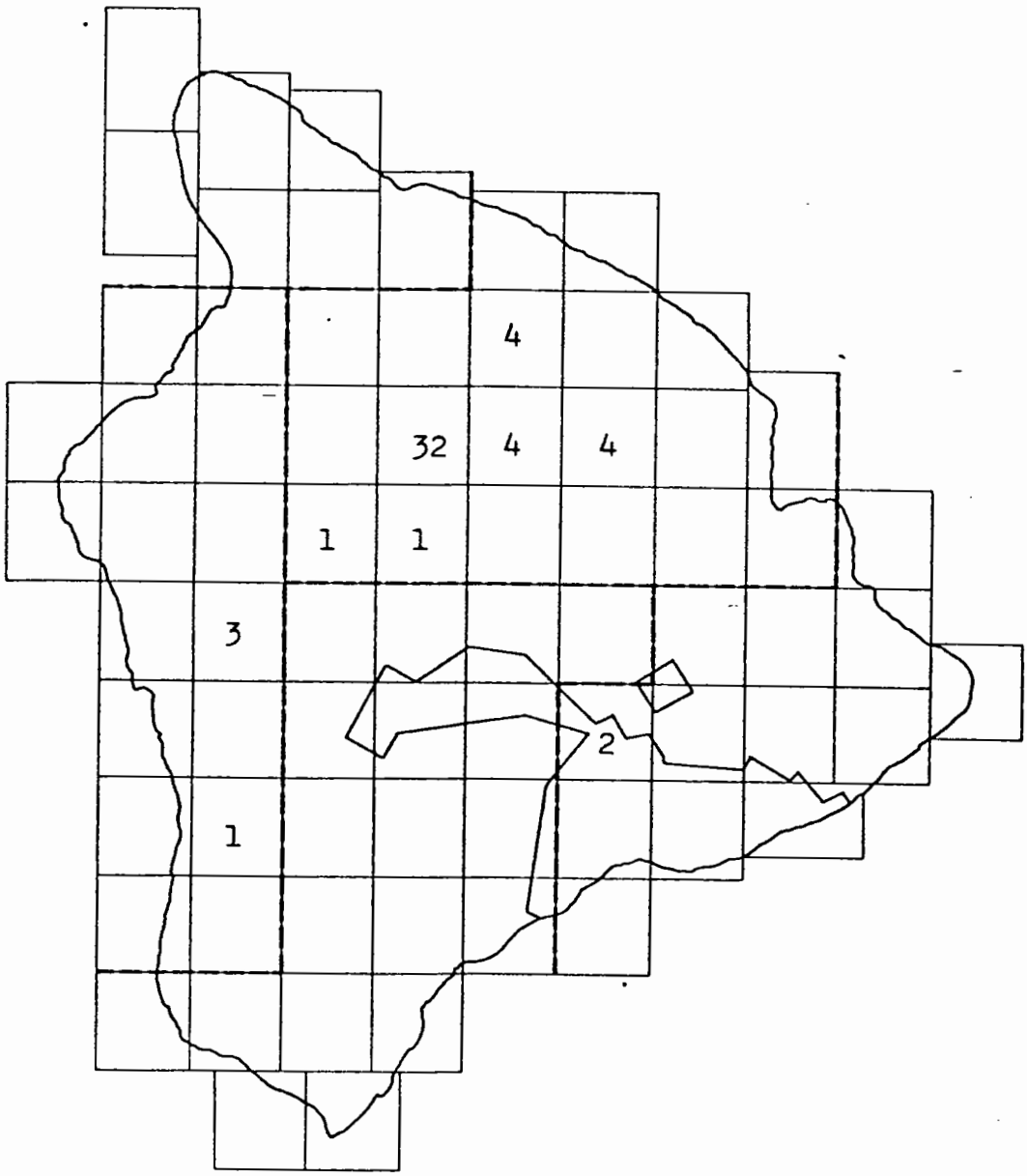
1770's - 0	1840's - 0	1910's - 0
1780's - 0	1850's - 0	1920's - 0
1790's - 0	1860's - 0	1930's - 3
1800's - 0	1870's - 5	1940's - 8
1810's - 0	1880's - 4	1950's - 8
1820's - 0	1890's - 20	1960's - 17
1830's - 0	1900's - 5	1970's - 28

GEOGRAPHICAL DISTRIBUTION OF RECORDS

Of a total of 52 (positive and negative) occurrence records which are traceable to a single quadrant, 32 (61%) are referable to AHUMOA where the largest remaining sub-population of Palila range. Some 20 records from Kona District were listed under the heading UNSPECIFIED LOCALITY as they could not be positively assigned to any one quadrangle. However, judging from what is

known of the travels of early naturalists in Kona, most, if not all, of these records represent ornithological activity in PUU LEHUA and, to a lesser degree, probably in KAUNENE quadrangles. Geographical distribution of records is shown in Figure 4.

FIGURE 4. Distribution of 52 observations, reports (including negative), and museum records of Psittirostra bailleui, per quadrangle on island of Hawai'i, 1876-1978.



COMPLETENESS OF DATA, BIAS, ERRONEOUS AND DOUBTFUL RECORDS

Summaries of survey results were utilized in cases where observations along individual transects were not available. Such practice gives less than full weight, in terms of numbers of observational events, to contemporary census activity.

Causes of apparent bias in the chronological distribution of records were previously noted.

It is suggested that the report of a Palila seen in Kīpukapuaulu between 23 March and 14 April 1958 by Eastman and Eastman (1958) is a case of mistaken identity.

SUMMARY

Psittirostra bailleui is a small, yellow and gray forest bird with a short, thick, brown bill, endemic to the island of Hawaii. Palila were found by ornithologists and naturalists in the 1890's and early 1900's to be restricted exclusively to predominantly māmane (Sophora chrysophylla) forests between 4000 and 6000 feet elevation. They were found to range geographically from Kaohe Ranch, South Kona, northward along the western flank of Mauna Loa to Hualālai, and on the north, northeast, and southeastern māmane-covered slopes of Mauna Kea from about 7000 to 8200 feet elevation. One (1950) record from the northwest slope of Mauna Loa (Kīpuka 'Alalā) indicates that this species also ranged the western slope of the Mauna Loa-Mauna Kea saddle. Decline of the Kona sub-population in 1894 and 1896 from levels noted in 1892 was recorded. Palila were last seen and/or collected on the Kona slope of Mauna Loa in 1896.

The last early-day evidence of Palila on Mauna Kea was the collection of six specimens on the north slope in 1903. After a gap of records lasting nearly 35 years, this species was reported on the southeastern slope in 1937, on the southwestern flank in 1943, and on the northeast side in 1950. Since that time Palila have been reported wherever stands of māmane trees exist at high elevations on all except the north slope. Detailed censuses of Palila in 1975 found a population totaling about 1,600 individuals occupying an estimated 9% of their former historic range.

CONCLUSIONS

Judging from two comprehensive surveys of Palila habitat on Mauna Kea in 1975, and negative reports of U. S. Fish and Wildlife Service islandwide-surveys conducted from 1975 to 1979, four to five sub-populations totaling ca. 1,600 Palila survive in māmane-dominated forests near tree line on all except the north flank of Mauna Kea. Casual observation of Palila on Mauna Loa in 1950, and failure of recent intensive surveys to detect them there, in addition to an informal survey of ca. 100 counted by a

single observer along 1 mile of trail on the southwest flank of Mauna Kea in 1966, when compared with a total of only ca. 1,600 censused (twice) along 364 to 370 miles of transects in five days by 17 observers, suggest that Palila population and range continue to shrink long-term.

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APPENDIX III

1. Observations, reports, and specimen records are organized by island group, island, district, and/or quadrangle map. Order of listing, names and locations of district, and quadrangle boundaries are explained and illustrated in CPSU/UH Avian History Report 4: Introduction to Part I, Population Histories--Species Accounts.

2. Acronyms composed of the first three letters of the author's (or senior author's) last name, the first letter of the first name, and the last two digits of the year of publication represent sources found in the bibliography under References Cited. For example, BRYW01 = Bryan, W. A., and A. Seale; 1901. Notes on the birds of Kauai. Bishop Museum Occas. Papers. 1(3): 129-137. In cases where it is necessary to distinguish between two or more articles published by an author in any given year, letters are added to the acronym in alphabetical sequence. For example, BRYW01a = Bryan, W. A. 1901a. A key to the birds of the Hawaiian group. Bishop Museum Press. 76pp.

3. Place-names are cited in original form.

4. Parenthetical information is qualified.

ABSTRACT

Psittirostra palmeri is a small, short-tailed, thick-billed, olive-green forest bird, the male having reddish orange about the head and neck. It is endemic to the island of Hawai'i. Exhaustive search of literature and field journals uncovered only 55 records (including doubtful and negative reports) of its occurrence. Ornithologists from 1892 to 1896 observed scores of this species in Kona, collecting 48 of the 59 known specimens at elevations ranging from 3000 to 5000 feet from the Hualālai area south to Hōnaunau. *Psittirostra palmeri* was also seen and/or collected at comparably high elevations in the Kīlauea area of Mauna Loa and on the southeastern slope of Mauna Kea during the early period. Positive and negative reports of this species since 1896 are reviewed. Intensive islandwide surveys conducted by the U. S. Fish and Wildlife Service from 1976 to 1979 yielded no sightings. The species is presumed extinct.

45. Psittirostra palmeri

Greater Koa Finch

The Greater Koa Finch is a small (ca. 7 to 8 inch long), short-tailed, thick-billed, olive-green forest bird, the adult males marked with reddish orange about the head and neck. First described by Rothschild (1892), the Greater Koa Finch is known only from Kona, Ka'u, and Hilo Districts on the island of Hawai'i. It apparently had no native Hawaiian name (Pyle 1977).

Numbers and principal repositories of 59 specimens of P. palmeri are as follows: 17 (incl. type) in American Museum of Natural History, 17 in Cambridge Museum of Zoology, and 9 in the British Museum of Natural History (Banko 1979 report).

Almost everything known of the habits and behavior of P. palmeri was recorded from field observations by Perkins (1893, 1903). Berger (1972) provides a recent overview of the little that is known of this species.

In the historical account which follows, one or two digit numbers in parentheses refer to specific records in the Appendix. Sources cited in the Appendix may be traced to complete references in the bibliography.

Early Notes and Records (1892-1900):

Rothschild (1900) states that during September and October 1891 Palmer obtained six specimens at ca. 5000 feet elevation "not very far from the mountain house in which Mr. Scott Wilson had stayed for some time" (Pulehua) and, in November that year, one specimen at "Honaunau, a dairy ca. 6000 feet elevation belonging to a Mr. Johnson...some twenty miles to the south of Pulehua, and a half-day's horse ride up Mauna Loa to above 9000 ft." (probably Kaohe Ranch, 5350 ft elev., South Kona) (14, 45). Rothschild (1900), no doubt on information supplied by Palmer, stated that (the Greater Koa Finch) was "by no means rare" in Kona and Hilo Districts, but that it was found "entirely in the upper forests, and most numerous at about 4000 feet" (elevation) (16). Palmer's assistant, Munro (1941), collected one specimen and stated that Palmer procured one from a group of three at about 4500 feet elevation on Pulehua Ranch on 28 September 1891, and another apparently in the same area on 30 September, remarking that in October this species proved "fairly common" in the area after once finding it (12,13,15)). According to Richards (field journal) Munro told him that Palmer shot at specimen at Johnson's dairy ca. 6000 ft. el. some 10 miles to the south of Honaunau in auka on 20 November 1891 (46).

Although none of the labels on Palmer's specimens are inscribed with names of localities, 20 (1 taken at 3000 ft elev.) were secured in September, October, and November 1891, and six were secured in May and June 1892 (Banko 1979 report) (4, 5). Examination of Palmer's diary (Rothschild 1900) shows that Palmer spent the fall months of 1891 entirely in Kona, the beginning of March 1892 at "Hanneberg's sheep station on Mauna Kea" (? Pu'u'ō'ō Ranch), from 23 April to 13 May in and above Hilo, and 25 May at Kīlauea volcano before departing the island of Hawai'i at the end of June 1892. Rothschild's inclusion of Hilo District within the range of the Greater Koa Finch is thus apparently based on observations made and specimens collected by Palmer during the months of March and June 1892.

Perkins (1893, 1903) collected in the Ka'awaloa-Pulehua Ranch area from June to early October 1892 taking a total of some 12 specimens at 4000 feet elevation, judging from labeled specimens in museums (Banko 1979 report) (6). In his field journal, however, Perkins noted taking only seven specimens (one each on 1, 2, 3, 9 July and 2 September) at 4000 feet elevation in the Pulehua Ranch area, and twice on undated occasions near the dairy at Nāhuina (above Ka'awaloa) (18-20, 22, 30-32). One or more (Greater Koa Finches) were additionally noted seen or heard by Perkins (1893, 1903) on 11, 12, 14, 19, and 22 July either in the vicinity of Pulehua Ranch or on the way from there to Nahuina (23-27). Perkins (1893, 1903) specifically comments on absence of this species in parts of Pulehua Ranch on 21 July and from 1 to 11 August (21, 28, 29).

At the comclusion of his June to October collecting visit to the Ka'awaloa-Pulehua Ranch area in 1892, Perkins (1893, 1903) wrote that he had seen "several score" of Greater Koa Finches as had Palmer and Munro before him, stating that this species "belongs to the upper district" from 3000 to 4000 feet elevation, but was "probably most numerous" at ca. 4000 feet (10, 11, 17, 33).

Perkins (1903) did not visit the island of Hawai'i in 1893, but upon return to the Pulehua Ranch area from 3 to 14 August 1894 he "heard a number" of Greater Koa Finches in the vicinity and observed that they had "moved down 1,000 feet." below their 1892 habitat (34, 35). None were collected during his 1894 visit.

In 1895 Perkins (field journal) returned to the island of Hawai'i where he collected exclusively in Puna and Ka'ū Districts. In his field journal and in a 19 September 1947 letter to O. H. Swezey, Perkins stated that the Greater Koa Finch occurred far back in the forest where he saw only "one or two" about 6 miles from the Volcano House up the slopes of Mauna Loa (47, 48), Henshaw (1902), however, states that Perkins informed him that he saw "numbers" of this species "in the extensive koa woods above (Kīlauea) volcano...on the very edge of the rainy 'Ola'a District which the bird appears never to enter" (49).

In March 1896 Perkins (field journal) returned again to the Pulehua Ranch area where he noted that the Greater Koa Finches were "quite numerous" about 3000 feet elevation remarking, "in 1892 I had never seen or heard (this species) so low down in the forest" (36), at the same time noting their absence at 4000 feet elevation in the vicinity of his 1892 camp (37). In the lower elevation where he found this species numerous in 1896, Perkins (field journal) called "nine fully adult males" into a single tree and collected "several" of them (36). Perkins collected a total of 17 specimens at 3000 feet elevation during his March 1896 visit to Pulehua (Banko 1979 report) (7). Later, Perkins (1903) summarized his impressions of their relative abundance in the Pulehua area by stating that "certainly some hundreds were examined with the naked eye or glasses" when searching especially for its smaller look-alike congener P. flaviceps (38).

There seems to be no conclusive evidence that the Greater Koa Finch was ever seen after Perkins (field journal) reported them to be "quite numerous" at 3000 feet elevation on the Pulehua Ranch in March 1896. There is one undated specimen taken by an unspecified collector in an undesignated locality that may have been obtained after 1896 (Banko 1979 report), but it seems more likely that it represents a bird taken before that date (8).

Later Reports (1901-1978):

Amadon (1950) reported that H. W. Henshaw searched unsuccessfully for P. palmeri in the Pulehua Ranch area in 1901 (38a).

G. C. Munro gives apparently conflicting testimony on results of surveys accomplished during the 1935 to 1937 period, viz. stating (Munro 1944a) that the only "trace" he could find of it was from a guide in Kona who heard a whistle which sounded to Munro identical to that of the Greater Koa Finch "as I remembered it," and (Munro 1946) writing that he "possibly" heard one in Kona (9, 39). However, Baldwin (1944, & field journal), Richards and Baldwin (1953), and Berger (1966) kept special lookout for rare birds in the Pulehua Ranch area in 1942, 1950, and 1966 but did not report detecting P. palmeri (40-43).

In the Kīlauea area, Donaghho (1937 report, 1951, 1954, 1963) reported seeing what may have been one of this species on Keauhou Ranch between Kīpukapuaulu (Bird Park) and the (Kīlauea) Forest Reserve fence on 30 June or 2 July 1937 (50, 51, 53, 54). Munro (1944b) credited Donaghho's report (52). Donaghho's successive accounts of his sighting present conflicting details, including the date and whether he saw or heard the bird first, but the fact that he did not recognize its whistle and described it as "female...grosbeak type of bill...dull green...whitish below...not an' O'u (Psittirostra psittacea)...excellent look through binoculars...on a limb 20 ft. away: where it had flown in response to his imitation of its whistle, and stated that he was "certain" of what he saw are all points which weigh on the side

of credibility. Donaghho was apparently unaware of the fact that his observation was made perhaps only 2 or 3 miles away from where Perkins (field journal, letter) saw this species in 1895, as he made no mention of Perkin's unpublished notes or Henshaw's (1902) previously cited account (47-49). Donaghho's insistence over a 25-year period that he saw a bird matching the description of a female Greater Koa Finch also appears to lend credence to his report.

Pratt (1967) stated that he saw a medium-sized finch with a large bill and green form somewhere around 3500 to 4000 feet elevation near a gate along a road from Kealakekua (in the Pulehua Ranch area) in February (1967), but positive identification was apparently not possible and no direct follow-up search appears to have been conducted (44).

Hawaii Division of Fish and Game (1969 report) stated that the Greater Koa Finch was thought to be extinct or extirpated (1). Berger (1970) wrote that there were no reliable records of this species since 1896 (2). Atkinson (1977) concluded after reviewing the literature that it probably became extinct in West Hawai'i from 1892 to 1896 (3).

During the summer of 1978, U. S. Fish and Wildlife Service biologists conducted an intensive ornithological survey of fome 311,000 acres of forest habitat in Kona and Ka'ū Districts (from Hualālai to South Point), but in a preliminary statement reported by the press (Whitten 1978) their spokesman did not report detection of a single Greater Koa Finch (3a).

The lone report by Bole (1961) that he saw four Greater Koa Finches in Sophora bushes at Hosmer Grove on the island of Maui sometime during his 23 to 30 April visit is, of course, not to be taken seriously (see Bryan 1961) (55).

CHRONOLOGICAL DISTRIBUTION OF RECORDS

Distribution of 57 records of P. palmeri, including duplicate or repeated reports and negative findings, is shown in Table 4. Despite possibly valid reports in 1937 and 1967, none were verified at the time. The year 1896 marks the last year P. palmeri were indisputably sighted.

TABLE 4. Distribution of 57 Psittirostra palmeri records by decade.

1770's - 0	1840's - 0	1910's - 0
1780's - 0	1850's - 0	1920's - 0
1790's - 0	1860's - 0	1930's - 7
1800's - 0	1870's - 0	1940's - 2
1810's - 0	1880's - 0	1950's - 1
1820's - 0	1890's - 39	1960's - 4
1830's - 0	1900's - 1	1970's - 3

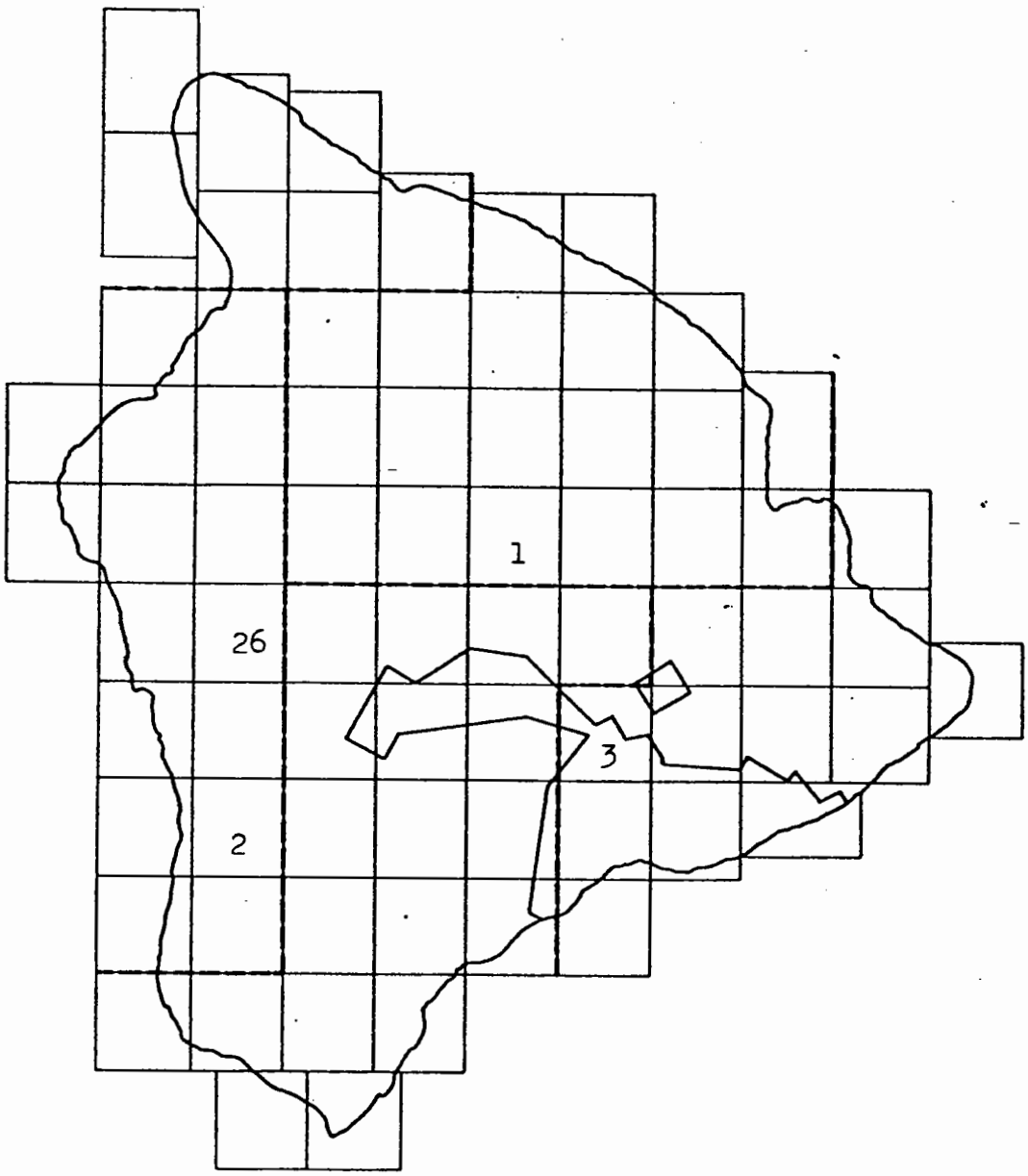
GEOGRAPHICAL DISTRIBUTION OF RECORDS

The geographical distribution of some 32 observational notes, collection records, and statements on P. palmeri in the 1890's is shown in Figure 5. Positive records of P. palmeri from the windward slopes of Mauna Loa and southeastern flanks of Mauna Kea, thus including windward Hawai'i in the range of this species, have apparently been previously overlooked.

SUMMARY AND CONCLUSIONS

From 1892 to 1896 P. palmeri was observed to range from 3000 to 5000 feet elevation along the Kona Coast southward from Pulehua Ranch to the Hōnaunau area. During this early period exploratory ornithologists collected 48 of the 54 known specimens and observed scores of this species in their principal Kona range (as many as 9 in one tree on one exceptional occasion). Six specimens were also collected in unrecorded localities in Hilo and/or Ka'ū Districts in 1892. A postive record of one or two seen on the slopes of Mauna Loa about 6 miles above Kīlauea in 1896 is also extant. However, not a single Greater Koa Finch was found during an intensive island-wide series of surveys concluded by the U. S. Fish and Wildlife Service from 1976 to 1979. Psittirostra palmeri is therefore almost certainly extinct.

FIGURE 5. Distribution of 32 observational notes, collection records, and related statements of P. palmeri, per quadrangle, on Island of Hawai'i, 1892-1896.



Psittirostra bailleui - Hawai'i

	Relative Abundance/Locality	Elev. (ft.)	Date	Source
ISLANDWIDE INFERENCE				
1	HDFG officially classed as endangered / island of Hawaii		(1969)	(4)
2	now found only in the mamane-naio forests on Mauna Kea...only rarely, apparently do the birds descend as low as 6,500 ft., but they are common from 7,000 ft. upwards nearly to tree line, which ...now ends at approximately 9,300 ft., varying somewhat around the mountain		(1972)	BERA72
3	occurs only / on Mauna Kea		(1974)	MULM74
MULTIDISTRICT				
4	Palmer: frequently met with; often seen in flocks of about half a dozen individuals / upper forest region; seldom found off the 'Mamane' trees; between elevations of 4,000 and 6,000 feet; Kona and Hamakua districts; and in the Hilo district, on the slopes of Mauna Kea they were seen even higher, at about 7,000 feet.		(1891/1892)	ROTW00
5	ranges / to a considerable height up the mountains		Jun/Oct 1892	PERR93
6	Found abundantly...some reason to believe it has become less common of late years / Kona and Hamakua distircts		(1892,1894, 1896)	PERR03
UNDESIGNATED LOCALITY				
7	two specimens obtained by Ballieu / (Dr. Trousseau's mountain cottage, district of Kona) (?Pulehua)		1876	WILS90

Psittirostra bailleui - Hawai'i

8	discovered by M. (Monsieur) Ballieu / Kona district		(1876)	ROTW00
9	Banko: Ballieu collected 2 specimens / (Pulehua)		1876	(1)
10	Banko: (Ballieu) collected 3 specimens / Mauna Hualalai (? Pulehua)		1877	(1)
11	Banko: (Ballieu) collected 3 specimens / undesignated place(s) (? Pulehua)		1877	(1)
12	Banko: Wilson collected 13 specimens / undesignated place(s)		(Jun/July 1887)	(1)
13	Banko: Wilson collected 2 specimens / undesignated place(s)		Mar 1888	(1)
14	Banko: Wilson collected 8 specimens / undesignated place(s)		(1887/1888)	(1)
15	singularly local...found...I believe / only in the upland districts of Kona and Hamakua		(1887/1888)	(1)
16	common, tame and easy to collect / in Kona	ca. 4000	18 Sept 1891	MUNG44
17	half a dozen specimens collected by Palmer / not very far from the mountain-house in which Mr. Scott Wilson had stayed for some time (upper Kaawaloa district) (? Pulehua)	ca. 5000	(Sept 1891)	ROTW00
18	Banko: Munro collected 1 specimen / undesignated locality		(Sept,Oct 1891)	(1)
19	Banko: Palmer collected 11 specimens / undesignated place(s)		(Sept,Oct 1891)	(1)
20	Banko: 1 specimen collected (C. H. Townsend) / undesignated locality		(Nov 1891)	(1)

21	noticed / on Hualalai up to ca. 6000 ft. elevation		(June/Oct 1892)	PERR93
22	Banko: Perkins collected 2 specimens / Kona	5000 (1) 4000 (1)	Aug 1894	(1)
23	Perkins: hardly to be found at all / vicinity 1892 camp	4000	Mar 1896	(3)
24	Banko: Perkins collected 2 specimens / Kona	4000	Mar 1896	(1)
25	Banko: undesignated collector obtained 1 specimen / Kona District		(? 1890's)	(1)
26	Banko: undesignated collectors obtained 3 specimen / undesignated place(s) (? Kona District)		(? 1890's)	(1)

MULTIQUADRANGLE

27	extremely numerous / in the Mamane belt of the middle and North Kona district, from rather below 4,000 feet to at least 6,000 feet		(1892)	PERR03

PUU LEHUA

28	Perkins: seen in numbers here this season everday / Pulehua		(Aug 1892)	(3)
29	Perkins: now almost totally absent...only two males seen / Pulehua		Aug (1894)	(3)
30	found none / Pulehua Ranch, north Kona		(Nov 1942)	BALP44 (5)

Psittirostra bailleui - Hawai'i

PUU POHAKULOA

31	Palmer: saw some / on a half-day's horse ride up Mauna Loa from Honaunau, a dairy belonging to a Mr. Johnson...about 6,000 feet above the sea and some twenty miles to the south of Pulehua.	(? 9000+)	(Nov 1891)	ROTW00

Ka'ū District

KILAUEA CRATER

32	none found / a few miles from the Volcano of Kilauea (where) the Mamane grows quite freely		(1895,1896)	PERR03
33	one seen / Bird Park		23 Mar-14 Apr 1958	EASW58

Mauna Kea District

UNDESIGNATED LOCALITY

34	Banko: Munro collected 1 specimen / Hamakua		2 Feb 1892	(1)
35	Banko: Henshaw collected 23 specimens / Hamakua District		Apr 1903	(1)
36	not uncommon...counted 28 on two lists / on the upper slopes of Mauna Kea, mostly in the Mamane belt		May 1940	DONW40
37	actually common...saw at least 20 birds during an hour / in the Mamane forest on Mauna Kea	ca. 7000	18 June (1960)	DUNW60
38	small groups of four to five...total estimate... 20-30 seen / rocky high slopes of Mauna Kea		(17-19 Jun 1960)	EISE61

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39	five seen / Kaohe Game Management Area		18-20 Apr 1964	KINW64
40	approximately 308 counted in a week's time / Mauna Kea		(17 Feb 1975)	ANON75
41	localized population...can be found / dry mamane - naio forest on Mauna Kea		(1973)	VANC73
42	one counted during extended census / Puu Kaena (? PUU KOLI, ? PUU OO), Area 1, U. S. Army P.T.A.		Jan 1975	SHAR77
43	now very local / (Mauna Kea)		(1977)	ATKI77
MULTIQUADRANGLE				
44	locally not uncommon / western and northeastern slopes, Mauna Kea	7750-8300	1943, 1948-1950	RICL53
45	quite common...sightings at Puu Laau, Pohakuloa Gulch, lower Halepohaku regions...believe that there has been an increase...during past five years / on clockwise survey around (Mauna Kea) in mamane forest belt		(ca. Jul 1962)	WALR62
46	now known / only in the mamane - naio forests on the slopes of Mauna Kea	6500+	(1970)	BERA70a
47	concluded from 714 days of field work that only 9 percent of historical range now occupied... decrease in population size to approximately 1600 individuals...effective breeding population may be smaller...evidence of infertility and embryonic death may indicate reduced fitness possibly resulting from the effect low population numbers have had on behavior and genetic conditions...population found to nest in relation to the period of greatest		(1969-1975)	VANC78a

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47	(continued) (mamane) pod food production...extremely long nestling period is thought to have resulted because the species evolved in the absence of ground predators... this, augmented by nest placement on large branches, would make the bird highly susceptible to predation / southwestern slope of Mauna Kea		
48	392 transect-mile census produced 256 confirmed sightings...most abundant near tree line / mamane - naio forest on Mauna Kea	(1975)	MARD75
49	17 census party members recorded 307 (252 seen) on 597 km (370 miles) of transects covering 2185 ha (5400 acres) surveyed...total population of about 1,595 statistically estimated (95% Confidence Interval = ½, 146 - 2,049) using a mean density of 36 birds per km found on southwestern flank and in three disjunct areas on the south and wouteast slopes; not found on the north slope from above Puu Laau past Kemole and Puu Mali to Kanakaleonui / all the high mamane and naio forest on Mauna Kea covered in census series	13-17 Jan 1975	VANC78b
50	17 census party members recorded 177 (141 seen) on 586 km (364 miles) of transects covering 715 ha (1766 acres) surveyed...total population of 1,940 statistically estimated (95% Confidence Interval = 1,643 - 2,237) using a mean density of 38 birds per km^2...found on the southwestern slope and four disjunct areas on the south and southeast slopes; not found on the north slope / all the high mamane and naio forest on Mauna Kea covered in census series	15-19 Sept 1975	VANC78
51	the two population estimates from both (breeding and non-breeding) seasons indicated approximately 1,600 birds on the mountain...variances of our estimates are too large to draw any conclusions / Mauna Kea	13-17 Jan 1975 15-19 Sept 1975	VANC78b

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52	27 per km^2 (.62 $mile^2$) censused on 2,380 m. (7807 ft.) elevation transect / between Puu O Kauha and approximately 1.6 km (1 mile) north of Puu Laau cabin		17,23,25,26 Sept 1975	VANC78b
53	although none were observed during survey, drought conditions may have affected results significantly... included in the critical habitat proposal are some P.T.A. lands north of the Saddle Road...within the upper elevations of Army Area 6 / U. S. Army Pohakuloa Training Area		Jan 1977	SHAR77
	NAOHUELEELUA			
54	(L.W.) Bryan: saw dozen at least / old pahoehoe mamane-naio-ohia kipuka (Kipuka Alala), Pohakuloa Training Area (13 miles along jeep trail from Saddle Road)	ca.6000	19 Sept 1950	(2)
	PUU KOLI			
55	Baldwin: none / Puu Koli and adjacent kipukas... not enough mamane trees to support them	7341	17 Apr 1943	(5)
	AHUMOA			
56	Baldwin: one seen / 1 mile NW Puu Laau...mamane forest at lower edge of forest reserve	7250	19 Apr 1943	(5)
57	Baldwin: saw one...very close...evidently not common here / about 2 miles (NW)...from Puu Laau		19 Apr 1943	(5)
58	Baldwin: watched several / Puu Laau forest, 1 mile NW of forest service cabin		20 Apr 1943	(5)
59	Banko: Baldwin collected 1 specimen / Puu Laau	7750	6 Nov 1948	(1)

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60	Ward: a few birds found eating mamane seeds; recordings made / Puu Laau		20 Jun 1961	(6)
62	Banko: three seen / horse pasture area (Puu Laau)		8 Feb 1966	(7)
63	counted 6 / near Puu Laau cabin		4 Oct 1966	ORDW67
64	estimated by count and by song that 100 were seen and heard (almost the same count tallied on return trip)...as many as 12 in one tree...pretty much in pairs (3 hour survey) / along one mile of jeep trail from Puu Laau cabin along the saddle road side of Mauna Kea		4 Oct 1966	ORDW67
65	seen extremely well / "flying" tour...Puu Laau area		16-23 Nov 1966	ORDW67a
66	one flock of three or four, and one solitary individual / Puu Laau area		28 Dec 1967	ORER68
67	very likely seen / down the road from Puu Ahumoa-Puu Laau road juction		28 Dec 1967	DONW68
68	three seen...probably others / in mamane trees... on hike from Halepohaku to Puu Laau	8000-9000	23-25 Jan 1968	WALR68
69	located on each of 15 successive field trips / Kaohe Game Management area (near Puu Laau)		Oct 1967 to May 1968	BERA70
70	found nest / Kaohe Game Management area (near Puu Laau)		6 Jul 1968	BERA70
71	one doubtful sighting during the approximately 8 hours we were there / Puu Laau area		25,26 Sept 1968	KAIC68
72	Morrison: one seen / Puu Ulala, Puu Laau area	7411	19 Nov 1968	(8)

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73	Morrison: one possibly seen / along jeep road to Puu Laau	6400	19 Nov 1968	(8)
74	seven seen / along a dirt road running east of the cabin...Puu Laau		19 Dec 1968	DONW69
75	Banko: saw male fly across jeep road / ½ mile before departing last mamane forest area headed north towards Kanakaleonui, a mile or so away		14 Jul 1970	(7)
76	van Riper: 3 observed, 1400-1730 hours walking survey / Puu Laau	8000	8 Dec 1970	(9)
77	van Riper: one observed, 0630-0800 walking survey / Puu Laau	8000	9 Dec 1970	(9)
78	van Riper: 2 seen , 1400-1730 hours / Puu Laau		9 Dec 1970	(9)
79	found / (Mauna Kea)	ca.7000-9500	(undated)	BERA70
80	Banko: Giffin reported seeing 2 / Puu Naha above Puu Laau	ca.10,000	ca. 5 May 1971	(7)
81	van Riper: 5 seen / 2½ miles SW of Puu Laau cabin		15 Aug 1971	(9)
82	van Riper: 2 seen / ½ mile south of Puu Laau cabin		21 Aug 1971	(9)
83	van Riper: 5 seen / ½ mile south of Puu Laau cabin		16 Nov 1971	(9)
84	Banko: saw 4 or 5, possibly 2 others / from near north sheep enclosure gate Puu Laau to ½ - ½ mile farther north along the road		14 Nov 1973	(7)

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85	found a flock...easily / in the mamane forest 100 yards from the Puu Laau cabin on Mauna Kea		(1973)	ANON73
86	van Riper: recorded mostly at 7400 feet elevation where mamane is most common, rarely below 7100 ft. el. / in study areas at 6500, 6700, and 7500 feet elevation, in the Kaohe Game Management Area, southwestern slope of Mauna Kea		Mar 1973 to Oct 1974	(10)
87	sightings made at or above upslope boundary during extended census / Area 6, U.S. Army P.T.A.		Jan 1975	SHAR77
88	promptly located 3 feeding / Hale Pohaku	9200	8 May 1977	MULM77
89	Erickson: 20 found / Puu Laau		12 Sept 1977	PYCR78
MAUNA KEA				
90	two paris about...saw three more farther up the mountain / mamane forest in rocky terrain above grassy pastures...on hike up Mauna Kea from Laumaia CCC camp		14 Sept 1937	DONW52
91	heard one / upon approaching forest on descent of Pohakuloa gulch from Lake Waiau		14 Sept 1937	DONW52
92	heard now and then / thick mamane and naio, descending Pohakuloa gulch from Lake Waiau, Mauna Kea		14 Sept 1937	DONW52
93	Pyle: flock seen / 5 hours hike up Mauna Kea from Pohakuloa		(Jan) 1953	(11)
PUU AKALA				
94	Richards: collected one / a couple of hundred yards mauka of the (Forestry) cabin, approximately 1 mile WNW from Hopuwai	ca. 7000	15 Dec 1950	(12)

95	Richards: found on mamanes with green beans at 8500 ft...two specimens collected...1315-1630 hours / hike along jeep road from Hopuwai cabin to Forestry cabin at 8000 ft. in direction of Puu Kanakaleonui, thence on road mauka to 8500 ft. about ½ mile fro base of Puu Kanakaleonui (then return to Hopuwai at 1735 hours)		16 Dec 1950	(12)
96	Richards: flock in group of about 7 to 10... about 10...seen, 1100-1600 hours / hike from Hopuwai cabin to Forestry cabin 8000 ft. near Puu Kanakaleonui, thence to summit of Kanakaleonui, (then return to Hopuwai via jeep trail arriving at 1700)		17 Dec 1950	(12)
97	Banko: Richards collected 2 specimens / between Pu'ukanakaleonui and Hopuwai, Mauna Kea	8000	Dec 1950	(1)

UMIKOA

98	Miller: found in abundance...8 specimens obtained / from the mamane belt at about 7,500 ft. and... as far up as we went (8,000 ft.) (Pokihi, up from Chester Blacow ranch house, Mauna Kea)		27 Dec 1902	(13)
99	Banko: Miller collected 5 specimens / Horner's Ranch (Umikoa) (Pa'auilo)	8200	1902	(1)
100	Banko: Blacow collected 6 specimens / Horner's Ranch (Umikoa)	8000 (4) 7800 (1) 7000 (1)	Jul, Aug, Sept, Dec 1903	(1)
101	7 specimens taken / vicinity of Horner's Ranch near Paauilo, district of Hamakua	7000-8000	26 Dec 1902	BRY03

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APPENDIX IV

1. Observations, reports, and specimen records are organized by island group, island, district, and/or quadrangle map. Order of listing, names and locations of district, and quadrangle boundaries are explained and illustrated in CPSU/UH Avian History Report 4: Introduction to Part I, Population Histories--Species Accounts.

2. Acronyms composed of the first three letters of the author's (or senior author's) last name, the first letter of the first name, and the last two digits of the year of publication represent sources found in the bibliography under References Cited. For example, BRYW01 = Bryan, W. A., and A. Seale; 1901. Notes on the birds of Kauai. Bishop Museum Occas. Papers. 1(3): 129-137. In cases where it is necessary to distinguish between two or more articles published by an author in any given year, letters are added to the acronym in alphabetical sequence. For example, BRYW01a = Bryan, W. A. 1901a. A key to the birds of the Hawaiian group. Bishop Museum Press. 76pp.

3. Place-names are cited in original form.

4. Parenthetical information is qualified.

Psittirostra palmeri - Hawai'i

	Relative Abundance/Locality	Elev. (ft.)	Date	Source
ISLANDWIDE INFERENCE				
1	HDFG: thought to be extinct or extirpated from this particular island /		(1969)	(1)
2	no reliable records since 1896 / Kona slope of Mauna Loa		(1970)	BERA70
3	probably extinct (1892-1896) / west Hawaii		(1977)	ATKI77
3a	none seen in preliminary report by 11 biologists in U.S. FWS survey / 5800 count periods at 2900 stations along 243 miles of transects in 311,000 across of forest habitat ranging from Hualalai, Kona to South Point, Ka'ū		summer of 1978	WHIH78
UNDESIGNATED LOCALITY				
4	Banko: Palmer collected 6 specimens / unspecified place(s)		Mar, June 1892	(2)
5	Banko: Palmer collected 20 specimens / unspecified place(s); 1 at 3000 ft. elevation		Sept, Oct, Nov 1891	(2)
6	Banko: Perkins collected 12 specimens / Mauna Loa, Kona District	4000	Jun, Jul, Sept 1892	(2)
7	Banko: Perkins collected 17 specimens / undesignated places Kona District	3000	1896	(2)
8	Banko: unspecified collector obtained 1 specimen / undesignated locality		(? 1890's)	(2)
9	1 possibly heard / Kona		(1935-1937)	MUNG46

Psittirostra palmeri - Hawai'i

MULTIQUADRANGLE				
10	belongs / to the upper district	3000-4000	(Jun-Oct 1892)	PERR93
11	probably most numerous	ca. 4000	(Jun-Oct 1892)	PERR93
PUU LEHUA				
12	Palmer...collected 1 from a group of 3 / near Puu Lehua...on the Greenwell Ranch	ca. 4500	28 Sept 1891	MUNG41
13	collected 1...Rothschild described it as a different species...I feel Rothschild was wrong / near Puu Lehua...on the Greenwell Ranch	ca. 4500	30 Sept 1891	MUNG41
14	Palmer obtained 6 specimens / not very far from the mountain-house in which Mr. Scott Wilson had stayed for some time (upper Kaawaloa district) (Pulehua)	ca. 5000	(Sept-Oct 1891)	ROTW00
15	proved fairly common..after once finding it / (near Puu Lehua...on the Greenwell Ranch)	ca. 4500	(Oct 1891)	MUNG41
16	by no means rare / Kona and Hilo district; (Palmer) found it entirely in the upper forests, and most numerous at about 4,000 feet		1891/1892	ROTW00
17	score or two seen by Munro and Palmer / (vicinity Pulehua)		(1891)	PERR03
18	Perkins: collected specimen / vicinity Pulehua		1 Jul (1892)	(3)
19	Perkins: collected specimen, saw 2 more / vicinity Pulehua		2 Jul (1892)	(3)
20	Perkins: collected 1 specimen / vicinity Pulehua		3 Jul (1892)	(3)

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21	Perkins: unsuccessful search / vicinity Pulehua		5 Jul (1892)	(3)
22	Perkins: obtained 1 specimen / vicinity Pulehua		9 Jul (1892)	(3)
23	Perkins: saw only 1 / vicinity Pulehua		11 Jul (1892)	(3)
24	Perkins: heard 1 / on way from Pulehua to Nahuina		12 Jul (1892)	(3)
25	Perkins: saw 1 / vicinity Pulehua		14 Jul (1892)	(3)
26	Perkins: heard several in the course of the day / vicinity Pulehua		19 Jul (1892)	(3)
27	Perkins: heard 1 / vicinity Pulehua		22 Jul (1892)	(3)
28	Perkins: saw none past two days / vicinity Pulehua		3 Aug (1892)	(3)
29	Perkins: still no Koa finches to be heard / vicinity Pulehua		11 Aug (1892)	(3)
30	Perkins: shot specimen / vicinity Pulehua		2 Sept (1892)	(3)
31	Banko: Perkins collected 1 specimen / Nahina (? Nahuina)	ca. 4000	June, Jul, Sept 1892	(2)
32	Banko: Perkins collected 1 specimen / near the dairy at Nahuina	ca. 4000	June, Jul, Sept 1892	(2)
33	several score seen / (vicinity Pulehua)		1892	PERR03
34	Perkins: heard a number / vicinity Pulehua		3-14 Aug (1894)	(3)
35	Perkins: moved down / a 1,000 ft. below its habitat of 1892 (vicinity Pulehua)		Aug (1894)	(3)

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36	Perkins: quite numerous; I called into this tree nine fully adult males...all at one time, and shot several of them / unspecified locality (? below Pulehua)...in 1892 I had never seen nor heard (it) so low down in the forest	3000	Mar 1896	(3)
37	Perkins: none seen or heard / vicinity 1892 camp	4000	Mar 1896	(3)
38	certainly some hundreds were examined with the naked eye or glasses / (vicinity Pulehua)		(1892,1894,1896)	PERR03
38a	Henshaw: unsuccessful search of Pulehua area		1901	AMAD50
39	the only trace I could find of it was from a guide in Kona who had heard a bird whistle a year or two before...his imitation of the whistle sounded to me identical to that of the bird as I remembered it / unspecified locality (? Pulehua)		1937 survey	MUNG44
40	found none / Pulehua ranch, north Kona		(Nov. 1942)	BALP44
41	Baldwin: (none seen) / Puu Lehua, type locality		19-21 Nov 1942	(4)
42	searched for unsuccessfully / type locality (? Pulehua)		(1953)	RICL53
43	(none seen) / vicinity Puu Lehua		27,28 Aug 1966	BERA66
44	saw medium sized finch with a large bill...green form (? P. palmeri) / vicinity scrub ohia, koa, mamane, and naio forest...near gate on road from near Kealakekua to Mt. Hualalai	ca. 4000-3500	Feb (1967)	PRAT67

Psittirostra palmeri - Hawai'i

PUU POHAKULOA

45	obtained specimen / Honaunau, a dairy belonging to a Mr. Johnson...some twenty miles to the south of Pulehua and a half-day's horse ride up Mauna Loa to above 9,000 ft.		(Nov 1891)	ROTW00
46	Richards: Munro: Palmer shot a specimen / Johnson's dairy...about 10 miles to the south of Honaunau mauka...	ca. 6000+	20 Nov 1891	(5)

KILAUEA CRATER

47	Perkins: occurred / far back in the forest from Kilauea, but not in the Koa forest within several miles of the crater		June-Sept 1895	(3)
48	Perkins: big beautiful Rhodocanthis occurred there...only one or two seen / koa forest about six miles from the Volcano House looking toward Mauna Loa		(1895)	(6)
49	Perkins informs me that he saw numbers of this bird / in the extensive koa woods above the volcano...on the very edge of the rainy Olaa district which the bird appears never to enter		(1895)	HENH02
50	heard strange whistle...long note followed by two short slurs...large bird...grosbeak type of bill...lighted on a limb about 20 ft. above my head (? Koa finch, P. palmeri) / Keauhou Ranch between Kipuka Puaulu and Forest Reserve fence		30 Jun 1937	DONW51

Psittirostra palmeri - Hawai'i

51	Donaghho: saw female Koa finch...and upon hearing it whistle, imitated it and it flew into plain sight on a limb about 20 feet away / on a hike from Kipuka Puuaulu north into Brown's Ranch koa forest thence southeast to fence-line and back via tanks and ranch house (7 miles)	30 June 1937, 2 Jul (1937)	(7)
52	Donaghho: saw only 1...female...heard it whistle... flew into plain sight on a branch 20 feet away... bill...resembling somewhat the bill of a grosbeak...not an Ou...color was dull green, whitish below / at the edge of the Koa forest south of the Bird Park	30 Jun 1937, 2 Jul 1937	MUNG44a
53	called female overhead / koa forest near the Volcano	1937	DONW54
54	called a female Koa finch over my head...had an excellent look through binoculars...certain of what I saw / koa forest east of Bird Park	1937	DONW63

Psittirostra palmeri - Maui

KILOHANA

55	four seen / in Sophora bushes at Hosmer Grove (Haleakala)	(23-30 Apr 1961)	BOLP61

ABSTRACT

Psittirostra flaviceps is a small, short-tailed, thick-billed, olive-green forest bird having yellow about the head and neck. It is endemic to the island of Hawai'i. Exhaustive search of literature and field journals uncovered only eight specimens and related collection records on or near the Pulehua Ranch in October 1891. Searches of the type locality by successive ornithologists in 1892, 1894, 1896, 1901, 1942, 1950, 1966 and the late 1907's failed to reveal this species. Psittirostra flaviceps is presumed extinct.

46. Psittirostra flaviceps

Lesser Koa Finch

The Lesser Koa Finch is a small (ca. 6 to 7 inches long), short-tailed, thick-billed, olive-green forest bird, the males having yellow about the head and neck. Known only from Kona, Hawaii, P. flaviceps was first described by Rothschild in 1892. It apparently had no native Hawaiian name (Pyle 1977).

Six specimens of P. flaviceps are in the American Museum of Natural History and the remaining two are in the British Museum of Natural History (Banko 1979 report).

In the historical accounts which follows, one or two digit numbers in parentheses refer to specific records in the Appendix. Sources cited in the Appendix may be traced to complete references in the bibliography.

H. C. Palmer, assisted by G. C. Munro, collected about 24 examples of what appeared to them to be the same species of thick-billed forest bird on or near Pulehua Ranch in October 1891 (Banko museum records). After preparing and shipping these specimens they were surprised to learn later that Rothschild (1892) had described some 16 of these specimens as P. palmeri and the remaining examples as another species (P. flaviceps), a decision with which Munro, at least, disagreed (Rothschild 1900; Hartert 1919; Munro 1944; Banko (1979 report) (4, 5, 8). Perkins (1903) also expressed doubt that these were two species. However, after carefully comparing specimens of both examples Amadon (1950), was convinced that Rothschild was correct.

Perkins (1903) was aware of the occurrence of both P. flaviceps and P. palmeri in the Pulehua Ranch area but during which he examined "some hundreds" of P. palmeri with the naked eye or glasses, he found no examples of P. flaviceps (6, 7). Negative finds likewise resulted from searches of the type locality, Pulehua Ranch, in 1901 by H. W. Henshaw (Amadon 1950), in 1942 by P. H. Baldwin (field journal), in 1950 by Richards and Baldwin (1953), in 1966 by Berger (1966), and in 1978 by the U. S. Fish and Wildlife Service survey team (Whitten 1978) (9-11, 13).

Hawaii Division of Fish and Game (1969 report) stated that the Lesser Koa Finch was thought to be extinct or extirpated (1). Berger (1970) found that there were no reliable records of it since 1896 but cited no source for the record that year (2). After reviewing the history of this species Atkinson (1977) presumed that it was extinct (3). Pratt (1967) reported seeing a medium-sized finch with a large bill and green form somewhere around 3500 to 4000 feet elevation near a gate along a road from

Kealakekua to Hualālai (Pulehua Ranch area) in February (1967), but positive identification was apparently not possible and no follow-up search appears to have been conducted (12).

CHRONOLOGICAL DISTRIBUTION OF RECORDS

Distribution of some 14 records of P. flaviceps, including duplicate or repeated reports and negative findings, is shown in Table 5. One possibly valid report in 1967 was not verified.

TALBE 5. Distribution of 14 Psittirostra flaviceps recorded by decade.

1770's - 0	1840's - 0	1910's - 0
1780's - 0	1850's - 0	1920's - 0
1790's - 0	1860's - 0	1930's - 0
1800's - 0	1870's - 0	1940's - 1
1810's - 0	1880's - 0	1950's - 1
1820's - 0	1890's - 6	1960's - 3
1830's - 0	1900's - 1	1970's - 2

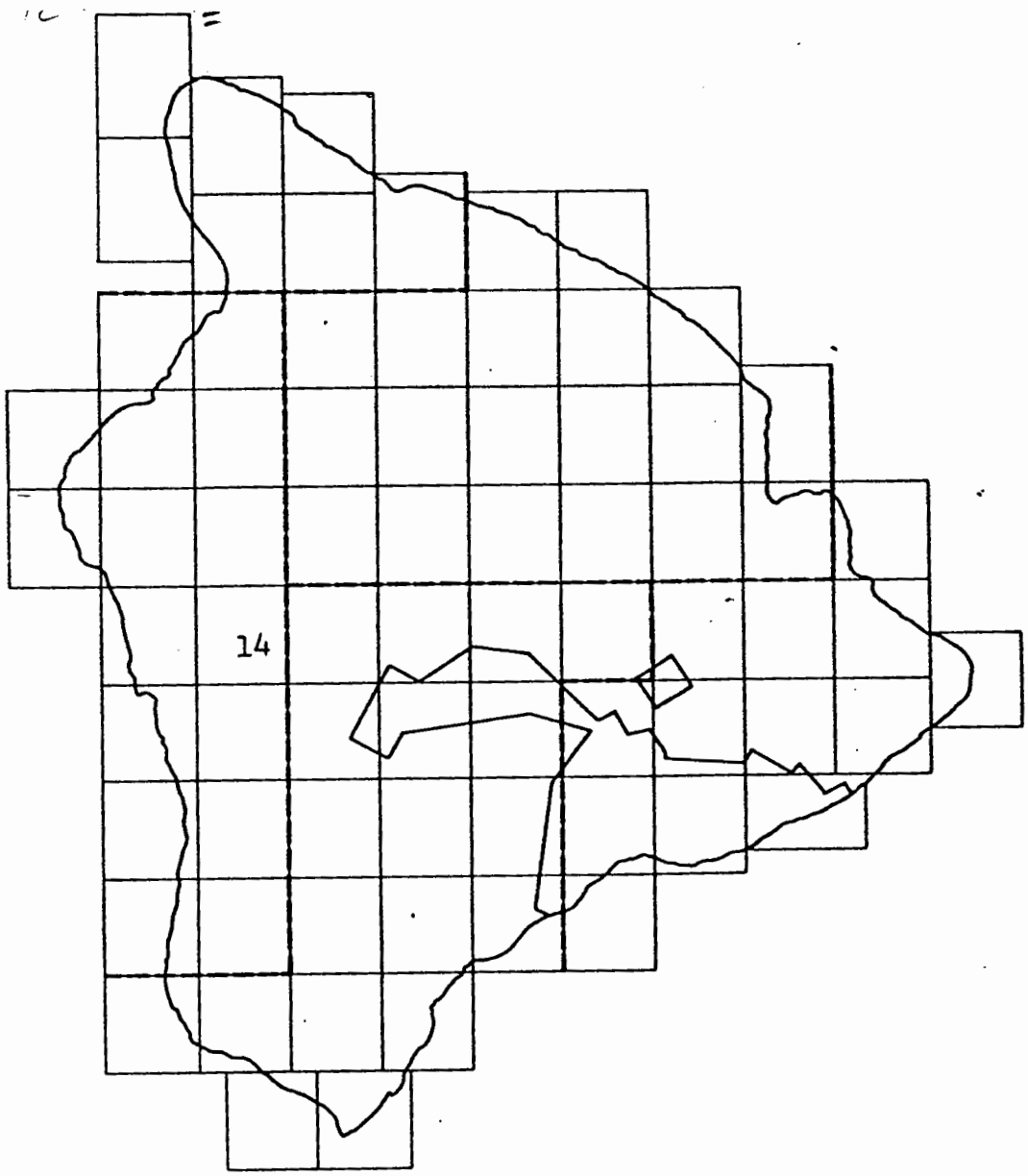
GEOGRAPHICAL DISTRIBUTION OF RECORDS

All records of P. flaviceps refer or relate to the eight specimens secured by H. C. Palmer and G. C. Munro in October 1891. Dates do not appear on specimen tags. Palmer's diary (Rothschild 1900) shows that he camped from 12 September to 25 October at about 5000 feet elevation near Pulehua, spent 26 October about 3 to 4 miles above Ka'awaloa in "Greenwell's old house," and moved on to Honomolino in South Kona on 6 to 7 November. The probability is therefore high that all eight specimens of P. flaviceps were collected on or near Pulehua Ranch (PUU LEHUA quad.), as shown in Figure 6.

SUMMARY AND CONCLUSIONS

Eight specimens of Psittirostra flaviceps were collected together with about 16 examples of P. palmeri on or near Pulehua Ranch by H. C. Palmer and G. C. Munro in October 1891. There appear to be no other positive records of this species anywhere. It is, therefore, presumed extinct.

FIGURE 6. Distribution of 14 observational notes, collection records, and related statements of Psittirostra flaviceps, per quadrangle, on Island of Hawai'i, 1891-1978.



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2. Banko, W. E. 1979 report. Specimens in museum collections. History of Endemic Hawaiian Birds. CPSU/UH Avian History Report 2. Dept. of Botany, University of Hawaii. 80 pp.

3. Baldwin, P. H. 1938-1949 field notes.

APPENDIX V

1. Observations, reports, and specimen records are organized by island group, island, district, and/or quadrangle map. Order of listing, names and locations of district, and quadrangle boundaries are explained and illustrated in CPSU/UH Avian History Report 4: Introduction to Part I, Population Histories--Species Accounts.

2. Acronyms composed of the first three letters of the author's (or senior author's) last name, the first letter of the first name, and the last two digits of the year of publication represent sources found in the bibliography under References Cited. For example, BRYW01 = Bryan, W. A., and A. Seale; 1901. Notes on the birds of Kauai. Bishop Museum Occas. Papers. 1(3): 129-137. In cases where it is necessary to distinguish between two or more articles published by an author in any given year, letters are added to the acronym in alphabetical sequence. For example, BRYW01a = Bryan, W. A. 1901a. A key to the birds of the Hawaiian group. Bishop Museum Press. 76pp.

3. Place-names are cited in original form.

4. Parenthetical information is qualified.

Psittirostra flaviceps - Hawai'i

	Relative Abundance/Locality	Elev. (ft.)	Date	Source
ISLANDWIDE INFERENCE				
1	HDFG: thought to be extinct or extirpated from this particular island / island of Hawaii		(1969)	(1)
2	no reliable records since 1896 / Kona slope of Mauna Loa		(1970)	BERA70
3	presumed extinct / west Hawaii		(1891-1892)	ATKI77
PUU LEHUA				
4	Banko: Palmer collected 8 specimens / (? above Kaawaloa; ? Pulehua)		Oct 1891	ROTW00 (2)
5	Palmer obtained a small series / District of Kona, at the same places where (Psittirostra palmeri) was first collected		(1891)	ROTW00
6	Munro and Palmer: two or three seen, among a score or two of (P. palmeri) / (vicinity Pulehua)		(1891)	PERR03
7	none found in numerous special searches / (vicinity Pulehua)		(1892-1896)	PERR03
8	eight skins were sent by Palmer / (vicinity Pulehua)		(1891)	HARE19
8a	Henshaw: unsuccessful search of Pulehua area		1901	AMAD50
9	Baldwin: (none seen) / Puu Lehua, type locality		19-21 Nov 1942	(3)
10	searched for unsuccessfully / type locality		(1950)	RICL53

Psittirostra flaviceps - Hawai'i

11	(none seen) / vicinity Puu Lehua		27,28 Aug 1966	BERA66
12	medium sized finch with a large bill...green form...(? P. flaviceps) / vicinity scrub ohia, koa, mamane, and naio forest...near gate on road from near Kealakekua to Mt. Hualalai	3500-4000	Feb (1967)	PRAT67
13	none reported by 11 biologists in U.S. FWS survey / 5800 count periods at 2900 stations along 243 miles of transects in 311,000 acres of forest habitat ranging from Hualalai to South Point Kona		summer of 1978	WHIH78

ABSTRACT

Psittirostra kona is a small, short-tailed, olive-green forest bird with an extremely thick, short bill. It is endemic to the island of Hawai'i. Exhaustive search of literature and field journals uncovered comparatively few records of its existence in 1891 and 1892, the last years a living population was noted. Psittirostra kona is presumed extinct.

37. Psittirostra kona

Grosbeak Finch

Psittirostra kona is a small (5 to 7 inch long), short-tailed, olive-green forest bird with an extremely thick, short bill (Wilson 1888; Rothschild 1900). Endemic to the island of Hawaii, and now apparently extinct, this species was originally placed in a monotypic genus (Chloridops) by Wilson because of its extraordinary bill, but Amadon (1950) considered it most properly placed in the genus Psittirostra with the other thick-billed Drepanidids. Like the Greater and Lesser Koa Finches P. kona apparently had no native Hawaiian name (Perkins 1903).

Numbers and principal repositories of 48 specimens of P. kona are as follows: 15 in American Museum of Natural History, 10 in British Museum of Natural History, 5 (incl. 1 mounted) in B. P. Bishop Museum, and 5 (incl. holotype, mounted) in the Cambridge Museum of Zoology (Banko 1979 report).

Perkins (1903) wrote the most complete account of the habits and behavior of the Grosbeak Finch. Berger (1972) provides a recent overview of this species.

In the historical account which follows, one or two digit numbers in parentheses refer to specific records in the Appendix. Sources cited in the Appendix may be traced to complete references in the bibliography.

Early Notes and Records (1887-1896):

Wilson (1888; Wilson & Evans 1893) collected only one specimen of the Grosbeak Finch (21 June 1887) and saw but two others during a 4-week stay at Pulehua Ranch, Kona, concluding from this and other exploratory work that the Grosbeak Finch was "extremely rare" (Munro 1941; Banko 1979 report) (13-16).

H. C. Palmer and R. C. L. Perkins found P. kona to be more plentiful a few years later. Palmer secured a total of 24 specimens after extensive collecting in Kona District in September and October 1891 and from June to September 1892 (Banko 1979 report) (4, 5). The name of Palmer's assistant, G. C. Munro, is on the label of one additional example taken during this period (Banko 1979 report) (5a). While none of the labels on specimens taken by Palmer or Munro are inscribed with the name of locality, Rothschild (1900) and Munro (1941) mention that a dozen examples were collected on 12 October 1891 at Pulehua Ranch (6 in 5 minutes) from flocks of six and 10 not much more than 100 yards apart on a big lava flow south of Pulehua dairy where they were almost exclusively found (17-19). From observatons relayed

to him by Palmer, Rothschild (1900) stated that P. kona was "not rare" in the localities of Pulehua Ranch, Nawina (? Nahuina) and Hōnaunau, occurring from 3500 to 5500 feet elevation over a 15 to 20-mile range in Kona District (12). Later, Munro told L. P. Richards that on 20 November 1891 Palmer saw a pair of Grosbeak Finches at about 6000 feet elevation "about a mile from (Johnson's) dairy... about 10 miles to the south of Honaunau mauka" (Richards field journal) (35).

Perkins (field journal; Banko 1979 report) collected a total of 21 specimens of Grosbeak Finches during his June to September 1892 visit to Kona District. Some 11 examples were seen or taken at 4000 feet elevation on Pulehua Ranch (20, 23, 25-28, 30), the balance being secured "on way from Pulehua to Nahuia," "from Pulehua to Kaawaloa and return," from "Pulehua to Kanahua," and apparently on other similar side-trips in the Pulehua area (22, 24, 29). Some nine specimens are tagged "4000" feet elevation and bear the various locality notations of "Mauna Loa," "Kona District," or combination thereof (7-9). The locality of one of the specimens taken by Perkins during this period went unrecorded (Banko 1979 report) (6), and he (field journal) conducted an unsuccessful search for this species in the vicinity of Pulehua Ranch on at least one occasion (5 July 1892) (21).

Perkins (field journal; Banko 1979 report) seems not to have observed the Grosbeak Finch during visits to Kona in 1894, 1895, and 1896, although he mentioned (1945) on the occasion of his 1896 visit, that Henry Greenwell was found to have preserved two whole birds in spirits (11).

In addition to the 44 specimens credited to Palmer (24), Munro (1), and Perkins (21), there is one example, probably taken in 1891 or 1892, without any information on the label (10).

Three specimens taken in September 1892 by R. C. L. Perkins marked "Pulehua, Mauna Loa, 4000 ft." seem to mark the last occasion of this species being seen alive.

In conclusion, Perkins (1893) stated that P. kona belonged to the upper district (3000-4000 ft. elev.), was "local... rare" with never more than "six or eight individuals" being seen on the most favorable and exceptional days, and ranged "within an area of about four square miles" and in the same localities as P. palmeri, in the vicinity of Pulehua, rarely visiting "any other tree than Naeo" (Naio) (31, 32). In 1893 Perkins was apparently unaware that Palmer (Rothschild 1900) observed this species some 15 to 20 miles south of Pulehua Ranch, in and/or south of Hōnaunau (12, 35).

Later Reports and Observations (1897-1978):

H. W. Henshaw searched fruitlessly for the Grosbeak (and Koa) finch(es) in 1901, according to Amadon (1950) (32a). Richards and Baldwin (1953) conducted several unsuccessful searches for the Grosbeak (and Koa) Finch(es) in likely localities in Kona

District during the 1940's and early 1950's (Richards field journal; Baldwin field journal) (33). Berger (1966) reported no positive results from a 2-day field trip to Pulehua Ranch on 27 and 28 August 1966 (33a). Pratt (1967), on an impromptu visit to the Pulehua area, stated that he saw a medium-sized finch with a large bill and green form (which might have been the Grosbeak Finch) in a scrub 'ōhi'a, koa, māmane, and naio forest at around 3500 to 4000 feet elevation near a gate on the road from near Kealakekua to Mt. Hualālai in February (1967), but no follow-up search to obtain substantiating evidence was apparently ever initiated (34).

Hawaii Division of Fish and Game (1969 report) stated that the Grosbeak Finch was thought to be extinct or extirpated (1). King (1971) wrote that there were no reliable records of this species since 1896 but cited no applicable reference (2). Atkinson (1977) concluded that the Grosbeak Finch was "probably extinct" (3). E. Kridler, spokesman for the U. S. Fish and Wildlife Service, is reported by Whitten (1978) as stating that survey crews had hoped to rediscover this species on a series of extensive surveys beginning in 1976, but experienced "no such luck" (3a).

The collection of three Grosbeak Finch specimens by R. C. L. Perkins in September 1892 thus appears to be the last positive evidence of a living population.

CHRONOLOGICAL DISTRIBUTION OF RECORDS

Distribution of 42 records of P. kona, including negative reports and related statements, is shown in Table 6. The last positive record of the living species was in September 1892 when three specimens were taken. A possible observation of this species 1967 was never verified.

TABLE 6. Distribution of 42 Psittirostra kona records by decade.

1770's - 0	1840's - 0	1910's - 0
1780's - 0	1850's - 0	1920's - 0
1790's - 0	1860's - 0	1930's - 0
1800's - 0	1870's - 0	1940's - 1
1810's - 0	1880's - 4	1950's - 1
1820's - 0	1890's - 27	1960's - 3
1830's - 0	1900's - 1	1970's - 5

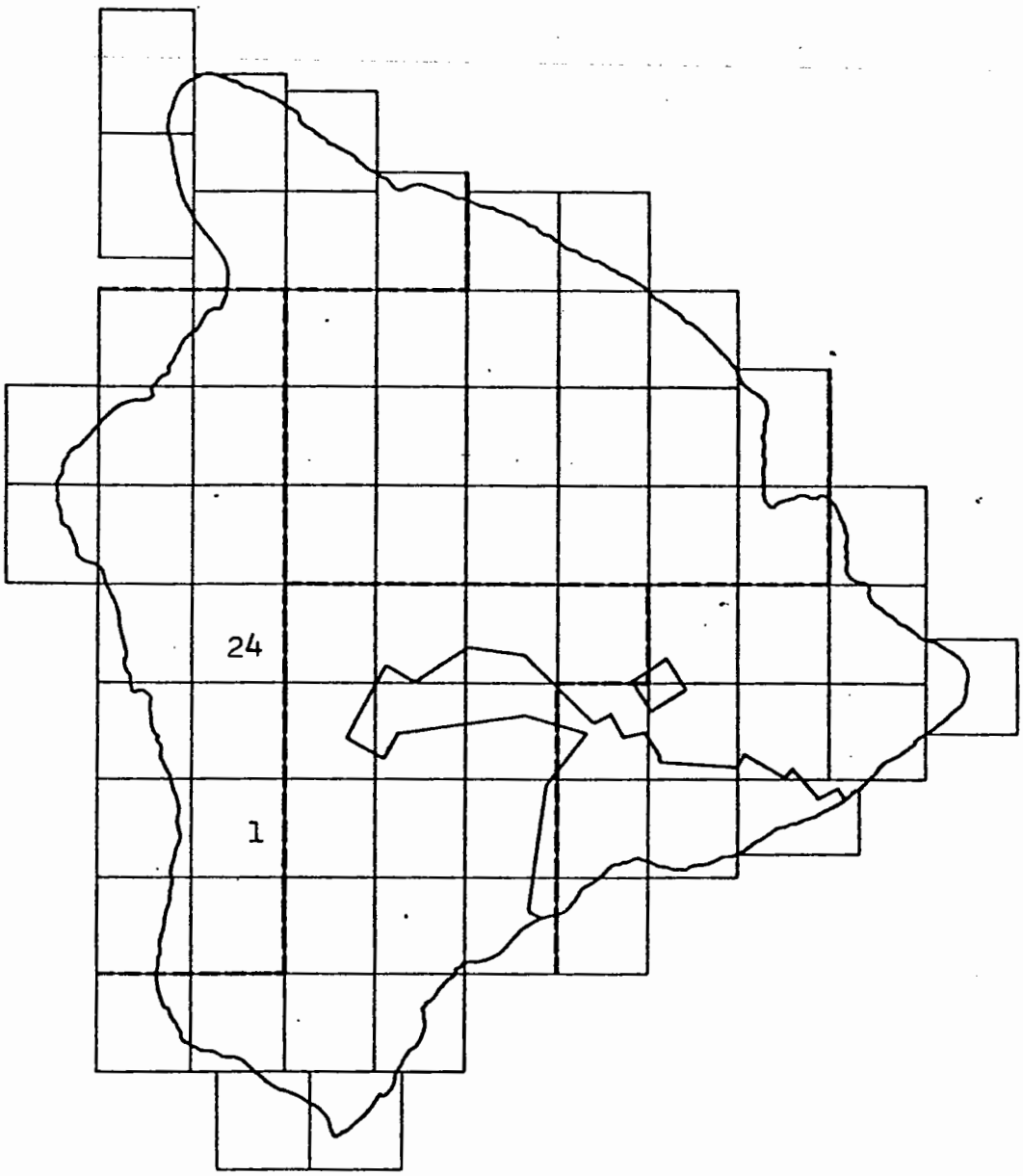
GEOGRAPHICAL DISTRIBUTION OF RECORDS

The geographical distribution of some 25 observational notes, collection records, and statements on P. kona is shown in Figure 7. The single record of P. kona in PUU POHAKULOA quadrangle refers to a pair seen by H. C. Palmer about 10 miles south of Honaunau mauka (?Ka'ohe Ranch) on 20 November 1891. This species was first discovered (1887) and last seen (1892) in PUU LEHUA quadrangle where all the specimens were collected.

SUMMARY AND CONCLUSIONS

In 1891 and 1892 P. kona was observed to range in sparse numbers locally between 3500 and 5500 feet elevation from Pulehua, North Kona, south 17 miles to Ka'ohe Ranch, South Kona District. A total of 48 specimens were collected during this early period by three exploratory ornithologists. Subsequent surveys in 1894, 1896, 1901, 1940 to 1950, 1966, and 1978 failed to uncover any sighting of this species. Psittirostra kona is therefore, almost certainly extinct.

FIGURE 7. Distribution of 25 observational notes, collection records, and statements relating to P. kona, per quadrangle, on Island of Hawai'i, 1887-1978.



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3. Perkins, R. C. L. 1892-1895 field notes.

4. Richards, L. P. 1950-1951 field notes.

5. Baldwin, P. H. 1938-1949 field notes.

APPENDIX VI

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3. Place-names are cited in original form.

4. Parenthetical information is qualified.

Psittirostra kona - Hawai'i

	Relative Abundance/Locality	Elev. (ft.	Date	Source
ISLANDWIDE INFERENCE				
1	HDFG: thought to be extinct or extirpated from this particular island / island of Hawaii		(1969)	(1)
2	no reliable records since 1896 / Kona slope of Mauna Loa		(1970)	KINW71
3	probably extinct		(1977)	ATKI77
3a	Kridler: survey teams hoped to find...but no such luck / Kau, Hamakua Coast and 311,000 acres between Hualalai and South Point, on latter some 5,800 count periods at 2900 stations on 243 miles of transects worked by 11 biologists		(Kau, 1976) (Hamakua, 1977) (Kona, 1978)	WHIH78
UNDESIGNATED LOCALITY				
4	Banko: Palmer collected 23 specimens / undesignated place(s)		Sept, Oct 1891	(2)
5	Banko: Palmer collected 1 specimen / Kona District, unspecified locality		Sept, Oct 1891	(2)
5a	Banko: Munro collected 1 specimen / undesignated locality		(1891-1892)	(2)
6	Banko: Perkins collected 1 specimen / undesignated locality		June-Sept 1892	(2)
7	Banko: Perkins collected 1 specimen / Mauna Loa	4000	June-Sept 1892	(2)
8	Banko: Perkins collected 1 specimen / Kona District, Mauna Loa	4000	June-Sept 1892	(2)

Psittirostra kona - Hawai'i

9	Banko: Perkins collected 5 specimens / Kona District	4000	June-Sept 1892	(2)
10	Banko: unspecified collector obtained 1 specimen / undesignated locality		(? 1890's)	(2)
11	Perkins: Henry Greenwell had 2 whole birds in spirits / (Kona)		1896	PERR45
MULTIQUADRANGLE				
12	not rare / Pulehua, Nawina (? Nahuina), and Honaunau, Kona (District), within a range of from 15 to 20 miles	3500-5500	12 Oct 1891	ROTW00
PUU LEHUA				
13	obtained...specimen...the only one which I have shot...only saw three...during four weeks stay / ...in the district of Kona...in a great tract of forest, consisting principally of Koa trees (Pulehua)	5000	June 1887	WILS88
14	Wilson collected 1 specimen / Pu'ulehua, Kona		21 June 1887	MUNG41
15	Banko: Wilson collected 1 specimen / Keauhou, North Kona (? Pulehua)	5000	21 June 1887	(2)
16	shot one specimen; saw two others during 4 weeks stay; extremely rare / district of Kona, great tract of Koa forest (Pulehua)	ca. 5000	(1887)	WILS93
17	Richards: Munro: found / camped at Pulehua... found almost only on the rough aa lava flows on the south side of the dairy		(1891)	(4)

Psittirostra kona - Hawai'i

PUU LEHUA

18	collected twelve...five of these were together... ten not much more than 100 yards apart / (Pulehua)		12 Oct 1891	MUNG41
19	shot as many as a dozen...and six of them during five minutes / on a big lava flow (south of Pulehua dairy)		1891	ROTW00
20	Perkins: saw a pair / vicinity Pulehua		4 Jul (1892)	(3)
21	Perkins: unsuccessful search / vicinity Pulehua		5 Jul (1892)	(3)
22	Perkins: got two specimens / on way from Pulehua to Nahuina		12 Jul (1892)	(3)
23	Perkins: collected three specimens / vicinity Pulehua		14 Jul (1892)	(3)
24	Perkins: obtained one specimen / hunted from Pulehua to Kaawaloa and return		18 Jul (1892)	(3)
25	Perkins: obtained three specimens / vicinity Pulehua		24 Jul (1892)	(3)
26	Perkins: two collected / vicinity Pulehua		25 Jul (1892)	(3)
27	Perkins: saw four / vicinity Pulehua		2 Aug (1892)	(3)
28	Perkins: one collected / vicinity Pulehua		9 Aug (1892)	(3)
29	Perkins: one collected / Pulehua to Kanahaha		10 Aug (1892)	(3)
30	Banko: Perkins collected 11 specimens / Pulehua Ranch	4000	June-Sept 1892	(2)
31	belongs / to the upper district	3000-4000	(Jun/Oct 1892)	PERR93

32	local...rare...I have never seen more than six or eight individuals...on the most favorable and exceptional days / within an area of about four square miles (vicinity Pulehua)...in the same localities in the Kona district as Rhodacanthis (P. palmeri)...rarely visits any other tree than Naeo (Naio)		(1892)	PERR03
32a	Henshaw: unsuccessful search		1901	AMAD50
33	searched for unsuccessfully / type locality		(1942,1950)	RICL53
33a	(none seen) / vicinity Pu'u Lehua		27,28 Aug 1966	BERA66
34	medium-sized finch with a large bill...green form...? Kona Finch / vicinity scrub ohia, koa, mamane, and naio forest...near gate at about 4000-3500 ft.el. on road from near Kealakekua to Mt. Hualalai		Feb (1967)	PRAT67

PUU POHAKULOA

35	Richards: Munro: Palmer saw a pair / about a mile from (Johnson's) diary...about 10 miles to the south of Honaunau mauka. (probably Kaohe Ranch, el. 5360 ft., 17 miles south of Pulehua)	6000+	20 Nov 1891	(4)