

TRIP REPORTS TO THE HAWAIIAN ISLANDS NATIONAL
WILDLIFE REFUGE

March 1961- Woodside and Kramer
Sept 1961- Woodside
Dec 1961- Kramer
June 1962- Kramer and Beardsley
Feb 1963- Kramer

assembled by George H. Balazs

REPORT ON TRIP TO NIHOA ISLAND

DECEMBER, 1961

By

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INTRODUCTION

The following is a report on the activities and observations made by Raymond J. Kramer and Gerald Swedberg, Biologists of the Division of Fish and Game, Department of Land and Natural Resources, State of Hawaii, during the period of December 9 through 16, 1961 on the island of Nihoa.

Purpose of Trip

Due to the fact that no floristic or faunistic observations have been recorded from Nihoa since the Tanager Expedition in 1923, and that this island differs so radically from the other islands composing the Hawaiian Islands National Wildlife Refuge, it was decided that a familiarization survey of this island was imperative at the earliest possible date. We attempted to examine the island for the following purposes:

1. To determine the status of the endemic Nihoa "Finch" (Telespiza ultima) and Nihoa Miller Bird (Acrocephalus kingi).
2. To observe which species of sea birds utilize Nihoa during this time of the year.
3. To determine the present status of the endemic Nihoa Palm (Pritchardia remota).
4. To determine the presence, distribution, and abundance of various species of plants and their relationship to the avian fauna in comparison to records made by members of the Tanager Expedition.
5. To establish experimental photographic stations to aid in recording later changes occurring in the vegetative pattern of the island.
6. To determine the extent of the military operation and its effect on the island.

Mode of Transportation

We are greatly indebted to the U. S. Navy for furnishing the only means of landing on Nihoa at this time of the year. We were taken to the vicinity of the island by a navy LST, and were transported on and off the flat area north of Miller's Peak by navy

helicopter. This type of landing was made possible due to the joint military operation known as HIRAN, Phase II, which is being conducted on all islands of the Refuge for the purpose of determining the correct location of all these islands.

Itinerary

- December 9 - Departed Pearl Harbor aboard LST 762 (Floyd County) at 1230 A.M.
December 10 - Left LST via helicopter at 3:30 P.M., circled island and landed near summit at 4:00 P.M. Camped here.
December 11 - Hiked to West Palm Valley. Camped overnight.
December 12 - Hiked to Miller Valley and back to Miller Peak summit camp.
December 13 - Remained at summit for collecting purposes.
December 14 - Hiked across Middle Valley to East Palm Valley, up valley to summit ridge, then back to Miller Peak camp.
December 15 - Broke camp, returned to LST at 8:30 A.M.
December 16 - Left LST off Kauai, flew to Bonham Air Force Base, Kauai via helicopter. Flew to Barbers Point, Oahu on Navy Transport, arriving at 10:00 A.M.

ACTIVITIES AND OBSERVATIONS

Vegetative Notes

In July, 1931, the Bishop Museum published Bulletin 81, entitled "Vascular Plants of the Leeward Islands, Hawaii" by E. Christophersen and E. L. Caum. Pages 5 through 7 refer to 20 species of plants found on the island at the time of the 1923 Tanager Expedition. We searched carefully for most species and have noted several changes in the ecological pattern in the ensuing 38 years:

1923

1961

1. Eragrostis variabilis

Common, especially on ridges and at valley heads; in places forms almost

"Common" but not as abundant as implied; scattered randomly throughout island with

pure stands, elsewhere, mixed with Chenopodium sandwichicum and Solanum nelsoni varieties.

no pure stands of any size; no apparent habitat preference; not nearly as common as appears in 1923 photograph; overall mixed with Chenopodium and Solanum. No seed heads.

2. Panicum torridum

Widely distributed, most plentifully in the central part; much less common than Eragrostis variabilis.

Distributed island-wide, particularly at edges of flatter open ground or rock; equally or more common than Eragrostis. Green seed heads on some in moister-appearing areas.

3. Pritchardia rasmota

In West Palm Valley....C. S. Judd counted 347 palms - omitting the small seedlings - and 168 in East Palm Valley leading up to Tanager Peak, a total of 515 palms for the island. Most of the trees on Nihoa are 7 to 10 feet high, but a few trees 25 feet high were seen.

229 Palms were counted in West Palm Valley, not counting palms under 3 ft. high. 54 trees over 3 ft. were counted in East Palm Valley for a total of 283. This reduction of almost $\frac{1}{2}$ the population appears to be due to several factors.* Most of the trees are 8 to 12 feet high with several in East Palm Valley about 20 feet high. Green seeds.**

4. Rumex giganteus

Found only at the foot of Miller's Peak at the upper end of Devils Slide.

Could not be located there. Presence doubtful now.

5. Chenopodium sandwichicum

Probably the commonest plant; grows everywhere except on the small plateau below and north of Miller's Peak; in places almost pure stands, but commonly associated with Sida fallax and Eragrostis variabilis. It grows to a height of 3 feet with stems 2 inches in diameter.

Sida and Solanum appear to be competitors today for the title of "commonest plant." Without running transects it would be impossible to say which of the 3 is most abundant; however it is now the most abundant species on plateau north of Miller's Peak. Very seldom over 2 - 2½ feet high. Green seed heads.***

6. Amarantus brownii

Most common on the ridge leading to Miller's Peak, but abundant also on the ridges to the east.

No traces of this species were found although Miller's Ridge was traversed twice. May be in dormant stage at this time of year even though all other species were very green.

7. Boerhaavia diffusa

Found only on the sand beach.

There is no sand beach at this time of year. As is common in much of Hawaii, many sand beaches wash out during the winter leaving only rocky shelves or boulders (Nihoa) exposed. This species probably is here only occasionally when seeds wash in, they sprout, and then wash out in the winter months.

8. Tetragonia tetragonioides

Rare, found only just above the sand beach and on steep rock faces west of it.

Not observed; not closely explored.

9. Portulaca lutea

Observed only in the lowermost part of Middle Valley.

Found island - wide; rarer at the highest elevations; not as common as P. caunii. Mainly on bare, rocky areas, very seldom more than 12 inches in breadth. Flowering.

10. Portulaca caunii

Same as for P. lutea.

Found island - wide at all elevations to summit. Common in its available habitat - apparently can't stand higher vegetative competition; bare loose rocks or cracks in basalt dikes. Lies flat on surface as does P. lutea. Flowering.

11. Schiedea verticillata

Seen only on the cliff west of the sand beach, and north of Miller's Peak, just below the summit.

Not observed north of Miller's Peak - existence there doubtful. West cliff not explored.

12. Sesbania tomentosa

Distributed all over the island, but nowhere in dense stands.

Unchanged. Flowering, no seed pods found.

13. Tribulus cistoides

Observed only at the foot of the ridge leading up to Miller's Peak, just above the cliff.

Unobserved; this specific area not visited.

14. Euphorbia calostroides

Common on the edge of the cliffs. Immediately below Miller and Tanager Peaks, and at the foot of the Tanager Peak ridge, it forms dense mats.

Unchanged. No flowers or seeds noted.

15. Sida fallax

Found all over the island, mainly at the lower elevations; most common in the eastern part, usually mixed with Chenopodium sandwichicum to form a dense knee - high scrub.

Found island - wide, common to summit of Miller's Peak; large pure stands in eastern part; interspersed lacings of Chenopodium, Solanum, and Sida over western part. Flowering.

16. Ipomoea indica

Rare; observed in the gorge just below Miller's Peak, at the base of the pinnacle on the west cliff, and above the sand beach.

Seen at head of gorge; not noted at other areas. No flowers; stand in gorge is in shade most of day but appears very healthy.

17. Heliotropium curassavicum

Apparently limited to the sand beach and the area immediately above it.

No sand, no vegetation at area of "sand" beach, and none seen on cliff edge above beach.

18. Solanum nelsoni

vars. caumii and acuminatum

Common all over the island, growing in the Chenopodium - Sida scrub, and with Eragrostis variabilis; not found in pure stands; most common at the lower elevations.

Common island wide, to summit of Miller's Peak; west side of Miller Valley at lower elevation is nearly pure stand of Solanum. Flowering and green fruit forming. No mature berries noted yet.

19. Solanum nigrum

var. nipoense

Two plants only were observed; one on the edge of the southern cliff, about the middle of the island, and the other in the pocket of a stream bed just above the sand beach.

Not observed but may well be present.

20. Sicyos sp.

Observed only below Tanager Peak.

Several patches noted just below and south of highest Pritchardia's above West Palm Valley; mixed with Panicum, Eragrostis, and Sida. No flowers or seeds noted.

* The Pritchardia's seem to be in no danger of further decline within the next 10 or 15 years as there is ample reproduction occurring in and below all the main groves. Probably the major cause for the decline in numbers is due to the fact that the majority of the palms are crowded onto several man-made (14th century) terraces which are built across watercourses and which have water seeps just above them (which seem to

be highly charged with leached phosphates.) The terraces have a 6 to 10 inch layer of duff and detritus mixed with stones atop them and every available bit of space and probably nutrient is used to its fullest. For the most part the lesser number of palms is probably only a natural thinning stage of a long range cycle. It would appear from the location of all the palms that they require somewhat more moisture and deeper seed implantation than the other species of plants on the island. This is indicated as the main groves are immediately below continuous water seeps or directly at the foot of high basalt cliffs which act as a type of natural catchment area which concentrates a supply of moisture at their base.

There also appears to have been several heavy flash floods in East Palm Valley which scoured the lower watercourse where many palms appear in the 1923 photographs.

** More than a dozen sprouting seeds were collected (all of which were about 6 inches deep in moist humus with much guano) and these have been given to a professional nurseryman, 2 biologists, and the State nursery for propagation. Three sprouting seeds were also planted in rabbit-proof enclosures on Manana Island off Oahu in an attempt to grow seed stock.

*** A bag of Chenopodium seeds was collected and will be dried and planted in nursery flats for seed stock which may, after further deliberation with Federal officials, be planted on Laysan, which at one time harboured this species.

Nihoa "Finch" Observations

Acre for acre, this Telespiza is not nearly so abundant as the Laysan bird and if the estimate of 10,000 birds on Laysan is fairly correct, I would estimate a total population of somewhere between 800 and 1,200 birds for Nihoa's 156 acres.

Regardless of the various taxonomists arguments over this bird, the great geologic variation and consequent floristic variation apparently causes this bird to vary its

habits and activities considerably from those of the Laysan "Finch."

This race, appears a much stronger flier and is often seen fluttering and diving out over the sheer 800 and 900 foot cliff edges. In fact, a goodly portion of its time is spent in flying from one bare bluff or cornice to another where it hops on the open rocks in groups of three or four but often numbering more than a dozen around water seeps. Birds were seen in all stages of plumage coloration, from a greyish brown to vivid yellow. The brighter yellow colored birds appeared much more vivid than any of the "finches" I have seen on Laysan. No nests or eggs were found. The majority of the birds did their feeding under the closed canopy of Chenopodium, Solanum, and Sida, but no notes on food habits were made. This race sings much more than the Laysan race.

Nihoa Miller Bird Observations

This species is the most difficult of all birds in the entire refuge to find and would be extremely difficult to study. This is due to its preference for remaining under the very dense, closed canopy of Chenopodium, Solanum, and probably, Sida. In the first three days on the island only three birds were seen, one in a very thick Chenopodium patch, one on a rock next to a Solanum bush in a deeply shaded gulch at dusk, and one at early dawn in the mouth of a shelter cave we camped in. The only other Miller birds seen were at the summit camp where considerable time was spent in attempting to flush them from dense Chenopodium for photographic purposes. They remained still and hidden until nearly stepped on and then either hopped or flew rapidly to the next shrub.

For the most part they appear to be solitary in habit, but pairing appeared to be taking place. It would be extremely difficult to census these birds due to their cautious habits, but a random guess would indicate perhaps a total of 200 birds. This estimate is based upon the apparently large feeding range of those we saw plus the fact that we did not see any of these birds on the eastern half of the island despite our constant lookout for them. Very few insects were noted other than the usual hippoboscids flies around the albatross and booby colonies; and only one large species of moth, Agrotis bryani (swezy) with larvae of the "cutworm" type was found. The host plant for this larvae is unknown. The generally dry, rocky nature of the soil, plus the lack of ground creeping plants (which aid in soil moisture retention) very probably limits the food supply available to this bird. It is very possible that with the apparent decline of Bragrostis variabilis, that a particularly important food item in the form of a host specific moth larvae has also declined, hence limiting the food supply.

From gross observation it appears that the Miller bird would survive on Laysan, but prior to recommendations for such a transfer we feel the various pros and cons should be thoroughly discussed with Fish and Wildlife Service experts. In view of the low population of this species, and the apparent shift in vegetative trend towards a slightly drier environment (at least over the last 40 years), such things as threshold levels should be considered before removing any number of these birds from Nihoa, and at the same time these same factors should possibly be projected for the next decade on Nihoa. To fully explore all these possibilities it would probably be advisable to undertake another trip to Nihoa for the express purpose of studying the Miller bird. This could best be done immediately, using the HIRAN transportation facilities which will be available only for a short period in the future.

Sea Birds

The following is a list of the sea birds seen on Nihoa with brief notes on breeding status, distribution, and abundance.

Petrels and Shearwaters - None seen. The nature of the soils of Nihoa apparently limit available burrowing areas to a relatively small portion of the island. These birds probably nest more in crevices and cracks than they do in burrows. The only area that appeared to have been used extensively was on the upper western slopes of Miller Valley where burrows were excavated under most of the rocks of 2 to 3 cubic foot size.

Red-footed Booby - One main colony seen on the upper slopes of Miller Valley. Single nests scattered over the island. Pritchardia groves offer major roosting and resting areas. All young were nearly full grown and capable of flying.

Brown Booby - Relatively rare - as usual. Females were on eggs.

Blue-faced Booby - Very abundant and by far the most common of the 3 species. Paired up and from actions appeared to be starting to breed.

Frigate bird - Very abundant. Large flying young. No eggs seen. Very few males seen with gular sac inflated.

Red-tailed Tropic bird - Only 1 bird, flying high over island, seen.

Sooty Tern - Only 2 birds, soaring over northern cliffs, seen.

Necker Island Tern - Paired, often seen 3 at a time which indicates last season's young. Rest in shallow caves or cracks in cliff faces in lower sheltered valleys. None seen soaring over summit ridge. Very wary and nervous. Not too common.

Common Noddy Tern - Scattered commonly all over island, under vegetation and with eggs and downy chicks. Very antagonistic when nest approached.

Fairy Tern - Many flying immatures seen. Sheer north cliff offers nesting area to many thousands.

Laysan Albatross - Seen only on the flat north of Miller's Peak summit. 30 $\frac{1}{2}$ birds, all around the periphery of the Black-footed Albatross colony. No eggs. Much "bachelor dancing."

Black-footed Albatross - Seen only on the flat north of Miller's Peak summit. One colony only of 50 $\frac{1}{2}$ birds, nesting in the only brushless, soil covered area on this flat. Many of these birds were incubating eggs.

Migratory birds - Approximately 12 Golden Plover were seen. Could be approached very closely. About 5 Turnstones were seen also.

Photographic Stations

Prior to visiting the island we had planned to set up permanent photo stations as had been done on other islands of the refuge. Once ashore, we realized the impracticality of this procedure for Nihoa. We did set up two 3-stake stations, photos of which will be seen in the appendix; we abandoned further efforts due to several factors. First, the

vegetative complex, as already described, is so randomized and in general, consistent, that there was no obvious zonation as is found on the atoll type islands farther north. The photographs taken would have to be enlarged to a greatly increased size if they are to show species composition variation over a period of years, and then they would be valid for only the small area between the stakes since it is impossible to distinguish between various types of Solanum, Sida, and Chenopodium at a distance on black and white photographs. Secondly, the terrain of the island is such that it is almost impossible to get camera angles on a three-stake layout that will work without sacrificing things of possible ecologic importance for good photographs.

OPERATION HIRAN

On landing on the island we found a military layout of four tents and one portable antenna on the plateau north of Miller's Peak. Two air force technicians and two army technicians had been living here for about two weeks. In general the camp was well organized and set up in a minimum of space. Only a few pairs of Masked Boobies were displaced by the camp but they moved a few yards and re-established territories. The personnel were relatively disinterested in the birds and made no attempt to molest them. Although these people had no weapons, a number of empty shotgun shells and what appeared to be small "line throwing" shells were found on the summit of Miller's Peak. These appeared to be less than a year old. One soldier's towel was found lying outside the tent with six Cenchrus sp seeds stuck to it. These were probably picked up accidentally on Midway. The seeds were burned, but this incident once again points out the necessity for a simple information brochure to be passed out to all people landing on the islands, telling them in layman's language of the importance of the islands and the effect that changes in the ecology could have upon the bird populations. To my knowledge this is the third introduction of exotics into the Refuge by the military in the last year.

Conclusions and Recommendations

From observations made, it can be concluded that:

Vegetation

Vegetative changes point to a relatively dry period during the past 38 years with occasional flash floods having occurred. Whether these conditions were "freaks of nature" or are cyclic is not known. If these conditions continue, the Nihoa Miller bird population could be affected adversely.

Pritchardia Palms

There has been a noticeable decline in this endemic species, due most probably to overcrowding of the available habitat. However, new growth is occurring constantly and the species appears to be in no danger of becoming extinct.

Nihoa Finch

*darker
Miller*
This bird seems to be thriving at an optimum level. In view of apparently brighter plumage coloration, difference in song, and daily habits, it very definitely should be considered on the sub-species level and appropriate consideration should be given to prevent its possible extinction or possible hybridization with the Laysan sub-species through Man's error.

Nihoa Miller Bird

This species is basically quite rare and definitely warrants further investigation of its life history and in particular, its food habits and territorial spatial requirements.

Careful thought should be given to the possibility of establishing a population of these birds elsewhere to eliminate the danger of extinction.

Sea Birds

No shearwaters or petrels were noted; the most abundant species appeared to be Frigate Birds, Fairy Terns, and Masked Boobys.

Photographic Stations

Two stations were set up. Both are considered relatively useless due to relative lack of vegetative zonation, inability of the black and white photographs to be useful for distinguishing species, and awkward photo angles available.

HIRAN Activities

The physical presence of people and equipment is negligible in effect but accidental introduction of exotics could prove disastrous on such a small, relatively uniform area.

Recommendations

It is recommended that:

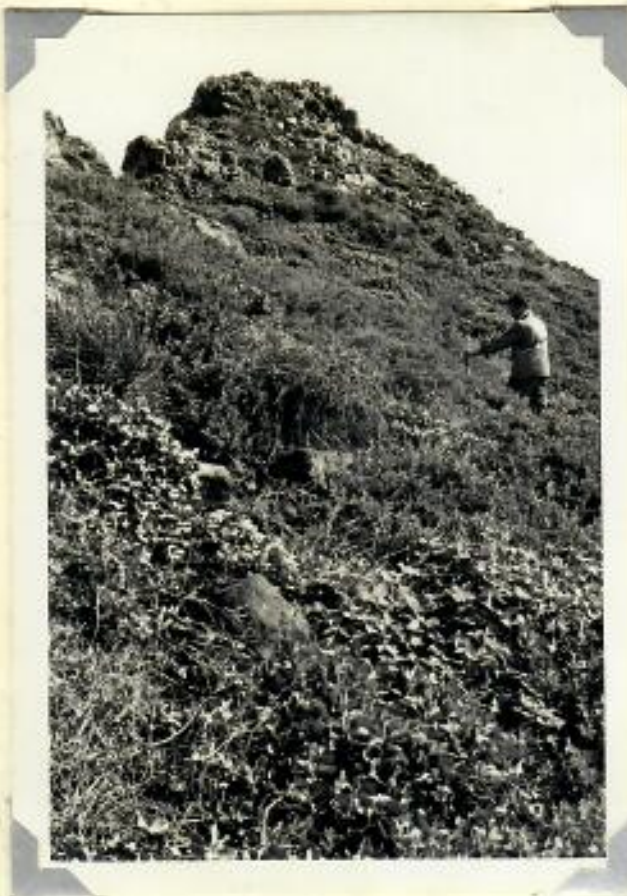
1. An entomologist familiar with plant host relationship studies be invited to participate in any future expedition.
2. A more intensive study of the Nihoa Miller bird be made in order to ensure its continuing survival.
3. Another expedition be made to Nihoa in the near future in order to utilize the facilities of the HIRAN ship and helicopter. If it were decided to transplant Miller birds to Laysan, the ship schedule could probably be worked out to go directly to Laysan from Nihoa, thus eliminating the hazards involved in taking the birds back to Honolulu for an unknown period before transfer back to Laysan.
4. A staff member of the U. S. Fish and Wildlife Service accompany Hawaii biologists on the next trip in order that they may more fully understand the myriad of problems inherent in these island populations.
5. A more specific type of permit be issued to all individuals or groups intending to land on any of these islands. Permits for military use should state (primarily for our information) when, exactly where, and

approximately how many people will be involved in operations on each of the islands. They should also include what type of facilities they will establish (how many tents, vans, antennas, etc.)

6. An information booklet or brochure be made telling in layman's language (with humour, perhaps, to hold interest) a little about each island, its birds and how to recognize them, the importance of specific types of plant life to these islands, and why it is a refuge. They could be issued not only to visitors to the islands but distributed throughout naval or coast guard vessels passing these islands for the interest of officers and crew. (We have continually noted an avid interest in what we are doing and why!)

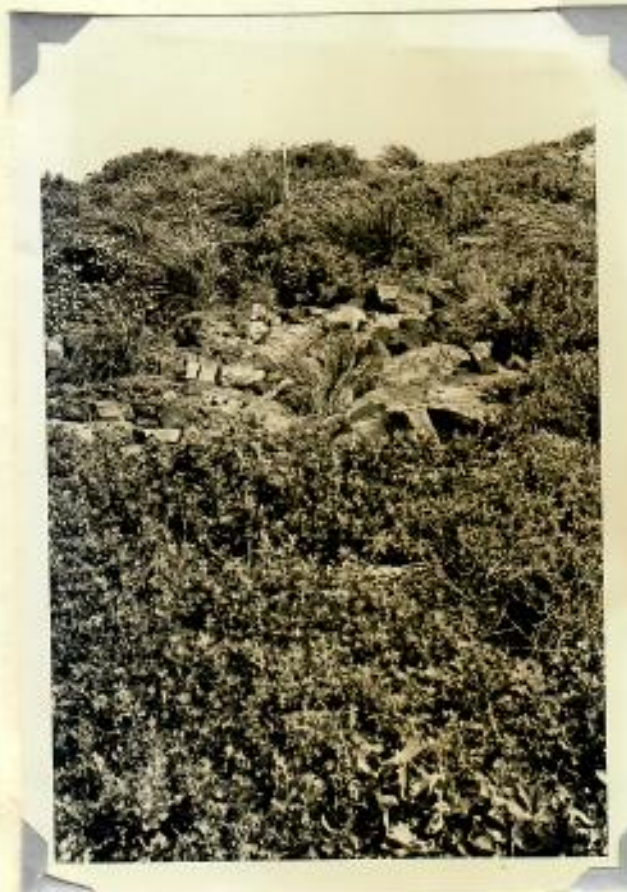
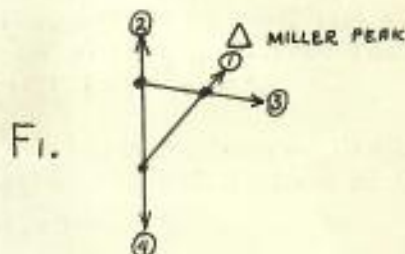
APPENDIX

NIHOA PHOTO STATIONS



F-1 series begins about 30 yards to the Southeast of the summit of Millers Peak.

F-1 (1) Sida in lower right foreground, Solanum in middle left, Eragrostis clumps above this with Chenopodium being the small leafed shrub elsewhere. Summit of Millers Peak at top of photo.



F-1 (2) Chenopodium in foreground, Solanum in extreme lower right foreground. Prostrate plant on bare area is Portulacca. Scattered Panicum at edges of opening. Looking northeast.



F-1 (3) Looking east by southeast at mixed vegetation complex. Primarily Chenopodium, Solanum, and Eragrostis. Stake in this photo is in patch of Sida fallax.



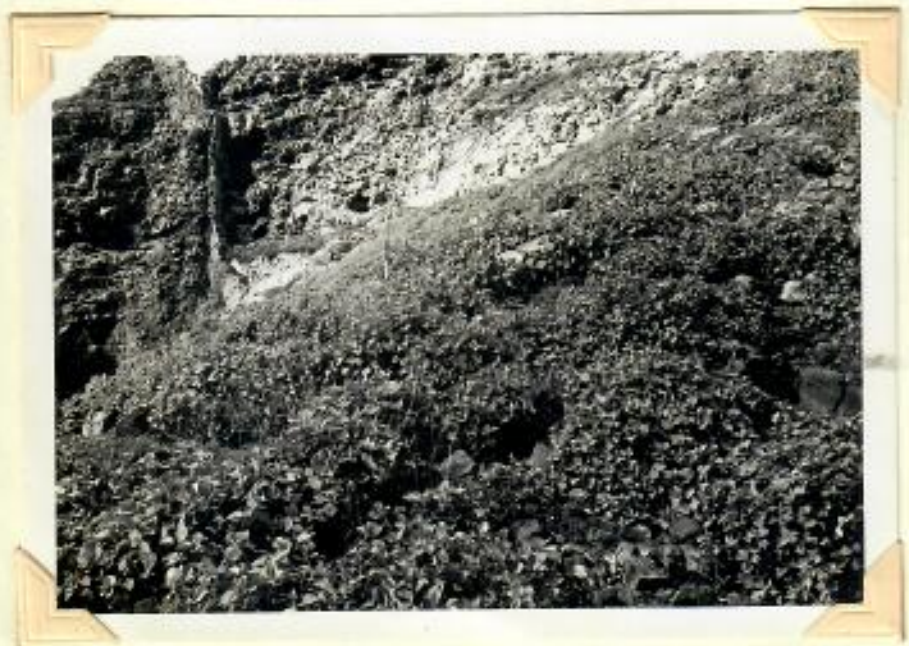
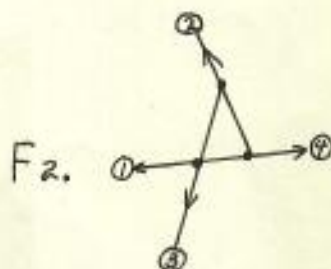
F-1 (4) Looking into W. Palm Valley, past stake where F-1 (1) and F-1 (2) were photographed from. Note grove of 35 Pritchardias at junction of arrows.

F-2 series is at 600 foot level on crest of ridge between W. Palm and Miller Valleys.

F-2 (1) Majority of broadleaf plants seen here are Sida. Chenopodium is small-leaf plant in lower right foreground.



△



F-2 (2) Sida dominates. Some Portulacca at rocky openings. Note dike for reference.



F-2 (3) Approximately 20-25 feet beyond stake on ridge crest are invading stands of Panicum torridum. Vigorous Portulacca growth is seen in lower foreground. Sida predominant shrub. Looking south.



F-2 (4) Sida dominant with some Chenopodium. Portulacca in foreground among rocks. Looking northwest.



NIHOA IS.
1 IN. = 500 FT.
MAP + ELEVATIONS
REVISED

NIHOA
1 IN. = 500
MAP + ELEVATIONS
REVISED



N.
(mno.)



