

COOPERATIVE NATIONAL PARK RESOURCES STUDIES UNIT

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(Final Report)

Clifford W. Smith, Unit Director

REPORT OF THE KĪ-PAHULU BICENTENNIAL EXPEDITION

JUNE 26 - 29, 1976

September 1976

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Abstract

An expedition through Kī-pahulu Valley was organized to evaluate the frequently implied negative environmental impact of the 1967 Kī-pahulu Valley Expedition. On the 1976 expedition four people trekked down through the valley from June 26 through 29, along the 1967 Expedition route, where possible. There is little evidence of the 1967 expedition remaining in the valley. The trails are difficult to locate and the campsites are recognizable only to those people who were on the expedition. There is no evidence of weeds being introduced into the valley along the 1967 trails. There is serious pig damage in the area between Basecamp 1 and Pali-kea.

A. Introduction

The purposes of this expedition were to retrace the path of the 1967 Nature Conservancy expedition; to assess the status of exotic plants along the expedition trails and elsewhere in the valley; and to attempt to ascertain if the 1967 expedition had played a significant role in the dispersal and/or establishment of exotic plants in Kī-pahulu Valley.

Expedition members were:

Terry Lind, NPS, guide (a member of the trail crew for the 1967 expedition);

John Kjargaard, NPS;

Charles Lamoureux, Professor of Botany, U.H.

(a member of the 1967 expedition);

Lani Stemmermann, Graduate Assistant in Botany, U.H.

B. Route of the expedition

June 26, 1976: The members of the expedition left Pali-kū Cabin in Hale-a-ka-lā Crater early in the morning, climbed the Lau-'ulu Trail to Pōhaku-pālaha, proceeded along Ka-lapa-wili Ridge through the *Deschampsia* grassland, and down the central ridge of Kī-pahulu Valley to the site of Basecamp 3 of the 1967 expedition at about 6500 ft. (2150 m). We arrived at midday and spent the afternoon exploring the vicinity of Basecamp 3.

June 27, 1976: We left Basecamp 3 in the morning and proceeded down the valley. The trail soon became indistinct and we spent much of the day looking for the trail while

making our way generally downslope, in and out of gullies, up and down ridges. Progress was hampered by fog and light rain which fell all day. Thus we were unable to obtain compass bearings on prominent landmarks, and could not determine our precise location. We camped at about 5400 ft. (1650 m).

June 28, 1976: Another day spent moving generally downslope through the fog, trying to locate the main ridge running down the center of the valley. On half a dozen occasions we came upon indications of the trail--an old blaze on a tree, a fallen log which bore old machete cuts, etc.--but we were never able to follow the trail for more than a few meters before losing it again. After losing much time in these futile searches for "the trail" we moved out in its general direction using compass and altimeter as guides. We camped at about 4300 ft. (1400 m).

June 29, 1976: Shortly after leaving camp we made our way on to the main ridge which runs down the center of the valley and along which the 1967 trail was located. The trail was generally locatable by old blazes and machete cuts, and was even more clearly defined by the fact that from this elevation to the mauka base of Pu'u Pali-kea at 2100 ft. (700 m) the trail runs right along the top of the steep cliff which separates the northeast and southwest halves of the valley. Consequently we were able to make rapid progress, even though the weather was bad with almost continuous rain. We must have passed within 50 meters of Basecamp 2, but we were unable to identify the site positively. We reached

Basecamp 1, at 3100 ft. (1000 m), at about 1030 hrs. and continued along the route of the 1967 trail to the pastures at the makai base of Pali-kea where we arrived in midafternoon.

C. Conditions at Basecamps

1. Basecamp 3. There is some trash (cans, bottles, plastic) left by the 1967 expedition, which enabled us to locate the campsite. Except for the trash it would have been difficult to recognize the campsite precisely. The ground cover consisted of ferns--mostly *Athyrium sandwichianum* and *Dryopteris paleacea*--forming a nearly continuous layer. In the middle of the campsite was a patch of grass about one meter in diameter, composed of the introduced *Holcus lanatus* (velvet grass) and the endemic *Deschampsia australis* ssp. *nubigena*. Both these species are common on the more open slopes just above the basecamp. It is possible that the presence of these species in the basecamp itself is a consequence of the 1967 disturbance of the basecamp site. If so it is a minor consequence, and the grasses have certainly not become dominant in the area--in fact, they are barely persisting there.

2. Basecamp 2. We were unable to locate the exact site of Basecamp 2 because we did not have time to search for any trash which was left behind in 1967. However, we were following the trail at this elevation and must have passed within 50 meters of the campsite. We saw no trace of the grass community reported from this campsite by Becking

in 1970 (excerpts included in Appendix A). Either the grass mentioned by Becking has now been replaced by a ground cover of ferns, or Becking did not correctly identify the location of Basecamp 2.

3. Basecamp 1. This site was located, and small amounts of trash were found. The area is an open grassy meadow dominated by *Paspalum conjugatum* (Hilo grass), with scattered *Metrosideros* and *Acacia* trees. This site was chosen in 1967 to be the site of Basecamp 1 since it was an open grassy meadow at that time and it was planned to use a helicopter for logistic support of the expedition. The site does not appear to have changed greatly since 1967 except that pig activity in the area is now much greater and the grass cover does not appear to be as dense as it was 9 years ago. On a subjective basis, there seems to be somewhat more *Erechtites* mixed with the grass at Basecamp 1 than there was in 1967, but no quantitative measurements were made by the 1967 expedition, so accurate comparison is not possible.

D. Conditions along the trail

1. Above Basecamp 3. In this part of the valley signs of the trail could generally be located where it follows the crest of a narrow open ridge above 7000 ft. (2300 m). Below 7000 ft. (2300 m) the ridge supports a closed forest and the trail is less evident. The trail on the upper open part of the ridge as marked in 1967 followed preexisting pig and goat trails. Terry Lind's recollection

is that these animal trails were more pronounced in 1967 than they are now and DeWreede's statement (1967, page 21) would seem to bear this out. The major weeds along this part of the trail are *Hypochaeris radicata* (gosmore) and *Holcus lanatus* (velvet grass). These are generally scattered in more open spots all over the upper slopes, and are no more abundant on the expedition trail than on animal trails, erosion scars, and other open areas. Weeds are no more of a problem in this part of the valley than they were in 1967; in fact, they may be less of a problem today (Smathers [1967] pages 66-69).

2. Between Basecamp 3 and Basecamp 2. We spent two days traversing this area, and saw essentially no weeds. We saw 2 or 3 plants of *Holcus lanatus* and a few *Hypochaeris radicata* in open spots and on rocks in stream beds, one clump of *Eupatorium adenophorum* (Maui pā-makani) and a little *Prunella vulgaris* (Selfheal) in a rocky stream bed (see DeWreede [1967] page 18). These plants were as frequent off the trail as on it. The fact that we spent two days trying to retrace some two miles of 1967 trail, mostly without success, is fairly substantial evidence that the 1967 expedition had very minimal impact on this part of the valley. Pig signs were noted in fair amounts, especially below 5500 ft. (1800 m), but in this part of the valley native plant species, primarily *Carex alligata*, occupied old pig wallows and swampy spots.

3. Between Basecamp 2 and Basecamp 1. Exotic plants gradually become more common in kinds and numbers as one moves downslope in this part of the valley. Several species were first noticed at about 4000 ft. (1300 m)--*Rubus rosaefolius* (thimbleberry), *Erechtites valerianaefolia*, *Cuphea carthagenensis* (puakamoli), *Paspalum conjugatum* (Hilo grass), and *Sacciolepis indica* (Glenwood grass). These occurred along the route of the expedition trail--they occurred in similar numbers in pig disturbed areas and along pig trails. Since pig signs were seen all along the route of the expedition trail, it is impossible to distinguish the short-term effects of the expedition from the long-term effects of pigs in determining relative responsibility for current weed distribution along this trail.

The part of the valley above about 3200 to 3500 ft. (1050 to 1150 m) does not seem to be of greatly different appearance than it was in 1967. Below this elevation it is dramatically different (see part 4). While there is a gradual increase in exotic plants as one approaches lower elevations, there is a considerable increase in amount of pig damage just above Basecamp 1. Between 4000 and 3200 ft. (1300 and 1050 m) the introduced *Paspalum conjugatum* gradually replaces *Carex alligata* as the plant which occupies old pig-disturbed wet sites. By 3200 ft. (1050 m) there are extensive grassy areas dominated by *Paspalum* with scattered *Erechtites*.

4. Between Basecamp 1 and Pu'u Pali-kea. The effect of pigs in this area is as pronounced as we have ever seen.

In 1967 Basecamp 1 was placed in an open grassy area dominated by *Paspalum conjugatum*. While this plant was described then as "Common in disturbed wet areas to above 4000 feet" (Lamoureux [1967] page 33), and as common in "areas which seem to have standing water on them for a large percentage of the time" (DeWreede [1967] page 15), it was not nearly as abundant as it is now. In 1967 the site of Basecamp 1 was the only such open area of more than a few square meters extent above about 2500 ft. (800 m) and there were only 2 or 3 such areas along the trail below this elevation. In 1976 dozens of such open areas were found, and the entire ridgetop from just above Basecamp 1 to the mauka base of Pu'u Pali-kea has been transformed into an enormous pig wallow. In this part of the valley every step we took was in mud at least ankle deep. *Paspalum conjugatum* is the dominant ground cover throughout the area. It is impossible to determine what the effects of the 1967 expedition were in this area--any effects have long since been masked by the effects of pigs. It would seem that there has been a great increase in the pig population in this part of the valley since Kī-pahulu became a part of Hale-a-ka-lā National Park and hunting stopped. In retrospect, it also appears that much of the disturbance attributed to the 1967 expedition by Becking in 1970 could instead be interpreted as pig disturbance.

The increase in *Paspalum* has been accompanied by a decrease in native ground cover species--largely such ferns

as *Athyrium sandwichianum* and *Asplenium* spp. We did not have time to survey carefully the situation in regard to reproduction of native woody plants, but in such pig-disturbed areas as this there is generally a reduction in numbers of tree seedlings and saplings of native species, and such seems to be the case here.

A further problem with exotic species concerns the spread of *Psidium cattleianum* (strawberry guava) into the valley. It is difficult to estimate how much this has spread since 1967, but it is much more common between 2000 and 3000 ft. (650 and 1000 m) than it was in 1967. Unfortunately, careful notes were not made of its distribution in 1967. Lamoureux (1967, page 41) indicated merely "Observed only, up to about 2200 feet" and Smathers (1967, page 61) indicated that the species was one of the dominants in the lower story of the forest in the lower part of segment 2 of his vegetation profile (at perhaps 2000 ft. [650 m]). The plant is now spreading rapidly and thickets of young trees occur up to at least 3000 ft. (1000 m). We suspect that pigs may play a role in its spread, both in carrying seeds and in removing competing vegetation, but this is only a suspicion and the evidence remains to be assembled. In any case, the spread of strawberry guava is likely to be a matter of some concern to park managers over the next several years.

E. Miscellaneous observations and comments

1. This was not planned as a collecting trip but we did note each higher plant species we saw, and checked it against the Lamoureux (1967, pages 24-48) and Henrickson (1971) lists. Only two new records were obtained, with a possible third one.

- a) BEGONIACEAE, *Hillebrandia sandwicensis*, pua-maka-nui.

One small seedling found on a stream bank at 6000 ft. (2500 m)

- b) CAMPANULACEAE, *Clermontia tuberculata*.

Two shrubs growing in a small gulch at about 4500 ft. (1500 m).

- c) PIPERACEAE, *Peperomia* sp.

A *Peperomia* with very large fruiting spikes was collected at about 4000 ft. (1300 m). It may represent a new record or may be merely an extreme form of one of the already known species.

2. We could find no indication of any recent visitors or trespassers in the valley. It is possible that some people have entered the top of the valley and descended a short way, and that others may have entered the bottom and ascended as far as perhaps Basecamp 1, but we found no real evidence of this, and it is almost certain that no one has traversed the valley in some years.

3. Without attempting to understate the fragility of the valley (the area between Basecamps 2 and 3 is as pristine as any area in Hawai'i and all steps should be taken to

maintain it that way) it seems possible that total exclusion of people from the valley may be a contributing factor in the increase in pig populations. In the long run the threat from pigs will probably be of greater magnitude than the threat from carefully supervised visitors. Some people will have to be allowed in to work on pig control, and it would appear that permitting limited access for scientific work which could be done only in Kī-pahulu would not pose a significant threat to the integrity of the area.

4. The current situation in the part of the valley makai of Basecamp 1 should probably be described as an emergency, and special efforts should be made as soon as possible to drastically reduce the numbers of pigs in this area, if not to eliminate them completely. Furthermore this reduction or elimination of pigs should take place in such a way that numbers of pigs do not merely move upslope into the less disturbed parts of the valley.

F. Summary of Observations

1. There is little evidence remaining of the 1967 Kī-pahulu Valley Expedition.

2. There is no evidence to suggest that the 1967 Expedition was responsible for the introduction or dissemination of weeds within the Valley.

3. There is no evidence of recent visitors to the valley.

4. Two plants are recorded from the valley for the first time. A third species has not been identified to date but it could be a new record.

5. There is considerable pig damage between Basecamp 1 and Pali-kea.

6. The spread of the strawberry guava (*Psidium cattleianum*) should be carefully monitored and steps taken to eradicate it if it spreads above 3000 ft. (1000 m).

G. Recommendations

Kī-pahulu Valley should be managed as it has been for the past several years except:

1. The pig population in the lower portions of the valley should be decreased substantially and rapidly.

2. Limited, carefully supervised access for scientific work which can only be done in Kī-pahulu Valley should be allowed.

H. References Cited

- DeWreede, R. E. 1967. A preliminary report on the ecological conditions of Kipahulu Valley, Maui. In Scientific Report of the Kipahulu Valley Expedition, edited by R. E. Warner. pp. 9-22.
- Henrickson, J. 1971. Vascular flora of the northeast outer slopes of Haleakala Crater, East Maui, Hawaii. 14 pp. Contributions from the Nature Conservancy #7.
- Lamoureux, C. H. 1967. The vascular plants of Kipahulu Valley, Maui. In Scientific Report of the Kipahulu Valley Expedition, edited by R. E. Warner. pp. 23-52a.
- Smathers, G. A. 1967. A preliminary survey of the phytogeography of Kipahulu Valley. In Scientific Report of the Kipahulu Valley Expedition, edited by R. E. Warner. pp. 55-86.

I. Acknowledgements

We would like to thank Ms. Deborah Weiner for typing the manuscript and Dr. C. W. Smith for editorial assistance. Special thanks go to Terry Lind--without his keen sense of direction we might still be wandering through the Kī-pahulu forest--and to John Kjargaard, for their assistance and companionship in the field.

APPENDIX A

UNITED STATES GOVERNMENT
Memorandum

DATE: 2/22/76

TO :Superintendent and Crater District Ranger

FROM :Kipahulu District Ranger

SUBJECT:Draft reply to Dr. Smith's letter regarding exotic introductions by the 1967 Kipahulu Valley Expedition

The possibility of exotic plants being spread by the 1967 Nature Conservancy Expedition first came to our attention in 1970 when Park Ranger Larry Guth followed the expedition's trail down through the valley. He reported that exotics are found all along the trail and that fireweed (Erechtites sp.) could almost serve as a trail marker and indicates very clearly where the campsites were.

Later that year, Dr. Rudolf Becking, a forestry consultant and professor at Humbolt State College in California accompanied then Kipahulu District Ranger Tom Vaughan up to the 5,000 ft. level of the valley. They made observations along the trail and at the sites of the lower two basecamps. The following are quotes from Becking's report:

"The grass, Paspalum conjugatum dominates with other immigrants into this indigenous forest and disperse themselves also along the pig trails like Stachyarpheta jamaicensis, Jussiaea suffruticosa, Erechtites valerianaefolia, Eupatorium adenophorum, and the indigenous Carex alligata and Machaerina angustifolca. These grass communities have spread themselves widely around the former basecamp sites and along the trails towards these basecamp sites suggesting not only dispersal by pigs but also dispersal and/or introduction by man."

"Entrance of man in large parties and expeditions is another threat to these already weakened forest communities. Clearance of large areas for camp sites, cutting of wide packing trails and the frequent necessary supply of such large camps further introduces new weeds

and exotics into the forest. At present, one has no difficulties in finding the 1967 expedition's trails because they are already well marked by such trail vegetation as Rubus rosaeifolius, Holcus lantanus, Machaerina angustifolia, Dicranopteris linearis, Psidium cattleianum, Lycopodium cernuum while one large Eucalyptus robusta tree was found at the 2,500 ft. level along the trail of the pali."

It was recommended by Vaughan and Becking that future expeditions into the valley be limited to small parties.

This past year John Kjaargard inspected the trail up to about 2,400 or 2,500 ft. and reported he could detect no significant difference in the type of vegetation found on the trail with that found off the trail. It must be emphasized however, that he did not get very far up into the forest and did not reach the 1st basecamp at 3,100 ft.



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Cooperative National Park
Resources Studies Unit

Pacific Environmental Research
and Training Programs

February 9, 1976

Mr. Dave Dunatchik
Chief Ranger
Haleakala National Park
P. O. Box 537
Makawao, Maui, Hawaii 96768

Dear Dave,

I have been discussing Kipahulu Valley with several people in an attempt to propose as many alternatives as possible for a possible R.B.I. Several times comments have been made, as per the attached letter, that the Nature Conservancy Expedition had introduced weeds which were causing the National Park some problems. Is this in fact the case? I really need to know because if true that type of approach will probably be unacceptable to you.

Hope all's well with you in this inclement weather.

Yours,

C. W. Smith
Associate Professor of Botany
Director, CPSU/UH

Att.



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November 5, 1975

Mr. Tom K. Tagawa
State Forester
1179 Punchbowl Street
Honolulu, Hawaii 96813

Dear Tom:

Since I have been involved in review of various EIS and Negative Declaration materials at The University Environmental Center, Doak Cox has shared with me your letter to him of October 23. Doak will be sending you his reply on behalf of The Environmental Center, but I would like to reply to you directly on certain statements you have made about Kipahulu Valley, in an effort to set the record straight.

Your letter refers to a trail cut in Kipahulu in 1969-70 "in the name of science and research" "which is causing the National Park problems due to invasion of noxious weeds". To the best of my knowledge the only recent expedition which involved cutting trails in Kipahulu was the 1967 expedition sponsored by The Nature Conservancy. Several U.H. faculty members and students participated in the expedition, at the invitation of the Conservancy, and the purpose of the expedition was to determine the suitability of Kipahulu for inclusion in the National Park System. No EIS was prepared since, in 1967, there was no requirement for an EIS. I suspect that in 1967 in Hawaii there had never been serious consideration given to a requirement for EIS preparation for any project.

Since I was a member of the 1967 Kipahulu expedition I am familiar with the activities of the expedition and with the state of the valley as we found it. Our expedition did cut trails in the valley--the work involved largely cutting branches of shrubs and fronds of tree ferns, and flagging the trail with plastic tape (which was removed at the end of the expedition). No digging or excavation was involved. The sorts of trails we made were those which would quickly become overgrown when they were no longer used regularly. In fact, in November 1967, 3 months after the expedition, Robert De Wreede, one of the botanists who had spent a month

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walking these trails, returned to the valley and was unable to reach the area he wanted because the trail had become so overgrown he could not locate it and follow it for any distance. Thus, I find it difficult to believe that these trails are "causing the National Park problems due to invasion of noxious weeds."

There were already weeds present in Kipahulu when the 1967 expedition entered the valley. In the central part of the valley these species were most common in areas where pigs had been rooting or wallowing and along pig trails. Enclosed is a page from my summary statement which appeared in the "Scientific Report of the Kipahulu Valley Expedition" issued by The Nature Conservancy in 1968. (If you do not have a copy of this report I would be glad to send you one on request.) The marked paragraph gives my assessment of the weed problem in the valley as we found it. The full report gives more detailed information, but the major weeds in the central part of the valley were Hilo grass (Paspalum conjugatum), glenwood grass (Sacciolepis indica), thimbleberry (Rubus rosaefolius), puakamoli (Cuphea carthagenensis), hino hana (Erechtites valerianaefolia), and Maui pamakani (Eupatorium adenophorum). All of these species were relatively common in pig-disturbed areas in 1967. Certainly any time anyone walks through a forest there is the possibility that he or she is contributing to the spread of weeds. However, to the best of my knowledge there is no evidence which indicates that the 1967 expedition caused any measurable change in the noxious weed numbers or distribution in Kipahulu. If you have such evidence would you please provide me with a copy of it, so that the information will be at hand should it become necessary to prepare an EIS for some future expedition. Thank you for your attention to this matter.

In the same letter to Doak Cox (last paragraph of the first page) you call attention to the threat to native fauna and flora from scientific collectors. I am in agreement with you that this could pose a real problem, and would urge that D.L.N.R. continue to exercise control as it has in the past by means of a permit system. In this regard, however, the example you have chosen is not very appropriate. It seems that you are referring to collections of a new genus of birds discovered on Maui in 1973. I am enclosing copies of relevant pages from the scientific paper in which this bird was described. This publication indicates that the two specimens collected were collected by a D.L.N.R. employee after appropriate authorization to make the collection was granted by D.L.N.R. I do not know if a formal EIS was prepared, but obviously enough information was supplies to D.L.N.R. to allow it to make a judgement and issue permission to make the collection.

Mr. Tom K. Tagawa - 3
November 5, 1975

I hope you will accept these comments as an effort
to clarify the issues involved.

Sincerely,

Charles H. Lamoureux
Professor of Botany

Enc.

cc: Doak Cox
Office of Env. Quality Control