

**INVESTIGATION OF THE DESTRUCTION OF WEKIU BUG HABITAT ON MAUNA KEA DUE TO CONSTRUCTION ACTIVITIES RELATED TO THE JAPANESE NATIONAL LARGE TELESCOPE (SUBARU) AND THE GEMINI TELESCOPE**

Fred D. Stone, PhD

26 May 1996

On 4 May, 1996, members of the Mauna Kea Advisory Committee, including Nelson Ho, Deborah Ward, Cathy Lowder and I, visited the summit of Mauna Kea to inspect the construction of various telescopes. Since my work on the summit EIS in 1982, I have visited the summit nearly every year to determine whether the construction activities are impacting the habitat of the Wekiu Bug, *Nysius wekiuicola*. Previously the prime *Nysius* habitat, the inner craters, had been relatively undisturbed. On this trip, it was evident that the entire inner crater of Pu'u Hiau Oki, adjacent to the Keck I and II and Subaru telescopes had been filled, levelled, and the crater walls cut. The surface of the filled and levelled crater had been scored or raked, leaving parallel ridges. The crater ridge and side opposite to the Subaru telescope was levelled, and construction trailers were still located on the crater rim. It appeared that the entire inner crater had been used as a staging area for the telescope construction. The crater rim, much of the inner walls and the floor had been compacted. These activities have destroyed the loose cinders, essential habitat for the Wekiu Bugs. (See photos #1-4)

Also, the access road along the Wekiu summit ridge, adjacent to the Gemini telescope, had been moved over a full road width, and the outer slopes of the ridge covered with fill, also impacting prime *Nysius* habitat. (See photo #5)

Since the recommendations of the 1983 EIS (see below) and the 1983 and 1987 Complex Development Plans (see below) had specifically give as a condition for development that damage to the prime *Nysius* habitats will be minimized, serious questions arise as to whether Subaru had been permitted to carry out construction-related activities in the inner crater, or whether these were unpermitted activities? If the DLNR did permit these activities, why did they do so? (See the CDUP cited below). Finally, what needs to be done to ensure that further careless construction does not continue to destroy important areas of the summit ecosystem?

On 11 May 1996 I wrote to Mike Wilson, reporting the damage to the Wekiu habitat and asking for answers to these questions. I also telephoned the IfA to find out whether permission had been given for bulldozing the inner crater of Pu'u Hiau Oki, and talked to Bob McClaren. He insisted that no bulldozing had been done to Puu Hiau Oki crater floor. When I insisted that it had been done, and that I had photographs to prove it, he became irate and "terminated this conversation" by hanging up the phone. I talked to Sam Lemmo at DLNR, and asked for copies of the relevant documents, and he sent me some of the ones referred to below.

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In the following section, I have attempted to list the relevant portions of several documents. In some cases, I have cited only the most relevant parts of the references, but I have listed the document and page so the reader can refer to the full text. My comments are italicized.

#### WHAT WAS PERMITTED UNDER THE CDUP FOR THE SUBARU TELESCOPE CONSTRUCTION?

**I. CDUA for Use of a 5-Acre Site within the Mauna Kea Science Reserve for the Japan National Large Telescope, Appurtenant Structures and Associated Infrastructure; temporary Accessory use of a Portion of the "Skiers' Parking Lot" for a Concrete Batching Plant . . . : CDUA NO. HA-1/18/91-2462 (Relevant pages and site map attached)**

The site plan (fig. 19) shows the proposed 5 acre site. The plan shows an area 330 X 660 ft. lying on the ridge and west inner wall of Pu'u Hau Oki crater. The telescope enclosure is located on the crater ridge at 13,580 ft. elevation. An access road runs north from the telescope along the crater ridge. A control building and heat exhaust outlet parallel the access road on the inner slope of the crater. No construction is shown for the inner crater itself, below 13500 ft. The center, eastern half, and northern slope of the inner crater are outside of the 5 acre site plan.

The list of construction activities (p. 10) includes modifications only to the areas within the site plan map. *The following is a partial list:*

- removal of about 10,900 yards of material from the telescope site at 13,580 ft.

- Excavation of pathway between the control building and the telescope, heat exhaust duct, spur road, structural foundations, utility trenches, wastewater disposal system and fuel storage.

*Nothing is said about excavation outside the site plan.*

- Placement of excavated material along the outer edges of the telescope pad, along the access road, and in the control building area.

*Nothing about placing excavated material in the central crater area, or outside of the 5 acre site.*

- Grading and filling to provide a level area for construction of the telescope and control building; grading and filling of the spur road; grading and leveling of the parking areas and other on site excavations when installation is completed.

*Nothing is stated here about grading and filling of crater areas outside of the area mapped on the 5 acre site.*

In the following section, I have attempted to list the relevant portions of several documents. In some cases, I have cited only the most relevant parts of the references, but I have listed the document and page so the reader can refer to the full text. My comments are italicized.

## **WHAT WAS PERMITTED UNDER THE CDUP FOR THE SUBARU TELESCOPE CONSTRUCTION? A**

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II. DLNR approval the CDUA, HA-4/18/91-2462, Doc. no. 1866E on Sept 27, 1991, subject to these conditions: *partial list (relevant pages attached)*

1. comply with all Federal, State, and County ordinances, rules, regulations and applicable parts of Sect. 13-2-21, Administrative Rules, as amended;

2. Approval of a construction right-of-entry for the subject project elements;

4. Before proceeding . . . applicant shall submit . . . grading and construction plans and specifications . . . for approval for consistency with the conditions of the permit and the declarations set forth in the permit applications. (*DLNR did not supply me with these plans*)

6. . . . If, subsequent to the issuance of this permit, information and data (submitted by the permittee) prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked . . . and/or the Department may, in addition, institute appropriate legal proceedings;

7. That all representation relative to mitigation set forth in the accepted Environmental Impact Statement and the Mauna Kea Science Reserve Complex Development (Management) Plan for this proposed use are hereby incorporated as conditions of this approval; (my underlining)

10. That the applicant shall be held responsible for the removal of all litter from the project and surrounding areas generated from the construction and maintenance of the project;

11. That failure to comply with any of these conditions shall render these CDLU application null and void.

Signed by Dan T. Kodani for William W. Paty

III. File No: Ha-11/8/91-2509/ Doc. No.: 2083E

Request by Office of Cons. and Env. Affairs to DOCARE to conduct a field inspection of the KECK II telescope. (*Map attached*)

*The map shows that KECK I and II are constructed entirely on the ridge and upper slopes of Pu'u Hau Oki crater, and do not impact the inner crater.*

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IV. 1983 EIS: Mitigation measures made a condition of approval of the CDA's and of construction work (Item 7 of the JNLT approval listed above). (Relevant pages attached)

p. 103: *Discussion of impacts of the UC TMT, or Keck, telescope*

**Biology:** Consultants' reports concerning the vegetation and fauna in the vicinity of the project site and surrounding areas were prepared for this EIS by Bishop Museum scientists. These reports are incorporated as appendices G and H of this document.

*This statement implies that the appendices are to be consulted as part of the EIS. I have included Appendix H on the arthropod fauna.*

**Arthropods (Bugs):** The proposed UC TMT site is not located in a prime habitat for the Lycosa (spider). It is, however, a prime habitat for the Nysius. Construction activities will destroy a portion of this habitat. . . . Construction activities will be restricted to specific areas so as to minimize the extent of the disturbed area and reduce the amount of aolian habitat which may be destroyed. (my underlining)

p. 120: **FUTURE TELESCOPE DEVELOPMENT (1990s)**

**2.1 Area I, Puu Hau Oki**

Environmental impacts of locating another telescope in Area I would be similar to those anticipated by the UC TMT. Grading and excavation would be required and an access road from the UC TMT to the new telescope would have to be constructed. The amount of grading and excavation required and the alignment of the access road would be dependent upon the telescope design and the actual site.

p. 121: para. 2:

. . . The area has been identified as habitat for the Nysius bug and construction of telescopes and access roads might destroy a portion of its habitat.

*While these statements recognize that some disturbance of Nysius habitat might occur, they clearly indicate that the same guidelines should apply, of minimizing disturbance of the habitat.*

p. 123+: **D. THE CUMULATIVE IMPACTS OF ASTRONOMICAL DEVELOPMENT ON MAUNA KEA - PLANNED DEVELOPMENT TO THE YEAR 2000**

p. 125:

**Fauna:** The major impacts on fauna of the area will be on various species of resident arthropods. Most of the direct impacts will be localized and related to specific telescope sites. (Area I, the location of the proposed UC TMT, has been identified as a prime Nysius). Impacts on these species can be minimized by keeping all construction activities within

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the minimum possible defined area; preventing cinders or debris from falling downslope on the cones; insuring that wind will not disperse trash and other material outside of construction areas, keeping new road alignments to a minimum size and length; and taking precautions to prevent oil spills and. (my underlining)

p. 135+: ANTICIPATED ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES (Of road improvements)

p. 136:

Biological impacts: . . . If, after the road is designed, it appears that diversions from the existing alignment could affect undisturbed areas nearby, arrangements will be made in conjunction and in coordination with the DLNR Forestry Division for biological mitigation.

(Roads on the cinder cone are diversions from the existing alignment, and have affected undisturbed areas--therefore, the EIS clearly calls for biological mitigation).

p. 174 (Comments on overall impacts)

Fauna: the major impacts on fauna of the area will be on various species of resident arthropods related to specific telescope sites. Impacts will be minimized by keeping all construction activities within the minimum possible defined area and keeping new road alignments to a minimum size and length. (my underlining)

*The statements and mitigation measures cited above, from pages 103, 121, 125, 136 and 174 of the EIS clearly indicate that telescope construction, road extensions, and related activities are to be kept in the minimum possible area to reduce disturbance of the habitat of the native fauna, specifically referring to the Nysius bug.*

V. 1983 Mauna Kea Science Reserve Complex Development Plan: Prepared by Group 70, Feb. 1983.

VI. 1987. Mauna Kea Science Reserve Complex Development Plan: Prepared by Group 70, Feb. 1985 (Relevant pages of the 1987 plan are attached)

Also a condition for the JNLT CDUA approval (Item 7 above)

(Where the sections are identical in these two plans, I have listed the 1983 plan page number followed by the 1987 plan page number. Where they differ, I have listed the year)

p. 29/36 FAUNA Summit

. . . One true bug, a highly aberrant new species of the world wide genus Nysius, was recently discovered at the summit. the habitat of this new bug is most commonly found under large boulders and among cinders.

p. 34/42-43 PLANNING CONSIDERATIONS

1. Minimize disturbance to mountain ecosystems.
2. Locate facilities within the Science Reserve in as compact a configuration as is consistent with the technical requirements of the telescopes;

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3. Recognize biological and cultural criteria as well as physical characteristics when evaluating potential development areas;

5. Minimize disturbance to undeveloped areas by locating utility lines and visual road alignments within currently disturbed areas as far as is practical and feasible

6. Preserve Puu Hau Kea (Goodrich) and Puu wekiu (the summit cinder cone); and,

7. Insure that Lake Waiiau and the adze quarry are not compromised by nearby development.

*The Subaru telescope violated sections 1, 2, 3, and 5 of these planning considerations.*  
p. 46/54 Biological/Botanical

Figure 11 (p. 47)/Fig. 12 (p. 56) identifies the major summit habitats of two species, the Nysius and the Lycosa, a spider.

Tephra cinder cones are a prime habitat for the Nysius. These habitats are particularly vulnerable to degradation by human activities because the tephra are easily crushed during construction activities. Area I, Puu Hau Oki, is located within this habitat. (*my underlining*)

p. 55/65: Area I This is the proposed location if the UC TMT. . . . If additional telescopes are proposed for the area, it is important that appropriate mitigating measures to control erosion are incorporated into the telescope design. The area is not sensitive botanically, however, it is a prime habitat for the Nysius bug.

p. 58/70: PLANNED TELESCOPE SITING AREAS: Area A - Western Rim of Puu Wekiu

p. 59/70: . . . The areas to the north and west of the ridge and the steep slopes of Puu Wekiu are habitat for the Nysius bug. Care must be taken during construction activities to insure minimal disturbance to this habitat. (*my underlining*)

*This is the area currently being impacted by construction of the Gemini telescope, and relocation of the access road along the north and west slopes of the ridge.*

p. 60/72 Area B - Puu Hau Oki

para. 4: . . . The area is, however, a prime habitat for the Nysius bug; design and construction of facilities in Area B must recognize this fact and must minimize disturbance to the surrounding area. (*my underlining*)

*The Subaru telescope violated this specifically stated development consideration*

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## PART VII: CONCEPTUAL MANAGEMENT PLAN/MANAGEMENT PLAN

### p. 114/139: Resources to be managed/Protected

Fauna The fauna on Mauna Kea summit area consists primarily of arthropods (bugs) . . . The bugs have adapted to the stressful environment on the mountain and some species may not be found elsewhere in the State. (Refer to Vol. 2, Technical Appendices, Appendix H, draft EIS for the SRCDP).

*(Detailed mitigation measures for protection of the summit habitats are given in this appendix, relevant portions enclosed)*

### p. 125/153: Monitoring of Resources

Baseline data on archaeological sites, arthropod fauna, and flora present in the summit area of the Science Reserve was obtained during special surveys by the Bishop Museum in conjunction with the development of the SRCDP. Discussions have been held with DLNR personnel concerning the possibility of DLNR specialists periodically monitoring these resources to determine if increased human activity has led to serious degradation of the summit ecosystem. (1987 version): DLNR will establish the standards/criteria for a monitoring program. The monitoring will be conducted by DLNR with assistance from UH within UH's available staff and funding resources. *(My underlining)*

*This has never been implemented*

It is suggested that one means of accomplishing this monitoring function would be to establish photo stations from which pictures could be taken at regular intervals and then analyzed and evaluated to determine if adverse impacts have occurred. This suggestion is being evaluated and may be incorporated into this Management Plan.

*This was never implemented*

### p. 126/154: MANAGEMENT COMMITTEE

The most important requirement of an on-going monitoring system is that the data be summarized at regular intervals, (1987 version): this will be done annually and as deemed necessary, so that additional controls can be initiated before extensive damage to the environment has occurred. A management committee, (1987 version) established jointly by DLNR and UH and advisory to them, with membership consisting of representatives from DLNR and the UH should be established. This committee should meet regularly and forward their recommendations to UH for appropriate action concerning control of access and management of resources in the UH Management Areas. *(my underlining)*

*This was never implemented, and was left out of the Revised Management Plan (below). Based on the violations of the currently occurring on Mauna Kea, DLNR should seriously reconsider the need for regular monitoring and for a management committee.*

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**VI. Revised Management Plan for UH Management Areas on Mauna Kea to Include a Commercial Activities Element; File No.: HA 1573A, Apr. 25 1995. (Relevant pages attached)**

p. 1, item 6: Mauna Kea Support Services shall be instructed as to what are the prohibitions on the mountain and they shall be responsible for reporting violations of the Mauna Kea Plan to the appropriate enforcement agencies;

p. 2, item 12: When the Biological and Archaeological reports are completed, staff shall report back to the Board as to whether any modifications to the plan are warranted by things learned in the biological and archaeological surveys;

*This revised management plan clearly calls for a biological survey to determine the impacts on the biological resources of Mauna Kea. It also designates Mauna Kea Support Services as the group responsible for reporting violations. Since the filling and grading of Puu Hau Oki crater is in violation of the existing EIS and Management Plans, Mauna Kea Support Services should have reported the violations to DLNR as soon as they became aware of them.*

**DID CONSTRUCTION ACTIVITIES RELATED TO THE JNLT EXCEED THE AREA PERMITTED BY DLNR IN THE CDUP?**

Comparison of the 5 acre site of the Subaru telescope and related construction with the area cut, filled and graded shows beyond any doubt that Subaru construction far exceeded the area and extent of disturbance allowed in the CDUP. There was no mention in the CDUA of filling and grading the inner crater of Puu Hau Oki.

It is clear that Subaru violated the CDUP HA 1/18/91 2462. If DLNR approved of any additional areas for cutting, filling and grading outside of the 5 acre lease, Sam Lemmo's office at DLNR did not supply me with the documents.

**DID THE ACTIVITIES OF THE JNLT VIOLATE EXPRESS GUIDELINES STATED IN THE 1983 EIS AND MANAGEMENT PLAN?**

In its approval of the JNLT CDUA, the DLNR clearly states that work shall be subject to the conditions stated in the 1983 EIS and the 1987 Complex Development Plan (Management Plan); failure to do so shall render the approval null and void. (Doc. No. 1866E, 18 Sep 1991)

The area of prime Nyctalus habitat is clearly shown in the 1983 EIS, in Appendix H, and in the Management Plan, Fig. 11. Conditions for protection of this habitat are also clearly spelled out in the sections cited above:

1983 EIS, pp. 103, 121, 125, 136, 174, and specifically referring to App. H.  
1983 Complex Development Plan, pp. 29, 34, 46, 60, 114, 125, 126, and EIS App. H

**VI. Revised Management Plan for UH'Management Areas on Manna Kea to Include a Commercial Activities Element; File No.2 HA 1573A, Apr. 25 1995. (Relevant pages attached) i**

p. 1, item 6:1 Mauna Kea Support Services shall be instructed as to what are the prohibitions on the mountain and they shall be responsible for reporting violations of the Mauna Kea Plan to the appropriate enforcement agencies;

p. 2, item 12: When the Biological and Archaeological reports are completed, staff shall report back to the Board as to whether any modifications to the plan are warranted by things learned in the biological and archaeological surveys;

*This revised management plan clearly calls for a biological survey to determine the impacts on the biological resources of Mauna Kea. It also designates Mauna Kea Support Services as the group responsible for reporting violations. Since the filling and grading of Puu Hau Oki crater is in violation of the existing EIS and Management Plans, Mauna Kea Support Services should have reported the violations to DLNR as soon as they became aware of them.*

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1987 Complex Development Plan, pp. 36, 42-43, 54, 65, 70, 72, 139, 153-154 and App H.

These conditions state that construction activities shall be restricted to the minimum area necessary for telescope construction, roads shall be kept to a minimum length and width, and the prime Nysius habitat shall be disturbed as little as possible. The maps and text also specifically describe the inner crater of Puu Hau Oki as prime Nysius habitat. This is precisely the area cut, filled and graded by Sularu construction in violation of their CDUP.

Therefore, there should be no doubt that construction of the Subaru Telescope violated both their application and the express conditions of the EIS and Management Plan.

#### IS CONSTRUCTION OF THE ROAD ADJACENT TO GEMINI TELESCOPE ALSO IN VIOLATION OF THE CONDITIONS OF THE MANAGEMENT PLAN?

The Management Plan also clearly describes the north and west slopes of the Puu Wekiu summit ridge (the area adjacent to the Gemini telescope) as being prime Nysius habitat. It states on p. 59 Care must be taken during construction activities to insure minimal disturbance to this habitat. (my underlining)

However, the access road has been moved over a full road width onto these slopes, covering them with fill material. This is clearly in violation of the design considerations cited above.

#### COULD THESE VIOLATIONS HAVE BEEN AVOIDED?

All of this destruction of Nysius habitat could have been avoided if DLNR and IfA had followed the guidelines included in the 1983 and 1987 Complex Development Plan:

P. 125/153: Regular monitoring of activities in the Science Reserve, along with use of photo stations.

P. 126/154: A management committee to meet regularly and review the impacts as shown by the monitoring.

Since there has been no systematic monitoring or management committee, the IfA has been given a free hand to treat the mountain resources with impunity, and to violate the Management agreement with no enforcement of penalties. If this situation continues, one can predict that in the near future, there will be no unique resources left to protect.

#### WHAT ARE THE PENALTIES FOR THE VIOLATIONS THAT HAVE ALREADY OCCURRED?

The penalties for violating the CDUP are given in the permit:

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6. . . . If, subsequent to the issuance of this permit, information and data (submitted by the permittee) prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked . . . and/or the Department may, in addition, institute appropriate legal proceedings;

11. That failure to comply with any of these conditions shall render these CDLU application null and void.

**CAN FUTURE VIOLATIONS AND DESTRUCTION OF THE FRAGILE SUMMIT ECOSYSTEMS BE AVOIDED?**

The existing management plans give the means of avoiding future damage:

1. Begin the regular monitoring called for in the 1983/1987 Management Plan. This could be done by the DOCARE official as called for in the 1995 Revised Management Plan.

2. Give official recognition to the Management Committee, and in addition to DLNR, UH and County members, include concerned interest groups such as biologists, geologists, Hawaiians concerned about cultural impacts, archaeologists. The currently established Mauna Kea Cultural and Natural Resources Advisory Council should meet the criteria for a monitoring and management committee.

3. Conduct the Biological and Archaeological Surveys as called for in the 1995 Revised Management Plan. To prevent further loss of prime habitat, place a moratorium on further construction work on the mountain until these surveys are completed.

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