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**STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
Honolulu, Hawai'i**

January 11, 2013

**Board of Land and
Natural Resources
State of Hawai'i
Honolulu, Hawai'i**

**REGARDING: Annual Report
Haleakalā High Observatory Site Management Plan
Advanced Technology Solar Telescope**

APPLICANTS: University of Hawai'i, Institute for Astronomy

AGENT: Mike Maberry, Assistant Director, University of Hawai'i, 34 'Ōhi'a Kū,
Room 216, Makawao, HI 96768

LANDOWNER: State of Hawai'i, set aside by Executive Order 1987 to the University of
Hawai'i

LOCATION: Haleakalā High Altitude Observatories Site (HO) at Pu'u Kolekole,
ahupua'a of Papa'anui, moku of Honua'ula, Makawao District, Maui

TMK: (2) 2-2-007:008 and (2) 2-2-007:007 (part; staging only)

ARE OF PARCEL: 18.166 acres (HO)

AREA OF USE: 0.86 acres

SUBZONE: General

BACKGROUND

On December 1, 2010, the Board of Land and Natural Resources approved the Haleakalā High Observatory Site Management Plan for the Haleakalā High Altitude Observatory Site at Pu'u Kolekole, Makawao District, Maui..

Condition 2 of the approval reads:

Beginning in November 2012 the University will submit to DLNR an annual report summarizing any construction activities occurring at HO; Habitat Conservation Plans; Monitoring Plans for Invertebrates, Flora, and Fauna;

Programmatic Agreements on Cultural Resources; Invasive Species Control Plans and other related plans. The Report should be brief but thorough. This report should also be presented to the Board of Land and Natural Resources for the first year, and every five years thereafter.

RECOMMENDATION

OCCL is presenting the attached report as a “non-action” item on the Board’s Agenda, and has invited the permittee to give a brief presentation to the Board.

Respectfully submitted,



Michael Cain, Staff Planner
Office of Conservation and Coastal Lands

Approved for submittal:



**William J. Aila, Chairperson
Board of Land and Natural Resources**

UNIVERSITY OF HAWAII AT MĀNOA

Institute for Astronomy

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OFFICE OF CONSERVATION
AND COASTAL LANDS

2012 DEC 17 A 8:35 December 11, 2012

Mr. William J. Aila Jr., Chairperson
Board of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

Dear Mr. Aila

**SUBJECT: Haleakala High Observatory Site Management Plan
Haleakala High Altitude Observatories Site, Pu 'u Kolekole, Makawao,
Maui TMK (2) 2-2-007:008**

In accordance with Condition #2 of the Board of Land and Natural Resources approval of the **Haleakala High Altitude Observatory Site Management Plan**, the University of Hawaii is submitting the First Year Annual Report, which summarizes all construction activities occurring at HO; Habitat Conservation Plans; Monitoring Plans for Invertebrates, Flora, and Fauna; Programmatic Agreements on Cultural Resources; Invasive Species Control Plans and other related plans.

Sincerely,



Michael Maberry
Assistant Director

c: Mr. Sam Lemmo, Administrator, DLNR OCCL

First Year Report—2012

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Haleakalā High Altitude Observatory Site Management Plan

2012 DEC 11 A 8:35

Introduction to Management of the Haleakalā High Altitude Observatory Site

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

The Haleakalā High Altitude Observatory Site (HO) Management Plan (MP) was approved by the Board of Land and Natural Resources (BLNR) on December 1, 2010. Condition #2 states:

“Beginning in November 2012 the University will submit to DLNR an annual report summarizing any construction activities occurring at HO; Habitat Conservation Plans; Monitoring Plans for Invertebrates, Flora, and Fauna; Programmatic Agreements on Cultural Resources; Invasive Species Control Plans and other related plans, The Report should be brief but thorough. This report should also be presented to the Board of Land and Natural Resources for the first year, and every five years thereafter.”

Staff from DLNR’s Office of Conservation and Coastal Lands (OCCL) instructed the University of Hawai’i, Institute for Astronomy (IfA) not to submit an annual report while Contested Case MA-11-04 was pending before the BLNR. Similar annual reports are placed on the Board’s agenda as a “non-action item.” To avoid controversy about whether the IfA’s presentation to the BLNR was an ex parte communication, OCCL staff decided that the report would not be placed on the agenda of a Board Meeting before the BLNR had made a decision on the above referenced contested case. The BLNR issued its decision in the contested case on November 9, 2011.

This report summarizes activities that occurred under the MP from December 1, 2010 to November 30, 2012.

The HO MP seeks to preserve a balance within HO, in which astronomy can continue to evolve at a premier ground-based viewing location, bringing with it the associated scientific, educational and economic benefits, while protecting cultural and environmental resources and values.

Construction Activities Occurring at HO Since December 2010

Section 3.5.3.1 of the MP implements a number of measures regarding construction practices, including IfA-approved environmental training for contractors, prevention of introduction of new species during construction, protection of the endangered Hawaiian petrel (‘ua’u) residing in burrows on the upper slopes of Haleakalā, pollution prevention, dust prevention, and management of solid waste. In addition,

the IfA requires that facilities designed for construction at HO follow certain guidelines regarding obscuration of other facilities, timing of construction to avoid impacts to nesting petrels, avoiding impacts to known archeological resources, painting to blend with surroundings where possible, consideration of site plans to population centers on Maui, use of natural materials, etc. The following construction activities have occurred at HO since December 2, 2010:

Construction Activities

1. February 11, 2011-Site Plan Approval MA-11-32 (CDUP MA-2705)-Landscaping at the HO Maui Space Surveillance Complex/completed
2. September 21, 2011-Letter of Concurrence (CDUPs MA-386 and MA-3201) Renovation of existing LURE Observatory North Dome to accommodate Pan-STARRS PS2 telescope installation/underway
3. December 30, 2011-CDUP MA-3603-Commerical Off-the Shelf (COTS) Telescope Domes at the HO Maui Space Surveillance Complex/completed
4. February 21, 2012-Letter of Concurrence (CDUP MA-1240) GEODDS Dome Replacement at the HO Maui Space Surveillance Complex/completed
5. November 13, 2012-CDUP MA-3542-Advanced Technology Solar Telescope (“ATST project”)/underway

Compliance

- Construction activities listed above are undertaken in compliance with applicable statutes, ordinances, rules, regulations, and conditions of the federal, state, and county governments, and applicable parts of the Hawai’i Administrative Rules, Chapter 13-5;
- Where applicable, plans were submitted and approved;
- Where applicable, notice of commencement and completion was provided;
- Where applicable, mitigations in specific or related CDUPs were/are being adhered to;
- All construction related vehicles, equipment and materials brought to the HO site were inspected by a qualified biologist before entering Haleakalā National Park;
- Requirements set out in the Haleakalā Observatories Management Plan for Monitoring Strategies, Cultural and Historic Preservation Management, Environmental Protection of Site Resources, Construction Practices, and Facility Design Criteria were complied with including the retention of a Cultural Specialist.

Habitat Conservation Plans (HCPs)

The ATST Project obtained approval of an HCP from BLNR in May 27, 2011 and an Incidental Take License from U.S. Fish and Wildlife Service (USFWS) on November 30, 2011 to address anticipated impacts to state and federal threatened, endangered, and listed species from construction, pursuant to Chapter 195D, Hawai'i Revised Statutes (HRS 195D). The Hawaiian petrel (*'ua 'u*) is the principal species of interest in the HCP. In order to initiate and pursue the mitigation measures described in the ATST HCP, the ATST Project has had a Resource Biologist on staff since 2011, along with seasonal and permanent field technicians under his direction. Although there was no ATST construction requiring mitigation, the Resource Biologist and his team implemented a number of measures related to the long-term objectives for the HCP. These include but were not limited to:

- a) botanical and archeological surveys of the 234 acre HCP Conservation Area assigned to ATST;
- b) survey and census of burrows within that mitigation area;
- c) video monitoring of burrows in the area closest to ATST site;
- d) identification of an approved control area that will not be subject to mitigation measures;
- e) initial predator control-ungulate removal and cat trapping;
- f) reproductive success monitoring; and,
- g) formal reporting on these efforts to Endangered Species Recovery Committee (ESRC), USFWS, and DLNR in October 2010

HCP requirements for the ATST Project correspond with the requirements in Section 3.5.3.2 (2) of the MP regarding protection of the Hawaiian petrel (*'ua 'u*) from noise, vibration, burrow collapse, flight collisions, lighting, and reporting on mortality. No mortalities have been reported under the HCP.

Monitoring Plans for Invertebrates, Flora, and Fauna

For about a year before the December 1, 2010 approval of the MP by the BLNR, programmatic monitoring of invertebrates, flora, and fauna was initiated at HO. The surveys conducted pursuant to the MP at HO are part of the long-term effort to characterize floral and faunal populations at the site that may be impacted or benefit from practices and procedures at HO, and thus be more effectively conserved, protected, and preserved by adaptive management of the site.

Four programmatic invertebrate surveys were conducted within HO between December 2010 and November 2012. The first was in July 2011¹ and the second in October 2012.² The first survey in 2011 reported that insects were in higher abundance and diversity, likely due to the timing of the sampling, and

the second survey reported that the arthropods found were characteristic of the fauna at the site. During the third and fourth surveys in March³ and October 2012,⁴ several species that were observed in other years were not present, likely absent because of the timing of the sampling, weather conditions, or their rarity. No new invasive arthropods were detected. No trends in populations were detected beyond normal seasonal variation. Future surveys will be designed, at least in part, to assess any impacts on invertebrates at HO from construction activities.

Annual botanical surveys of HO were conducted in June of 2011⁵ and August 2012.⁶ In summary, the botanical specialists on site reported that there were three non-native species new to HO found in 2011. They were *Bidens pilosa*, *Foeniculum vulgare*, and *Senecio madagascariensis*. These were all pulled and had not yet set seed. These species occur in large numbers in areas below HO, so their continued arrival in the future would not be unexpected.⁵ No new non-native plant species were found at HO in 2012, which contrasts with the previous four surveys, all of which found plants new to HO. This lack of new records and apparent decline in the number and distribution of non-native species in 2012 seemed mostly attributable to recent weed control efforts. Future botanical surveys will identify any consequences from construction activities.⁶

Video and field monitoring of endangered Hawaiian petrels at HO continued throughout the 2011 and 2012 nesting seasons (March-November). The programmatic monitoring of petrel burrows in and adjacent to HO was initiated prior to the MP, and is designed to characterize changes in population from year to year and to observe and changes in nesting behavior that may be due to activities at HO. The results for the 2011 and 2012 nesting seasons are similar to prior years, with reproductive success dependent upon multiple naturally occurring environmental factors.⁷ An annual report on reproductive success of petrels at HO in 2012 is currently in preparation for the ESRC and USFWS.

Endangered species such as the Hawaiian petrel may be sensitive to noise and vibration during nesting season.⁸ To characterize noise and vibration at HO from routine on-site activities, sensors were deployed at various locations within HO during 2011-2012. The results indicated that at peak levels, typical human and vehicular traffic, maintenance activities, and observatory operations yielded vibration levels at petrel burrows closest to such activity at three orders of magnitude less than levels thought to disturb nesting. Noise at those burrows was never above ambient levels.⁹

Programmatic Agreements on Cultural Resources

The National Science Foundation (NSF), the National Park Service, the University of Hawai'i, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation signed a Programmatic

Agreement (PA). The PA established mitigation measures for the ATST project that include but are not limited to the establishment of a Native Hawaiian Working Group (NHWG), the retention of a Cultural Specialist; reserving up to 2% of the total ATST usage time for native Hawaiian scientists, when there are native Hawaiians among the pool of qualified scientists; and providing support to an educational initiative addressing the intersection between native Hawaiian culture and science. The IfA will provide this written annual report to the Board on the status of the implementation of the Programmatic Agreement, including: listing the proposed mitigations to impacts on cultural resources developed by the NHWG; the response to those proposed mitigations by the signatory parties to the Programmatic Agreement and the implementation of any such mitigation measures by the IfA.

Status of the Implementation of the Programmatic Agreement

The following summarizes the status of pertinent items under Section II- NSF’s Area of Responsibility of the PA. These items are discussed as applicable during the NHWG meetings.

Establishment of the ATST Native Hawaiian Working Group

The PA was fully executed on November 13, 2009. The NHWG first met on December 5, 2009, which was within 60 days of the fully executed date. The NHWG has met a total of seven times. The table below shows the meetings held during the reporting period.

	Date	Location
1	February 28, 2011	Mayor Hannibal Tavares Community Center, Pukalani
2	June 15, 2011	Haliimaile Community Center. This meeting was a scheduled Section 106 meeting for the Supplemental Draft Environmental Assessment and provided another opportunity for the NHWG to meet.
3	October 24, 2011	Mayor Hannibal Tavares Community Center, Pukalani
4	September 17, 2012	Mayor Hannibal Tavares Community Center, Pukalani

Implementation of Best Management Practices

Best Management Practices as outlined in the BLNR approved HO MP have been and will continue to be implemented.

Naming of HO Roads

As of September 17, 2012, the NHWG has not discussed the possible renaming of HO roads.

Retention of a Cultural Specialist

CKM Cultural Resources, LLC (Kahu Charles Maxwell) accepted the award to be the ATST Project’s Cultural Specialist on January 27, 2011. In 2012, he ordained his grandson Dane Maxwell as Kahu; and unfortunately Kahu Charles Maxwell passed away a few months thereafter. Kahu Dane Maxwell has stepped into the role as the ATST Cultural Specialist assuming all duties and responsibilities.

Possible Repainting

At the September 17, 2012 NHWG meeting, it was discussed that currently, no new technology has been developed.

Removal of Reber Circle Site #50-50-11-5443

The Reber Circle concrete ring was removed on December 3, 2012.

Hawaiian Star Compass

Craig Foltz (NSF) spoke with Nainoa Thompson. Nainoa expressed that while a star compass is a thing of value, he would not be supportive if located at Haleakalā. Kahu Dane Maxwell and the NHWG subcommittee were more supportive if a star compass were located at UH Maui College, where it would be more accessible to those who would be interested in learning about this navigational tool. A NHWG member did not want to rule out Haleakalā, but would want to look at other options and locations to support a star compass.

Required "Sense of Place" Training

All contractors and employees continue to participate in this training.

Exterior Design

As of September 17, 2012, the NHWG has not discussed the Exterior Design of the ATST.

Possible Shelter for Cultural Practitioners

As of September 17, 2012, the NHWG deferred action.

State Road 378

Under Contract to IARII, Mason Architects completed the State Highway 378 Historic Evaluation Report identifying and photographing Contributing Features of historic significance along the roadway consisting of 10.1 miles from the Crater Road junction to the Haleakalā National Park entrance. Copies of the final report were transmitted to the National Park Service (NPS) in November 2012. Based on the identified Contributing Features, a draft of State Road Historic Archival Engineering Report will be completed and transmitted to NPS and SHPD for review on 12/14/12.

Acknowledgment of Significance of Haleakala and NSF's Gratitude

No change. NSF has provided the NHWG an example of acknowledgment language. It was also noted that this item would not need resolution for a few years.

Status of Implementation of this PA Reported on Project Website

The "Status of Implementation of Programmatic Agreement" web page is available on the Internet at: <http://atst.nso.edu/node/747>.

ATST Telescope time for Native Hawaiian Scientists

Reserving up to 2% of the total ATST usage time for native Hawaiian scientists, when there are native Hawaiians among the pool of qualified scientists. Not applicable at this time.

Providing support to an educational initiative addressing the intersection between Native Hawaiian culture and science

The Division of Astronomical Sciences of the National Science Foundation funded the second year of a ten-year, \$20M award has been made to the University of Hawaii Maui College (UHMC). This brings the total amount funded to UHMC under this award to \$4M. The award is being funded, contingent upon the availability of appropriations, at a rate of \$2M annually and is being used to establish and fund programs to address the intersection of native Hawaiian culture and science, technology, engineering and mathematics. The first cadre of student participants has been recruited and UHMC has hired a Director for the program, Damien Cie, and has begun to develop the details of the program that involve student stipends, mentoring, internships, as well as training in native Hawaiian culture.

The terms of the award are such that subsequent years' funding will be contingent upon the construction of the ATST. Should the ATST not be constructed on Haleakalā, future funding would be cancelled.

Details of the award can be found at: <http://nsf.gov/awardsearch/showAward.do?AwardNumber=1135694>

Proposed mitigations to impacts on cultural resources developed by the NHWG and the response to those proposed mitigations by the signatory parties to the Programmatic Agreement the implementation of any such mitigation measures by the University

The role of the ATST NHWG is to provide consultation concerning historic property matters related to the construction and operation of the ATST Project. The NHWG meeting minutes are summarized and posted to the "Status of Implementation of Programmatic Agreement" web page is available on the Internet at: <http://atst.nso.edu/node/747>. The proposed mitigation discussed to date has been summarized in this report.

Invasive Species Control

The MP provides for active prevention of introduction of invasive species that may threaten HO site resources. The implemented practices include but are not limited to weeding of HO property, vector control for rodents, soil and erosion control in accordance with the HO Storm Water Management Plan,¹⁰ and frequent removal of trash.

Active weed control at HO has been in place since 2010. After the most recent weed removal efforts in August 2012, the biologist who supervised eradication efforts reported, "Suppression of invasive plants in the Haleakalā High Altitude Observatory of Haleakalā summit has been much advanced by weed control efforts, 2010-2012...invasive plant species now occupied an estimated 10-15% of the cover they did in 2010 when these efforts were initiated. Native plant species are definitely spreading and thriving in areas previously occupied or even dominated by invasive plant species in 2010."¹¹

With the commencement of construction of the ATST, vector control at HO will expand significantly. There will be a multi-acre grid of traps for rats, mice, cats, and other feral predators.

Summary of Activities Under the HO Site Management Plan

Numerous preventive actions, studies, surveys, and inventories were undertaken by IfA, its lessees, and contractors to monitor, protect, and preserve environmental and cultural resources at HO during the reporting period from December 2010 to November 2012. The above descriptions of programmatic activities do not include or assign credit for the many day-to-day actions by the employees and contractors at HO to preserve and protect environmental and cultural resources and values at HO. A few examples of such daily actions (and non-actions) by site occupants include:

- a) not disturbing land for any reason without consultation and guidance from a Cultural Consultant;
- b) respectful, helpful and courteous support to native Hawaiian practitioners who enter the HO site for traditional cultural practices;
- c) vigilance to keep seeds, spores, or invasive plants from “hitchhiking” on persons or personal items;
- d) parking only in designated paved areas;
- e) avoiding known archeological sites and features;
- f) care to avoid harassment or injury to endangered petrels during nesting season;
- g) not damaging or removing endangered Silversword plants; and,
- h) avoiding noise not absolutely necessary for construction or operations

It is the commitment of the IfA to use past, present, and future knowledge of the dynamic environment at HO to continually inform its site Management Plan, so that site personnel who work there can preserve a balance within HO. It is the objective of IfA to proactively provide effective stewardship of an environment where astronomy can continue to evolve to move mankind toward a deeper understanding of the Universe in which we live while ensuring the cultural and environmental resources and values of HO are protected.

References

1. Pacific Analytics, LLC. 2011. Programmatic Arthropod Monitoring at the Haleakalā High Altitude Observatories and Haleakalā National Park, Maui Hawai‘i, July 2011.
2. Pacific Analytics, LLC. 2011. Programmatic Arthropod Monitoring at the Haleakalā High Altitude Observatories and Haleakalā National Park, Maui Hawai‘i, October 2011.
3. Pacific Analytics, LLC. 2012. Programmatic Arthropod Monitoring at the Haleakalā High Altitude Observatories and Haleakalā National Park, Maui Hawai‘i, March 2012.
4. Pacific Analytics, LLC. 2012. Programmatic Arthropod Monitoring at the Haleakalā High Altitude Observatories and Haleakalā National Park, Maui Hawai‘i, October 2012.
5. Starr, Forest & Kim. Starr Environmental. 2011. Botanical Survey for Haleakalā High Altitude Observatories, June 2011, p. 9.
6. Starr, Forest & Kim. Starr Environmental. 2012. Botanical Survey, 2012 Programmatic Survey, Haleakalā High Altitude Observatories, Maui, Hawai‘i, August, 2012, p. 5.
7. Chen, Huisheng / ATST Resource Biologist. ATST Project Annual Final Report Pre-Construction Habitat Conservation Plan Actions January-December 2012, in preparation.
8. USFWS (U.S. Fish and Wildlife Service). 2011. Biological Opinion of the U.S. Fish and Wildlife Service for Construction and Operation of the Advanced Technology Solar Telescope (ATST) at the Haleakalā High Altitude Observatory Site, Maui, Hawaii. June 15, p. 71.
9. Ibid. p. 68, and ATST Weekly Status Report, June 15, 2012.
10. UH IfA (University of Hawai‘i, Institute for Astronomy) 2006. Haleakalā High Altitude Observatory, Stormwater Management Plan. Prepared by Tetra Tech, Inc. 2006.
11. Medeiros, Art. 2012. Haleakala High Altitude Observatory invasive plant control project July 2012, p.1
12. NSF (National Science Foundation). 2012. Hawai‘i Department of Health Clean Water Branch, National Pollutant Discharge Elimination System (NPDES) ATST permit number R10D933, issued October 19, 2011 and extended October 18, 2012.
13. Telescope Project, Haleakalā, Maui, Hawai‘i. Original Programmatic Agreement fully executed October 2009. Amended Programmatic Agreement fully executed February 2011.
14. Minutes of the 7th Meeting of the ATST NHWG, held September 17th 2012. On file at the ATST office.