

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

May 9, 2014

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

**REGARDING: 2014 Annual Report
Status of the Implementation of the Mauna Kea Comprehensive
Management Plan**

PERMITTEE: University of Hawai'i at Hilo

AGENT: Stephanie Nagata, Director, Office of Mauna Kea Management, 200 W.
Kawili Street, Hilo, HI 96720

LANDOWNER: State of Hawai'i; leased to the University of Hawai'i under General
Lease S-4191, with management delegated to the Office of Mauna Kea
Management (OMKM)

LOCATION: Mauna Kea Science Reserve, Ka'ohē Mauka, Hāmākua District, Hawai'i

TMK: (3) 4-4-015:009

ARE OF PARCEL: approximately 11,288 acres (Mauna Kea Science Reserve)

SUBZONE: Resource

BACKGROUND

On April 9, 2009, the Board of Land and Natural Resources approved the Mauna Kea Comprehensive Management Plan (CMP) for the Mauna Kea Science Reserve, including Hale Pōhaku and the Summit Access Road, Ka'ohē Mauka, Hāmākua District, Hawai'i

Conditions 2 and 3 of the approval reads:

- 2) That within one year of the approval of the CMP, the BOR (*Board of Regents*) or its authorized designee shall provide the BLNR in writing and in person with the following information:
 - Status of the development of each sub plan;

- Status of the development of each management action;
- 3) The BOR or its authorized designee shall continue to submit annual reports to the BLNR (in writing and in person), which shall include the items listed in condition No. 2.

This current report reflects the ongoing management actions and activities in the Science Reserve for the 2013 calendar year.

Previous years' reports are available on OCCL's website at dlnr.hawaii.gov/occl/special-projects.

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

2014 Annual Report

To the
Board of Land and Natural Resources

Status of the Implementation of the Mauna Kea Comprehensive Management Plan

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Overview of CMP Management Actions

The CMP contains 103 management actions categorized into four component plans which are further subdivided into sub-components (Table 1).

Table 1. CMP component plans.

CMP Section	Component Plan
7.1	Understanding and Protecting Mauna Kea's Resources
7.1.1	Native Hawaiian Cultural Resources
7.1.2	Natural Resources
7.1.3	Education and Outreach
7.1.4	Astronomy Resources
7.2	Managing Access and Use
7.2.1	Activities and Uses
7.2.2	Permitting and Enforcement
7.3	Managing the Built Environment
7.3.1	Infrastructure and Maintenance
7.3.2	Construction Guidelines
7.3.3	Site Recycling, Decommissioning, Demolition and Restoration
7.3.4	Considering Future Land Use
7.4	Managing Operations
7.4.1	Operations and Implementation
7.4.2	Monitoring, Evaluation, and Updates

Assigning Categories and Priorities

All of the management actions were first sorted into four categories. These categories represent time periods during which it was estimated the actions would be implemented.

Immediate	1 - 3 years
Short term	4 - 6 years
Mid-term	7 - 9 years
Long-term	10 + years

For reporting purposes in 2010 and 2011, each management action was initially assigned one of four progress status designations: **As Needed**, **Short to Long Term**, **Ongoing**, or **Completed**. For the 2012 report, the **Ongoing** category was further divided into two groups, **Ongoing** and **In Progress**, to distinguish management actions that are part of OMKM's regular responsibilities and those that require

specialized implementation. For the 2014 report, based on feedback from the Office of the Auditor, State of Hawaii, we again refined these definitions. **Ongoing** refers to activities that have established processes in place and are performed as part of OMKM's daily responsibilities. For example, processes for reporting disturbances to historic properties are established while actual reporting is **Ongoing** as necessary. **In Progress** refers to actions that require specialized implementation such as the development of policies or hiring consultants and researchers, and while efforts are **In Progress** the action or process is not yet complete.

Short to Long Term	Management action still to be implemented during its scheduled time period
In Progress	Management action that requires specialized implementation has been initiated, process is not yet complete
Ongoing	Management action is implemented and processes are in place to fulfill this requirement. The actions will continue indefinitely because they are part of OMKM's continuing management responsibilities
Completed	Management action is completed

2013 – 2014 Summary of Implementation Status

Most management actions have either been implemented or are in progress. Many actions are considered 'ongoing' as they are long term, continuous land management responsibilities. Appendix A details the implementation status with explanations for individual CMP management actions.

CMP Management Action Implementation Overview

As reported in earlier reports OMKM identified five priority categories. Efforts have been initiated in all of the categories and are described below.

Priority Categories:

- Research
- Monitoring
- Resources Management Programs
- Education, Training and Outreach
- Printed Materials & Public Forums

Research. Research efforts continue to establish baseline data. In addition to the wekiu bug, alien arthropods and botanical resources, OMKM initiated a four-year study on the status of permafrost in the summit region. Concerns about climate change places an urgency to learn more about permafrost on the summit and the potential impacts on the biota, and the natural and cultural landscapes. OMKM is also collaborating with the UH Geography and Meteorology departments to develop a sea-level to summit monitoring system to track changes in weather and climate over the long term. Data collected would be useful in monitoring long-term weather conditions and impacts on the summit ecosystem. This long-term monitoring will also evaluate altitudinal changes and impacts on ecosystems from sea level to the summit. A multi-year study of surface erosion processes in cinder cone environments, with UH Hilo Geography department, is being planned; to better understand natural erosion and mitigate impacts of existing infrastructure and improve our characterization of arthropod habitat.

To address the overcapacity, traffic and parking issues mentioned in last year's report, OMKM will be using CIP funds to study and design improvements to the Visitor Information Station (VIS), parking for

the general public and commercial tour operators, road improvements, as well as designs for a more efficient and safe traffic flow. .

OMKM and Maunakea Support Services (MKSS) with the assistance of the County of Hawaii installed speed bumps and added “calming” road surface markings, e.g., pedestrian cross walks, impending speed bumps, and speed and caution signs. These additions and improvements are providing a safer environment for the visiting public, in particular during the evening stargazing periods.

Initiate surveys and studies on flora and fauna, geology and hydrology, climate/weather and air quality, and erosion.	<ul style="list-style-type: none"> • Initiated 4-year study on permafrost • 4-year survey of native and other summit arthropods commenced in the Fall 2011. • Botanical survey report of UH’s lands now available on-line. • A 4-year climate change study commenced in the Spring 2012. • Initiated a study of surficial geology and erosion in cinder cone environments. • Pending the outcome of a preliminary location study, by the UH Geography and Meteorological Depts. install a summit weather tower as part of a weather monitoring system stretching from sea level to the summit.
Initiate surveys of human activities and needs such as commercial tour capacity and fees, traffic, parking and public facilities.	<ul style="list-style-type: none"> • OMKM and Maunakea Support Services is implementing an interim plan addressing parking at the VIS. OMKM to use CIP funds to study and design improvements to the VIS, public and commercial tour vehicles, road repairs, and more efficient and safe traffic flow.. • Rangers continue to submit daily reports on human activities; data are input in a database. • A vehicle counter is installed, that will keep a real time count of all vehicles above Halepōhaku, including specific counts of observatory and commercial vehicles on the mountain. • A survey of visitors was completed at Halepōhaku. The majority are non-resident visitors.
Continue studies on the wēkiu bug and alien arthropods	<ul style="list-style-type: none"> • Research on the biodiversity of arthropods continues.
Other Studies	<ul style="list-style-type: none"> • Pending funding, OMKM would like to initiate a study of commercial tour activities to determine the “capacity” for commercial tour operators.

Monitoring. Monitoring is an ongoing and long-term priority that is needed to assess the status of the resources over time.

Annual surveys of the wēkiu bug, which began in 2002, and alien arthropods, in 2007, continue. A monitoring plan for botanical resources will be developed following a review of the botanical report.

Initiate monitoring of the archaeological resources.	<ul style="list-style-type: none"> • A monitoring plan was approved by the State Historic Preservation Division and is being implemented.
Continue surveys of the wēkiu bug and arthropods species.	<ul style="list-style-type: none"> • Monthly surveys for alien arthropods at mid-level facilities, quarterly surveys at all facilities, and annual surveys of alien arthropods across UH managed lands. • Annual surveys of the wēkiu bug.

	<ul style="list-style-type: none"> • Ant monitoring program of facilities at Halepōhaku and the summit
Initiate monitoring of new categories of resources using data obtained during the baseline data gathering stage.	<ul style="list-style-type: none"> • Monitoring plans will be developed following baseline surveys, e.g., monitoring of botanical resources.

Resources Management Programs. Concurrent with the gathering of baseline information is the need to develop and implement resource management programs. It was reported last year that OMKM together with Kahu Kū Mauna developed preliminary policies for the construction of new cultural features, scattering of cremated human remains, and the stacking of rocks. In order for these policies to be enforceable OMKM plans to incorporate these policies into its administrative rules.

Data from surveys and studies provide valuable information for developing management programs for the wēkiu bug. Invasive flora and fauna are a concern because of their potential impact not only on the wēkiu bug, but also on other native species, and on the “health” of Maunakea’s unique ecosystem. OMKM continues to work on developing an invasive species prevention, response and control plan. It is taking longer than expected in part due to the complexity of scope and constraints associated with Maunakea.

Senecio madagascarensis (fireweed) removal is an ongoing activity. Rangers continue to remove fireweed when they find it along the road and in the summit areas. Over the two years OMKM organized its community volunteer program and a total of 550 bags of weeds were pulled by 350 volunteers putting in 2,500 hours. In 2013, OMKM assisted the Division of Forestry and Wildlife by planting 200 silverswords in an effort repopulate this endangered plant on Maunakea where it once covered the mountainsides. It is OMKM’s goal to control invasive weeds and to restore the area with native vegetation.

The invasive ant, *Cardiocondyla kagutsuchi*, was discovered at Halepōhaku. Subsequent ant surveys documented their presence along the Maunakea Access road from the Mauna Kea Forest Reserve up to Halepōhaku. It was discovered upon further investigation that this ant is also present along the Mana Road, in Hakalau National Wildlife Refuge, and in Department of Hawaiian Home Lands. It is estimated that this ant has been present in the area since at least 2009. Preventing the introduction of predatory ants remain a high priority, fortunately *C.kagutsuchi* is a relatively benign non-native species.

Development of protocols and/or policies related to cultural practices.	<ul style="list-style-type: none"> • A draft of a burial treatment plan was approved by the Hawaii Island Burial Council. The final draft is under review by the Division of Historic Preservation. • Cultural related policies will be incorporated into administrative rules currently being drafted. These policies will be enforceable through the issuance of citations and fines.
Invasive species control	<ul style="list-style-type: none"> • OMKM continues to work with the Big Island Invasive Species Committee on the development of an invasive species prevention, control and response plan. • OMKM hosted two UH Hilo Pacific Internship Programs for Exploring Science (PIPES) interns for the summer. One intern worked with the Big Island Invasive Species Committee (BIISC) to draft portions of this plan that are presently being

	<p>implemented.</p> <ul style="list-style-type: none"> • An active volunteer program to remove <i>Scenicio madagascarensis</i> (fireweed) and other invasive plants continues; rangers also continue to remove fireweed in the upper elevations. • Ant monitoring is conducted quarterly at the summit facilities and monthly at the facilities at Halepōhaku.
Development of a wēkiu bug management plan and habitat restoration plan.	<ul style="list-style-type: none"> • Data from wēkiu bug, alien arthropod, invertebrate studies, topography and wēkiu bug food distribution, and climate studies will provide the basis for developing management and habitat restoration plans for the bug. • A wēkiu bug habitat restoration study plan is being drafted for agency review.
Public facilities	<ul style="list-style-type: none"> • With the release of CIP funds OMKM will be studying and designing improvements to the VIS, parking and traffic flow in an around Halepōhaku. In the absence of permanent facilities, especially on the summit, MKSS has installed portable toilets.

- **Education, Training and Outreach.** OMKM recognizes the need to formally educate and train management staff, stakeholders, construction workers and the general public about the resources and significance of Maunakea. One of the key tenets of the Public Access Plan is that “an informed public is best prepared to make good decisions and act responsibly.” The OMKM Maunakea User/Resource Orientation program was launched in the Summer of 2013. It is a requirement that all observatory and support staff (both office and on-mountain) attend the orientation. Statistics for 2013 are:
 - 815 employees were identified as needing this training across all observatories, OMKM, & MKSS.
 - 657 employees attended the training
 - 157 employees still need the training
 - 81% of employees completed the requirement.

[As of March 31, 2014: commercial tour companies began their orientation. Collectively, of the 916 observatory, MKSS and OMKM employees, and commercial tour operators needing this training all but 14% have completed the requirement.]

OMKM continues to record observations daily activities and incidents that are reported by the rangers. Data is critical for OMKM to make informed decisions and program development.

Initiate programs to educate stakeholders, management staff, and the general public.	<ul style="list-style-type: none"> • OMKM continues to offer orientations trying to reach the remaining employees and new observatory employees. The current focus is commercial tour operators • OMKM plans to launch orientation sessions on online as a more efficient means of reaching contractors, vendors, visiting staff, or other interested parties. • Plans are to initiate the development of a refresher program as many of those working on Maunakea are long-serving employees. • A video orientation for visitors will be developed and shown in the VIS.
Develop and maintain a GIS and database	<ul style="list-style-type: none"> • A GIS-based data storage and reporting system has been developed and continues its efforts to expand and enhance

<p>program.</p>	<p>the system.</p> <ul style="list-style-type: none"> • Rangers continue to submit daily reports summarizing their observations and their activities. • Vehicle data collection will soon be automated. A vehicle counter has been installed and is being tested for accuracy. • The second 2013 summer OMKM hosted PIPES intern was assigned to work closely with the Spatial Data Analysis and Visualization Lab (aka GIS lab) at UH Hilo to advance OMKM's mapping efforts.
<p>Develop an outreach program.</p>	<ul style="list-style-type: none"> • In 2013, OMKM's volunteer program engaged 236 volunteers, working 1,747 hours, and removed 363 bags of invasive weeds. This year's program once again focused on removing invasive plants in the Halepōhaku parcel and along the access corridor. <p>Volunteer Mary Begier and the Hawaii Island Chamber of Commerce were presented the Community Hero Award by the Invasive Species Council at its first annual recognition ceremony. OMKM was the nominator.</p> <ul style="list-style-type: none"> • 200 'Āhinahina, Maunakea Silversword, were planted in the DLNR enclosure behind the VIS. Silverswords were provided by the Division of Forestry and Wildlife. • Speakers at the volunteer events included Kahu Ku Mauna members, UH Hilo faculty, USGS scientists, and astronomers. • Volunteer groups included the Hawaii Island Chamber of Commerce, Circle K (Kiwanis youth), UH Hilo student groups, and general community members.

Printed Materials & Public Forums. The education process and outreach efforts include the development of educational materials, such as brochures, eNewsletters, signage and the dissemination of materials.

<p>Develop and print brochures.</p>	<ul style="list-style-type: none"> • A brochure is being finalized and will contain information about the resources and significance of Maunakea. This will be available for public distribution at the VIS, 'Imiloa, and at other public venues
<p>Distribution of informational materials.</p>	<ul style="list-style-type: none"> • Continue distribution of existing brochures – cultural, visiting safely, and Maunakea hazards. • The culture and public safety brochures are currently being updated.
<p>Participate in public events, community gatherings and other opportunities to inform the community about Maunakea.</p>	<ul style="list-style-type: none"> • Continue to seek opportunities to participate or speak at public forums, including community meetings, local organization's membership meetings, etc. • Mentoring young students with science projects and participation in local science and sate science fairs. Jesse Eiben, wēkiu bug research for OMKM mentored a 7th grade student at Waiākea Intermediate who studied a

	<p>native bee and its feeding habits on native vs. non-native plants. This young student won many local awards and advanced to the State science fair where she won 1st place in the junior division.</p> <ul style="list-style-type: none"> • Maunakea Environment Committee member and UH Hilo faculty Dr. Don Thomas and OMKM staff partnered with UH Hilo computer science students under professor Dr. Keith Edwards to serve as a 'client' for a capstone computer programming class. "Team Poli'ahu" developed a smart phone application to report invasive species on Maunakea. The group won the U.S. national Microsoft Imagine Cup competition, and was selected to represent the U.S in the international competition in St Petersburg, Russia. • Dr. Norbert Schorghofer's (principle investigator for OMKM's sponsored permafrost study) colleague Dr. Kenji Yoshikawa, is working with a Hilo Intermediate 7th grade science class to collect comparable data in their school yard for comparison with Maunakea and other sites across the globe.
Signs	<ul style="list-style-type: none"> • With input from Rangers and Kahu Kū Mauna, signs were or planned to be installed to highlight cultural awareness and safety issues • A map of all the signs on UH's managed lands has been completed.

Daily Implementation of Ongoing Actions

The Maunakea rangers continue to monitor activities on UH's managed lands on a daily basis. They record pertinent data including the number of vehicles by type (4 vs. 2-wheel drive, observatory, commercial and motorcycles) and observations of visitor activities, including hikers, bikers, vehicle speeds, trash, etc. Through their interactions with the public they help to educate people about Maunakea. Of interest is the frequency in informing people about the need to use low gear, even when in 4-wheel drive and/or how to engage their vehicle in low gear. Many of the management actions relating to public and commercial activities, and trash pick-up and removal are carried out by the Rangers as part of their daily responsibilities.

Administrative Rules

The process for developing administrative rules resumed following the conclusion of the contested case and final decision by the Board of Land and Natural Resources regarding the Thirty Meter Telescope (TMT) project.

Appendix A

April 2014 Summary of In Progress, Ongoing, Completed and As Needed Mauna Kea CMP Management Actions and Relationship to the CMP Sub Plans

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TEXT IN BLUE INDICATES CHANGES OR ADDITIONS FROM THE PREVIOUS YEAR'S REPORT

COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES

Implementation Schedule

Comments

Sub Plans

NATIVE HAWAIIAN CULTURAL RESOURCES

Management				
CR-1	<p>Kahu Kū Mauna shall work with families with lineal and historical connections to Mauna Kea, cultural practitioners, and other Native Hawaiian groups, including the Mauna Kea Management Board's Hawaiian Culture Committee, toward the development of appropriate procedures and protocols regarding cultural issues.</p>	Ongoing	<p>Identification of lineal and historical connections will be part of the development of the Burial Treatment Plan (see CR-13).</p> <p>Solicitations were made through announcements in the daily newspapers and the OHA newsletter.</p> <p>There were no responses to our solicitations but OMKM continues to seek out individuals as part of its interaction and relationship building with the community.</p> <p>Fall 2013 the Hawaii Island Burial Council officially recognized several individuals as cultural descendants of Kaohe Ahupua'a.</p> <p>Rangers through their interactions with the visiting public help to educate and raise awareness about Mauna Kea.</p> <p>The development of an informational brochure is in final editorial stages prior to printing in 2014.</p> <p>OMKM sends out monthly eNewsletters informing the public about OMKM and its activities.</p> <p>Resource orientation of those who work on the mountain including observatory personnel, VIS and MKSS staff, rangers, commercial tour operators and staff, and construction workers commenced in 2013. Orientation will be made available online in 2014.</p> <p>It is our understanding that the State Historic Preservation Division is reviewing the Archeological Inventory Survey for the Mauna Kea Ice Age Natural Area Reserve. Completion of the review means a complete inventory of the historic properties on the summit region of Mauna Kea which will be included in the filing of a petition to designate the summit region of Mauna Kea an Historic District as proposed by SHPD and for placement on the National Register of Historic Places.</p>	<p>NRMP 5.1.1 CRMP 4.2.1 PAP 2.3, 6.1, 6.3, 6.8</p> <p>NRMP 4.4.2 CRMP 4.3.3 PAP 4.2, 5.2, 6.1</p> <p>CRMP 2.4.2.1</p>
CR-3	<p>Conduct educational efforts to generate public awareness about the importance of preserving the cultural landscape.</p>	Ongoing		
CR-2	<p>Support application for designation of the summit region of Mauna Kea as a Traditional Cultural Property, per the National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq. in consultation with the larger community.</p>	Short-term		

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Cultural Practices				
CR-5	Develop and adopt guidelines for the culturally appropriate placement and removal of offerings.	In Progress	Kahu Kū Mauna reviewed a draft of a process. The final outcome will be included in administrative rules for UH's managed lands. Note: CR-5 overlaps with CR-7 (constructing new Hawaiian cultural features) being that offerings are usually associated with the construction of new features.	CRMP 4.2.1.3 PAP 6.3.6.8
CR-6	Develop and adopt guidelines for the visitation and use of ancient shrines.	In Progress	Visitation is a public access issue and is a matter to be addressed in administrative rules for UH's managed lands.	CRMP 4.2.1.5 PAP 2.7.2, 6.3
CR-7	Kahu Kū Mauna shall take the lead in determining the appropriateness of constructing new Hawaiian cultural features.	In Progress	Kahu Kū Mauna reviewed a draft of a process. The final outcome will be included in administrative rules for UH's managed lands	CRMP 4.2.1.6
CR-8	Develop and adopt a management policy for the UH Mgt. Areas on the scattering of cremated human remains.	In Progress	Kahu Kū Mauna reviewed a draft of a process. The final outcome will be included in administrative rules for UH's managed lands.	
CR-9	A management policy for the culturally appropriateness of building ahu or "stacking of rocks" will need to be developed by Kahu Kū Mauna who may consider similar policies adopted by Hawai'i Volcanoes National Park.	In Progress	Kahu Kū Mauna reviewed a draft of a process. The final outcome should be included in administrative rules for UH's managed lands.	CRMP 4.2.1.8 PAP 6.8
CR-4	Establish a process for ongoing collection of information on traditional, contemporary, and customary cultural practices.	Short-Term		CRMP 4.2.1.1
Historic Properties				
CR-10	Develop and implement a historic property monitoring program to systematically monitor the condition of the historic district and all historic properties, including cultural sites and burials.	Completed	SHPD approved our monitoring plan, monitoring is ongoing according to the plan's schedule.	CRMP 4.3.1 PAP 5.2
CR-11	Complete an archaeological survey of the portions of the Summit Access Road corridor that are under UH management.	Completed		CRMP 4.3.7
CR-12	Consult with Kahu Kū Mauna about establishing buffers (preservation zones) around known historic sites in the Astronomy Precinct, to protect them from potential future development.	Ongoing	Kahu Kū Mauna determined that this should be reviewed on a case-by-case basis.	CRMP 4.2.7
CR-13	Develop and implement a burial treatment plan for the UH Management Areas in consultation with Kahu Kū Mauna Council, MKMB's Hawaiian Culture Committee, the Hawai'i Island Burial Council, recognized lineal or cultural descendants, and SHPD.	In Progress	OMKM submitted a draft plan to SHPD for review and approval Plan was approved by the Hawaii Island Burial Council in June 2013. Awaiting final review of plan by Historic Planning Division	CRMP 4.3.2, 4.3.7
CR-14	Immediately report any disturbance of a shrine or burial site to the rangers, DOCARE, Kahu Kū Mauna Council, and SHPD.	Ongoing	Rangers report disturbance to OMKM.	CRMP 4.3.1.6 PAP 2.5.1

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COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES

Implementation
Schedule

Comments

Sub Plans

NATURAL RESOURCES

Threat Prevention and Control				
NR-6	Reduce threats to natural resources by educating stakeholders and the public about Mauna Kea's unique natural resources.	Ongoing	Rangers through their interaction with the visiting public help to educate them about Mauna Kea. See CR-3 and EO-2	NRMP 4.4 PAP 2.7.1, 4.2 5.2, 6.1, 6.3, 6.6
NR-2	Limit damage caused by invasive species through creation of an invasive species prevention and control program.	Ongoing	OMKM is working with the Big Island Invasive Species Committee on the development of an invasive species prevention, control and response plan A volunteer program was established to pull invasive weeds on UH's managed lands with emphasis in the Hale Pohaku area. Long term goal is to re-vegetate the mid-level area with native plants. Beginning in 2007 OMKM conducted annual surveys of invasive arthropod species on UH's managed lands. This program was expanded to include monthly and quarterly monitoring depending on the nature of the arthropod threat, and annual invasive plant monitoring concurrent with arthropod surveys. Rapid response strategies, using carabid beetles as an example, were drafted. Inspections of heavy equipment, construction material, and other items too large to be carried by an individual occur prior to coming on to UH's lands. A written plan is in development and will contain policies and procedures to prevent, respond and control invasive species.	NRMP 4.2.3.7, 4.3 PAP 2.7.1, 6.3
NR-1	Limit threats to natural resources through management of permitted activities and uses.	In Progress	OMKM is currently in the process of developing administrative rules relating to public access and commercial activities.	NRMP 4.2.3
NR-3	Maintain native plant and animal populations and biological diversity.	Mid and Long-term		NRMP 4.2.3.8
NR-4	Minimize barriers to species migration to help maintain populations and protect ecosystem processes and development.	Mid and Long-term		NRMP 4.2.3.11
NR-5	Manage ecosystems to allow for response to climate change.	Long-term		NRMP 4.2.3.11

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Ecosystem Protection, Enhancement & Restoration			
NR-7	Delineate areas of high native diversity, unique communities, or unique geological features within the Astronomy Precinct and at Hale Pōhaku and consider protection from development.	In Progress	Vegetation surveys completed. Biodiversity and wēkiu bug surveys are ongoing. Erosion and surficial geology project initiated in 2014.
NR-8	Consider fencing areas of high native biodiversity or populations of endangered species to keep out feral ungulates (applies to areas below 12,800 ft elevation).	Ongoing	Assisted DLNR with fencing Silverswords. Other areas will be fenced when areas are identified and needed.
NR-9	Increase native plant density and diversity through an outplanting program.	Long-term	Mamane seedlings germinated from seeds found in the Hale Pohaku area were planted near the Visitor Information Station
NR-10	Incorporate mitigation plans into project planning and conduct mitigation following new development.	Ongoing	Worked with DLNR and planted 200 Silversword seedlings in the Halepōhaku area.
NR-11	Conduct habitat rehabilitation projects following unplanned disturbances.	Ongoing	Mitigation and best management practices plans are required for projects as appropriate.
NR-12	Create restoration plans and conduct habitat restoration activities, as needed.	Mid and Long-term	Vehicle accident (passenger car rolling down summit pu'u) in 2013 was used as a template for developing damage assessment, monitoring, and rehabilitation criteria. Currently developing a proposal to develop a wēkiu bug habitat restoration study.
COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES			
Implementation Schedule			
NATURAL RESOURCES			
Program Management			
NR-13	Increase communication, networking, and collaborative opportunities to support management and protection of natural resources.	Ongoing	OMKM has established and continues to establish working relationships with the community and DLNR through working groups such as the Environment and Rules Committees; the Mauna Kea Neighbors, Big Island Invasive Species Committee, and OHA.
NR-14	Use the principles of adaptive management when developing programs and methodologies. Review programs annually and revise any component plan every five years, based on the results of the program review.	In Progress	Potential CMP revisions are identified in annual program documentation. Proposed revisions, for future submission to BLNR, will be prepared in 2014.
Inventory, Monitoring and Research			
NR-16	Conduct regular long-term monitoring, as outlined in an inventory, monitoring, and research plan.	Ongoing	OMKM conducts annual wēkiu bug and alien arthropod surveys. Botanical monitoring is expected following the submittal of the botanical survey report. Other monitoring plans to be developed following baseline surveys.
			Sub Plans
			NRMP 4.1, 4.2.3.1
			NRMP 4.2.3.7, 4.3
			NRMP 4.3, 4.4
			NRMP 4.3
			NRMP 4.3
			NRMP 4.3

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NR-18	Develop geo-spatial database of all known natural resources and their locations in the UH Management Areas that can serve as baseline documentation against change and provide information essential for decision-making.	Ongoing	<p>Wēkiu bug and botanical data location of infrastructure and signs have been mapped. OMKM is working with the University of Hilo Geography Department on the development of the GIS database. All future survey data will be mapped.</p> <p>GoogleEarth layers of priority resources are now complete.</p>	NRMP 4.1, 4.5
NR-15	Conduct baseline inventories of high-priority resources, as outlined in an inventory, monitoring, and research plan.	Ongoing	<p>Baseline surveys of invasive arthropods continue. A botanical survey was completed in the Summer of 2011. OMKM is planning to fund a study on permafrost and hopefully a weather monitoring system to help monitor the change in climate over time.</p> <p>The botanical survey was published in 2013 and is currently online. OMKM is funding a 4-year study on permafrost and working on designing a climate monitoring network. We are planning an erosion study to better understand surficial geology, cinder cone erosion, and arthropod habitat characterization.</p> <p>OMKM is funding a study to develop a model relating to climate change and potential impact to the summit ecosystem, and a study of native arthropods.</p>	NRMP 4.1
NR-17	Conduct research to fill knowledge gaps that cannot be addressed through inventory and monitoring.	Ongoing	<p>OMKM funded an international symposium on Tropical Alpine Ecosystems. Invited speakers are experts in research and management of alpine ecosystems. OMKM hopes to develop a network with other researchers and managers to gain knowledge to better manage Mauna Kea.</p>	NRMP 4.1.2.3

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COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES

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EDUCATION AND OUTREACH

Program Development				
EO-1	Develop and implement education and outreach program	Ongoing	Volunteer, Orientation, Brochures (new + update), 2 in-school visits (Hilo Inter, HAAS)	NRMP 4.1 CRMP 4.3.3 PAP 2.7.1, 4.2, 5.2, 6.1, 6.3, 6.6
Education				
EO-3	Continue to develop, update, and distribute materials explaining important aspects of Mauna Kea.	Ongoing	Materials on culture, visiting safely and responsibly and Mauna Kea hazards are distributed at the Visitor Information Station. An informational brochure on the significance of Mauna Kea is currently being developed	NRMP 4.4 CRMP 4.3.3 PAP 6.1
EO-4	Develop and implement a signage plan to improve signage throughout the UH Management Areas (interpretive, safety, rules and regulations).	Short Term	This was originally classified as immediate implementation but has been deferred to Short Term to accommodate the accrual of additional resource information. A map showing the location of signs on UH's managed lands has been completed. New cultural and safety related signs are planned.	NRMP 4.4.2 PAP 4.2, 5.2, 6.2
EO-5	Develop interpretive features such as self-guided cultural walks and volunteer-maintained native plant gardens.	Mid-term		NRMP 4.3, 4.4.2 CRMP 4.3.3 PAP 6.2
EO-6	Engage in outreach and partnerships with schools, by collaborating with local experts, teachers, and university researchers, and by working with the 'Imiloa Astronomy Center of Hawai'i.	Ongoing	See EO-1	NRMP 4.4.2 PAP 5.2, 6.1
EO-2	Require orientation of users, with periodic updates and a certificate of completion, including but not limited to visitors, employees, observatory staff, contractors, and commercial and recreational users.	Ongoing	OMKM initiated a test orientation of consultants working on the mountain. The program is undergoing edits. Resource orientation of those who work on the mountain including observatory personnel, VIS and MKSS staff, rangers, commercial tour operators and staff, and construction workers commenced in 2013. Orientation will be made available online in 2014.	NRMP 4.4.2 PAP 6.1, 6.6
Outreach				
EO-7	Continue and increase opportunities for community members to provide input to cultural and natural resources management activities on Mauna Kea, to ensure systematic input regarding planning, management, and operational decisions that affect natural resources, sacred materials or places, or other ethnographic resources with which they are associated.	Ongoing	OMKM through the MKMB, Kahu Kū Mauna, Environment and Rules Committees provide opportunity for members of the community and other organizations to participate in the management activities of the mountain. Monthly volunteer activities provide an alternative venue for the community to participate and share knowledge.	NRMP 4.4.2 CRMP 5.3 PAP 5.2, 6.3, 6.8

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EO-8	Provide opportunities for community members to participate in stewardship activities.	Ongoing	<p>OMKM through the MKMB, Kahu Kū Mauna, Environment and Rules Committees provide opportunity for members of the community to participate in the management activities of the mountain.</p> <p>Monthly volunteer activities provide an alternative venue for the community to participate and share knowledge.</p>	NRMP 4.4.2
<p>COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES</p> <p>Implementation Schedule</p> <p>Comments</p> <p>Sub Plans</p>				
<p>ASTRONOMICAL RESOURCES</p>				
<p>Protection of Astronomical Resources</p>				
AR-1	Operate the UH Management Areas to prohibit activities resulting in negative impacts to astronomical resources.	In Progress	OMKM is currently in the process of developing administrative rules relating to public access and commercial activities.	PAP 5.1
AR-2	Prevent light pollution, radio frequency interference (RFI) and dust.	Ongoing	Project proposal requesting the use of radio signals are reviewed by the Institute for Astronomy for potential interference with astronomical research activities.	NRMP 4.2.3.2
<p>COMPONENT PLAN: MANAGING ACCESS AND USE</p> <p>ACTIVITIES AND USES</p>				
<p>General Management</p>				
ACT-2	Develop parking and visitor traffic plan.	In Progress	<p>OMKM is currently working with Mauna Kea Support Services to develop a plan to address parking at the Visitor Information Station. A CIP request was submitted to study and design improvements at the Mid-level facilities and summit access road.</p> <p>OMKM and MKSS developed a parking plan. Due to ex parte concerns during the contested case for the TMT CDUP, we were not able to communicate with DLNR regarding permitting approvals. This plan may be modified or replaced following the CIP infrastructure study and design process.</p> <p>On a daily basis OMKM Rangers implement an interim parking plan to maintain order, accommodate as many vehicles a possible and to ensure the safety of visitors to the VIS.</p>	NRMP 3.1.1.2 PAP 5.2, 6.4, 6.6, 6.7

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ACT-3	Maintain a presence of interpretive and enforcement personnel on the mountain at all times to educate users, deter violations, and encourage adherence to restrictions.	Ongoing	Mauna Kea Rangers are present year round from 7 am to 10 pm daily; DOCARE officers and Hawaii County Police are called in on an as needed basis.	NRMP 5.1.2 CRMP 4.1.1 PAP 4.2, 4.4, 4.5, 4.6, 5.2, 6.1, 6.2, 6.5, 6.6, 6.7
ACT-4	Develop and enforce a policy that maintains current prohibitions on off-road vehicle use in the UH Management Areas and that strengthens measures to prevent or deter vehicles from leaving established roads and designated parking areas.	Ongoing	OMKM prohibits the use of off-road vehicles on UH's managed lands. Commercial operators and film crews are required to stay on the road or within the footprint of existing facilities, unless granted permission from OMKM. OMKM is currently in the process of developing administrative rules relating to public access and commercial activities. There is a stay on the development of rules until the conclusion of the contested case for a proposed project for Mauna Kea. The process for developing administrative rules resumed following the conclusion of the contested case and final decision by the Board of Land and Natural Resources regarding the Thirty Meter Telescope (TMT) project. OMKM is currently in the process of developing administrative rules relating to public access and commercial activities. There is a stay on the development of rules until the completion of the contested case for a proposed project for Mauna Kea.	NRMP 4.2.3.1 CRMP 4.1.2 PAP 2.5.1, 2.5.2, 2.6.3, 5.2, 6.3, 6.5
ACT-1	Continue and update managed access policy of 1995 Management Plan.	In Progress		NRMP 4.2, 4.4 PAP 2.5.2, 5.2, 7
Recreational				
ACT-6	Define and maintain areas where snow-related activities can occur and confine activities to slopes that have a protective layer of snow.	Ongoing	Generally, this is a self-regulated activity. People usually do not venture to areas where there is no snow.	NRMP 4.2.3.1 CRMP 4.2.3.2 PAP 3.3.5, 5.2, 6.1, 6.3, 6.4
ACT-7	Confine University or other sponsored tours and star-gazing activities to previously disturbed ground surfaces and established parking areas.	Ongoing	Star gazing activities on UH's lands are limited to parking lots, or in areas in close proximity to the Visitor Information Station.	NRMP 6.2.3 CRMP 4.2.3.1 PAP 2.5.3, 2.6.2, 3.3.3, 5.2
ACT-8	Coordinate with DLNR in the development of a policy regarding hunting in the UH Management Areas.	In Progress	Hunting policy similar to DLNR's is being addressed in the development of UH's administrative rules.	NRMP 3.1.3.5 3.2.12 CRMP 4.2.3.3 PAP 2.5.1, 3.3.6, 5.2

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ACT-5	Implement policies to reduce impacts of recreational hiking	In Progress	OMKM is currently in the process of developing administrative rules relating to public access and commercial activities.	NRMP 4.2.3.1 CRMP 4.2.3.4 PAP 3.3.7, 5.2, 6.2, 6.3
Commercial				
ACT-9	Maintain commercial tour permitting process; evaluate and issue permits annually.	Ongoing	UH oversees commercial tour permits. A responsibility transferred to UH from BLNR.	NRMP 3.1.4 PAP 2.5.3, 2.5.4, 3.3.3, 4.3, 5.2, 6.1, 6.7
ACT-10	Ensure OMKM input on permits for filming activities	Ongoing	All film permits require OMKM's approval. OMKM is currently in the process of developing administrative rules relating to public access and commercial activities. There is a stay on the development of rules until the conclusion of the contested case for a proposed project for Mauna Kea. The process for developing administrative rules resumed following the conclusion of the contested case and final decision by the Board of Land and Natural Resources regarding the Thirty Meter Telescope (TMT) project.	NRMP 3.1.4.2 PAP 2.5.3, 3.3.3, 4.3, 6.1, 6.7
ACT-11	Seek statutory authority for the University to regulate commercial activities in the UH Management Areas.	Completed	Transfer of commercial tour permitting function was transferred to UH by BLNR. OMKM oversees commercial tour operations and film activities. Statutory authority to promulgate administrative rules was granted by the Legislature in 2009	NRMP 1.4.2.3
Scientific Research				
ACT-12	Ensure input by OMKM, MKMB, and Kahu Kū Mauna on all scientific research permits and establish system of reporting results of research to OMKM.	Ongoing	All research proposals must be approved by OMKM. Proposals requiring ground disturbing activities or potential impact to the cultural and/or natural landscape are reviewed by MKMB, Kahu Kū Mauna and the Environment Committee.	NRMP 4.2.3.1, 4.2.3.7, 4.2.3.9 CRMP 4.2.6

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COMPONENT PLAN: MANAGING ACCESS AND USE PERMITTING AND ENFORCEMENT

Laws and Regulations

P-1	Comply with all applicable federal, state, and local laws, regulations, and permit conditions related to activities in the UH Management Areas.	Ongoing	NRMP 1.4.3 PAP 2.4, 2.5, 2.5.1, 2.5.2, 2.5.3, 5.1
P-4	Educate management staff and users of the mountain about all applicable rules and permit requirements.	Ongoing	NRMP 4.4 PAP 4.2, 5.2, 6.1, 6.2, 6.5
P-2	Strengthen CMP implementation by recommending to the BLNR that the CMP conditions be included in any Conservation District Use Permit or other permit.	Ongoing	NRMP 1.4.3.2
P-3	Obtain statutory rule-making authority from the legislature, authorizing the University of Hawai'i to adopt administrative rules pursuant to Chapter 91 to implement and enforce the management actions.	Completed	NRMP 1.4.3.2
Enforcement			
P-5	Continue coordinating with other agencies on enforcement needs.	Ongoing	NRMP 5.1 PAP 4, 6.5
P-6	Obtain legal authority for establishing, and then establish, a law enforcement presence on the mountain that can enforce rules for the UH Management Areas on Mauna Kea.	Completed	NRMP 1.4.2.3, 3.1.3.2, 5.1 PAP 4.4, 4.5, 4.6, 5.2, 6.5, 6.6
P-7	Develop and implement protocol for oversight and compliance with Conservation District Use Permits.	Ongoing	NRMP 1.4.2.3
P-8	Enforce conditions contained in commercial and Special Use permits.	Ongoing	NRMP 3.1.4 PAP 2.5.3, 3.3.3, 4.3, 4.5, 4.6, 6.5

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COMPONENT PLAN: MANAGING THE BUILT ENVIRONMENT

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INFRASTRUCTURE AND MAINTENANCE

Routine Maintenance		In Progress	Comments	Sub Plans
IM-1	Develop and implement an OMMP.	In Progress	Draft of plan is being developed.	
IM-2	Reduce impacts from operations and maintenance activities by educating personnel about Mauna Kea's unique resources.	Ongoing	A draft of a cultural and natural resources orientation program has been developed.	NRMP 4.4
IM-5	Develop and implement a Debris Removal, Monitoring and Prevention Plan.	Ongoing	Trash from the HP facilities and Visitor Information Station are removed daily. Each observatory removes trash from their respective facilities. Rangers routinely check for and pick up trash and debris while on their daily patrols. Rangers pick up and map the location of trash at the parking lot near the trail head to Lake Waiiau (NAR). The amount of trash decreased following the installation of a portable toilet.	NRMP 4.2.3.5 CRMP 4.1.4, 4.3.4
IM-3	Conduct historic preservation review for maintenance activities that will have an adverse effect on historic properties.	In Progress	OMKM is currently developing a Programmatic Agreement relating to maintenance activities that will be submitted to State Historic Preservation Division	CRMP 4.1.3
IM-4	Evaluate need for and feasibility of a vehicle wash station near Hale Pōhaku, and requiring that vehicles be cleaned.	In Progress	Will be included in the Invasive Species Management plan discussed in the plan.	NRMP 4.2.3.7
IM-6	Develop and implement an erosion inventory and assessment plan.	In Progress	Partnering with UH Hilo geography department to address surficial geology and cinder cone erosion issues.	NRMP 3.2.4, 4.1.4.2, 4.2.3.4 PAP 2.6.3, 6.3, 6.4
IM-7	Prepare a plan, in collaboration with the Department of Defense, to remove military wreckage from a remote area of the UH Management Areas, while ensuring protection of natural and cultural resources.	Mid-term		CRMP 4.3.4.1

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Infrastructure			
IM-10	Evaluate need for additional public restroom facilities in the summit region and at Hale Pōhaku, and install close-contained zero waste systems if necessary.	In Progress	<p>A CIP request was submitted to study and design improvements at the Mid-level facilities and summit access road.</p> <p>To relieve congestion at the VIS, MKSS proposed to convert a portion of the presentation room building into a rest and eating stop for commercial tour operators. Due to ex parte concerns during the contested case for the TMT CDUP, we were not able to communicate with DLNR regarding permitting approvals. Upon conclusion of the contested case the cost to renovate increased significantly and the project did not move forward. The CIP study will look at the needs and alternatives for additional public restrooms.</p> <p>NRMP 3.1.3.1 3.2.3, 4.2.3.3 PAP 5.2, 6.4, 6.6, 6.7, 6.8</p>
IM-8	Assess feasibility of paving the Summit Access Road.	In Progress	<p>A CIP request was submitted to study and design improvements at the Mid-level facilities and summit access road.</p> <p>NRMP 4.2.3</p>
IM-9	Evaluate need for additional parking lots and vehicle pullouts and install if necessary.	Mid-term	<p>NRMP 3.1.1.2.3 PAP 5.2, 5.4, 6.7</p>

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COMPONENT PLAN: MANAGING THE BUILT ENVIRONMENT				Comments	Sub Plans
Implementation Schedule					
Sustainable Technologies					
IM-11	Encourage existing facilities and new development to incorporate sustainable technologies, energy efficient technologies, and LEED standards, whenever possible, into facility design and operations.	Ongoing	The proposed Thirty Meter Telescope is incorporating energy efficiency in its design. MKSS received approval from the MKMB and OCCL to install a photovoltaic system at Halepōhaku		
IM-12	Conduct energy audits to identify energy use and system inefficiencies, and develop solutions to reduce energy usage.	Short-Term	This was initially scheduled for immediate implementation but has been deferred to Short Term implementation.		NRMP 4.2.3.3
IM-13	Conduct feasibility assessment, in consultation with Hawaii Electric Light Company, on developing locally-based alternative energy sources.	Mid-term	Mauna Kea Support Services is currently looking at the feasibility of installing a photo voltaic system at Halepōhaku.		NRMP 3.1.1.2.3
IM-14	Encourage observatories to investigate options to reduce the use of hazardous materials in telescope operations.	Short-Term	MKSS received approval from the MKMB and OCCL to install a photovoltaic system at Halepōhaku		
COMPONENT PLAN: MANAGING THE BUILT ENVIRONMENT					
Implementation Schedule					
CONSTRUCTION GUIDELINES					
General Requirements					
C-1	Require an independent construction monitor who has oversight and authority to insure that all aspects of ground based work comply with protocols and permit requirements.	Ongoing	Included as part of the TMT Management Plan in its approved CDUP		NRMP 3.2, 4.2
Best Management Practices					
C-2	Require use of Best Management Practices Plan for Construction Practices.	Ongoing	Included as part of the TMT Management Plan in its approved CDUP		NRMP 4.2.3
C-3	Develop, prior to construction, a rock movement plan.	Ongoing	Included as part of the TMT Management Plan in its approved CDUP		NRMP 4.2.3.1
C-4	Require contractors to provide information from construction activities to OMKM for input into OMKM information databases.	Ongoing	Included as part of the TMT Management Plan in its approved CDUP		
C-5	Require on-site monitors (e.g., archaeologist, cultural resources specialist, entomologist) during construction, as determined by the appropriate agency.	Ongoing	Included as part of the TMT Management Plan in its approved CDUP		CRMP 4.2.7
C-6	Conduct required archaeological monitoring during construction projects per SHPD approved plan	Ongoing	Included as part of the TMT Management Plan in its approved CDUP		CRMP 4.2.7
C-7	Education regarding historical and cultural significance	Ongoing	Included as part of the TMT Management Plan in its approved CDUP		NRMP 4.4

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C-8	Education regarding environment, ecology and natural resources	Ongoing	Included as part of the TMT Management Plan in its approved CDUP	NRMP 4.4
C-9	Inspection of construction materials	Ongoing	Included as part of the TMT Management Plan in its approved CDUP	NRMP 4.2.3.7
SITE RECYCLING, DECOMMISSIONING, DEMOLITION AND RESTORATION				
SR-1	Require observatories to develop plans to recycle or demolish facilities once their useful life has ended, in accordance with their sublease requirements, identifying all proposed actions.	Ongoing	This will be part of the TMT decommissioning plan	NRMP 4.3.3.4.1
SR-2	Require observatories to develop a restoration plan in association with decommissioning, to include an environmental cost-benefit analysis and a cultural assessment.	Ongoing	Included as part of the TMT Management Plan in its approved CDUP	NRMP 4.3.3.4.1
SR-3	Require any future observatories to consider site restoration during project planning and include provisions in subleases for funding of full restoration.	Ongoing	Included as part of the TMT Management Plan in its approved CDUP	NRMP 4.3.3.4.1

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COMPONENT PLAN: MANAGING THE BUILD ENVIRONMENT

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CONSIDERATION OF FUTURE LAND USE

Facility Planning Guidelines				
FLU-1	Follow design guidelines presented in the 2000 Master Plan.	Ongoing	The Design Review Process, which incorporated the 2000 Master Plan's design guidelines, are being used in the review of the Thirty Meter Telescope project	NRMP 5.1.1
FLU-2	Develop a map with land-use zones in the Astronomy Precinct based on updated inventories of cultural and natural resources, to delineate areas where future land use will not be allowed and areas where future land use will be allowed but will require compliance with prerequisite studies or analysis prior to approval of Conservation District Use Permit.	Short-Term	This was originally listed for immediate implementation. However, this task will require additional data gathered from baseline surveys of the resources.	NRMP 4.3.3.1
FLU-3	Require cataloging of initial site conditions for use when conducting site restoration.	Ongoing	TMT was example (photo documentation received)	
FLU-4	Require project specific visual rendering of both pre- and post-project settings to facilitate analysis of potential impacts to view planes.	Ongoing	TMT was example (photo documentation received)	NRMP 4.1.4.11
FLU-5	Require an airflow analysis on the design of proposed structures to assess potential impacts to aeolian ecosystems.	Ongoing	TMT was example	NRMP 4.1.4.4
FLU-6	Incorporate habitat mitigation plans into project planning process.	Ongoing	TMT was example	NRMP 4.3.3.3
FLU-7	Require use of close-contained zero-discharge waste systems for any future development in the summit region, from portable toilets to observatory restrooms, if feasible.	Ongoing	TMT was example	NRMP 3.1.1.2.6

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COMPONENT PLAN: MANAGING OPERATIONS

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OPERATION AND IMPLEMENTATION OF THE CMP

Management				
OI-1	Maintain OMKM, MKMB, and Kahu Kū Mauna in current roles, with OMKM providing local management of the UH Management Areas, and MKSS providing operational and maintenance services.	Ongoing		
OI-2	Develop training plan for staff and volunteers.	In Progress	OMKM initiated a test orientation of consultants working on the mountain. The program is undergoing edits.	NRMP 5.1 CRMP 5.2 PAP 5.1, 5.2, 6.1, 6.4, 6.5
OI-3	Maintain and expand regular interaction and dialogue with stakeholders, community members, surrounding landowners, and overseeing agencies to provide a coordinated approach to resource management.	Ongoing		NRMP 5.1 PAP 5.1
OI-5	Update and implement emergency response plan.	Ongoing	A draft of an emergency response is currently being developed.	CRMP 4.1.6, 4.3.5 PAP 6.1, 6.4, 6.5, 6.7
OI-4	Establish grievance procedures for OMKM, to address issues as they arise.	Short-term		PAP 6.6

CMP MONITORING, EVALUATION AND UPDATES

Management				
MEU-1	Establish a reporting system to ensure that the MKMB, DLNR, and the public are informed of results of management activities in a timely manner.	Ongoing	Reports are provided at the publicly held Mauna Kea Management Board Meeting. DLNR is represented on the Mauna Kea Management Board.	NRMP 4.1.3.3 PAP 6.4, 6.6, 7
MEU-2	Conduct regular updates of the CMP that reflect outcomes of the evaluation process, and that incorporate new information about the resources.	In Progress	Five-year CMP revision commences in 2014. Revision process initiated by OMKM for eventual submission to BLNR.	NRMP 5.2 CRMP 5.5 PAP 7
MEU-3	Revise and update planning documents, including the master plan, leases, and subleases, so that they will clearly assign roles and responsibilities for managing Mauna Kea and reflect stewardship matters resolved with DLNR.	In Progress	Updates to the Master lease has been initiated	PAP 7

CRMP - Cultural Resources Management Plan; NRMP - Natural Resources Management Plan; PAP - Public Access Plan