

## 2011 Annual Report

### To the Board of Land and Natural Resources

### Status of the Implementation of the Comprehensive Management Plan

#### Summary 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

#### Summary of Implementation Status

All of the management actions were prioritized for implementation and assigned to a time category when they are planned for implementation: Immediate (1 – 3 years); Short-term (4 – 6 years); Mid-term (7 - 9 years); and Long-term (10+ years). Of the total 103 management actions, 41 actions are currently being implemented (ongoing) compared to 24 in 2010. Five management actions classified as immediate are scheduled for implementation over the next year.

The number of completed actions remains the same at four. Twenty-eight are scheduled for implementation in the short, mid and long-terms. The As Needed actions relate to construction and decommissioning activities should they occur.

Table 2 is a summary of the implementation status in 2010. Table 3 is a summary of the implementation status for 2011 including a comparison of the ongoing implementation for 2010 and 2011. Appendix A lists the implementation schedule for all the CMP management actions.

Table 2. 2010 implementation status of the CMP management actions.

Component Plan	Implementation Schedule (2010)					
	2010 Ongoing	Immediate	Short to Long Term	Completed	As needed	
<b>7.1: Understanding and Protecting Mauna Kea's Resources</b>						
7.1.1: Native Hawaiian Cultural Resources (14)	1		10	2	1	
7.1.2: Natural Resources (18)	2		5	8		3
7.1.3: Education and Outreach (8)	3		2	3		
7.1.4: Astronomy Resources (2)	2					
<b>7.2: Managing Access and Use</b>						
7.2.1: Activities and Uses (12)	7		2	2	1	
7.2.2: Permitting and Enforcement (8)	4		1		2	1
<b>7.3: Managing the Built Environment</b>						
7.3.1: Infrastructure and Maintenance (14)	1		4	8		1
7.3.2: Construction Guidelines (9)						9
7.3.3: Site Recycling, Decommissioning, Demolition & Restoration (3)						3
7.3.4: Considering Future Land Use (7)			1			6
<b>7.4: Managing Operations</b>						
7.4.1: Operations and Implementation (5)	4			1		
7.4.2: Monitoring, Evaluation, and Updates (3)			1	1		1
<b>Total</b>	<b>24</b>		<b>26</b>	<b>25</b>	<b>4</b>	<b>24</b>

Table 3. 2011 implementation status of the CMP management actions including a comparison between the 2010 and 2011 current (ongoing) implementation.

Component Plan	Implementation Schedule (2011)					
	2010 Ongoing	2011 Ongoing	Immediate	Short to Long Term	Completed	As Needed
<b>7.1: Understanding and Protecting Mauna Kea's Resources</b>						
7.1.1: Native Hawaiian Cultural Resources (14)	1	7	3	2	1	1 <sup>1</sup>
7.1.2: Natural Resources (18)	2	7		8		3
7.1.3: Education and Outreach (8)	3	3	1	4 <sup>2</sup>		
7.1.4: Astronomy Resources (2)	2	2				
<b>7.2: Managing Access and Use</b>						
7.2.1: Activities and Uses (12)	7	9		2	1	
7.2.2: Permitting and Enforcement (8)	4	5			2	1
<b>7.3: Managing the Built Environment</b>						
7.3.1: Infrastructure and Maintenance (14)	1	3	1	9 <sup>3</sup>		1
7.3.2: Construction Guidelines (9)						9
7.3.3: Site Recycling, Decommissioning, Demolition & Restoration (3)						3
7.3.4: Considering Future Land Use (7)				1 <sup>4</sup>		6
<b>7.4: Managing Operations</b>						
7.4.1: Operations and Implementation (5)	4	4		1		
7.4.2: Monitoring, Evaluation, and Updates (3)		1		1		1
<b>Total</b>	<b>24</b>	<b>41</b>	<b>5</b>	<b>28</b>	<b>4</b>	<b>25</b>

The following were originally classified Immediate implementation. <sup>1</sup> CR-2 reclassified to As Needed; <sup>2</sup> EO-4 reclassified to Short-Term; <sup>3</sup> IM-12 reclassified to Short-Term; <sup>4</sup> FLU-2 reclassified to Short-Term.

### **CMP Management Action Implementation Overview**

As reported last year, OMKM identified five priority categories to be implemented in the immediate term (1 – 3 years). Efforts (Ongoing) 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

A summary of the implementation of Ongoing management actions by priority category is presented in Table 4.

**Research.** In order to protect and manage the resources, it is necessary to assess the status of the resources by first establishing baseline data. Research to date has focused on the wēkiu bug, a candidate for protection under the Federal Endangered Species Act. Since 2005, OMKM, with funding assistance from the Institute for Astronomy, funded a research project to learn more about the biology and habitat range of the bug. Data collected from these efforts resulted in the U.S. Fish and Wildlife Service downgrading the threat status and lowering the priority for listing the bug as threatened or endangered. Beginning in 2007, OMKM began funding annual surveys of invasive arthropods. Efforts are concentrated at the mid-level facilities, which is considered the gateway for species entry to the summit, and at selected areas on the summit.

Research efforts on the wēkiu bug continue, but are now expanding to include botanical resources other arthropods, and climate change. OMKM is working with the Mauna Kea Management Board's Environment Committee in reviewing potential hydrology studies of the summit region.

Initiate surveys and studies on flora and fauna, geology and hydrology, climate/weather and air quality, and erosion.	<ul style="list-style-type: none"><li>• Research on other summit arthropods will commence in Fall 2011.</li><li>• A botanical survey of UH's lands will commence in the summer 2011.</li><li>• A 4-year climate change study will commence in the Fall 2011.</li><li>• Potential/conceptual hydrology studies are currently being reviewed by the MKMB Environment Committee.</li></ul>
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"><li>• OMKM and Mauna Kea Support Services are currently reviewing a parking plan for the mid-level facility.</li><li>• Rangers submit daily reports on human activities; data is inputted into a database.</li></ul>
Continue studies on the wēkiu bug including habitat restoration.	<ul style="list-style-type: none"><li>• Research on the wēkiu bug continues.</li></ul>

**Monitoring.** Monitoring is an ongoing and long-term priority for assessing the status of the resources over a period of time. Archaeological and architectural inventory surveys of the Mauna Kea Science

Reserve, the summit access road corridor, and the mid-level facilities were completed following five years of intensive efforts. OMKM initiated the process for developing a burial treatment plan and a five-year monitoring plan of the archaeological resources.

Annual surveys of the wēkiu bug and alien arthropods continue. A monitoring plan for botanical resources will be developed following the baseline survey.

Initiate monitoring of the archaeological resources.	<ul style="list-style-type: none"> <li>• A monitoring plan is currently being developed.</li> </ul>
Continue surveys of the wēkiu bug and arthropods species.	<ul style="list-style-type: none"> <li>• Annual surveys of alien arthropods at the mid-level location and selected locations on the summit.</li> <li>• Annual surveys of the wēkiu bug.</li> </ul>
Initiate monitoring of new categories of resources using data obtained during the baseline data gathering stage.	<ul style="list-style-type: none"> <li>• Monitoring plans will be developed following baseline surveys, e.g., monitoring of botanical resources.</li> </ul>

**Resources Management Programs.** Concurrent with the gathering of baseline information is the need to develop and implement resource management programs. OMKM is working with Kahu Kū Mauna on several policy actions. There are two actions that Kahu Kū Mauna is looking for further guidance following the passage of the revised Conservation District Rules. In particular, the development of guidelines for constructing new cultural features including the “stacking of rocks”.

Data from nine years of survey, the five-year life history study of the wēkiu bug, and weather and climate studies provide the basis for developing management programs for the bug. Invasive flora and fauna are a concern because of their potential impact on native species and the “health” of Mauna Kea’s unique ecosystems. OMKM is working with the Big Island Invasive Species Committee, which includes members from DLNR, on the development of an invasive species control program.

Development of protocols and/or policies related to cultural practices.	<ul style="list-style-type: none"> <li>• A burial treatment plan is being developed.</li> <li>• Kahu Kū Mauna is researching policies of other agencies regarding the scattering of cremains.</li> </ul>
Development of an invasive species control plan.	<ul style="list-style-type: none"> <li>• OMKM is working with the Big Island Invasive Species Committee on the development of an invasive species control plan.</li> </ul>
Development of a wēkiu bug management plan and habitat restoration plan.	<ul style="list-style-type: none"> <li>• Data from surveys, and forthcoming information from a 5-year research life history project and a 5-year topographical and wind dispersal study will provide the basis for developing management and habitat restoration plans for the bug.</li> </ul>

#### Status of Implementation of the Remaining Immediate Actions

The five Immediate actions that are scheduled for implementation over the next year are the development of policies and guidelines (3) relating to cultural practices, assessing the need for additional public restrooms on the summit, and developing an educational and outreach program.

**Education, Training and Outreach.** OMKM recognizes the need to formally educate and train management staff, stakeholders, as well as the general public about the resources and significance of Mauna Kea. 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.” OMKM is developing a cultural and natural resources orientation program that is applicable to a diverse group of users and visitors. OMKM continues its daily recording of data, for example, vehicle counts and hikers, which are collected by rangers. An outreach program will be developed based on the collection and compilation of data.

Initiate programs to educate stakeholders, management staff, and the general public.	<ul style="list-style-type: none"><li>• OMKM is developing a cultural and natural resources orientation program that will be used for construction workers, rangers, Visitor Information Station and mid-level employees, observatory personnel, and commercial operators.</li></ul>
Develop and maintain a GIS and database program.	<ul style="list-style-type: none"><li>• Storage of data in a GIS-based system will be used in monitoring the resources.</li><li>• Data, such as number of vehicles by vehicle type and hikers, are reported daily by rangers and stored in a database.</li></ul>
Develop an outreach program.	<ul style="list-style-type: none"><li>• The collection and compilation of data will provide the basis for an outreach program.</li></ul>

**Printed Materials & Public Forums.** The education process and outreach efforts include the development of educational materials, such as brochures, signage and the dissemination of materials. OMKM has initiated the development of informational brochures, one for adults and one for children.

Develop and print brochures.	<ul style="list-style-type: none"><li>• A brochure is being developed that will contain information about the resources and significance of Mauna Kea for public distribution at the Visitor Information Station, 'Imiloa, and at other targeted public venues.</li><li>• A children's version on Mauna Kea will be developed for use in outreach programs at schools and for distribution at public venues.</li></ul>
Distribution of informational materials.	<ul style="list-style-type: none"><li>• Continue distribution of existing brochures – cultural, visiting safely, and Mauna Kea hazards. Update as needed</li></ul>

Participate in public events, community gatherings and other opportunities to inform the community about Mauna Kea.	<ul style="list-style-type: none"> <li>Continue to, and seek opportunities to participate or speak at public forums, including community meetings, organization's membership meetings, etc.</li> </ul>
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### **Daily Implementation of Ongoing Actions**

The Mauna Kea rangers monitor activities on UH's leased 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). Through their interactions with the public they help to educate people about Mauna Kea. 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**

OMKM convened an Administrative Rules Committee comprised of representatives from the various divisions of DLNR. Act 132, the statute that gave the University the authority to promulgate administrative rules, and the BLNR approved Public Access Plan provided policy and guidelines for developing rules. Both acknowledge the need for UH's rules to be consistent with rules on the DLNR adjacent lands. Assisting OMKM is the co-author of the Public Access Plan and a former DLNR employee with experience in drafting DLNR rules.

The first step involved a review and combining DOFAW, Sanctuaries and NAR rules into one document followed by a review to streamline the rules by removing, adding or modifying them to be compatible with Mauna Kea as they relate to public access. Concurrent activities included research of the University's policies relating to civil procedures including administrative processes, and research of other agencies' rules relating to commercial activity. With respect to the latter DLNR hierarchy of priorities was adopted as a guiding principal in formulating rules. This hierarchy is protection of the resources, followed by public activity, with commercial activities ranked third.

To date we have content drafts of the public activities and civil procedures sections. The public activities section incorporates many of the existing DLNR rules including, for example, proposing that UH follow existing hunting rules. Unlike public activities, the civil procedures section needed to incorporate UH's not DLNR's public policies. It will require finalization of the public and commercial activities sections to complete this section.

Discussion continues on determining the best procedures for commercial tour permits. While there exists a variety of state and federal commercial policies and rules, the committee is trying to find the "best fit" for addressing commercial tour permits on Mauna Kea. As part of its update to the Mauna Kea Management Board, OMKM will be seeking their insights on commercial tour activities and permits. A content draft of the commercial section is anticipated sometime in May.

Another partner in the rules development process is OHA. A meeting was held with staff members of OHA and OMKM will continue dialogue and meetings as OMKM/DLNR/OHA work to refine the rules. Reaching out to the public is a vital part of the rules development process. OMKM will be attending meetings of community associations and other community organizations to introduce them to UH's rule making process, provide some background on the issues and concerns relating to Mauna Kea and to get their input on their concerns and suggestions on the various rules' topics. This process may be slow, but it is deliberate so that OMKM can engage the community in a meaningful way.

It is anticipated that a completed draft for legal review will be ready by July/August 2011. Upon completion of their review it will be presented to the MKMB for their review and recommendation to the

Board of Regents. The Board of Regents in turn will make its determination on whether or not to authorize public hearings on the draft rules.

Table 4. Summary of implementation of Ongoing management actions by priority category.

Ongoing Implementation					
Component Plans	Priority Categories (2011)				
	Research	Monitoring	Resources Mgt Programs	Education, Training & Outreach	Printed Materials & Public Forums
<b>7.1: Understanding and Protecting Mauna Kea's Resources</b>					
7.1.1: Native Hawaiian Cultural Resources (14)		1	5	1	
7.1.2: Natural Resources (18)	2	1	2	1	
7.1.3: Education and Outreach (8)					3
7.1.4: Astronomy Resources (2)			2		
<b>7.2: Managing Access and Use</b>					
7.2.1: Activities and Uses (12)			8	1	
7.2.2: Permitting and Enforcement (8)			4	1	
<b>7.3: Managing the Built Environment</b>					
7.3.1: Infrastructure and Maintenance (14)			2	1	
7.3.2: Construction Guidelines (9)					
7.3.3: Site Recycling, Decommissioning, Demolition & Restoration (3)					
7.3.4: Considering Future Land Use (7)					
<b>7.4: Managing Operations</b>					
7.4.1: Operations and Implementation (5)			2	1	1
7.4.2: Monitoring, Evaluation, and Updates (3)					1
<b>Total</b>	<b>2</b>	<b>2</b>	<b>25</b>	<b>6</b>	<b>5</b>

## **Appendix A**

### **April 2011 Summary of Ongoing, Completed and As Needed Mauna Kea CMP Management Actions and Relationship to the CMP Sub Plans**

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**COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES**

		Implementation Schedule	Comments	Sub Plans
<b>NATIVE HAWAIIAN CULTURAL RESOURCES</b>				
<b>Management</b>				
CR-1	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.	Ongoing	Identification of lineal and historical connections will be part of the development of the Burial Treatment Plan (see CR-13).	NRMP 5.1.1 CRMP 4.2.1 PAP 2.3, 6.1, 6.3, 6.8
CR-3	Conduct educational efforts to generate public awareness about the importance of preserving the cultural landscape.	Ongoing	Rangers through their interaction with the visiting public help to educate them about Mauna Kea.  UH is developing an informational brochure.  UH is also working with 'Imiloa on the development of a cultural training program.	NRMP 4.4.2 CRMP 4.3.3 PAP 4.2, 5.2, 6.1
CR-2	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.	Short-term		CRMP 2.4.2.1
<b>Cultural Practices</b>				
CR-5	Develop and adopt guidelines for the culturally appropriate placement and removal of offerings.	Immediate		CRMP 4.2.1.3 PAP 6.3, 6.8
CR-6	Develop and adopt guidelines for the visitation and use of ancient shrines.	Immediate		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.	Immediate	Kahu Kū Mauna waiting for the new conservation district rules to be approved before taking action.	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.	Ongoing	OMKM is working with Kahu Kū Mauna. Reviewing Dept. of Health, DOFAW and Nat'l Park policies.	
CR-9	A management policy for the cultural 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.	Ongoing	Kahu Kū Mauna waiting for the new conservation district rules to be approved before taking action. Following the 14-day rule; any new ahu without a permit is removed after 14 days.	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

**COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES**

		Implementation Schedule	Comments	Sub Plans
<b>Historic Properties</b>				
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.	Ongoing	OMKM is working with a consultant on the development of a monitoring plan.	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.	As Needed	Kahu Kū Mauna determined that this should be reviewed on a case-by-case basis instead of taking Immediate implementation.	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.	Ongoing	OMKM is working with a consultant on the development of a burial treatment plan.	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

# COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES

		Implementation Schedule	Comments	Sub Plans
<b>NATURAL RESOURCES</b>				
<b>Threat Prevention and Control</b>				
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.  OMKM will be developing an informational brochure.	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 and control program.	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.	Short-term		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
<b>Ecosystem Protection, Enhancement &amp; Restoration</b>				
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.	Short and Mid-term		NRMP 4.1, 4.2.3.1
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).	Mid-term		NRMP 4.2.3.7, 4.3
NR-9	Increase native plant density and diversity through an outplanting program.	Long-term		NRMP 4.3, 4.4
NR-10	Incorporate mitigation plans into project planning and conduct mitigation following new development.	As needed		NRMP 4.3
NR-11	Conduct habitat rehabilitation projects following unplanned disturbances.	As needed		NRMP 4.3
NR-12	Create restoration plans and conduct habitat restoration activities, as needed.	As needed		NRMP 4.3

**COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES**

Implementation Schedule					Comments	Sub Plans
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.			NRMP 4.1.3.3, 4.3, 5.1.3 PAP 4.2, 4.5
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.	Short-term / As needed				NRMP 5.2 PAP 5.1, 5.2, 6.4, 6.7, 7
Inventory, Monitoring and Research						
NR-16	Conduct regular long-term monitoring, as outlined in an inventory, monitoring, and research plan.	Ongoing	Annual wēkiu bug surveys. Other monitoring plans to be developed following baseline surveys.			NRMP 4.1 PAP 6.4
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	Wēkiu bug data has been mapped. All future survey data will be mapped.			NRMP 4.1, 4.5
NR-15	Conduct baseline inventories of high-priority resources, as outlined in an inventory, monitoring, and research plan.	Ongoing	Baseline surveys of invasive arthropods continue. A botanical survey is planned for Summer 2011			NRMP 4.1
NR-17	Conduct research to fill knowledge gaps that cannot be addressed through inventory and monitoring.	Ongoing	OMKM is funding a study on climate change and potential impact to the summit ecosystem.			NRMP 4.1.2.3

**COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES**

Implementation Schedule					Comments	Sub Plans
EDUCATION AND OUTREACH						
Program Development						
EO-1	Develop and implement education and outreach program	Immediate and Short-term				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.		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.		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.	Mid-term				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.	Long-term				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.		NRMP 4.4.2 CRMP 5.3 PAP 5.2, 6.3, 6.8
EO-8	Provide opportunities for community members to participate in stewardship activities.	Ongoing		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.		NRMP 4.4.2

# COMPONENT PLAN: UNDERSTANDING AND PROTECTING MAUNA KEA'S RESOURCES

		Implementation Schedule	Comments	Sub Plans
	ASTRONOMICAL RESOURCES			
Protection of Astronomical Resources				
AR-1	Operate the UH Management Areas to prohibit activities resulting in negative impacts to astronomical resources.	Ongoing		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 the potential interference with astronomical research activities.	NRMP 4.2.3.2
COMPONENT PLAN: MANAGING ACCESS AND USE				
	ACTIVITIES AND USES			
General Management				
ACT-2	Develop parking and visitor traffic plan.	Ongoing	OMKM is currently working with Mauna Kea Support Services to develop a plan to address parking at the Visitor Information Station.	NRMP 3.1.1.2 PAP 5.2, 6.4, 6.6, 6.7
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.	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.	Short-term		NRMP 4.2, 4.4 PAP 2.5.2, 5.2, 7

# COMPONENT PLAN: MANAGING ACCESS AND USE

Implementation Schedule				
Comments				
Sub Plans				
ACTIVITIES AND USES				
<b>Recreational</b>				
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.	Ongoing	Hunting policy is being addressed in the development of UH's rules.	NRMP 3.1.3.5 3.2.12 CRMP 4.2.3.3 PAP 2.5.1, 3.3.6, 5.2
ACT-5	Implement policies to reduce impacts of recreational hiking	Short-term		NRMP 4.2.3.1 CRMP 4.2.3.4 PAP 3.3.7, 5.2, 6.2, 6.3
<b>Commercial</b>				
ACT-9	Maintain commercial tour permitting process; evaluate and issue permits annually.	Ongoing	UH oversees commercial tour permits.	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 commercial activities.	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	OMKM oversees commercial tour operations and film activities.  OMKM is currently in the process of developing administrative rules relating to commercial activities.	NRMP 1.4.2.3

COMPONENT PLAN: MANAGING ACCESS AND USE				
		Implementation Schedule	Comments	Sub Plans
ACTIVITIES AND USES				
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
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.	As needed		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	A DOCARE officer is a member of OMKM's rules committee.	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	OMKM rangers conduct twice yearly inspections for CDUP compliance.	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

COMPONENT PLAN: MANAGING THE BUILD ENVIRONMENT				
		Implementation Schedule	Comments	Sub Plans
INFRASTRUCTURE AND MAINTENANCE				
Routine Maintenance				
IM-1	Develop and implement an OMMP.	Ongoing	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	OMKM is working with ‘Imiloa and a consultant on the development of a cultural and natural resources training program.	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 is required to remove trash from their respective facilities. Rangers routinely check for and pick up trash and debris while on their daily patrols.	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.	Short-term		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.	Short-term		NRMP 4.2.3.7
IM-6	Develop and implement an erosion inventory and assessment plan.	Long-term		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
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.	Immediate		NRMP 3.1.3.1 3.2.3, 4.2.3.3 PAP 5.2, 6.4, 6.6, 6.7, 6.8
IM-8	Assess feasibility of paving the Summit Access Road.	Long-term		NRMP 4.2.3
IM-9	Evaluate need for additional parking lots and vehicle pullouts and install if necessary.	Mid-term		NRMP 3.1.1.2.3 PAP 5.2, 5.4, 6.7

**COMPONENT PLAN: MANAGING THE BUILD ENVIRONMENT**

<b>Implementation Schedule</b>				
<b>Comments</b>				
<b>Sub Plans</b>				
<b>Sustainable Technologies</b>				
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.	As needed		
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		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		

COMPONENT PLAN: MANAGING THE BUILD ENVIRONMENT				
		Implementation Schedule	Comments	Sub Plans
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.	As needed		NRMP 3.2, 4.2
Best Management Practices				
C-2	Require use of Best Management Practices Plan for Construction Practices.	As needed		NRMP 4.2.3
C-3	Develop, prior to construction, a rock movement plan.	As needed		NRMP 4.2.3.1
C-4	Require contractors to provide information from construction activities to OMKM for input into OMKM information databases.	As needed		
C-5	Require on-site monitors (e.g., archaeologist, cultural resources specialist, entomologist) during construction, as determined by the appropriate agency.	As needed		CRMP 4.2.7
C-6	Conduct required archaeological monitoring during construction projects per SHPD approved plan	As needed		CRMP 4.2.7
C-7	Education regarding historical and cultural significance	As needed		NRMP 4.4
C-8	Education regarding environment, ecology and natural resources	As needed		NRMP 4.4
C-9	Inspection of construction materials	As needed		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.	As needed		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.	As needed		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.	As needed		NRMP 4.3.3.4.1

**COMPONENT PLAN: MANAGING THE BUILD ENVIRONMENT**

Implementation Schedule				
Comments				
Sub Plans				
CONSIDERATION OF FUTURE LAND USE				
Facility Planning Guidelines				
FLU-1	Follow design guidelines presented in the 2000 Master Plan.	As needed		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 cataloguing of initial site conditions for use when conducting site restoration.	As needed		
FLU-4	Require project specific visual rendering of both pre- and post-project settings to facilitate analysis of potential impacts to view planes.	As needed		NRMP 4.1.4.11
FLU-5	Require an airflow analysis on the design of proposed structures to assess potential impacts to aeolian ecosystems.	As needed		NRMP 4.1.4.4
FLU-6	Incorporate habitat mitigation plans into project planning process.	As needed		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.	As needed		NRMP 3.1.1.2.6

COMPONENT PLAN: MANAGING OPERATIONS				
		Implementation Schedule	Comments	Sub Plans
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.	Ongoing	OMKM is working with 'Imiloa and a consultant on the development of a cultural and natural resources training program.	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.	Short-Term/ As needed		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.	As needed		PAP 7

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