
MANAGEMENT PLAN

I. MANAGEMENT PLAN OBJECTIVES

The experience of the last three decades has shown the need for re-examination of the existing management procedures. The lessons from this experience are summarized in the following clusters of management objectives:

- A. To create a structure for sustainable, focused management of the resources and operations of the Mauna Kea Science Reserve in order to:
- **Protect historic/cultural resources: e.g. archaeology sites, traditional cultural practices.** While actual damage to known archaeological sites has been minimal, there has evolved a greater sensitivity to cultural values and the importance of geophysical forms in the cultural landscape. The proposed management plan incorporates these values and sets up a supportive framework for current, traditional Hawaiian cultural practices. It proposes a framework for assessing the impact of current practices on historic sites, natural resources and other uses on the mountain. If there are conflicts, the management plan would establish a procedure for resolving disputes. The plan also promotes education and further research in ethnography and related disciplines.
 - **Protect natural resources: e.g. Wēkiu habitat, alpine ecosystem.** The natural resources that should be protected begin with the mountain's geology and atmospheric qualities. These form the base for the unique ecosystems that make up the Science Reserve, Summit Road corridor and Hale Pōhaku. Tropical island alpine environments are extremely rare on the planet. The value of the mamane forest has been recognized in all plans. The passage of years has only reinforced the importance of this ecosystem. The impetus from the planning for astronomy and other activities has provided us with studies that have given us greater understanding of the uniqueness of the Wēkiu and other endemic species. This increased understanding has provided more information on potential protective and mitigative measures.
 - **Protect and enhance education and research: e.g. astronomy, Hawaiian language and culture, archaeology, ecology, geology.** The continued recognition of the importance of astronomy in the Mauna Kea Science Reserve remains critical. Its economic impact to the island is significant. Mauna Kea's global importance has grown over the last twenty years until it is now recognized as one of the premier viewing places in the world. The qualities that make Mauna Kea such a desirable site need to be preserved. Facility and infrastructure improvements must continue for the complex to retain its continued prominence in the field.

Knowledge about the potential for other research disciplines has grown. Mauna Kea has many qualities and resources that make it a great outdoor laboratory and classroom for Hawaiian language and culture, archaeology, ecology, biology, geology and a host of other disciplines. This is recognized in the plan by the encouragement of joint use of support facilities and the identification of these other disciplines as important overall goals. Education is a major function of the State of Hawai'i and the University. The value of the mountain for educational purposes with particular emphasis on K-12 and post-secondary programs for native Hawaiian students, is recognized and incorporated in the use concepts for the mountain. The proposed management plan recognizes this greater diversity of interests.

- **Protect and enhance recreational opportunities: e.g. hiking, snow play and skiing.** Recreational opportunities are an adjunct to the existence of the natural resources of the mountain. The proposed plan recognizes the importance of recreational values by identifying it as a separate resource cluster. Proposed management plans hope to address the anticipated growth in recreational uses while protecting the resources.
- **Promote public safety.** Improved access and growing numbers of visitors and vehicles raise concerns about public safety. This is already a problem with accidents and injuries; especially on the Summit Road. The plan proposes various measures to increase public safety.

B. To create a structure which meets the following objectives:

- **Promote community input.** The inadequacy of opportunities for public input has been a long standing issue. The proposed plan addresses the issue with the creation of a new management structure and review procedures for amendments and proposals that include public participation.
- **Establish local management.** The need and sentiment for local management has been clear. The plan addresses this question with the creation of a management body located on the Big Island.
- **Establish a focal point for management responsibility.** For the general public, multiple jurisdiction has created vagueness and confusion in responsibility, authority, communication and policy. The need for a focal point of management responsibility and contact has become clear. The plan addresses this goal by creating a single entity as a hub for activity and management on the mountain.
- **Establish clear lines of decision making and accountability.** Within responsible agencies, lines of authority and communication must be clear. The proposed management structure must increase the accountability of all parties on the mountain and make sure each agency is aware of its responsibilities.

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- **Economic and structural feasibility.** Funding for management has been inadequate. The proposed plan focuses on changes that can be achieved without statutory changes to existing regulations and responsibilities. Management functions would become a part of a funded function of the University supported by the Board of Regents.
 - **Provides a base for future expansion of the scope of activities in the Science Reserve.** It is anticipated that activities supported in the Science Reserve will expand beyond astronomy to include a variety of other areas such as cultural practices, sports/recreation, education, other academic areas and environmental programs. The proposed plan provides a structure designed to manage these varied activities under a single management entity.

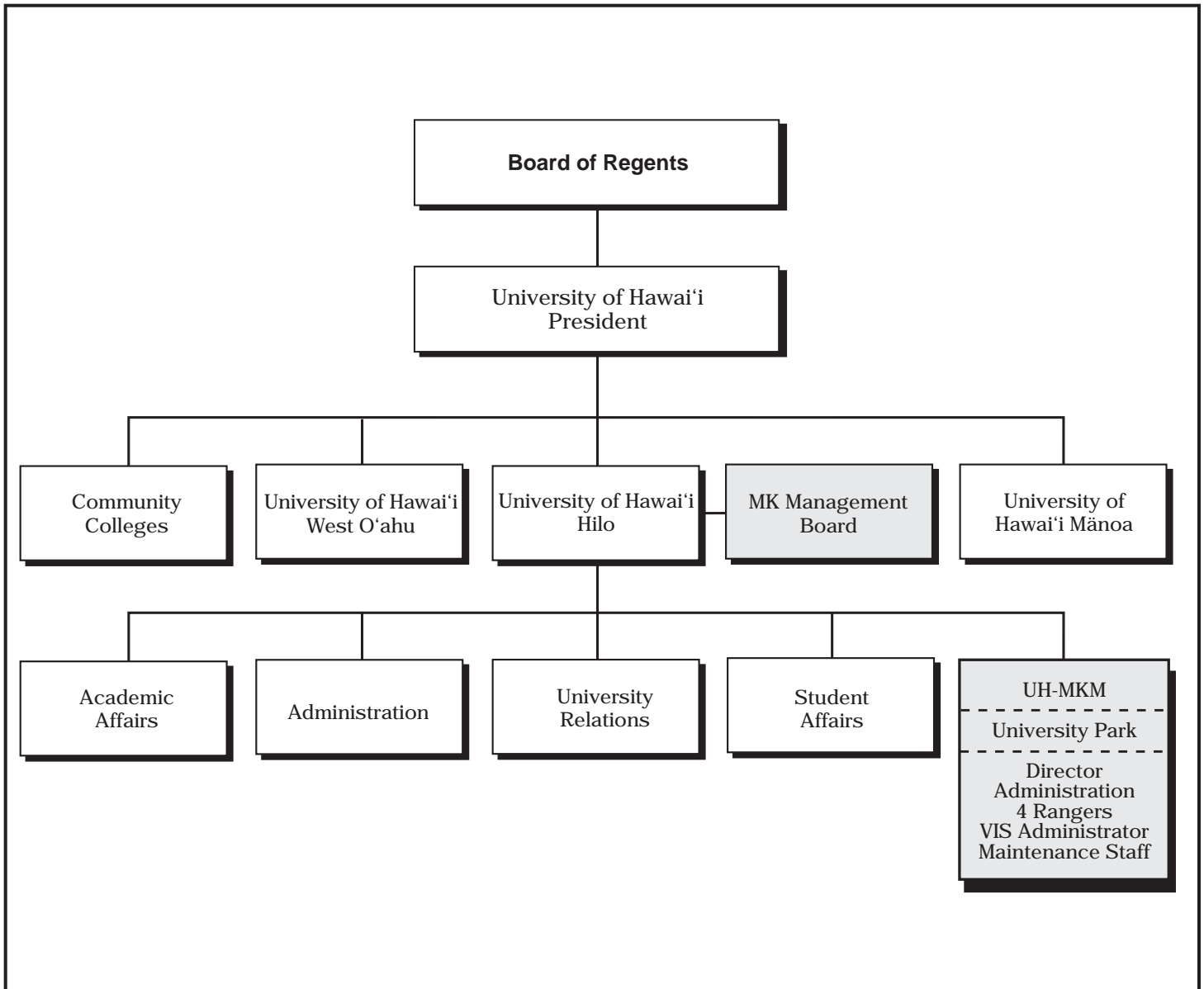
The management objectives and the proposed management plan evolved after many Mauna Kea Advisory Committee meetings and discussions with key individuals from the University of Hawai'i, Department of Land and Natural Resources and the community. Many alternative management structures were proposed, discussed, revised and/or discarded. The management plan delineated here addresses the issues mentioned in Chapter XIII and meets the objectives listed above. It can be implemented quickly with a minimum of consent or approval outside of the current University of Hawai'i system. The plan calls for the creation of a management organization capable of providing the necessary stewardship for the sustainable use of Mauna Kea. The structure can also evolve to take on more responsibility and authority as needed. The plan also considers the integrated nature of the resources and establishes clear relationships with the adjacent NAR and other DLNR lands.

II. MANAGEMENT ORGANIZATION AND PROCEDURES

Three levels or tiers of responsibility comprise the structure at Mauna Kea: land ownership, policy setting/regulatory compliance, and management. The following is proposed:

Management Organization Proposal: There is a need for a single entity to manage a comprehensive integrated plan for the Mauna Kea Science Reserve. This management organization should be based on the Big Island and recognized by the general public as the point of contact for the summit region. It could be housed within the University of Hawai'i system and funded as a separate, ongoing program unit out of the University of Hawai'i at Hilo (See Figure X-1). Housing it within a permanent unit of the UH system makes a clear statement that the University accepts the responsibility for this function, including its funding.

A suggested name for the organization is the University of Hawai'i Office of Mauna Kea Management (UH MKM or Office). It is also proposed that a Mauna Kea Management Board be recommended by the UH Hilo Chancellor and appointed by the Board of Regents to guide the operations of the UH MKM. This Board will be advisory

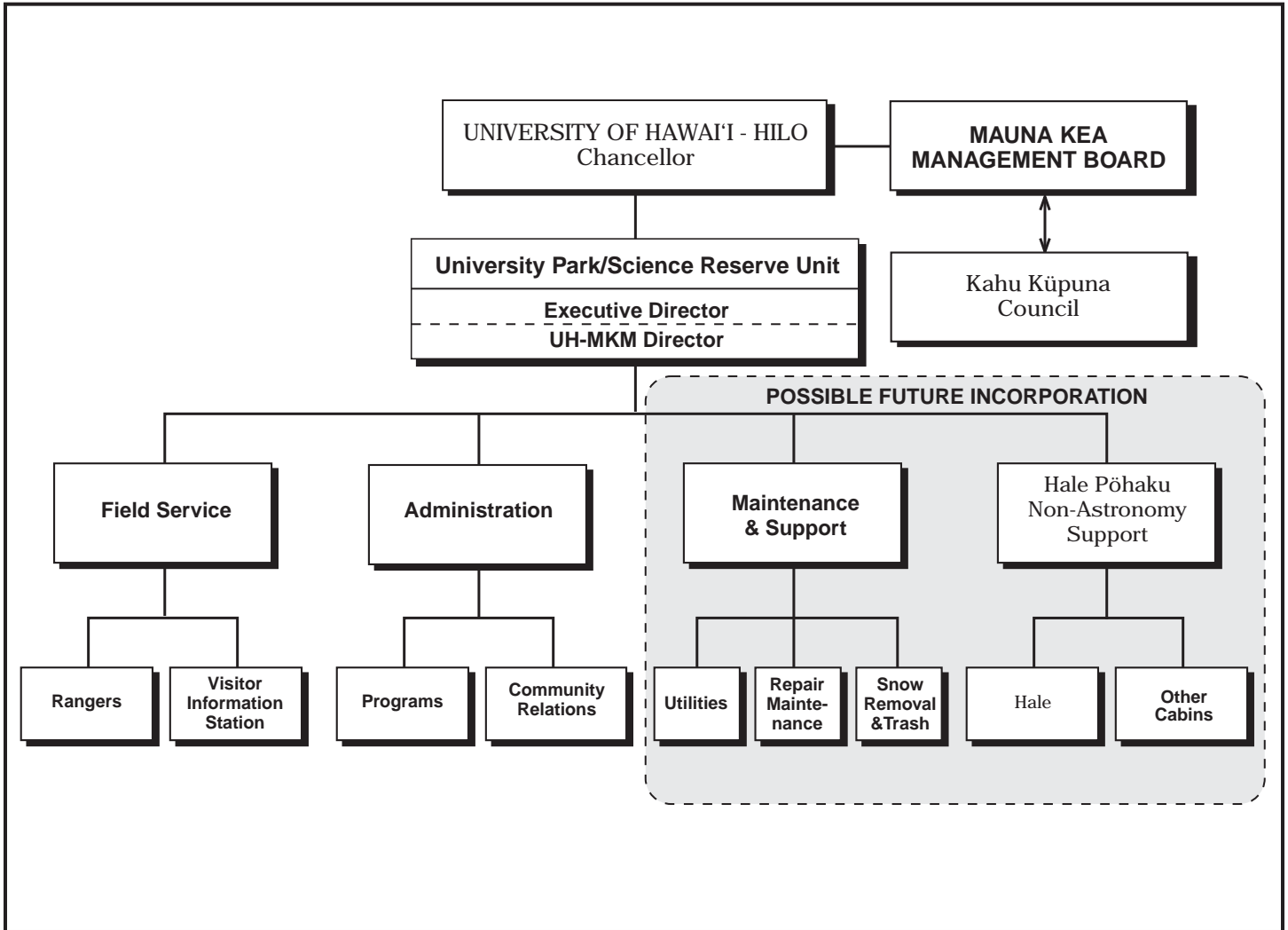


to the Chancellor. It is further proposed that the Office be housed within the unit for UH Hilo which is projected to manage the University Park. The Office should be responsible for the management of the Science Reserve, Summit Road and Hale Pōhaku. It would be responsible for establishing and enforcing management policies within the parameters of General Lease S-4191. The Office would be the focus of contact for the general public and would function as a referral and facilitative agency for issues that are outside its authority but related to the mountain.

It is projected that the UH MKM would have an initial staff which includes a director, administrative assistant, mountain rangers and general maintenance and support staff (Refer to Figure X-2). For general maintenance and support services, except for functions retained by IfA for existing leases and agreements, most of the current Mauna Kea Support Services could be transferred to the UH MKM. This transfer would be projected to occur over time after the updated master plan is adopted by the Board of Regents and the new structure is implemented.

Within the UH system, the director would have overall management responsibility for the Office. The director would be the key representative of the Office and the daily point of contact for the general public and tenant organizations on the mountain and at University Park. Any permitting and rental arrangements that may be established could be processed through UH MKM. Except for facilities managed by IfA at Hale Pōhaku for astronomy support, scheduling and requests for use of facilities or support services should be processed through the director. The Office would also address other requests, grievances and requests for information. Monitoring programs and databases would be coordinated through UH MKM to provide integrated management of the mountain.

Rangers, located at Hale Pōhaku, should be trained as cultural and natural resource specialists and it is recommended that some of the ranger staff be bilingual Hawaiian and English speakers. Their primary role would be education, coordination, monitoring and resource management. They would have a secondary enforcement role with possible assistance from DLNR DOCARE officers and County of Hawai'i police. It is envisioned that there would be a minimum of two rangers on the mountain at any time; one at Hale Pōhaku managing the entrance and one roaming in the Science Reserve. The ranger at Hale Pōhaku should register and orient visitors and coordinate programs that may be occurring at the Visitor Information Station (VIS) or other parts of the mid-elevation facilities. The ranger that is roaming would monitor people activity and make periodic field checks in resource areas. They would assist with safety and emergency procedures. Rangers would assist and educate visitors at all times. Rangers should monitor all field activities in the summit area from sports activities to volunteer rubbish sweeps and outdoor educational programs.



Organization Chart

General maintenance and research support services are currently provided by Mauna Kea Support Services (MKSS). At present these functions include:

- Food and lodging at Hale Pōhaku;
- Gas, diesel and water to existing astronomy facilities and their staff;
- Provision of utility support services, including trash removal;
- Safety and emergency services;
- Road maintenance and snow removal;
- Visitor Information Station services and manpower;
- Library and office services at Hale Pōhaku;
- Maintenance of the communications network;
- Servicing the construction camp.

After negotiations with IfA and current tenants, portions of MKSS functions, budget and personnel would be transferred to the MKM and become a permanent part of the new management organization. Existing agreements specify IfA involvement in the provision of specific utility services and support functions and any transfer of responsibilities would be contingent on agreement from existing sublease holders.

Hale Pōhaku: The mid elevation facilities at Hale Pōhaku are projected to accommodate much of the anticipated growth in facilities and programs for astronomy education and non-astronomy purposes. As the facility expands with new equipment and spaces, program specialists in education, culture and natural resources may be added to the staff as funding increases. These specialists would assist in program development and coordination and may be accommodated at either Hilo or Hale Pōhaku. New programs in culture, Hawaiian language, geology, biology, ecology, habitat restoration and others are potential areas of growth. These programs may have field, classroom and distance learning components. Facility and infrastructure support may be provided in the Science Reserve, at Hale Pōhaku or elsewhere.

Community Involvement: Mauna Kea is a community resource. Community involvement in the management of the mountain begins with the membership of the Mauna Kea Management Board. The Board should be composed of members representing the major stakeholders of Mauna Kea.

The Board's primary role is to advise the Office of the Chancellor at UH Hilo on management of the Mauna Kea Science Reserve. The Board should be the main community voice for activities and development planned for the Science Reserve. The Board would be a public forum for future uses, activities and development on the mountain. Finally, the Board could act as a facilitator during grievance procedures and assist in the resolution of conflicts.

The Board is encouraged to establish special committees on culture, environment and education, as needed, to assist it in its functioning. For cultural issues the Burial Council

model is suggested. The Burial Council is a group of appointed citizens which provides guidance on the disposition of human remains. A special Kahu Kūpuna Council made up of representatives of native Hawaiian organizations as well as individuals recognized for their specialized knowledge could function like the Council. Other special advisory committees may be formed for environmental and education issues. These committees could focus on docent and other programs for Mauna Kea.

Docent programs are suggested to expand knowledge of the mountain and to encourage greater community participation. Docents could teach visitors about the rich and complex resources of the mountain. Volunteer organizations and alliances are also encouraged in order to broaden the pool of people who value and support the stewardship of the mountain. These groups could be called upon for various functions such as the periodic maintenance sweeps, special programs or fund raising events. Groups should be encouraged to “adopt the mountain”. The UH MKM should encourage and coordinate community participation.

Grievance Procedures: The MKM should establish grievance procedures to address issues as they arise. All grievances should be presented to the director of the Office who will make an assessment about the appropriate resolution of the issue. If the issues represent broad plan or policy questions beyond the management authority of the MKM, the director should refer the questions and/or questioner to specific contacts at the appropriate agencies; usually the DLNR or the UH Board of Regents. The Office should follow the progress of the grievance and assist where it is able. Where the grievance is about management issues or items within the jurisdiction of the Office, the director will receive and respond to the questions. If the issue requires management or rule changes by the Office, the director will research the question and bring it before the Management Board for review. All grievances should be handled in a sensitive and timely manner.

Coordination and Other Agencies: A major role for the Office of Mauna Kea Management will be its role in coordinating actions that are peripheral to its responsibilities but still important to the management of the mountain. This is because authority on the Mountain is distributed among many governmental entities. Besides the University of Hawaii, the Department of Land and Natural Resources retains a major role in management of the mountain. The Office will communicate issues and concerns that it receives to the appropriate agencies and follow through in their resolution.

It needs be re-emphasized that while the University of Hawaii has the master lease for the Science Reserve, the Board of Land and Natural Resources holds the title to the lands that make up the summit of Mauna Kea. In the master lease, DLNR specifically reserved its authority over activities that are not related to the educational and research mission of the University of Hawaii. Even in the Science Reserve, DLNR is still the primary agency responsible for protection of natural and cultural resources, managing recreational activities such as hunting and hiking, as well as controlling commercial uses. These responsibilities are written into the Hawaii Revised Statutes and cannot be delegated without legislative or constitutional action. Of special importance is the DLNR authority

and responsibilities related to historic sites and cultural practices. These responsibilities remain with DLNR and are not delegated through the master lease.

Other lands related to the management of the summit of Mauna Kea are under the jurisdiction of DLNR and DHHL. The two natural area reserve areas which are part of the summit region are not part of the Science Reserve. Also, the summit access road passes through land belonging to the Department of Hawaiian Home Lands and lands managed by the Forestry Division of the Department of Land and Natural Resources. Beyond the roadway reserve the responsibility for management remains with DLNR. Finally, except for the acreage specified in the lease, Hale Pōhaku is located in the forestry reserve managed by the Division of Forestry. Access and management of the lands around Hale Pōhaku are the responsibility of DLNR.

Finally, during medical emergencies and special events like forest fires or inclement weather other agencies such as the County fire and police departments as well as the military units at Pohakuloa may play lead or major roles in responding to these emergencies. The Office of Mauna Kea Management will assist and coordinate during these situations.

III. POLICIES AND STRATEGIES

The management plan proposes policies and strategies to integrate and balance the natural, cultural, educational/research and recreational values of Mauna Kea within a framework that provides responsible stewardship of the resources. It seeks to allocate resources and priorities toward sustainable use and enhancement of the Mauna Kea Science Reserve as a Hawaiian place with a unique and significant meaning, both locally and globally.

The management plan has several sub-components: A, General Policies, B, Natural Resources, C, Cultural Resources, D, Education/Research E, Recreation and F, Commercial Uses.

A. General Policies

Access Management: Vehicular access to the summit area should be managed but not curtailed. Hiking will remain unrestricted. Pack animal access should be managed. Detailed policies and guidelines for access should be adopted and implemented by the University of Hawai'i. Access through the summit region should be managed through a control point at Hale Pōhaku. The management plan seeks to integrate the developments at Hilo, Hale Pōhaku and the Summit Region. Access management will be consistent with the provisions of the DLNR Historic Preservation Plan (March 2000). The following are some guidelines:

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1. Registration, Orientation and Permits: Visitors may be required to register at the Visitor Information Station before they go beyond Hale Pōhaku. Specified visitors and pre-authorized groups may be allowed to proceed on their own schedule without the normal orientation. Acclimatization is recommended for all visitors. During registration, visitors should be given information about risks associated with the summit area, times of use, road conditions, inclement weather and cultural and environmental resources. Information about the adjacent NAR should be included in the orientation package.

The list of permitted uses is presented later in this plan. The Office may issue permits and assess fees where desired. Special permits should be processed through the director. No fees will be assessed for traditional cultural access.

2. Hours of Operation: Hours of operation will be established by the UH MKM and communicated visually and electronically. Special permission for public vehicular use of the road outside these hours would require permission from the Office. The Visitor Information Station is currently open 7 days a week and at night for stargazing programs and special events.
3. Control Point: A kiosk and/or entrance control protocol should be developed to manage the Summit Road. Primary access management would be by the ranger at the Visitor Information Station. Signage about hours of operation and access policies should be displayed prominently at the control point.
4. Shuttle: A shuttle service may be developed for summit access as traffic increases. Visitors would park at the Visitor Information Station parking lot and access the summit via shuttle. The shuttle schedule would be developed after completion of a more detailed assessment of demand and cost.
5. Helicopters: Helicopter landings will be permitted for emergencies and special purposes.
6. Private vehicles: standard sedans and 4 wheel drives: Standard sedans would normally be restricted from the Science Reserve. Private 4-wheel-drive vehicles would be allowed beyond the control point with appropriate registration. The policy for private 4-wheel-drive vehicles should be re-evaluated if a shuttle service is developed. Travel would be restricted to designated roadways. For cultural, research, education, special recreation and other approved special uses private 4-wheel-drive vehicles may be used in the Science Reserve, with passes, even if the shuttle is developed.
7. Other means: hiking, horses, motorcycles, bicycles, snow mobiles etc.: Hiking will remain unrestricted. Access by horseback or mule should be managed to minimize impacts on the fragile summit environment. Horses and mules should generally stay on established trails and roadways. Recreational activities

involving “off road” vehicles are not allowed. This restriction should apply to both the general public and commercial vendors and their clients. “Off-road” vehicles include motorcycles, dune buggies, snowmobiles and 4-wheel-drive passenger vehicles. This restriction does not apply to emergency rescue, medical or service purposes.

Facilities and Physical Maintenance: The UH MKM will be responsible for the physical maintenance of the Science Reserve, Summit Road and Hale Pōhaku.

1. Visitor Information Station (VIS): The Visitor Information Station is proposed to be managed by the Office. It should also be expanded into a facility where the Mauna Kea experience can be made satisfying at this elevation such that people may be less inclined to go to the summit. This should reduce the pressure on the summit region and also reduce the risk of potential health and safety problems. Safety concerns would otherwise increase as greater numbers of people head to the summit. The VIS should also be the headquarters for the mountain rangers.
2. Hale Pōhaku Mid-Elevation Support Facilities: Hale Pōhaku should remain the physical management Station for the mountain. The UH MKM should manage the services and facilities at Hale Pōhaku. Dormitories for researchers on the mountain would remain in this location. IfA may retain services and facilities that specifically support astronomy and/or are included in its sublease agreements. Other functions should be transferred to the UH MKM. New concessions, other subleases and subcontractors would be managed through the UH MKM.
3. Subaru Cabins/Construction Camp: The Subaru construction cabins will become fully available to the University in February 2002. At that time they should be managed and made available for educational/research/cultural uses. Faculty and student groups should be given preference. Secondly, they may be offered to recreational and commercial users. These cabins should be administered by the UH MKM. Cabins and the area around the dormitories would be managed to avoid potential conflicts between day users and night users of Hale Pōhaku. Astronomers tend to work at night and sleep during the day while other users are likely to be active during the day. Programs and activities should be limited to those which do not generate excessive noise.
4. Stone Cabins: The historic stone cabins at Hale Pōhaku may be renovated to accommodate other uses. The exterior facades should be preserved as is. Interior renovations may be made to allow appropriate adaptive re-use. Renovation plans should be reviewed by the State Historic Preservation Office early in the planning process. If the restroom facility is restored, new methods of wastewater disposal should be reviewed in concept by both the Department of Health and the SHPO before detailed designs are started. The renovated buildings may be used for cultural programs, education, other research, environmental restoration or similar

programs and purposes. If they are renovated as cabins they may be used in a manner similar to the construction cabins.

5. Roads and Parking Areas : Roads and parking areas from Hale Pōhaku to the summit will be maintained on a regular schedule. Over time, guardrails should be installed along all segments of the road identified as potentially hazardous. A schedule for guardrail installation should be developed after a road safety study is completed. As new facilities are planned or new recreational or service roads and trails are needed, the UH MKM should be responsible for construction and maintenance. Significant new roads should be identified in the physical plan before development.
6. Trails: It is proposed that the Office of Mauna Kea Management maintain trails in the Science Reserve. Historic trails should be identified. Other trails, if developed, should be designed and maintained in a safe and environmentally sensitive manner. The Office should consider enhancements such as signage or *ahu* markers for trail identification and interpretation. The SHPO would be consulted for activities or improvements that may impact known historic or pre-contact trails.
7. Utilities and Infrastructure: The UH MKM should manage utility and infrastructure support in the Science Reserve. Agreements in existing subleases will be managed as contracted unless revised by mutual consent. The Office would be responsible for development, implementation and management of all new infrastructure and utility systems. Utility services, gas, oil and water support, and repair and maintenance facilities should continue to be managed from the mid-elevation facilities.
8. Trash and Solid Waste: Solid waste and trash are generated from three sources: construction activity, visitors and ongoing observatory activities. Construction trash is expected to abate with the slowdown in construction. When new construction begins again, the development agreements with the facility developer should include strict guidelines for trash pick-up and removal. Agreements would also include provisions for securing supplies in a manner that prevents them from being blown by high winds and scattered over the summit region. Compliance monitoring for these conditions would be the responsibility of the UH MKM. Visitor generated trash should be managed in two ways: First, there should be routine service provided by UH MKM. Second, periodic clean-ups should be organized with various community groups to sweep the summit area of windblown trash. Broad sweeps are periodically needed because strong winds in the summit region spread trash over large areas. These sweeps should be conducted in an environmentally sound manner with sensitivity to environmental and cultural features, sites and practices. Volunteers involved in sweeps should be given instructions to avoid unintentional damage to the mountain's resources. Solid waste pick-up from existing astronomy operations could become the

responsibility of the UH MKM. Regular pick-ups should be organized to serve the Science Reserve and Hale Pōhaku.

All trash receptacles in the Science Reserve should be designed, and secured to withstand high winds which may blow over normal containers and spread the trash over wide areas. Containers should be sited to encourage usage by visitors.

Handouts, paper cups and other similar items that may be disposed should be minimized to limit the supply of potential sources of trash on the mountain. This precaution should be a part of the orientation presentation at the Visitor Information Station.

Safety, Security and Liability: The UH MKM should develop and maintain safety and security plans which include the following:

1. Weather: The summit region is subject to severe weather conditions that may be life threatening. The Office will restrict access when conditions dictate. Additionally, since weather changes can occur quickly on the summit region, rangers should monitor activity to warn people when weather becomes inclement. Rangers should be trained in emergency rescue procedures. Hale Pōhaku may serve as the weather station for the summit.
2. Altitude: High altitudes may affect people visiting or working on the summit. During registration, visitors should be oriented to the potential hazards of high altitude environments. Rangers will have access to oxygen and other first aid supplies at the summit region. Even frequent visitors will be invited to spend time acclimating at the Visitor Information Station.
3. Medical Emergencies: The existing medical emergency system involves IfA, the observatories, the military, County emergency services and hospitals. Helicopter landing areas could be identified in the emergency evacuation plan. The UH MKM should coordinate medical emergencies in the Science Reserve.
4. Security and Vandalism: While this is not a serious problem UH MKM should maintain security programs. Registration at the VIS and the control point at Hale Pōhaku will aid in monitoring activity. The mere presence of uniformed personnel will often act as a deterrent. Rangers would monitor activity as they roam the summit area. Enforcement will continue to be handled in coordination with DOCARE and County police officers.
5. Other Hazardous Site Conditions: Road and site conditions may occasionally require closure of the road or certain sections of the mountain. UH MKM may coordinate such emergencies. The UH MKM should also prepare an emergency evacuation plan should there be a need for such action.

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6. Fire Protection: The UH MKM fire plan would include education for visitors, a trained volunteer fire crew, emergency procedures (especially from the summit area) and a habitat fire plan for the Hale Pōhaku māmane-naio forest area.
 7. Alcohol and Drugs: Alcohol and drugs are prohibited from the Science Reserve.

Jurisdiction: The management plan applies to the Mauna Kea Science Reserve, the summit access road and Hale Pōhaku. It does not include other state lands in the upper mountain region managed by the DLNR or DHHL.

Compliance with Regulatory Requirements: The Office will oversee permitting and compliance activity for uses on the mountain in areas of the University's jurisdiction. MKM will work with DLNR in areas of DLNR's jurisdiction. MKM could prepare annual reports on the status of activities and include regulatory compliance as a part of this annual report. The Office will monitor sub-lease holders and permit holders to check on the status of CDUA conditions, EIS mitigation measures, historic sites treatment, endangered species monitoring and other similar conditions and requirements.

Language: As a general policy, Hawaiian and English languages should both be used for signs, pamphlets, videos and other material developed for the general public. Where practical, the Hawaiian language should be given the position of prominence in the communication format.

B. Natural and Environmental Resources.

Special plans to protect and enhance the natural and environmental resources of Mauna Kea for their perpetual enjoyment and use into the foreseeable future are suggested. Baseline studies of geology and biology have been completed and can be used to protect the resource. Some of these studies have data over time that may be used to discover trends. More detailed mitigation response plans may be developed as knowledge of the resource increases. The information is contained in a GIS database and it seems desirable for the office to maintain the database.

Recommendations for geological resource management (Lockwood, January 2000) and botanical resources management (Char, January 2000) will be implemented to avoid impacts to sensitive resource areas.

UH MKM policies to support educational and research programs in these areas may call for provision of support facilities for these programs. While information about potential programs and requests are limited at the current time the demand is expected to grow. Sharing existing and future facilities developed for astronomy requires coordination with IfA and the observatories. New support facilities would also require programming, permitting, construction funds, and operations and maintenance support. Overall

management is needed when the facilities at Hale Pōhaku and the summit area are made available to these programs. Uses may be as simple as a small storage area and desk space or it may include computer hook-ups, meeting rooms and libraries. At Hale Pōhaku the impact of sharing facilities should be considered before permission is granted. If compatibility is a problem, expansion at the mid-elevation facility may be considered to provide resting, storage and work spaces for other disciplines and programs.

The two adjacent NAR areas contain some of the best natural, cultural and environmental resources in the summit area and are accessed through the Science Reserve. It is suggested that protocols be developed at the Visitor Information Station and the road/trail interface between the Science Reserve and the NAR to inform people of the importance and proper treatment of these resources.

C. Historic and Cultural Resources

This plan protects archaeological sites and provides guidance for traditional Hawaiian cultural practices. Known archaeological sites within the Science Reserve are identified in the GIS database. These sites have been identified using GPS coordinates. Additional information should be added to the database as more information becomes available.

The State Historic Preservation Office (SHPO) has prepared a plan for the historic and cultural resources within the Science Reserve (Appendix F). SHPO's proposed plan describes policies and management guidelines for archaeological sites, cultural properties, and cultural practices. The physical plan was developed with a consideration for the cultural landscape. View planes, no-build areas and restoration plans are based on an understanding of the significance of geomorphological features such as the summit *pu'u* complex, Wai'au and locations of known archaeological sites. The following policies and activities are recommended:

1. Orientation: An educational program should be developed to inform all visitors of the cultural, spiritual, historic and archaeological values of Mauna Kea. This program should be a part of the registration process.
2. Archaeological and Historic Sites: Known sites on the summit area should be preserved. Preservation sites near potentially heavy traffic areas should be identified with signage. Some of the features are difficult for layman to notice and the danger from inadvertent destruction seems greater than from deliberate tampering. Periodic photographic monitoring of sites is suggested.
3. Geo-physical Features: These features are identified in the physical plan. Educational programs should be developed to heighten the sensitivity of visitors to the natural landscape and its role in Hawaiian culture. The concept of *wāhi pana* is of special importance here. Signage from key vantage points could describe their significance. Earlier or more authentic place names should be used where they are

known. Future studies may provide more information on this topic and adjustments should then be made accordingly.

4. Current Practices: Hawaiian cultural and religious practices should be generally unregulated. However, practices that have potential to significantly impact the physical landscape or traditional Hawaiian spiritual values of sites should be managed or coordinated. Examples of this would be a revival of adze making (requiring resource extraction), and building new religious or cultural activity areas with their affiliated structures: *ahu*, platforms, shelters, walls. The operative word is “significant” which needs to be defined more specifically after discussions with potential Hawaiian practitioner groups and knowledgeable individuals. Modern non-Hawaiian cultural and religious practices would be reviewed for sensitivity to Hawaiian cultural values. Where conflicts are unresolved, native Hawaiian practices and values should take priority.
5. Advisory Committee: A Kahu Kūpuna Council of individuals knowledgeable about native Hawaiian cultural practices should be formed to advise the Mauna Kea Management Board. This Committee should be:
 - Organized by the Board;
 - Review current cultural activities and programs and recommend programs and policies to support cultural programs on the mountain;
 - Advise the Board on questions about cultural practices;
 - If needed, be available to assist in dispute resolution.

Awareness and understanding of the cultural significance of Mauna Kea is growing. The following protocols and programs are suggested as possible activities to improve the management of the cultural values and resources of the mountain:

Protocols

- Before any facility siting or infrastructure alignment decision has been finalized, if warranted, an inventory level archaeological survey of the area should be conducted to ensure that no unrecorded sites are located in the area.
- In addition to the archaeological inventory survey, it is recommended that geophysical features, *wahi pana* and other aspects of potential cultural significance be evaluated.
- Where possible, avoid impact to cultural and historic sites.
- If unavoidable mitigate the impacts.
- The treatment of historic and cultural features will be governed by the Historic Preservation Plan for Mauna Kea. The Preservation Plan includes designation of the summit area as a historic district and various protocols for use and activities on the summit area. The Plan proposes inventory surveys, significance evaluations, potential impact on cultural properties, mitigation measures and the presence of a qualified archaeologist during excavation activities. The Plan also

expands on the treatment of potential and inadvertent burials that may be discovered as well as permanent long-term monitoring programs needed to protect the resources of the mountain.

Suggested Programs

- Support ongoing ethnographic and archaeological research programs.
- Create an education oriented docent program.
- Develop a signage plan to protect resources and educate the public.

D. Education and Research

1. Astronomy: A goal of the plan update is the maintenance of Mauna Kea as one of the premier astronomical observing locations in the world. Most of the factors necessary for its continued desirability as an astronomical site are addressed in the physical planning guide for the mountain (Chapter IX). IfA will remain the lead UH entity responsible for astronomy development in the Science Reserve. However, since development and upgrades occur in the context of the master plan the UH MKM would be responsible for other activities and overall property management. Issues that need to be addressed from a management standpoint include:

- Upgrades of equipment, facilities and support facilities are needed to retain its global position. In partnership with IfA, the UH MKM would be responsible for maintenance of support facilities and infrastructure.
- Dust and light conditions near the summit must be controlled to ensure a continued high quality environment for ground based astronomy. Vehicular headlights and other night activities need to continue to be managed to avoid negatively impacting astronomical activities. The gate at Hale Pōhaku may be closed for this reason. Where possible, activities that increase atmospheric dust or otherwise degrade air and environmental quality should be prohibited or minimized. IfA and the UH MKM would monitor and manage activities that may affect these conditions.
- No new fixed radio frequency transmitters will be allowed in the Science Reserve because of their potential to interfere with radio telescopes and other sensitive astronomical detectors. The only possible exception would be a low-powered repeater for emergency use only. The use of low-power handheld transmitters (walkie-talkies and cellular phones) is permitted if they do not interfere with telescope detector systems.
- Interference from other radio transmitters: Radio transmitters can negatively affect astronomy observations. The growth of private telecommunication companies creates pressure to develop these facilities in high elevation sites. The MKM should discourage these facilities from developing in locations where they would affect astronomy operations.

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2. Non-astronomy related academic and research areas: The sentiment supporting the growth of other research disciplines on the mountain is growing. Facility implications of such support are unclear. If new spaces are needed, these proposals would be evaluated for their conformity to the plan vision before they are sent to the Board of Regents or DLNR. The following needs further definition before this support can be realized:

- Define program areas and activity zones.
- Relate to academic plans and programs.
- Identify resource needs and manage support facilities requirements and standards.
- Assess potential impact to existing uses.
- Identify functional relationships and alternative sites and strategies.
- Train rangers and other personnel to manage these areas and policies.

When programs are defined, plan amendment proposals can be developed for facility and resource support and processed through the UH MKM.

3. Education: Mauna Kea is a great outdoor classroom. Policies should encourage the use of the mountain for educational purposes. Approvals and logistical support should be coordinated through the UH MKM. The following activities are suggested:

- Set up policies and procedures to accommodate and encourage educational use of the mountain.
- Identify areas and zones of the mountain appropriate for field activities and outdoor classrooms.

The interpretation and educational components of the DLNR Historic Preservation Plan include a “Public Interpretation Plan” which addresses four major tasks. The first is an interpretive plan which designates those historic properties which are suited for public access and proposed ways in which visitation will be informative and cause the least amount of disruption to the historic properties. Second, a brochure will be prepared for distribution at the Visitor’s Center at Hale Pohaku on the historic properties found within the summit region and in the area surrounding Hale Pohaku. The third task, according to the scope of work, was to prepare a display for the Visitors Center. Instead, the plan may only propose an appropriate display or display options because plans to renovate or expand the current center have been proposed. If this is the case, then it would be premature to produce a display that might not conform to the size of general lay-out of the rest of the Visitor’s Center. The fourth task is to provide background materials that would help staff prehistory and history of Mauna Kea and to answer many of the routine questions asked by the public.

E. Recreational Activities

The existence of natural resources draws recreational users to the mountain. Recreational uses need to be managed to avoid conflicts of use and degradation of resources. Education is the best tool for reducing the impact of man on natural resources. All visitors should be given a brochure and/or briefing on the proper treatment of resources; both natural and cultural. Signage should be developed in areas of sensitivity and high traffic. The presence of rangers will also enhance resource protection while accommodating recreational activities.

1. **Hiking:** Hiking will be unrestricted but hikers should be encouraged to stay on known trails for safety and minimization of impact to natural and cultural resources. Simple rules of sustainability such as walking gently in the wilderness and carrying out what one brings in should be emphasized. Signage is suggested at appropriate places on trails to provide information necessary for safety and sensitivity to area resources. The creation of formalized trails may be necessary if monitoring determines that multiple paths or tracks are being created because of repeated visitation to specific areas.
2. **Sightseeing and Tourism:** Most visitors will come by vehicle and stay on paved roads and stay near developed facilities.
3. **Snow Play, Skiing and Snow Boarding:** Private four-wheel-drive vehicles may be allowed for skiers and snow players. Brochures could be developed to educate recreational visitors about the cultural and environmental resources that may be impacted if they ski or snow play outside of designated areas.
4. **Hunting:** Hunting is unrestricted in the Science Reserve. Hunters should be cautioned about safety regarding the presence of other people on the mountain. Commercial hunting operations are prohibited in the Science Reserve.
5. **Extreme Sports:** This term refers to any number of recreational activities that seek dangerous or unusual thrills such as down hill biking or hang gliding. While these activities are not categorically prohibited they must be evaluated on a case by case basis and require a permit. A fee may be attached to such activities. Some activities may be prohibited if they may impact resources, appear too dangerous or require support services that are unavailable.

F. Commercial Activities

Limited commercial activities would be allowed in the Science Reserve. These activities and operations should be small and low impact in nature. Commercial operations should remain small to avoid negatively impacting the primary missions of protecting natural and cultural resources and the promoting educational and research activities. It is suggested that the UH MKM manage the permitting responsibilities for these functions.

The following commercial activities are allowed in the Science Reserve and Hale Pōhaku:

1. Commercial Sightseeing Tours: At present commercial tours are allowed in the Science Reserve. Tour operators apply for a permit and pay a fee for these activities to the DLNR. These tours would continue to be allowed. Tours should generally stop at Hale Pōhaku for registration, orientation and acclimatization.
2. Movies, Commercials and similar productions: These activities would be allowed with special permits. Logistical support could be provided from the construction cabins. These activities should be allowed with the condition that they will not negatively impact the natural and cultural resources of the mountain or the priority uses for education/research and culture.
3. Concessions: Concessions may be allowed on a limited basis at Hale Pōhaku; especially around the Visitor Information Station. These concessions would be an accessory to the major activities and provide support services and items. Special care must be taken to ensure that trash does not become a problem in the operation of concessions.
4. Special Events: Facilities at Hale Pōhaku may be rented for special events if they do not interfere with education/research activities or contractual obligations. Small conferences and cultural festivals are possible activities. Additionally, with special permits the Science Reserve may be used for events like snowboarding contests.
5. Eco-education Tours: Commercial eco-tours may be allowed. These tours should be conducted on established trails and designated areas and designed to avoid impact to natural and cultural resources. The facilities at Hale Pōhaku may be used to support these tours as long as they do not conflict with education/research use of the facilities.
6. Cabin/room rentals: The facilities at Hale Pōhaku may be rented to individuals and small groups as long as education/research uses take priority and are not compromised. Commercial rentals should generally consider the rental of the construction cabins to avoid conflicts with the research dormitories.

IV. FUNDING

As part of a permanent program unit within UH - Hilo funding is anticipated through normal University procedures. In addition to basic program funds from the University of Hawai'i, the following potential funding sources may be pursued to improve management and program implementation.

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1. Existing observatories. Existing facilities at Mauna Kea may be willing to provide additional contributions for the proposed management entity and new programs.
 2. New astronomy development could share in the broader management and maintenance responsibilities of the mountain. New license agreements could consider monetary contributions to support programs and personnel needed to protect and manage environmental and cultural resources.
 3. User fees and licenses: Commercial and quasi-commercial uses such as tours, and ski operations should be charged fees. If allowed, extractive uses like quarrying done for commercial purposes should be monitored closely and charged. Traditional Hawaiian cultural practices should not be charged. A general Science Reserve vehicle entrance fee may be considered. A charge should be considered for the proposed shuttle transport. Transfer of fees from existing DLNR permits to a Mauna Kea management account should also be considered.
 4. Hale Pōhaku: If compatible with astronomy activities, Hale Pōhaku could be made available to other parties. Small conferences and retreats may be held. Education/ research/ culture related gatherings should have preference but other uses could be accommodated with fees.
 5. Construction Cabins: When the Subaru cabins are turned over to the University of Hawai'i in 2002, they could be made available to other users. The construction cabins may also be renovated to serve as rental accommodations. Support services could be provided from the Hale Pōhaku kitchen and housekeeping staffs.
 6. Stone Cabins: These facilities may also be rented in a similar fashion as the construction cabins.
 7. Visitor Information Station: Fees could be charged for private or non-UH use of the Visitor Information Station and related facilities. Concessions may be permitted.
 8. Research and other grants: Funding could be sought from foundations and governmental agencies for research and management objectives.
 9. Private and non-profit donations: A tax exempt trust fund for the maintenance of Mauna Kea could be set up. This fund could be the repository for special funds that may be received. This would support, not replace, the normal O&M budget.
 10. The Department of Land and Natural Resources is responsible for many of the management responsibilities on the mountain. It may be possible to obtain additional DLNR resources to assist in some of the overall management responsibilities.

In summary, management functions must be funded. Funding would be from the UH system in cooperation with astronomy interests and supplemented by other sources.