

Fritz Klasner Written Direct Testimony

My name is Fritz Klasner. I am the Environmental & Natural Resource Program Manager for the Office of Mauna Kea Management (“OMKM”). I am responsible for developing programs and identifying collaborative partnerships that will help OMKM best achieve its overall goal to manage and protect lands managed by the University of Hawai‘i (“University”) on Mauna Kea. My position was created in 2012, and I was hired as the first Environmental & Natural Resource Program Manager as part of OMKM’s on-going efforts to fulfill its long-term commitment to preserve and protect the natural resources found within the Mauna Kea Science Reserve, Halepohaku, and the road corridor. To prepare for my testimony, I reviewed Exhibits A-9, A-10, A-16 through A-22, and A-40.

Background

In 1991, I received my Bachelor’s Degree from St. Olaf College. I graduated with honors, majoring in Biology with a minor in Environmental Studies. In 1998, I received my Master’s Degree from Oregon State University in Geography with a resource emphasis. From 2002 through 2007, I worked for the National Park Service at the Pacific Island Network as an Ecologist. I was the principal scientist for the development of a long-term monitoring program for National Park Service units in the tropical Pacific. From 2007 through 2012, I worked for Kenai Fjords National Park in Alaska first as the Natural Resource Program Manager and then as the Chief of Resource Management.

Management Actions

Through the Environmental & Natural Resource Program Manager, OMKM is addressing the management actions outlined in the Comprehensive Management Plan (“CMP”). Exhibit A-9. The CMP contains 103 management actions categorized into four component plans

which are then further subdivided into sub-components, as illustrated in Table 1 of Exhibit A-22:

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

Most management actions have either been implemented or are in progress. Many actions are considered “ongoing” as they are long term, continuous management responsibilities. Appendix A of Exhibit A-22 details the implementation status with explanations for individual CMP management actions. OMKM has identified five priority categories: (1) research and inventories; (2) monitoring; (3) resource management programs; (4) education, training, and outreach; and (5) printed materials and public forums. Efforts have been initiated in all of these categories.

Research Efforts

Several of the management actions in the CMP relate to OMKM’s research efforts to establish baseline data (i.e. inventories). We have been tasked with initiating surveys and studies

on flora and fauna, geology and hydrology, climate/weather and air quality, and erosion. We are currently in the midst of a four-year study on permafrost in the summit region as well as the development of a climate change sea-level to summit monitoring system, and development of a climate change models that encompass the entire Island of Hawai'i. The climate change projects will help track changes in weather and climate over the long term and will provide us with data to evaluate altitudinal changes and impacts on ecosystems from sea level to the summit.

Our survey of native and other summit arthropods is ongoing. We are continuing our research into the biodiversity of arthropods, including the wēkiu bug. In 2014, OMKM initiated a study of surficial geology and erosion in cinder cone environments, with LiDAR data collected for the summit and road corridor above 12,500 ft. This study will help to better understand natural erosion and mitigate impacts of existing infrastructure and improve our characterization of arthropod habitat. Using data and technology from this erosion study, a 2016 University of Hawai'i at Hilo ("UH Hilo") graduate student thesis produced the first quantitative habitat maps for the wēkiu bug on Mauna Kea. Also in 2016 we are initiating a multi-year study of native birds and bats at high elevations. This study will use new acoustic technologies and radar to identify seabirds, forest birds, bats, and other species that may be found near tree-line or in alpine regions of Mauna Kea.

We are also conducting surveys of human activities and needs such as commercial tour capacity and fees, traffic, parking and public facilities. Rangers continue to submit daily reports on human activities, including the number of vehicles by type and observations of visitor activities. The data is then inputted in a database. A vehicle counter was installed to keep a real time count of all vehicles above Halepōhaku, including specific counts of observatory and commercial vehicles on the mountain. A consultant has been secured using Capital

Improvement Project (“CIP”) funds to study and design improvements to the Visitor Information Station (“VIS”) and surrounding areas to address parking and vehicular and pedestrian flow.

This CIP project also includes evaluation of restoration needs in the affected area and addition of a greenhouse for sustained restoration activities at high-elevations on Mauna Kea.

Monitoring

Monitoring is an important aspect of management. It is an ongoing and long-term priority that is needed to assess the status of the resources over time. A monitoring plan to monitor archaeological resources was reviewed and approved by the State Historic Preservation Division (“SHPD”) and is being implemented. Biologists accompany archaeologists as part of this SHPD-approved plan, providing a collaborative and comprehensive survey of all University managed lands for both native and non-native species. As previously mentioned, surveys of the wēkiu bug and arthropod species are ongoing. Additionally, surveys are periodically conducted for invasive species - monthly surveys of the mid-level facilities, quarterly surveys of the summit facilities, and annual surveys across University-managed land. Annual surveys of the wēkiu bug are also being conducted. Invasive species monitoring focuses particularly on ants near the facilities at Halepōhaku and at the summit as our Invasive Species Management Plan (Exhibit A-40) identifies a biosecurity approach and in the process of monitoring for and removing ants other taxa are also addressed. As our baseline data develops, our monitoring programs will be appropriately adjusted.

A draft debris monitoring plan is being tested and updated to both ensure the mountain is kept in an unimpaired state while providing monitoring information to guide and sustain management response to best address the sources of litter and debris that may be left behind. Besides removal of any litter or debris, as articulated in the principals of adaptive management,

once tested and refined, this draft plan will be submitted to Kahu Kū Mauna Council and the Maunakea Management Board for consultation, review, and approval.

Resource Management Programs

One of our primary areas of concern is the prevention and control of invasive species. Invasive species have the potential to impact the wēkiu bug, other native species, and the overall health of Mauna Kea's unique ecosystem. The Maunakea Invasive Species Management Plan is regularly reviewed, revised, and implemented. Exhibit A-40. It was reviewed by both the Kahu Kū Mauna and the Mauna Kea Management Board ("MKMB") and implementation is supported by the Hawai'i Ant Lab and Big Island Invasive Species Committee. A graduate student is currently studying the efficacy of recommended and required preventive actions stipulated in the plan, and evaluating the feasibility of a vehicle car wash facility. Such research partnerships with University faculty and students continually inform and update our management programs.

Fireweed removal is an ongoing activity. Rangers continue to remove fireweed when they find it along the road and the summit areas. We coordinate an active volunteer program to remove fireweed and other invasive plants. Since its creation in 2012, OMKM's volunteer program engaged over 1,000 volunteers, working over 7,000 hours, removed over 1,500 bags of invasive weeds, and planted several hundred Mauna Kea Siversword. In addition to removing invasive species, OMKM is working on restoring native vegetation. OMKM worked with a Kamehameha student with his science project and a Hawai'i Community College student which included propagating native plants. The plants are being cared for by OMKM and will be planted in the Halepōhaku area.

In 2013, an invasive ant was discovered at Halepōhaku and are currently present along the Maunakea Access Road from the Mauna Kea Forest Reserve up to Halepōhaku, along Mana

Road, in Hakalau National Wildlife Refuge, and in the Department of Hawaiian Home Lands. The ant is fortunately relatively benign. Preventing the introduction of predatory ants remain a high priority. Ant monitoring is conducted quarterly at the summit facilities and monthly at the facilities at Halepōhaku. Large deliveries are inspected by a biologist approved by the Department of Land and Natural Resources (“DLNR”) per the requirements identified in the Mauna Kea Invasive Species Management Plan. Exhibit A-40.

We are in the process of developing a wēkiu bug habitat restoration plan. Data from wēkiu bug habitat mapping research, alien arthropod, invertebrate studies, topography and wēkiu bug food distribution, and climate studies will provide the basis for developing habitat restoration plans for the wēkiu bug.

Geographic Information System data about built infrastructure, from the locations of all signs to sub-lease boundaries, along with natural and cultural resource data such as locations of historic properties, geologic maps, and terrain elevation is gathered when it existed previously or collected such as with sign locations. For the purposes of a sign database, this information is the basis for preparing a draft sign plan for Mauna Kea that will be submitted to Kahu Kū Mauna Council and the MKMB for consultation, review, and approval per the CMP.

Educational Programs for Staff and General Public

OMKM recognizes the need to formally educate and train management staff, stakeholders and the general public about the resources and significance of Mauna Kea. The Mauna Kea rangers help to educate the general public about Mauna Kea through their daily interactions with them. 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. A video orientation for visitors will be developed and shown in the VIS.

We have initiated programs to educate management staff. The OMKM Maunakea User/Resource Orientation program was launched in the Summer of 2013. It is a requirement that all observatory and support staff, vendors, construction workers, mid-level support and VIS staff, University employees, and commercial tour drivers attend the orientation prior to their first visit to Mauna Kea and repeat the orientation at least every three years thereafter. Over 1,500 employees across all observatories, OMKM, Mauna Kea Observatories Support Services (“MKSS”), commercial tour companies, etc. have attended the training since 2013. OMKM continues to offer orientations to reach the remaining employees and new employees. The current focus is to incorporate contractors and vendors and ensure observatory staff have all taken the orientation within the past three years. OMKM currently offers this orientation to everyone via an online webinar and in-person format and plans to launch orientation sessions on-demand online as a more efficient means of reaching contractors, vendors, visiting staff, or other interested parties. OMKM is working with Kahu Kū Mauna on updates and narrative for the online version of the orientation. A staff and volunteer training plan was submitted to Kahu Kū Mauna Council and the MKMB and approved in 2016, regular trainings on topics such as historic preservation, safety, and invasive species have been held for all OMKM, MKSS, and VIS staff.

We are developing outreach programs to get the community more involved. We host volunteer groups from various organizations including Hawai‘i Island Chamber of Commerce, Circle K (Kiwanis youth), Interact (Rotary Youth), Hawai‘i National Guard Youth Challenge Academy, UH Hilo student groups, and general community members. OMKM also hosted student groups from Ke Ana La‘ahana Public Charter School and Hawai‘i Academy of Arts and Sciences. Volunteer events typically include both opportunities for the public to assist with on-

the-ground activities as well as include a discussion and question-and-answer session about Mauna Kea resources and management.

OMKM participates in public events, community gatherings and other opportunities to inform the community about Mauna Kea. We continue to seek opportunities to participate or speak at public forums, including community meetings, local organization's membership meetings, etc. We partner with scientists to bring Mauna Kea research to local schools and partner with young students and help them with science projects and participation in local science and state science fairs.

Educational Material

The education process and outreach efforts include the development of educational materials, such as brochures, signage and the dissemination of materials. A recently (2016) updated resource brochure containing information about the resources and significance of Mauna Kea is available, a cultural brochure, and "Visiting Maunakea Safely and Responsibly" are available for public distribution at the VIS, and other public venues. OMKM's safety brochures have also been updated. With input from Rangers and Kahu Kū Mauna, signs were installed to highlight cultural awareness and safety issues. Trading cards, coloring sheets, and other material suited for younger audiences provide opportunity for both activities and learning about Mauna Kea. An Education and Outreach Strategy (Plan) for all stakeholders on Mauna Kea is being prepared in fall 2016.

Community Recognition

In recognition of OMKM's sensitivity and concern for the environment as demonstrated by its innovative environmental practice, OMKM received Kona-Kohala Chamber of Commerce's 2016 Pualu Award for Environmental Awareness. Established in 1979 by the

Kona-Kohala Chamber of Commerce, the Pualu Awards celebrate individuals, non-profit organizations, and businesses that bring people together to get positive things done in the community. The Kona-Kohala Chamber of Commerce cited OMKM's research on the wēkiu bug, its volunteer program that involves members of the community in its conservation efforts, and its outreach programs to elementary schools, rotary clubs, chambers of commerce and community associations as the basis for the award.

Overview of Programs and Projects since 2000

The table below summarizes projects initiated since 2000, when OMKM was established.

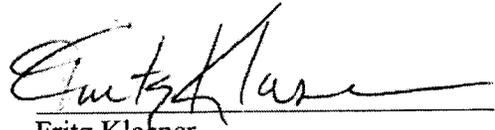
Topic	Year Established	Notes
Closing of road to the top of Pu'upōliahu	2001	Out of cultural concerns relating to Pu'upōliahu, Kahu Kū Mauna requested that the road on Pu'upōliahu be closed to vehicular traffic.
Establishment of the Ranger Program	2001	OMKM establishes the ranger program to help oversee daily activities on the mountain and look out for the safety and welfare of visitors to the mountain.
Wēkiu bug: annual monitoring	2002 - present	Annual surveys of wekiu bug began.
Mauna Kea—Ka Piko O Ka 'Āina	2004	Review of archival and historical documents relating to Maunakea and oral history/interviews of individuals with ties to Maunakea, By Kumu Pono Associates. Two volumes.
Wēkiu bug: life history study	2005-2011	Study of the biology and life history and genetics of the wēkiu By Dr. D. Rubinoff and Dr. J. Eiben.
Archaeological Inventory Survey and historic buildings survey	2005-2010	Archaeological inventory of the summit and access road, and historic buildings at Halepōhaku by

		Pacific Consulting Services, Inc.
Climatological Analysis of Meteorological Observations at the Summit of Mauna Kea	2006	Dr. S. Businger and S. C. DaSilva; review of data from two Maunakea observatories
Invasive Species: annual surveys	2007-present	Survey to assess the introduction of invasive species, and alien species with potential to become an invasive species
Lake Waiau water level monitoring	2009 – present	Regular monthly OMKM Ranger photo documentation of the lake's level.
Botanical Inventory	2011	By Dr. G. Gerrish; inventory of botanical resources on UH's managed lands
High Altitude Climate of the Island of Hawai'i	2012	Dr. S. Businger and S. C. DaSilva; review of historical Maunaloa data as a means of assessing climate conditions on Maunakea.
Arthropod Biodiversity inventory	2011-2017	By Dr. J. Eiben; Inventory of other arthropods.
Climate Change Forecast Downscaling	2011-2017	Dr. S. Businger; model to look at weather changes over the next 50 years.
Modelling of Aeolian Drift and Bug fall for wēkiu bug	2012	Dr. S. Businger and L. A. Eaton; Assess Aeolian distribution of Wēkiu bug food on the summit
Scientific Symposium on Tropical Alpine Ecosystems	2012	OMKM sponsored international symposium with Dr. J. Juvik as principal coordinator
Permafrost research and monitoring recommendations	2012 – 2017	Study to assess whether permafrost still occurs on the summit by Dr. N. Schorghofer
Snow cover trends on Maunakea	2012, 2016	Student led review of snowfall data
Invasive Species: site monitoring	2013	Monthly surveys at Halepōhaku, quarterly surveys of Observatories, annual surveys concurrent with Historic Property monitoring
Sign notifying visitors to not hike to the summit of Pu'uwēkiu	2013	After consultation with Kahu Kū Mauna. Requesting visitors to not hike to top of Pu'uwēkiu out of cultural concerns.
Botanical monitoring	2013 – present	Concurrent with historic property monitoring
Maunakea User Orientation	2013 – present	All those working on Mauna Kea must take every 3 years

Resource Brochure	2013	Publication on resources found on UH's managed lands
Burial Treatment Plan	2014	Approved by State Historic Preservation Division
Long-Term Historic Property Monitoring Plan	2014	Approved by State Historic Preservation Division. [Note: Annual monitoring began in 2012 and continues through present.]
Climate Monitoring Network design for Maunakea	2014 – 2017	Dr. T. Giambelluca; network of climate monitoring from sea level to the summit to assess climate change
Surficial Geomorphology and Erosion Monitoring	2014-2018	By Dr. R. Perroy. Baseline erosion rates and processes
High resolution habitat suitability modeling for a narrow-range endemic alpine Hawaiian species	2015-2016	By Dr. R. Perroy and N. Stephenson. Habitat models for the wēkiu bug.
Wēkiu bug: habitat restoration study	2015-2018	By Dr. J. Eiben and J. Kirkpatrick Study on restoring wēkiu bug habitat
Invasive Species: Management Plan	2015 – present	Approved by the Maunakea Management Board in 2015. [Note: OMKM implemented invasive species inspection protocols in 2013]
Invasive Species: Vehicle wash efficacy and evaluation of preventive measures	2015 – 2017	By Dr. J. Eiben and J. Zarders; review of current methodology
Resource Brochure	2016	2 nd edition released in 2016
Seabird, Forest Bird, Bat inventory	Initiate in 2016-2019	By Dr. P. Hart. Assess presence absence and relative abundance and distribution.

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DATED: Hilo, Hawai'i, October 11, 2016.

A handwritten signature in black ink, appearing to read "Fritz Klaßner", written over a horizontal line.

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Kea Management