

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

February 24, 2023

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

REGARDING: 2022 Annual Progress Report the implementation of the Mauna Kea Comprehensive Management Plan (CMP) (non-action item)

PERMITTEE: University of Hawai'i at Hilo

REPRESENTATIVE: Gregory Chun, Executive Director, Center for Maunakea Stewardship

LANDOWNER: State of Hawai'i; leased to the University of Hawai'i under General Lease S-4191

LOCATION: Mauna Kea Science Reserve, Ka'ōhe Mauka, Hāmakua District, Hawai'i

TAX MAP KEYS: (3) 4-4-015:009 (Maunakea Science Reserve)
(3) 4-4-015:012 (Halepōhaku)

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

SUBZONE: Resource

ATTACHMENTS: Exhibit 1: Map of Subject Areas
Exhibit 2: 2022 Annual Progress Report to the Board of Land and Natural Resources

dlnr.hawaii.gov/occl/files/2023/02/2022-Annual-Progress-Report.pdf

ONLINE LIBRARY: dlnr.hawaii.gov/occl/maunakea-management

MAUNA KEA STEWARDSHIP AND OVERSIGHT AUTHORITY: dlnr.hawaii.gov/maunakea-authority

BACKGROUND

In July 2022 Governor David Ige signed Act 255, which established the Maunakea Stewardship and Oversight Authority, which will assume governance and management authority over Mauna Kea lands. These lands encompass tax map key (TMK) parcels:

- (3) 4-4-015:009, an 11,288-acre State-owned parcel currently leased by the University of Hawai'i under General Lease S-4191, with day-to-day management delegated by the Board of Regents to the Center for Maunakea Stewardship (CMS). It contains most land within a 2.5-mile radius of the site of the UH 2.2-m telescope – in effect, all land above 3700 meters in elevation except for a pie-shaped wedge set aside as the Mauna Kea Ice Age Natural Reserve. The lease commenced on January 1, 1968, and is set to expire on December 31, 2033.
- (3) 4-4-015:012, a 19.3-acre State-owned parcel below the summit region currently leased to the University of Hawai'i under General Lease No. S-5529. It is the site of the Onizuka Center for International Astronomy (Halepōhaku Mid-Level Facilities). The lease commenced on February 28, 1986, and is set to expire on February 28, 2041.

In addition, Grant of Easement No. S-4697, covering the Maunakea Access Road, was issued to the University as of September 8, 1981. The easement is coterminous with GL No. S-4191, ending on December 31, 2033.

Exhibit 1 contains a map of the subject parcels.

During the transition period to the Mauna Kea Stewardship and Oversight Authority the University will continue to fulfill its management responsibilities.

COMPREHENSIVE MANAGEMENT PLAN

On April 9, 2009, the Board of Land and Natural Resources approved the Maunakea Comprehensive Management Plan (CMP) for the Maunakea Science Reserve, including Halepōhaku and the Summit Access Road, Ka`ohe, Hāmākua District, Hawai'i.

On March 25, 2010, the Board approved four associated resource subplans which elaborated on the management actions contained in the CMP. The four plans were the Natural Resource Plan, Cultural Resources Management Plan, Public Access Plan, and Decommissioning Plan.

A condition of the approval is that the University Board of Regents, or its authorized designee, submit annual reports to the Board of Land and Natural Resources, in writing and in person, with information regarding the status of the development of each sub plan, and the status of the development of each management action.

This current report reflects the ongoing management actions and activities in the Science Reserve.

This and previous years' reports are available on OCCL's website at dlnr.hawaii.gov/occl/maunakea-management.

2022 UPDATES

In October 2022 the University submitted a Conservation District Use Application for the decommissioning of the Hōku Ke'a Observatory. The permit application will be presented to the Board for consideration at a regularly scheduled meeting in April 2023.

On January 18, 2022 the Board of Land and Natural Resources approved the decommissioning plan for the Caltech Submillimeter Observatory. The work is in progress, and is scheduled for completion by the end of 2023.

On July 22, 2022 the University presented a supplement to the 2009 Comprehensive Management Plan. A contested case request was made at the Board hearing, and the 2022 amendments have not been implemented.

On January 10, 2023 a fluid leak was discovered at the University's 88-inch Observatory. The Observatory's chilling system had been powered down in advance of a winter storm, and when it was powered up engineers discovered that the fluid in the system was low. Two visible leaks were discovered, one in the pump that circulates fluid in the system, and one on an overflow valve. An unknown amount of fluid entered a drain pipe in the floor. The drain ends at an obstruction, presumably frozen ground. The leak was immediately reported to the State Department of Health (DOH) and to the Department of Land and Natural Resources. Material was sent to an EPA-certified lab in California for testing. The University has convened a working group to address clean-up and mitigation; they are currently awaiting test results from the lab and DOH guidance.

RECOMMENDATION

The Office of Conservation and Coastal Lands is presenting the attached annual report as a "non-action" item on the Board's Agenda. We have invited a representative from the Center for Maunakea Stewardship to give a brief presentation to the Board.

Respectfully submitted,

S Michael Cain

Michael Cain, Administrator
Office of Conservation and Coastal Lands

Approved for submittal,



Dawn N. S. Chang, Chairperson
Board of Land and Natural Resources

UH Management Areas

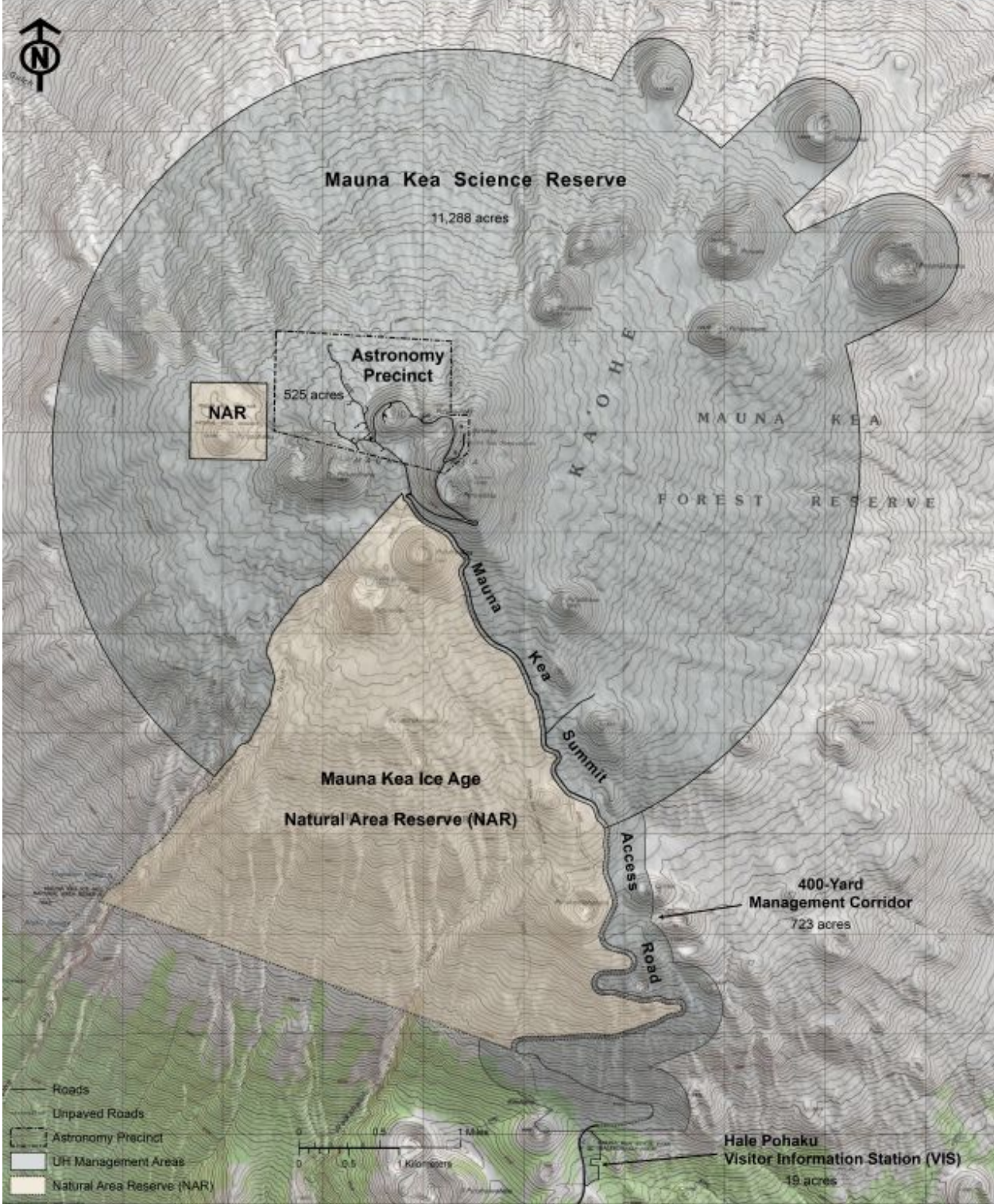


Exhibit 1: Map of Subject Areas

University of Hawai'i Hilo
Center for Maunakea Stewardship
Maunakea Comprehensive Management Plan
2022 Annual Progress Report

Prepared for
The Board of Land and Natural Resources
State of Hawai'i



'Āhinahina Maunakea 2022

I. Introduction

In 2009 the Board of Land and Natural Resources (BLNR) approved the Mauna Kea Comprehensive Management Plan; UH Management Areas (2009 CMP). Consistent with Hawai'i Administrative Rules (HAR) § 13-5-2, the 2009 CMP is the University of Hawai'i's (UH) "comprehensive plan to manage multiple uses and activities in order to protect and conserve natural and cultural resources." To achieve comprehensive management of the UH Management Areas, the 2009 CMP identified 12 focus areas, each with a desired outcome, and management actions (103 in total) designed to achieve the desired outcomes. As specified in the 2009 CMP, status reports and periodic updates/supplements are to be conducted to ensure the management actions remain relevant and sufficient to achieve the desired outcomes based on experience, data, and learning. Annual progress reports (APR) to DLNR are called for in the 2009 CMP and this report represents our update for FY22.

Consistent with past practice, this report covers the fiscal year 2022 (FY22), which started on July 1, 2021, and ended on June 30, 2022, but may also include matters and data outside FY22 to provide historical context, trend analyses, and relevancy with recent events. Also, as defined in the updated Comprehensive Management Plan described below, progress updates are "not intended to be a status report on the resources in the UH Management Areas nor is it meant to provide a detailed status update on every CMP management action." Rather, the purpose of the 2022 APR is "to keep the department informed of progress and the future direction of our management program for Maunakea." Highlighted here are the management activities that comprised the University's strategic priorities for the period covered.

II. Background

In 1964 the Hawai'i State Legislature passed Senate Concurrent Resolution 16 (SCR 16) stating that the "State of Hawaii and its citizenry are most desirous and willing to co-operate and aid in the promotion of our nation's space program and research to the benefit of the County of Hawaii, the state and the nation." It was resolved that the governor set aside and establish an appropriate area on the summit of Maunakea for the installation and operation of telescope observatory and astronomical activities. In fulfillment of SCR 16, the Mauna Kea Science Reserve (MKSR) was established in 1968, and the Board of Land and Natural Resources (BLNR) and UH entered into an agency-to-agency lease granting UH a lease of the Science Reserve for a term expiring on December 31, 2033 (MKSR General Lease). The lease is gratis, a common practice for leases between government agencies and one that supports the goal of benefiting the County of Hawai'i, the State, and the Nation.

Also in 1964, Governor John A. Burns recognized that Hawai'i has ". . . some obvious natural advantages in this area of scientific research, [and that Hawai'i] must capitalize on these,

utilizing all our available resources at the University, in the industrial community and at the levels of State and local government.” He also emphasized that Hawai’i is not “constrained by these physical advantages.” “We can acquire competence in any field of scientific inquiry,” and “[t]he limitations are only those we impose on ourselves.” (Honolulu Advertiser, August 7, 1964).

Governor Burns understood the demand for manual labor in agriculture would decrease over time, and that future jobs would require technicians and scientists. The development of a research enterprise would provide jobs of the future. The two areas Governor Burns felt the state should pursue were in the fields of oceanography and astronomy, areas in which the State of Hawai’i unquestionably excels.

In the State’s effort to establish astronomy as a viable research endeavor and establish Hawai’i as a center for astronomical research, UH entered into subleases with 11 organizations to operate astronomical observatories. BLNR approved all subleases, which are co-terminus with the MKSR General Lease. Each sublessee is obligated to provide a guaranteed percentage of viewing time to UH. Viewing time provides invaluable advantages for advancing UH, Hawai’i’s only State-funded institution of higher education, as a center for excellence in research, including astronomy.

At little cost and risk to the State, UH is recognized as one of the Nation’s leading astronomical research institutions and globally as the center of excellence for astronomical research. This recognition contributes significantly to the State’s efforts to expand its high-technology sector. The annual economic impact of astronomy in the State in 2019 was \$220.95 million (\$261.33 million in 2022 dollars (CPI-U)), with the largest impacts found on Hawai’i Island and Honolulu, \$101.68 million (\$120.26 million in 2022 dollars (CPI-U adjusted)) and \$86.96 million (\$102.85 million in 2022 dollars (CPI-U adjusted)), respectively.¹ Additional benefits accrue to the State and local communities through opportunities in scientific, professional, technical, and administrative employment within the local community.

III. Governance

A. Alternative Models and Internal Restructuring

To fulfill its mandate to develop a world-class astronomy program for the State of Hawai’i UH, through its Institute of Astronomy (IfA), became the responsible entity for managing the University’s leased lands on Maunakea and stewardship of the mauna. In 1998 the State

¹ In 2022 UHERO updated its 2014 economic impact analysis for astronomy. Numbers reported are for 2019 which was the last year of pre-pandemic operations [UHERO Astronomy Summary 2022.pdf](#).

Auditor issued a critical report of UH’s management of Maunakea which led to the development of the Office of Maunakea Management (OMKM) located within the University of Hawai’i Hilo and a comprehensive community-based management structure comprised of the Maunakea Management Board (MKMB), Kahu Kū Mauna (KKM), and the Environment Committee (EC). These advisory groups remain in place today and play a central role in reviewing and providing community input on all major policies, plans, permits, and projects proposed for the University’s managed lands on Maunakea. While advisory, their implied authority is evident in decisions to revise, add requirements to, and even halt projects from moving forward.

As in all things, over time the University recognized the need to evaluate its current organizational structure for Maunakea. One component of that evaluation was a review of alternative governance models designed to expand the involvement of key agency collaborators and stakeholder groups in the management of Maunakea. At its April 16, 2020 meeting, the UH Board of Regents (BOR) considered agenda item V.C, “Status Update on Items Relating to Maunakea Management Pursuant to Board of Regents Resolution 19-03 (Discussion Only).” The BOR was presented with alternative governance models to fulfill the requirements of BOR Reso. 19-03, Paragraph 9, which asks “whether the management of the Maunakea Science Reserve (MKSR) would be better served if transferred to a governmental authority or other third-party entity, or through alternate management mechanisms.”

A number of existing management models used by other state agencies and private organizations that manage large tracts of land with diverse and complex land management issues were reviewed. Land managers were asked about the benefits and challenges of working under various land management structures. Five models were identified: Attached State Agency Model, BLNR Management Model, Third-Party Model, Collaborative Stewardship Model, and Collaborative Stewardship within UH Model. These models are more fully discussed in the presentation to the BOR available online at [UH Alt Gov Models](#).

UH’s preference was for Model 4A identified in the review (Collaborative Stewardship within UH). This model could be implemented without legislation, minimizes the complications arising from HRS Chapter 171 provisions governing disposition of public lands, and leaves only the summit area and Hale Pōhaku under direct UH management in full collaboration with stakeholders. If the world-class astronomy envisioned in the 1960s by the state, Hawai’i County, and UH leaders is still one of the key objectives for Maunakea, UH must play an active role not only in astronomy but other educational opportunities that the unique cultural and natural attributes of Maunakea provide.

The BOR noted that a change to a completely new model that removed UH from its lead role would require action by state entities outside UH so took no action on that specific matter. However, work continued on BOR Reso. 19-03 to include development of an internal restructuring plan of UH’s management operations for Maunakea and work to expand membership and representation on the MKMB, KKM, and EC.

At its August 20, 2020 meeting, the BOR considered and adopted agenda item VI.B, “Approval of Revised Internal Restructuring Plan for Management Operations of Maunakea Lands (*continued from May 21, 2020*).” The proposed plan is a requirement of BOR Reso. 19-03, paragraph 8, which provides that the “purpose of the plan is to improve operations and management and make it more efficient, effective, and transparent.” Outreach was a key element of BOR Reso. 19-03, paragraph 8.

After consultation and outreach with various stakeholders, both formal and informal, findings were reported to the BOR. Outreach included seeking input and comments from the MKMB, KKM, EC, ‘Imiloa Astronomy Center (‘Imiloa), existing Maunakea Observatories (individual and group), Maunakea Observatory Support Services staff, OMKM staff, interested Legislators, Congressional staff, Governor’s Office and Cabinet, Governor’s Land Authorization Working Group (DLNR, National Science Foundation, UH, Governor’s representative), Thirty Meter Telescope International Observatory Board of Governors, Pūko‘a Council, Kūali‘i Council, and Maunakea kia‘i (through a third-party; kia‘i did not respond to UH’s direct outreach).

Among other things, the restructuring included the creation of the Center for Maunakea Stewardship (CMS), which coordinates all activities on land managed by UH on Maunakea with direct reporting to the UH Hilo Chancellor. The restructuring also provides more direct input from cultural, community, and stakeholder advisory groups.

Details of the “Center for Maunakea Stewardship: Internal Restructuring Plan for Management Operations of Maunakea Lands,” are posted online at [CMS Restructuring Plan](#).

In December 2021, the UH BOR directed UH Internal Audit to review the status of the reorganization and establishment of CMS. The objective of this audit was to evaluate the status of the Restructuring Plan in addition to the status of Corrective Actions to address recommendations included in historical audit reports by Internal Audit (September 2018) and the State Auditor (most recent dated July 2017). Internal Audit released their report in April 2022 stating that “Internal Audit believes that the reorganized and restructured management of Maunakea is more streamlined and provides a better reporting structure when compared to the historical convoluted structure. Based on the work performed, Internal Audit believes CMS has either completed or is in the process of meeting the Restructuring Plan’s objectives. Interviews with leaders of the various advisory groups support Internal Audit’s conclusions. In addition, Internal Audit has determined that all recommendations noted in historical State Auditor and Internal Audit reports have been properly addressed and/or implemented.” The report of Internal Audit is posted online at [UH IA re CMS](#).

B. [Act 255](#)

Prior to the 2022 Legislative Session, the State House of Representatives established the Maunakea Working Group (MKWG) to recommend alternative governance structures for the future management of Maunakea. The purpose was to replace UH as the responsible entity for managing the Mauna Kea Science Reserve, Hale Pōhaku, and the roadway easement connecting

Hale Pōhaku and the Mauna Kea Science Reserve. To support the MKWG’s work, UH’s analysis of alternative governance structures was made available and offers were made to provide the working group an overview of the data UH had collected. The working group did not accept UH’s offers to discuss the analysis.

After considering the Working Group’s recommendation, HB 2024 was introduced which eventually resulted in Act 255 which was signed into law by Governor Ige in June 2022. Act 255 establishes the Mauna Kea Stewardship and Oversight Authority (MKSOA) that is placed within DLNR for administrative purposes and is comprised of eleven voting Board members.² Act 255 establishes a five-year transition period during which the UH and the MKSOA will jointly manage certain aspects of Maunakea while MKSOA is formally organized and prepares to assume all legal responsibilities held by UH (e.g., UH’s two general leases, grant of easement, and all conservation district permits held by UH for third party non-UH astronomy facilities and buildings). Act 255 also grants the MKSOA certain land disposition responsibilities currently under the jurisdiction of the BLNR and appropriates \$14M for MKSOA start-up.

Act 255 prohibits new leases on Maunakea until after the transition period ends and leases are taken over by the MKSOA. **Consequently, all UH work on an Environmental Impact Statement (EIS), a new land authorization from BLNR, and new real property sub-agreements with Maunakea observatories have ceased** (discussed below). As reiterated in Act 255, the two astronomy facility decommissioning projects already underway for the Caltech Submillimeter Observatory (CSO) and UH Hilo’s Hōkū Ke’a teaching telescope will progress to completion under CMS supervision.

C. MKSOA startup

In support of UH and MKSOA’s joint management through the transition period, UH is supporting MKSOA with various aspects of their start-up needs. At the request of Governor Ige, CMS prepared a list of organizational needs and priority tasks for the MKSOA to consider in their start-up plans which has been provided to the MKSOA. On May 30, 2022 UH sent a letter to BLNR Chair Case identifying various agreements, permits, and assets held by UH that are impacted by the establishment of the MKSOA which UH would be seeking release from and

² Three ex officio members: chair of BLNR, mayor of the County of Hawai’i, and chair of the UH Board of Regents. Two members are appointed by the governor from two lists of three, one provided by the president of the senate and one provided by the speaker of the house. Six individuals appointed by the governor in six categories: (i) aina (land) resource management expertise and specific experience with Hawaii island-based management, (ii) possessing expertise in the fields of p-12 public education or post-secondary education, (iii) one name from a list of three submitted by Maunakea Observatories, (iv) business and finance experience and previous administrative experience in managing a large private-sector business, (v) lineal descendent of a practitioner of Native Hawaiian traditional and customary practices associated with Mauna Kea, and (vi) recognized practitioner of Native Hawaiian traditional and customary practices. The chancellor of UH at Hilo serves as an ex officio, nonvoting member.

would need to transfer or be assigned to the new entity. That letter may be found here: [CMS Letter to BLNR Chair re HB 2024 Implementation](#). This includes two General leases, a Right of Roadway Easement, eleven subleases, 18 Conservation District Use Permits (CDUPs) incorporating 301 conditions, 23 Chapter 343 environmental reviews and associated mitigations, and a few more special permits held by UH. UH has also made our analysis and data on governance structures available to the MKSOA and is in the process of educating MKSOA Board members of their stewardship responsibilities and the financial underpinnings of operations. In addition, CMS leadership meets regularly with the MKSOA Chair and is providing limited administrative support until the MKSOA is able to recruit and hire their own administrative personnel.

IV. FY2022 CMP Management Action Highlights

The restructuring and consolidation of UH’s management functions into CMS in FY21 and FY22, in combination with the updating of our Plans and implementation of the Administrative Rules (described below), has enabled a more comprehensive and integrated approach to implementation of the CMP. Thus, this report covers a broader range of activities and metrics than have been previously included in UH’s CMP updates. Table 1 provides an overview of CMP management action highlights for FY22 with additional FY data noted where it is included for context. Following Table 1 are brief summaries of some of our more strategic and notable activities for FY22.

Table 1. CMP Overview: Management Action Highlights

CMP Management Objective	CMP Management Actions	Highlights
3.2 Identify, document the condition of, and protect cultural resources and historic properties in the UH Management Areas.	CR-10: Implement Historic Property Monitoring Plan (260 identified sites)	1. 90 sites visited and documented (CY21) <ul style="list-style-type: none"> ▪ No changes to site conditions were detected other than expected by natural conditions.
4.2 Increase understanding of the status of natural resources (biotic and abiotic) and identify threats to these resources to better protect and preserve unique geological features, ecosystem functions, subalpine and alpine habitats, and biological communities through adaptive management of stressors and threats.	NR-1 Limit threats to natural resources through management of activities and uses. NR-2 Implement the Maunakea Invasive Species Management Plan (C. Vanderwoude, February 2015) and modify, amend, and update it as warranted. NR-5 Allow, and where possible facilitate, ecosystems to respond to climate change. NR-9 Increase native plant density and diversity through an outplanting program. NR-10 Require mitigation measures in plans for new development. NR-10 Require mitigation measures in plans for new development. NR-12 Plan and conduct habitat restoration activities, as needed. NR-13 Increase communication, networking, and collaborative opportunities that support management and protection of natural resources. NR-17 Conduct research to fill knowledge gaps that cannot be addressed through monitoring.	1. Large Vehicle and Cargo Inspections: <ul style="list-style-type: none"> ▪ 134 (FY22) 2. Arthropod Survey: <ul style="list-style-type: none"> ▪ 111 sites (FY22) 3. Implementation of native plant outplanting program at the VIS. Plant counts as of 12/29/22: <ul style="list-style-type: none"> ▪ Māmane- 525 ▪ ‘Āweoweo- 277 ▪ Pāwale- 14 ▪ Pua Kala- 34 ▪ ‘Ena’ena-1689 4. 9,470 lbs. of weeds removed from our restoration area through volunteer programs. 5. Habitat monitoring research conducted in collaboration multiple academic institutions: <ul style="list-style-type: none"> ▪ Arthropod Food webs - UH Mānoa ▪ Arthropod Biodiversity - Cal U of PA ▪ Climate monitoring - UH Mānoa ▪ Endosymbionts in <i>Nysius spp.</i> - UC Merced ▪ Permafrost monitoring (Ongoing) - Planetary Science Institute ▪ Water Isotopes - UH Mānoa ▪ Seabirds & Bats - UH Hilo ▪ Visitor impact study – UH Mānoa ▪ Physiological Effects of High-Altitude Acclimation (Ongoing) – Univ of Montana ▪ Hydrogeology – UH Mānoa /Hilo Proposed

Table 1. CMP Overview: Management Action Highlights		
CMP Management Objective	CMP Management Actions	Highlights
		<ul style="list-style-type: none"> 6. Development of greenhouse completed through community partnerships and contributions. 7. Development of greenhouse as a requirement of Ingress/Egress project. 8. Implementation of native plant outplanting program at the VIS. 9. 'Āhinahina (SILVERWORD) Propagation-DLNR/PEPP (FY22)
6.2 Astronomical resources shall be protected by preventing the intrusion of activities and uses incompatible with astronomy facilities, such as those that generate nuisance light, dust, and radio frequencies.	<p>AR-1 Manage activities and uses in the UH Management Areas to avoid, minimize, or mitigate adverse impacts to astronomical resources.</p> <p>AR-2 Prevent light pollution, radio frequency interference (RFI) and dust.</p>	<ul style="list-style-type: none"> 1. Drone permits <ul style="list-style-type: none"> ▪ 3 submitted, all approved 2. RFI permit <ul style="list-style-type: none"> ▪ 1 submitted (review pending)
7.2 To retain and enhance recreational and cultural activities, ensure regulation of commercial activities, and support scientific studies while maintaining adequate protection of resources, educating users regarding resource sensitivity, and ensuring the health and safety of those visiting or working at Maunakea.	<p>ACT-1: Develop and implement robust access management guidelines and Procedures.</p> <p>ACT-2 Implement and enforce Maunakea Administrative Rules to reduce impacts of parking and traffic.</p> <p>ACT-3 Maintain the Ranger program to educate and encourage adherence to rules and guidelines and enforce Maunakea Administrative Rules.</p> <p>ACT-4 Maintain and strengthen infrastructure to educate and encourage adherence to rules and guidelines.</p> <p>ACT-5 Implement and enforce Maunakea Administrative Rules to reduce impacts of</p>	<ul style="list-style-type: none"> 3. Road closures for safety due to inclement weather and hazardous conditions: <ul style="list-style-type: none"> ▪ 89 (CY20) ▪ 121 (CY21) ▪ 103 (CY22) 4. Road Grading (Frequency): <ul style="list-style-type: none"> ▪ 72 (FY20) ▪ 78 (FY 21) ▪ 96 (FY22) 5. Ranger orientations and safety briefings prior to vehicular summit access: <ul style="list-style-type: none"> ▪ 69,133 Visitors (CY22) 6. Ranger vehicle inspections prior to vehicular summit access: <ul style="list-style-type: none"> ▪ 23,452 Vehicles (CY22) 7. Hiker counts (Ranger safety briefings for most but not all): <ul style="list-style-type: none"> ▪ 3781 (CY20) ▪ 4225 (CY21)

Table 1. CMP Overview: Management Action Highlights

CMP Management Objective	CMP Management Actions	Highlights
	<p>recreational hiking.</p> <p>ACT-9 Implement and enforce Maunakea Administrative Rules pertaining to commercial tour permitting.</p> <p>ACT-10 Provide input on permits for filming activities</p> <p>ACT-12 Vet all proposals for activities that require a research or special use permit under the Maunakea Administrative Rules.</p>	<ul style="list-style-type: none"> ▪ 5468 (CY2022) <p>8. Commercial Tour Activity:</p> <ul style="list-style-type: none"> ▪ 9 operator permits; 7 active with 6 operating ▪ Passenger Counts: <ul style="list-style-type: none"> ○ 1700-3600/mo (FY22) incorporating orientation and safety briefings by operators. ○ Reduces additional vehicle traffic to the summit by an estimated 570-1200 vehicles/mo. <p>9. CMS website updated and modernized to make it more user-friendly. Information on weather, temperature and road conditions more easily accessible.</p> <p>10. Developed and implemented new signage at the VIS identifying permitted activities per the Maunakea Administrative Rules (FY22).</p> <p>11. Implemented new online CTO daily reporting feature to streamline tracking process for Rangers and Admin staff.</p> <p>12. Film Permits CY22</p> <ul style="list-style-type: none"> ▪ 25 total inquiries ▪ Commercial – 2 approved; 3 denied/withdrawn ▪ Non-commercial/education – 8 allowed to proceed <p>13. New projects</p> <ul style="list-style-type: none"> ▪ 9 proposals submitted; 9 approved all with conditions ▪ 5 classified as minimal impact ▪ 4 required additional consultation with KKM <p>14. Research proposals</p> <ul style="list-style-type: none"> ▪ 6 submitted: 4 denied, 1 pending

Table 1. CMP Overview: Management Action Highlights

CMP Management Objective	CMP Management Actions	Highlights
<p>8.2 Achieve compliance with existing and any new guidelines and regulations designed to manage and minimize human impacts, to preserve and protect Maunakea’s resources.</p>	<p>P-1 Comply with all applicable federal, state, and local laws, regulations, and permit conditions related to activities in the UH Management Areas.</p> <p>P-2 Strengthen CMP implementation by recommending that compliance with the CMP be a condition of permits and agreements.</p> <p>P-4 Educate management staff and those working on the mountain about applicable rules, CMP management actions, and permit requirements.</p> <p>P-7 Periodically review facility compliance with Conservation District Use Permits.</p> <p>P-8 Enforce conditions contained in permits issued under the Maunakea Administrative Rules.</p>	<p>15. Special Use</p> <ul style="list-style-type: none"> ▪ 2 submitted: 1 denied, 1 withdrawn <p>1. 7 cease and desist notices to unpermitted tour operators.</p> <p>2. Developed and implemented new signage at the VIS identifying permitted activities per the Maunakea Administrative Rules (FY22).</p> <p>3. New projects</p> <ul style="list-style-type: none"> ▪ 9 proposals submitted; 9 approved all with conditions ▪ 5 classified as minimal impact ▪ 4 required additional consultation with KKM <p>4. Online assessments - 803 taken, 687 issued</p> <p>5. Closed 4 cesspools (3 at HP and one at JCMT at the summit) and installed 2 zero discharge holding tanks - 1 at JCMT and 1 at HP Utilities.</p> <p>6. Developed and implemented new signage at the VIS identifying permitted activities per the Maunakea Administrative Rules (FY22)</p>
<p>9.2 Manage the built environment by implementing an Operations, Monitoring and Maintenance Plan (OMMP) containing specific maintenance strategies and guidelines that will result in minimal disruptions to activities and uses, minimize impacts to the resources, and ensure that permittees remain compliant with their CDUP requirements.</p>	<p>IM-2 Require maintenance personnel to complete the worker orientation (EO-2).</p> <p>IM-10 Assess improvements to restroom and wastewater facilities consistent with the 2022 Master Plan.</p>	<p>1. Implemented revised employee orientation video (FY22).</p> <ul style="list-style-type: none"> ▪ Online assessments; 803 taken, 687 issued <p>2. Closed 4 cesspools (3 at HP and one at JCMT at the summit) and installed 2 zero discharge holding tanks - 1 at JCMT and 1 at HP Utilities.</p>
<p>10.2 Minimize adverse impacts to resources during all phases of construction through use of innovative best management practices.</p>	<p>C-1 Require an independent construction monitor who has oversight and authority to ensure that all aspects of construction comply with guidelines and permit requirements.</p> <p>C-5 Require on-site monitors (e.g., archaeologist, cultural resources specialist, invasive</p>	<p>1. All construction guidelines being enforced for all projects and specifically for CSO which is the only current large scale construction project that this applies to. Pre-construction activities have begun and Independent, Construction, Cultural, and Invasive Species Monitors have all been hired.</p>

Table 1. CMP Overview: Management Action Highlights		
CMP Management Objective	CMP Management Actions	Highlights
	species specialist) during construction, as determined by the appropriate agencies.	2. CMS working with CSO to ensure BMPs are followed, including having the appropriate monitors as outlined in C-1 and C-5.
11.2 To the extent possible, reduce the area disturbed by physical structures within the UH Management Areas by upgrading and reusing buildings and equipment at existing locations, removing obsolete facilities, and restoring impacted sites to pre-disturbed condition.	SR-1 Require astronomy facilities to develop plans for reuse or removal in accordance with the Decommissioning Plan for the Mauna Kea Observatories (Sustainable Resources Group International, Inc., January 2010b). SR-2 Require astronomy facilities to develop plans for site restoration in accordance with the Decommissioning Plan for the Mauna Kea Observatories (Sustainable Resources Group International, Inc., January 2010b).	1. CSO - Plan in place - Construction to start tentatively in Spring of 2023. 2. Hoku Kea - Working thru process for construction to start tentatively October 2023.
13.2 Conduct effective operations to support management that is focused on resource protection, education, and public safety.	OI-5 Update and implement emergency response plan	1. Maunakea Emergency plan updated June 2022
14.2 Determine whether management actions are achieving the goals [desired outcomes] of the CMP and provide a process for improving and updating management strategies through evaluation and revisions of the CMP.	MEU-1 Post tracking and assessment metrics and provide annual Progress Reports to DLNR regarding management activities. MEU-2 Conduct regular evaluations and updates of the CMP utilizing adaptive management means that address public input, incorporate lessons learned, and take advantage of new data and information. MEU-3 Revise and update planning documents, including the master plan, leases, and subleases, to maintain compatibility and consistency between them and reflect stewardship matters resolved with DLNR.	1. Reorganized internal governance in FY21 with implementation ongoing through FY22 to present. Purpose is to improve internal coordination across units responsible for management. Per UH Internal Audit completed in May 2022; the objectives of the restructuring are being achieved. 2. Provided annual update to BLNR in Jan 2022. 3. E Ō I Nā Leo, UH's new Master Plan, developed in FY21 and approved by the BOR in FY22. 4. CMP update completed in FY22 and approved by BLNR in FY23. 5. Sublease discussions with MKOs initiated in FY21 with significant progress made towards development of a new sublease template. Discussions halted in FY22 per Act 255.

Table 1. CMP Overview: Management Action Highlights

CMP Management Objective	CMP Management Actions	Highlights
<p>Outreach and Education</p> <p>3.2 Increase understanding and appreciation of Native Hawaiian history and cultural practices related to Maunakea to ensure that these practices are protected and respected. Identify, document the condition of, and protect cultural resources and historic properties in the UH Management Areas.</p> <p>4.2 Increase understanding of the status of natural resources (biotic and abiotic) and identify threats to these resources to better protect and preserve unique geological features, ecosystem functions, subalpine and alpine habitats, and biological communities through adaptive management of stressors and threats.</p> <p>5.2 Build and maintain a constituency to engage in active and meaningful stewardship of Maunakea, through education and involvement of the public, to support/enhance conservation, and sustain the natural, cultural, and astronomical resources of Maunakea.</p>	<p>EO-2 Require orientation of all persons accessing the UH Management Areas in a manner consistent with the MEOP and Maunakea Administrative Rules.</p> <p>EO-3 Consistent with the MEOP, continue to develop, update, and distribute materials explaining important aspects of Maunakea.</p> <p>EO-4 Consistent with the MEOP, implement the Maunakea Sign Plan (Office of Mauna Kea Management, February 2017) and modify, amend, and update it as warranted.</p> <p>EO-5 Consistent with the MEOP, develop interpretive themes and features.</p> <p>EO-8 Consistent with the MEOP, continue and increase opportunities for community members to participate in stewardship activities.</p>	<ol style="list-style-type: none"> 1. Implemented revised employee orientation video (FY22). 2. Developed and implemented new signage at the VIS describing cultural, natural, and astronomy resources and the cultural landscape of Maunakea (FY22). 3. Developed and implemented new signage at the VIS identifying permitted activities per the Maunakea Administrative Rules (FY22) 4. Remodeled the VIS to improve space for expanded cultural and educational displays (FY22). 5. Development of greenhouse completed through community partnerships and contributions (FYs21-22). 6. 9470 lbs of weeds removed from our restoration area through volunteer programs (FY22). 7. Christmas in the Park - Liliuokalani Park, Hilo (FY23).

A. Planning, Permitting, Land Disposition

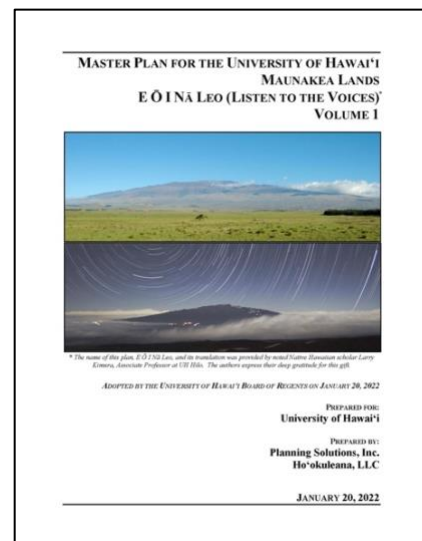
Prior to Act 255 being signed into law, UH had begun work in preparation for seeking a new land authorization (e.g., a new general lease from the BLNR beyond 2033). This included updating the “Mauna Kea Science Reserve Master Plan” adopted by the UH Board of Regents (BOR) in 2000, and the “Mauna Kea Comprehensive Management Plan,” adopted by the BLNR in 2009 (collectively, the Plans). These efforts are in compliance with CMP Management Action MEU-3 that calls for UH to “Revise and update planning documents, including the master plan, leases, and subleases, to maintain compatibility and consistency between them and reflect stewardship matters resolved with DLNR.” Among other things, the Plans integrate management actions that strive for a renewed balance across the cultural, natural, educational, and recreational values Maunakea provides the State. The Plans also address decommissioning commitments UH has made and the replacement of the University of Hawai‘i Hilo’s educational telescope from the summit to the mid-level facilities at Hale Pōhaku.

The effort to update the Plans involved significant community and stakeholder input. UH’s new master plan, *E O Nā Leo: Listen to the Voices*, was adopted by the Board of Regents in January 2022, and the updated Mauna Kea Comprehensive Management Plan, *Comprehensive Management Plan 2022 Supplement*, was approved by the Board of Land and Natural Resources in July 2022.³

UH had also been preparing an environmental impact statement (EIS) for UH’s proposed new land authorization to continue astronomy on Maunakea post 2033. As noted previously, UH has halted further work on the EIS and new land authorization in accordance with Act 255.

1. Master Plan

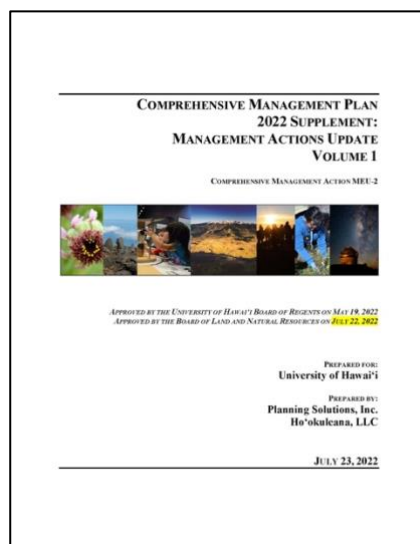
Starting in FY21 and extending into FY22, UH worked on a new master plan to replace the 2000 master plan that had a 20-year lifespan. *E O Nā Leo* identifies proposed land uses for current UH managed lands for the next 20 years. Unlike other master plans where a vision for development is expressed, *E O Nā Leo* is grounded in the view that going forward UH will make better use of existing facilities and already developed sites and permitted projects. Incorporated in the plan are proposed improvements for managing public access, safety, stewardship, expanded educational programming, and astronomy’s footprint. All proposals incorporated in the plan share the common goal of limiting impacts to the cultural, natural, and educational



³ BLNR’s adoption of the *Comprehensive Management Plan 2022 Supplement* is currently being challenged by opponents in *Teale v. Bd. of Land & Nat. Res.*, SCOT-22-0000502.

resources of Maunakea. Notably, the plan commits to limiting the future footprint of astronomy to nine observatories on the summit post-2033 and to pledges UH has made to the community to replace the University of Hawai'i Hilo's educational telescope from the summit to the mid-level facilities at Hale Pōhaku. As noted above, *E O Nā Leo* was approved by the BOR in January 2022. The 2022 Master Plan may be found here: [E O Nā Leo](#).

2. Comprehensive Management 2022 Supplement: Management Actions Update (2022 CMP)



The 2009 CMP identified 103 management actions grouped into 12 focus areas to be carried out by UH.⁴ The purpose of 2022 CMP is to supplement the 2009 CMP. Updating the 2009 CMP is required under Management Action MEU-2 to “Conduct regular evaluations and updates of the CMP utilizing adaptive management means that address public input, incorporate lessons learned, and take advantage of new data and information.” Section 1.2 of the 2022 CMP replaces Section 3.1.1 of the 2009 CMP, and all other parts of the 2022 CMP replace Section 7 of the 2009 CMP. The CMP 2022 Supplement aligns with the findings of DLNR’s *Independent Evaluation of the Implementation of the Mauna Kea Comprehensive Management Plan (2020)* conducted by Ku’iwalu and does not propose new activities or land uses.⁵

The first step in updating the 2009 CMP was to conduct an Outcome Analysis Report (OAR). The OAR is based on the most current available data and provides the information called for in CMP management actions MEU-1 and MEU-2. It describes the status of the resources in the plan area, summarizes the work that has been conducted regarding each of the management actions in the CMP, and outlines the progress made toward meeting the CMP’s stated goals (desired outcomes).

Based on the OAR, UH determined that it has completed 14 of the management actions identified in the 2009 CMP. Since these 14 management actions are completed, they have not been modified from their 2009 form and are not discussed further in the 2022 CMP and will not be discussed in future annual reports or future updates. The remaining 89 management actions were reviewed and updated as needed consistent with the principle of adaptive management based on progress made, new information, changed circumstances, etc. Most of

⁴ Cultural resources (CR); Natural resources (NR), Education and outreach activities (EO); Astronomical resources, activities, and uses (AR); Activities and uses (ACT); Permitting and enforcement (P); Infrastructure and maintenance (IM); Construction guidelines (C); Site recycling, decommissioning, demolition, and restoration (SR); Considering future land use (FLU); Operations and implementation (OI); Monitoring, evaluation, and updates (MEU).

⁵ [Ku’iwalu Independent Review](#)

the changes made were to clarify our desired outcomes, the need for the management action, and roles and responsibilities for implementing the management actions themselves.

The 2022 CMP was reviewed and approved by the BLNR in July 2022. As noted, a request for a contested case was made by a member of the public which is pending. The 2022 CMP inclusive of the OAR may be found here: [Maunakea CMP](#).

3. Decommissioning

Pursuant to the Conservation District Use Permit (CDUP) for the Thirty Meter Telescope project (TMT), the BLNR imposed special conditions regarding the decommissioning of telescopes on Maunakea, including the following:

10. The University will decommission three telescopes permanently, as soon as reasonably possible, and no new observatories will be constructed on those sites. This commitment will be legally binding on the University and shall be included in any lease renewal or extension proposed by the University for Mauna Kea.

11. Notwithstanding any lease renewal or extension, consistent with the Decommissioning Plan, at least two additional facilities will be permanently decommissioned by December 31, 2033, including the Very Long Baseline Array antenna and at least one additional observatory.

Related to decommissioning, on November 6, 2019, the BOR adopted Resolution 19-03, “Resolution to Act on Items Relating to Maunakea Management” (BOR Reso. 19-03, revised in part by BOR Reso. 21-02). Accordingly, a schedule to decommission the Caltech Submillimeter Observatory (CSO) and Hōkū Ke‘a by December 31, 2021, was presented to the BOR. This presentation and schedule are available at [BOR Reso 19-03 Decom Schedule](#). This schedule has been updated due to COVID-19 and permitting delays with the new projected timelines discussed below.

The Resolution established a December 30, 2025 deadline to determine which three additional telescopes will be decommissioned in compliance with existing or future permits or governmental approvals. In FY21 UH began discussions with sublessees to prepare a framework for decision-making for public comment and review as part of the Plans update process. However, these discussions between UH and sublessees has stopped with the passage of Act 255, which will transfer the CDUP for TMT to the MKSOA in 2028, after the transition period. UH Plans will also no longer be applicable after the transition period, wherein UH commits to only 9 operating astronomy facilities on Maunakea after decommissioning. Important to note here is that subleases are coterminous with the MKSR General Lease, which expires in 2033. The subleases and MKSR General Lease all provide provisions for the removal or transfer of ownership of astronomy facilities on Maunakea on or before 2033.

The CSO and Hōkū Ke‘a are currently undergoing the decommissioning process. Both CSO and Hōkū Ke‘a issued a Notice of Intent to decommission in 2015 and have been coordinating and consulting with UH and DLNR in the preparation of their permitting requirements and environmental assessments under HRS Chapter 343 to address impacts associated with removal and restoration activities.

CSO’s environmental assessment (EA) was accepted, and their CDUP was approved, in FY23 by the BLNR. All internal fixtures and furnishings have been removed and the first phase of lead paint abatement has been completed. CSO is currently working on additional permits and transport requirements that are needed to ship the telescope itself to Chile. These permit requirements and winter weather are impacting CSO’s decommissioning schedule such that telescope removal and deconstruction of the dome and support facilities will restart in Spring 2023. Deconstruction is expected to be completed by December 2023.

UH Hilo submitted the Hōkū Kea Conservation District Use Application (CDUA) to DLNR in August 2022. The CDUP is projected to be approved by April 2023 with site deconstruction projected to be completed by December 2023.

In addition to CSO and Hōkū Ke‘a, UH committed to decommissioning the United Kingdom Infrared Telescope (UKIRT) by the time the TMT project becomes operational in finding of fact 171 of the CDUP issued for TMT, and the BLNR identified the Very Long Baseline Array (VLBA) for decommissioning in Special Condition 11 of the CDUP issued for TMT. Act 255 will require transfer of all CDUPs issued to UH for astronomy facilities owned by third parties, like TMT, to the MKSOA. Consequently, the MKSOA will need to pursue these options.

4. Thirty Meter Telescope (TMT)

On September 27, 2017, the BLNR issued its 271-page Findings of Fact, Conclusions of Law and Decision and Order containing 1070 Findings of Fact and 512 Conclusions of Law, for the Conservation District Use Permit (CDUP) allowing the construction and operation of TMT. On October 30, 2018, the Hawai‘i Supreme Court affirmed the CDUP after various parties appealed. The process for obtaining the CDUP approval took approximately seven years from the permit application’s initial submission in 2010, including two contested cases, several judicial appeals, and two Hawai‘i Supreme Court decisions. Parties continue to challenge the TMT project, for example, in cases before BLNR, the State Land Use Commission, and Hawaii’s circuit and appeals courts.

Unlike the other existing observatory subleases, which provide for nominal rent in exchange for viewing time and sublessee contributions to shared operations, maintenance, and stewardship of Maunakea, the TMT International Observatory (TIO) sublease provides for substantial lease rent payments. Pursuant to TIO’s sublease, annual lease rent starts at \$300,000. The lease rent schedule is phased, with increases based on construction activity. Full annual lease rent payments of \$1,080,000 a year will be paid when TMT is operational. To date, \$3,435,258 has been paid. These payments are deposited into the Mauna Kea lands management special fund

as the legislature directed in 2009 Hawai'i Session Laws Act 132 (codified at HRS § 304A-2170).⁶ Twenty percent of TMT lease rent collected is set aside for payment to OHA.

In addition, as part of the lease negotiations TIO committed \$1 million per year in donations to community benefits, primarily by advancing STEM education on Hawai'i Island, and a similar amount to a workforce pipeline initiative as operations become imminent to maximize employment opportunities for residents. TIO has paused these payments while they await National Science Foundation (NSF) funding. NSF initiated a Section 106 consultation process as part of their review of TIO's application for funding. This process involved months of pre-consultation meetings with the community and, more recently, three public meetings held on Hawai'i Island. The process spanned FY22 and FY23 and is ongoing.

B. Administrative Rules

Hawai'i Administrative Rules Chapter 20-26, "Public and Commercial Activities on Mauna Kea Lands," was adopted by the BOR on November 6, 2019, and approved by Governor David Ige on January 13, 2020 (MK Rules).⁷ UH's Maunakea administrative rules may be found here: [Maunakea Admin Rules](#).

The focus in FY22 was on continuing the implementation of the MK Rules. This work included staff training, developing administrative systems, improving signage, revamping our employee orientation, improving education at the Visitor Information Center (VIS), opening discussions with commercial tour operators, and updating the Rangers' operating procedures. This work also included key hires and recruitment to replace recent vacancies and fill positions based on the reorganization of Maunakea management approved by the BOR on August 20, 2020.

Act 255 repeals the MK Rules after the transition period, and grants the MKSOA authority to develop its own administrative rules.

C. Protecting Resources and Ensuring Public Safety: Managing Access

The impacts of COVID on travel continue to be felt with visitor counts still not back to pre-pandemic levels though bumps in visitor traffic have occurred during the holidays. Nonetheless, interest in visiting Maunakea and driving to the summit remain high. In CY22, visitor and vehicle counts reported by our Rangers were 69,133 and 23,452 respectively. A key

⁶ "The proceeds of the special fund shall be used for: (1) Managing the Mauna Kea lands, including maintenance, administrative expenses, salaries and benefits of employees, contractor services, supplies, security, equipment, janitorial services, insurance, utilities, and other operational expenses; and (2) Enforcing administrative rules adopted relating to the Mauna Kea lands." HRS § 304A-2170(b).

⁷ BOR's adoption of the administrative rules are being challenged by opponents in *Flores-Case 'Ohana v. University of Haw.*, No. SCRQ-22-0000118.

element here is that each of these interactions involve a safety/resource briefing and vehicle inspections by our Rangers for all those accessing the summit.

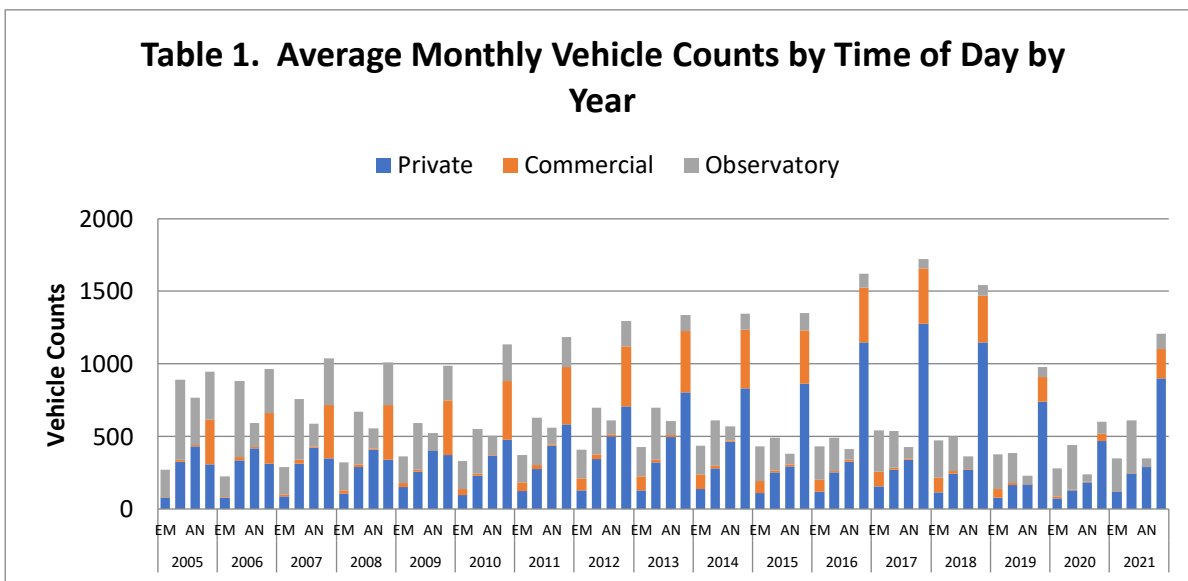


Ranger brake checks instituted post Jan 2022 accident

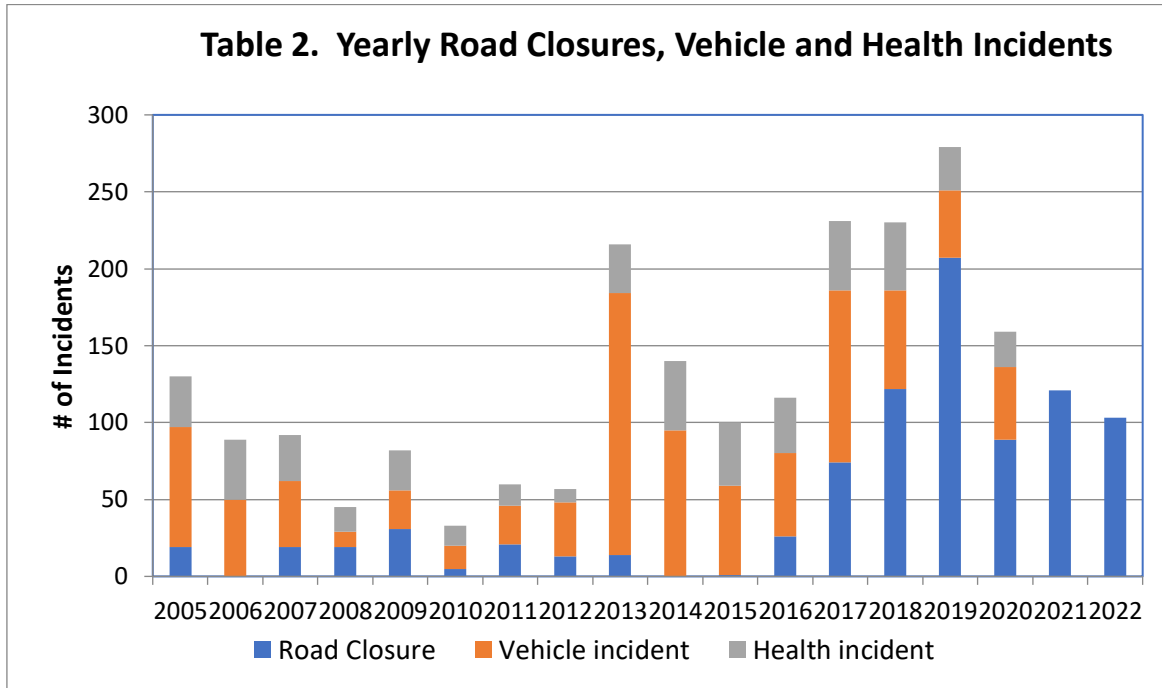


Overheated Brakes

Historically, private vehicles account for the majority of traffic to Maunakea. This includes both visitors and residents. Implementation of the MK Rules requiring 4WD to access the summit has not altered this pattern with the major rental companies promoting rentals of qualifying vehicles. In addition, evening remains the most popular time for summit access. Table 1 provides the historical trend of vehicle counts by time of day since 2005.

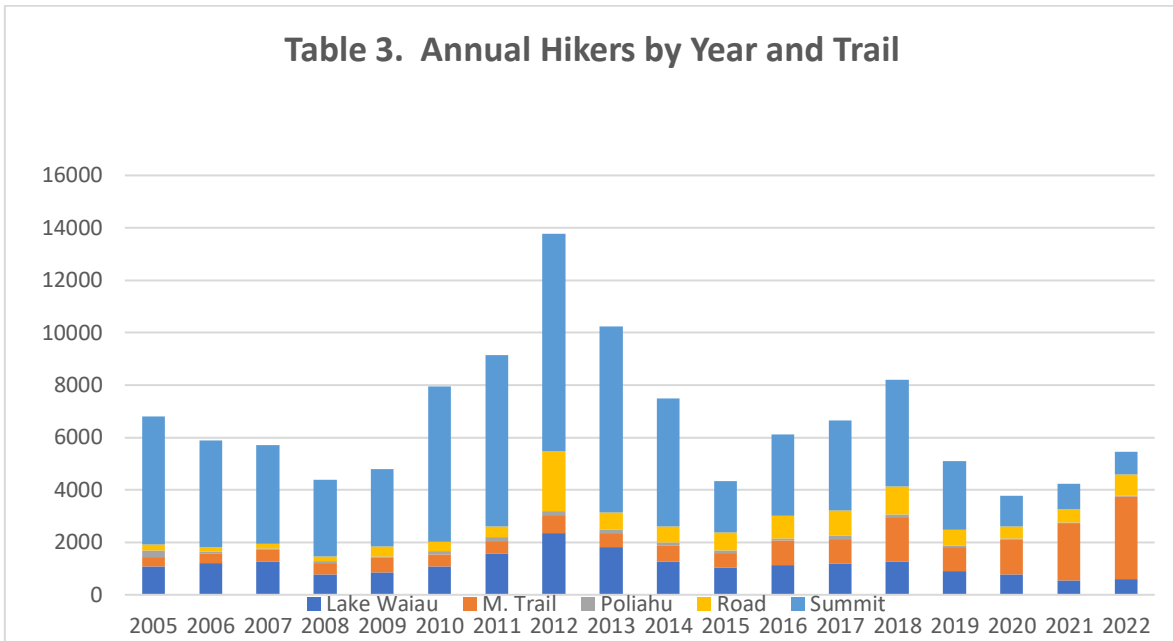


Responding to natural and human emergencies is a critical element of management on Maunakea. Weather conditions can be extreme and change rapidly, and environmental conditions can exacerbate or lead to major health concerns. Rangers and VIS staff serve as first responders for all emergencies. Table 2 summarizes the annual historical trend for road closures and emergency incidents since 2005.



Interest in Maunakea’s recreational resources remains a constant with hiking being the most available activity for the public. Rangers and VIS staff conduct daily monitoring of hiker access to ensure their location and estimated time of return. In CY22 there were 5468 hikers who registered with staff. The mauna trail and hiking to the summit are consistently the most popular destinations. Table 3 summarizes the annual historical trend for hikers by destination.

Table 3. Annual Hikers by Year and Trail



D. Resource Prevention, Protection, and Restoration Activities

Resource management is a central element of our stewardship program and stewardship of historic properties is a key focus of the CMP. There are 260 identified cultural sites within our UH managed lands that are monitored every one, three, or five years depending on location. In CY21 90 sites were monitored. No changes to site conditions were detected other than expected by natural conditions. CY22 data is still being processed.



MKSR Archaeological Survey

Stewardship of our natural resources is also an important element of the CMP. Two notable recent accomplishments have been our ‘āhinahina (silversword) propagation program conducted in partnership with DLNR and the Plant Extinction Prevention Program (PEPP) and our outplanting program at the VIS. Construction of our greenhouse in FY21 has supported the success of both these programs.



‘Āhinahina Seedlings Dec 2022



Community Partnerships

The plan for integration of our ‘āhinahina propagation program and expansion of the VIS outplanting effort is being updated in FY23. Plant counts at the VIS as of 12/29/22 include:

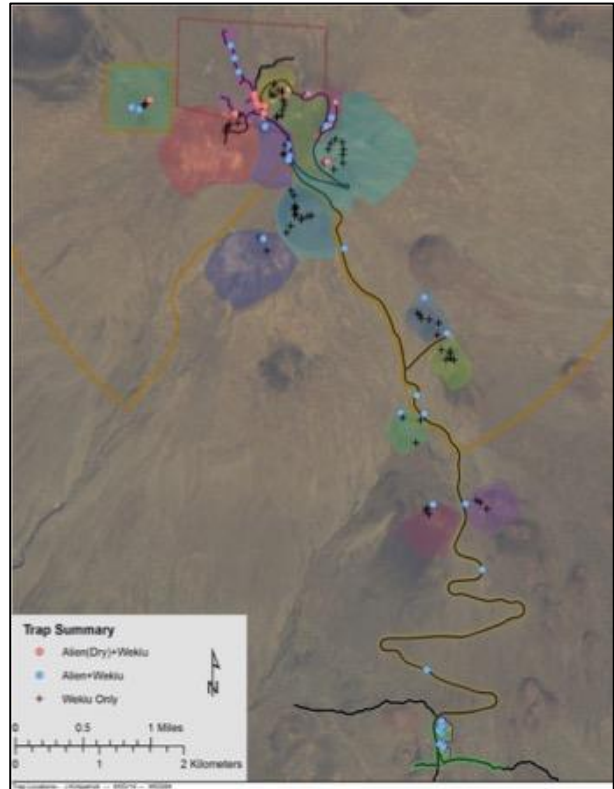
- Māmane- 525
- ‘Āweoweo- 277
- Pāwale- 14
- Pua Kala- 34
- ‘Ena‘ena-1689

In addition, 9,470 lbs. of weeds have been removed from our restoration area through our volunteer program.



Comparison of VIS Outplanting Area Between 2021 vs. 2022

Prevention is also a critical element of our CMP. In FY22 we conducted 134 large vehicle and cargo inspections and surveyed 111 sites in our annual arthropod survey. No infestations of note were found.



Arthropod Survey Sites



Large Vehicle and Cargo Inspections

E. Commercial Activities

UH assumed nine commercial permits from DLNR as part of the 2009 CMP. Seven commercial tour operator permits are active. With the pandemic, only six have been operating; the seventh is planning to restart in 2023. Each commercial tour operator is charged a \$6.00/tour passenger fee, which is submitted to the Center for Maunakea Stewardship (formerly the Office of Maunakea Management (OMKM)) every month. All fees are used to cover management activities on Maunakea. Twenty percent of the fees collected are set aside for payment to OHA.

The COVID-19 pandemic significantly impacted commercial tour operators, demonstrating the risks of an overreliance on this revenue stream. With the easing of COVID and travel restrictions, commercial tour passenger numbers have increased but not to pre-pandemic levels. In FY22, passenger counts have averaged 1700-3600/mo. incorporating orientation and safety briefings by the operators. This reduces additional vehicle traffic to the summit by an estimated 570-1200 vehicles/mo.

UH began outreach to individual commercial tour operators to bring existing permits into compliance with the new MK Rules and to seek their input on fee increases and permitting requirements. UH had also been considering additional options for managing visitor access, including concessions, a shuttle system, and new permit requirements. Due to Act 255 UH temporarily paused this work but would like to continue updating commercial tour permits since it is uncertain how long it will take MKSOA to develop administrative rules. UH plans to discuss this issue with the MKSOA. In the meantime, existing permit conditions apply.

To support our assessment of permit fees and managed access UH contracted with the UH at Mānoa School of Travel Industry Management (TIM) to conduct a visitor and operator survey to

better understand the relationship between demand, fee acceptance, and capacity. We also worked with the University of Hawai'i (UHH) Sociology Department who conducted a visitor survey to help us understand visitor interests and their behavioral economics. Both of these projects were impacted by COVID-19 as visitor traffic and commercial tour demand were significantly reduced and has not fully recovered. However, UHH recently completed their survey and has just issued the results of their study which CMS is currently reviewing. In light of Act 255, the scope of the TIM study is being re-evaluated since commercial activities and access management will fall under the purview of the MKSOA after the transition period.



Maunaloa Eruption as seen from the VIS - Nov 2022

F. Education and Outreach



New Interpretive Signage at the VIS

CMS has remodeled the Visitor Information Station (VIS) at our mid-level facilities on Maunakea to prepare for new educational exhibits to be developed by the 'Imiloa Astronomy Center of Hawai'i ('Imiloa). Temporary educational exhibits occupy the space while exhibit development continues. CMS also developed and installed new educational signage at the VIS covering Maunakea's cultural history, natural resources, astronomy, and the administrative rules. These exhibits are intended to help educate and foster visitor

awareness about Maunakea’s cultural heritage, natural environment, and astronomical inquiry while informing the public about safety and permitted activities. In addition, ‘Imiloa has been awarded federal funding to develop a plan to expand the educational programs and uses of Hale Pōhaku and the VIS and is currently developing that planning process.

During FY21 ‘Imiloa completed work on a new training and orientation video and materials for employees, contractors, and vendors that replaced the current training required by the CMP. The new program was implemented in FY22 during which there were 803 online assessments taken and 687 certificates of completion issued. A public version of this orientation will be developed using the new video as its basis. The new employee orientation video can be viewed here: [CMS Orientation](#).

CMS staff historically support a wide range of STEM-related outreach activities and coordinate various volunteer programs throughout the year. As vacancies are filled (see Section I below), we anticipate increased and more regular outreach in the community.



Christmas in the Park
Lili’uokalani Park, December 2022

G. Research

UH has and continues to sponsor or support climate, environmental, habitat, and human physiology research in collaboration multiple academic institutions. The purpose of this research is to deepen our understanding of Maunakea’s resources as well as to contribute to scientific inquiry that can be uniquely advanced because of the mauna’s distinctive and special conditions. Completed and current research projects include:

- Arthropod Food webs - UH Mānoa
- Arthropod Biodiversity - Cal U of PA
- Climate monitoring - UH Mānoa
- Endosymbionts in *Nysius spp.* - UC Merced
- Permafrost monitoring (Ongoing) - Planetary Science Institute
- Water Isotopes - UH Mānoa
- Seabirds & Bats - UH Hilo

- Visitor impact study (Ongoing/Pending) – UH Mānoa/Hilo
- Physiological Effects of High-Altitude Acclimation (Ongoing) – Univ of Montana
- Hydrogeology (Proposed/Pending) – UH Mānoa /Hilo

Ongoing or pending projects are being evaluated in light of Act 255.

One significant finding in FY22 was the sighting of native Hawaiian petrel ('Ua'u; *Pterodroma sandwichensis*) nesting sites on Maunakea. This is the first sighting in over 60 years and was found on Department of Hawaiian Home Lands (DHHL). UH, DLNR, and DHHL have collaborated to put site protection measures in place. Coverage of this study may be found here: ['Ua'u News](#).



'Ua'u Nesting

H. Cesspool Removal

In FY22 and FY23 UH completed the process of closing two cesspools that were not in service and replacing two others with zero discharge waste systems. All four served UH-owned facilities. Notifications have been provided to the appropriate regulating agencies.

I. Management

Act 255 contributed to a few key management resignations and other pending departures. These changes have prolonged disruptions associated with our restructuring and caused a temporary slowdown of certain management activities. However, it also created the opportunity for exploring additional restructuring for operational efficiencies and developing alternative options for implementation of the CMP, administrative rules, and permits. Most notable is the collaboration we established in FY22 with the Big Island Invasive Species Council (BISC) who are supporting our inspections for invasive species of large vehicles used for deliveries to the observatories and their cargo. This partnership has been valuable and has provided UH an opportunity to develop an outsourcing option for a key CMP management action. CMS management has successfully filled a couple of our key vacancies and is actively recruiting to fill our remaining openings which we anticipate to be completed in FY23. In the meantime, we will continue to explore other service delivery options to increase efficiency without sacrificing effectiveness.

V. FY23 Priorities

Given the numerous requirements of Act 255, and their implications, the next five-years present significant priorities for CMS as management is transitioned to the MKSOA. Near-term, developing the co-management relationship with the MKSOA is key as is defining the new working relationship between CMS, MKSOA, and DLNR. CMS priorities for FY23 include:

- Continue to improve stewardship through implementation of the 2020 CMP.
- Fulfilling our general lease, master plan, 2020 CMP, CDUP, administrative rules, and decommissioning commitments.
- Facilitating the transfer of leases and permits to the MKSOA.
- Supporting the start-up activities of the MKSOA as appropriate.

There will undoubtedly be other issues requiring CMS attention as we move through the transition process. CMS is committed to supporting the success of the MKSOA while ensuring we do not jeopardize fulfillment of UH's obligations under our existing agreements.