Supplemental Environmental Assessment

Lick Observatory

University of California at Santa Cruz

PDMC-PJ-09-CA-2005-065

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FEMA

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Supplemental Environmental Assessment to the Programmatic Environmental Assessment (PEA) for Typical Recurring Actions Resulting From Flood, Earthquake, Fire, Rain, and Wind Disasters in California as Proposed by the Federal Emergency Management Agency

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1. INTRODUCTION

The University of California at Santa Cruz (UCSC) has applied to the Federal Emergency Management Agency (FEMA) through the State of California Governor's Office of Emergency Services (OES) for a Pre-Disaster Mitigation (PDM) Program grant to implement a vegetation management project. UCSC's PDM Program grant application seeks FEMA funding to reduce future wildfire risks to the University of California Observatories Lick Observatory (LO) and appurtenant facilities.

The project area is located at the top of Mount Hamilton in Santa Clara County, California (Figure 1, Appendix A).

1.1 SCOPE OF DOCUMENT

FEMA has prepared the Final Programmatic Environmental Assessment for Typical Recurring Actions Resulting From Flood, Earthquake, Fire, Rain, and Wind Disasters in California (PEA), which assesses common impacts of the action alternatives that are under consideration at the proposed project site (FEMA 2003). The PEA adequately assesses impacts from the action alternatives for some resource areas, but for the specific actions of this particular project, some resources are not fully assessed in the PEA. Therefore, for this specific project to comply with the National Environmental Policy Act (NEPA), this Supplemental Environmental Assessment (SEA) has been prepared to tier from the PEA and fully assess the additional impacts to resources that are not adequately addressed in the PEA. This SEA hereby incorporates the PEA by reference, in accordance with Title 40 of the Code of Federal Regulations (40 CFR) Part 1508.28.

1.2 PURPOSE OF AND NEED FOR ACTION

The PDM program was authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), Title 42 of the United States Code Part 5133, as amended by Section 102 of the Disaster Mitigation Act of 2000, Public Law 106-390, 114 Statute 1552, to assist states and communities to implement a sustained, pre-disaster, natural-hazard mitigation program to reduce overall risk to the population and structures, while also reducing reliance on funding from actual disaster declarations. Therefore, the purpose of the action is to provide PDM Program funding to UCSC.

LO facilities comprise 64 buildings and structures valued at $71,673,750 that are located near the top of Mt Hamilton. These facilities include telescope domes, offices, dormitories, employee residences, a dining hall, a Visitors Center, a physical plant and technical operations, water storage and treatment facilities, and fire booster-pump stations. Beyond the monetary value of the LO facilities, the LO remains an active world-class scientific facility supporting University of California scientists, researchers, and students. It is also valued for its historic role in the science of astronomy and astrophysics. In addition to the facilities at LO, a remotely controlled California Department of Forestry and Fire Protection (CDF) fire search TV camera, a Santa Clara County Communications Relay Station that is used for emergency services to the relatively isolated rural eastern portion of Santa Clara County, and three telephone relay stations leased to SBC, Verizon, and AT&T are located on LO grounds. Approximately 30 private residents live near LO.

CDF has determined that Mt. Hamilton lies in an area of high fire danger. The burn recurrence interval at and near LO, which was calculated using methodology described by FEMA, is 146 years—LO has not experienced a major fire within its 130-year history. Relatively long response times, a history of multiple simultaneous ignitions in the area, heavy growth of brushy fuels on inaccessible slopes, the scattered nature of the buildings, and the absence of an onsite wildfire protection infrastructure all contribute to the difficulty of providing protection to LO. In addition, as California Highway 130 provides the only ingress and egress to the mountaintop facilities, it is likely that LO staff and visitors would be trapped on the summit. Therefore, action is needed to reduce wildfire risks to LO and appurtenant facilities.

2. DESCRIPTION OF THE PROPOSED ACTIONS AND ALTERNATIVES

2.1 NO ACTION ALTERNATIVE

The existing fire hazard would remain under the No Action Alternative. Economic losses from fire damage would occur in addition to the threat to public health and safety posed by a wildland fire. The LO and appurtenant facilities would remain vulnerable to a wildfire. Loss of native flora and fauna and their associated habitat would occur in the event of a wildfire, along with loss of topsoil due to erosion, sedimentation of local streams, and loss of established hardwood overstory.

2.2 PROPOSED ACTION ALTERNATIVE

Under the Proposed Action Alternative, UCSC would conduct vegetation management at LO facilities and the surrounding areas. The action area encompasses approximately 48 acres that would be divided up into 35 treatment units (Figure 2, Appendix A). Treatment units would consist of 100-foot-wide defensible spaces around structures and “area treatments” that would be outside of these spaces around structures. Treatment unit boundaries would be flagged on the ground. Table 1 (Appendix A) shows the vegetation management activities planned for individual treatment units.

To create the 100-foot-wide defensible zones surrounding structures, vegetation management techniques would consist of brush cutting and pruning canyon oaks, blue oaks, and foothill

pines to a height of 8 feet; removing dead materials; and mowing brush along roadways. Flammable ornamental vegetation such as rosemary and juniper shrubs would be removed, including rootballs**,** and replaced with lower-hazard shrubs as identified by California Fire-safe Council.

Area treatments would be conducted in locations beyond the 100-foot-wide treatment units surrounding structures. Vegetation management techniques at area treatments would generally consist of thinning oak trees and mechanical mowing of brush. Hand equipment and tractor-mounted brush mowers would be used for mowing.

Herbicide would be hand-applied to the stumps of scrub and canyon live oak on 33 acres (of the total 48-acre action area) where future vegetation management maintenance by UCSC staff is infeasible due to the steepness of the slopes. Herbicides would not be used where hand maintenance by UCSC staff is feasible.

Hand labor would be utilized to perform the proposed action. Two 10-person work crews would complete the proposed action between October and May. Crews would camp onsite and use bathing and toilet facilities provided by LO. Equipment used by the hand crews would include handsaws, chainsaws, brush cutters, mowers and hand pruners.

Cut materials would be handled in various ways including: being chipped onsite, then scattered or hauled away, depending on the volume; piled and left to decompose, if a suitable location would be available; or burned at designated locations between the months of January and March. Pile burning and hauling away cut materials (chipped or left un-chipped) have potential to disturb the ground surface. Staging areas would be located on paved roads adjacent to buildings.

2.3 OTHER ACTION ALTERNATIVES

Other alternatives to the proposed project are adequately addressed in Section 2 of the PEA.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The PEA has adequately described the affected environment and impacts of the proposed action for many resource areas, except for geology and soils; air quality; water resources; biological resources; cultural resources; public services and recreation; noise; and visual resources. Therefore, the affected environment and environmental consequences for those resources are described in this section, which is intended to supplement the information contained in the PEA. Necessary avoidance and minimization measures, either stipulated in the PEA, or based on the results of the impact analysis in the SEA, that are appropriate for the proposed action, are discussed in Section 4.

3.1 GEOLOGY AND SOILS

LO is located on top of Mount Hamilton, which is part of the Diablo Range of California's Inner Coast Range. Mount Hamilton is one of the tallest mountains overlooking the Silicon Valley at an elevation of 4,360 feet. The geology is complex and consisting of mostly Upper Cretaceous age rock. The topography rises sharply from the San Jose Basin, pushed up by

action of thrust faults and restraining bends along the San Andreas Fault, forming the steep slopes and canyons of Mount Hamilton.

Soils on the upper portion of Mount Hamilton have developed in limestone and other mixed geology. The steepness of the slopes in the project area drives the soil characteristics; because of the steepness erosion rates are high and soils are unable to develop mature profiles, and have a shallow depth to bedrock (commonly less than 20 inches deep), have high percentages of rock content, have rapid rates of runoff, and are well drained.

Unstable soils and geologic conditions have historically resulted from vegetation removal associated with wildfires, timber harvesting, mining, and grading as part of road building and site development. Depending on local topographic, geologic, and hydrological conditions, significant precipitation can exacerbate unstable conditions, resulting in severe surface erosion, landslides, and mudslides.

FEMA has determined that implementation of the proposed action would not exacerbate current erosion levels or result in impacts to geology and soils with implementation of the avoidance and minimization measures described in Sections 4.1 and 4.3 of the SEA. Therefore, the proposed action would not result in adverse impacts to geology and soils.

3.2 AIR QUALITY

The project site is located in the Bay Area Air Quality Management District. Santa Clara County does not attain the state or Federal standards for ozone and does not attain the state standards for particulate matter. The U.S. Environmental Protection Agency, in conjunction with the U.S. Department of Transportation, established the General Conformity Rule [40 CFR Part 51.583(b)]. The Federal Clean Air Act defines conformity as the upholding of a set of air quality goals by eliminating or reducing violations of the national ambient air quality standards and achieving attainment of these standards. Conforming activities or actions should not, through additional air pollutant emissions, result in the following: cause or contribute to new violations; increase the frequency or severity of existing violations; or delay timely attainment or interim emission reductions.

The minimum emission thresholds for which a General Conformity Rule determination must be performed for various criteria pollutants are 10 tons per year for ozone precursors, 70 tons per year for particulate matter, and 100 tons per year for all pollutants.

Implementation of the proposed action would result in a temporary deterioration of air quality. The project-related effects to air quality would include short-term increases of fugitive dust and equipment combustion emissions that would be created by chainsaws, chippers, mowers, and other equipment. In addition, pile burning would result in the emission of particulate matter. Assuming a 90-day project duration in the first year, the proposed action would create approximately 0.3 ton per year of emissions for all pollutants. Thus, emission estimates for PM_{10} (particulate matter size of 10 micrometers), nitrogen oxides, carbon monoxide, sulfur dioxide, and hydrocarbons (ozone precursors) fall below the threshold levels of the General Conformity Rule. Therefore, the proposed action qualifies as a General Conformity Rule exemption, and no further analysis is required to establish conformity with the State Implementation Plan.

3.3 WATER RESOURCES

There are no surface water bodies within the action area due to the steepness of the slopes; however, several ephemeral draws are located in the action area. In addition, there are five unnamed tributaries that occur less than 0.5 mile downgradient of the action area, and Sulphur Boy Creek, Isabel Creek, and Smith Creek are located approximately 0.5, 1.0, and 1.3 miles from the action area, respectively; all are ephemeral creeks located in extremely steep hills. These creeks would only have flowing water for short periods of time after a rain event. No riparian vegetation associated with slow-moving water is present in the action area. The action area does not provide any ponds, seasonal wetlands, vernal pools, or artificial impoundments such as stock ponds.

With implementation of avoidance and minimization measures, such as BMPs for erosion and sediment control, as described in Sections 4.1 and 4.3 of the SEA, impacts to water resources would be minimal. Buffers adjacent to ephemeral streams would be used to reduce sediment entering the waterways, reduce erosion along banks, and provide for infiltration during precipitation events that would reduce peak flows (USEPA 2004). No vegetation clearing activities would be allowed within these buffers. Wildfires are known contributors to deterioration of water quality by increased erosion, sedimentation, and ash input. Implementation of the proposed action would result in a long-term benefit to water quality by reducing the chance for a wildfire in the project area.

3.4 BIOLOGICAL RESOURCES

A reconnaissance survey was conducted and habitat of the action area was mapped October 19, 2005. Three vegetation communities were identified in the action area: foothill pine/canyon oak woodland, annual grassland, and blue oak woodland (FEMA 2006a). Ruderal grassland is also present.

Biosearch Associates, a consultant to UCSC, also conducted a habitat assessment of the action area on September 20, 2005 (Biosearch Associates 2005). In addition, Biotic Resources Group (BRG) conducted a rare plant survey in the action area on September 13, 2005 (BRG 2005). No federally listed plant species were identified during the BRG rare plant survey.

The presence of federally listed species in the action area was evaluated based on a review of the existing data and the results of the FEMA, BRG, and Biosearch Associates surveys of the action area. Sources of existing data included the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB) records and a U.S. Fish and Wildlife Service (USFWS) species list obtained for the Lick Observatory, San Jose East, Calaveras Reservoir, Mount Day, Eylar Mountain, Isabel Valley, Mount Sizer, Morgan Hill, and Santa Theresa Hills 7.5-minute U.S. Geological Survey (USGS) quadrangles.

The background data review identified 14 wildlife species and 6 plant species that are federally listed as threatened or endangered, proposed, or candidate species and have recorded occurrences in the vicinity of the action area or have the potential to occur based on historic range and suitable habitat in the vicinity of the action area (Table 2, Appendix A).

As a result of the field and background review and as explained in the species table in Table 2 (Attachment A), FEMA determined that the action area does not provide habitat suitable to support any federally listed species under the USFWS' jurisdiction.

Although the action area overlaps with Unit 6 of the designated critical habitat for the California tiger salamander, FEMA determined that the proposed action would not adversely modify or destroy the primary constituent elements of the designated critical habitat for this species because the action area does not provide suitable habitat to support California tiger salamander.

FEMA submitted a letter report for the proposed action to the USFWS on April 12, 2006. FEMA received comments on the letter report from the USFWS on June 14, 2006. Subsequently, FEMA submitted a response letter to the USFWS on August 31, 2006, to provide answers to USFWS questions. On October 13, 2006, FEMA received a letter from the USFWS concurring with FEMA's determination that implementation of the proposed action is not likely to adversely affect Federally listed species or their critical habitat and that no avoidance and minimization measures are necessary (Appendix B).

3.5 CULTURAL RESOURCES

Cultural resource investigations were undertaken to identify both previously recorded sites and previously undiscovered sites within the action area in compliance with Section 106 of the National Historic Preservation Act (NHPA) and the Programmatic Agreement (PA) Among FEMA, the California State Historic Preservation Officer (SHPO), OES, and the Advisory Council on Historic Preservation. FEMA's archaeological consultant conducted a pedestrian survey on November 16, 2005. No prehistoric sites were discovered during the survey. One historic site, a scatter of mostly tin cans, was discovered adjacent to a CDF fire lookout tower.

FEMA contacted the California Native American Heritage Commission (NAHC) on November 7, 2005, to request a review of its Sacred Lands File and to receive a list of the individuals and groups that the NAHC believes should be contacted regarding information or concerns related to the project areas. The NAHC responded on November 10, 2005, with negative results for its search of the Sacred Lands File. On February 17, 2006, URS transmitted an informational letter to the eight potentially interested parties identified by the NAHC. To date, no responses to the informational letter have been received.

A cultural resources literature review was conducted on November 17, 2005, at the Northwest Information Center (NWIC) at Sonoma State University for known archaeological and historical sites within a ¼-mile radius of the action area. As reported by the NWIC, no sites are listed, or determined eligible for listing, in the Office of Historic Preservation Historic Property Directory, the California Inventory of Historic Resources, the California Register of Historic Places, nor the National Register of Historic Places (NRHP). While the Main Observatory (Building 7240), Crossley Observatory (Building 7211), and Shane Observatory (Buildings 7276 and 7277) as well as the Copernicus Peak fire lookout tower have been recommended as eligible to the NRHP, these properties are outside the proposed action's area of potential effects.

FEMA prepared a cultural resources technical report (FEMA 2006) and transmitted this to the SHPO on March 29, 2006. Based on the cultural resources evaluation, FEMA made a determination of "no historic properties affected." The tin scatter discovered adjacent to a CDF fire lookout tower does not meet eligibility requirements for the NRHP. On April 19, 2006 the SHPO responded with a letter concurring with FEMA's determination (Appendix C). Therefore, the proposed action complies with Section 106 of the NHPA and the PA. Section 4.5 of this SEA describes steps that UCSC must take in the event of an unanticipated discovery.

3.6 PUBLIC SERVICES AND RECREATION

Mount Hamilton hosts approximately 30,000 tourists annually. Summer public concerts and lectures at LO attract about 2,000 visitors each year, and an additional 1,500 come to LO for special academic tours.

Temporary impacts include changes to parking areas and traffic flow. With implementation of the minimization and avoidance measures described in Section 4.6 of the SEA, short-term impacts associated with the proposed action would be minimal, and far less substantial than the short- and long-term impacts to the public as a result of a wildfire.

3.7 NOISE

The action area is generally quiet, consisting primarily of natural noises (e.g., bird calls, wind rustling leaves in trees), except for vehicle traffic and human voice noises along Highway 130 and within close proximity to the structures. Exceptions include summer concerts and public lectures that are held outside periodically. Noise-sensitive receptors within and near the action area include visitors, employees and research scientists within buildings and outside on UCSC property. Noise associated with the proposed action includes the operation of chainsaws, chippers, mowers, other equipment and vehicles, and human voices.

The evaluation of noise impacts is based on typical noise emission levels from chainsaws and mowers. The effects of large-scale terrain features and propagation through foliage were neglected in the noise analysis. Santa Clara County's noise ordinance sets a limit on exterior noise levels for residential public space land uses as 55 A-weighted decibels (dBA) between 10:00 pm and 7 am. Noise levels at receptors farther than approximately 1000 feet from project activities are expected to be below 55 dBA. Receptors less than approximately 1000 feet from chainsaws and mowers may experience temporary sound levels of between 55 and 60 dBA.

Noise associated with project activities would move throughout the project area, and no single noise-sensitive receptor would be subject to project-related noise levels above 55 dBA for more than a few hours at a time for a few days. Therefore, with implementation of the avoidance and minimization measures described in Section 4.7, impacts to noise-sensitive receptors would be minimal.

3.8 VISUAL RESOURCES

The scenic qualities of the landscape on Mount Hamilton mainly consist of a naturally forested environment and UCSC buildings including the Main Observatory (Building 7240).

Removal of vegetation with implementation of the proposed action would not create additional viewsheds or deteriorate existing views from atop Mount Hamilton. Short-term impacts to views within the action area would occur during vegetation clearing and brush piling and burning activities when crews are working within the action area. Implementation of the proposed action would create a more beneficial viewshed than what may occur if Mount Hamilton was to sustain a wildfire that could remove most of the existing vegetation.

3.9 CUMULATIVE IMPACTS

No other projects are planned in the project vicinity or in nearby areas. Therefore, no adverse cumulative impacts are expected to occur with implementation of the proposed action.

4. MINIMIZATION AND AVOIDANCE MEASURES

The following minimization and avoidance measures have been extracted from the PEA Section 4, or from measures developed for this SEA based on site specific impacts, and are applicable for the proposed action.

4.1 GEOLOGY AND SOILS

UCSC would be responsible for implementing erosion protection measures including best management practices (BMPs) to minimize soil loss and sedimentation including chipping and scattering of cut vegetation onsite to the maximum extent possible.

4.2 AIR QUALITY

UCSC would be responsible for reducing potential air quality impacts from vegetation clearing activities and employing minimization measures to limit fugitive dust and emissions. These measures include but are not limited to watering disturbed areas, scheduling the siting of staging areas to minimize fugitive dust, and keeping vehicles and chainsaws tuned properly. Further, UCSC would only conduct pile burning on days approved by the Bay Area Air Quality Management District.

4.3 WATER RESOURCES

UCSC would be responsible for implementing BMPs to reduce potential impacts to water resources including:

- Designating vehicle parking areas on paved surfaces where possible to prevent disturbance of surface soils,
- Leaving shredded/cut material on-site to the maximum extent possible to prevent erosion,
- Using buffers around ephemeral streams that would consist of a vegetated strip of land beginning at the edge of the active channel and continuing for 5 feet perpendicular to the channel (on both sides) where no project-related activities, including clearing of vegetation, may occur,
- Applying herbicides with appropriate mitigation techniques including:

- An herbicide solution would be applied directly to the cambium layer of the freshly cut stump within a few minutes of cutting. The herbicides would likely consist of a combination of Garlon® 4 (tricloypyr) or Roundup® (glyphosate) in a solution of water and marking dye. A typical tree requires 1 to 2 ounces of diluted solution. Initial application would occur during the dry season (i.e., later summer or fall).
- For all applications, herbicide treatment would occur only by a licensed applicator. Herbicides would not be applied directly to water or to plants within 10 feet of standing water or an ephemeral stream or swale.
- No foliar herbicide application would occur, and herbicides would not be applied by spraying.

UCSC would also ensure that large pieces of vegetation, large limbs, soil, and other debris are not allowed to accumulate in a waterway that might create a blockage when flow is present.

4.4 BIOLOGICAL RESOURCES

No avoidance and mitigation measures are required for biological resources.

4.5 CULTURAL RESOURCES

If previously unrecorded archaeological sites are discovered during vegetation management activities, UCSC would stop project activities in the vicinity of the discovery, take all reasonable measures to avoid or minimize harm to the site, and notify FEMA as soon as possible, so that FEMA can reinitiate consultation with the SHPO.

4.6 PUBLIC SERVICES AND RECREATION

UCSC would work with CDF staff to develop educational materials relating to ongoing maintenance activities for the duration of the proposed action. UCSC would be responsible for notifying the public prior to implementation of the proposed action and providing educational materials to the public, such as the posting of fliers at the vistor's center and outdoor concert areas.

4.7 NOISE

UCSC would be responsible for implementation of the following mitigation measures to reduce noise levels associated with the operation equipment for proposed action activities:

- Project activity creating noise levels of above 55 dBA would not be conducted between 10:00 p.m. and 7:00 a.m. and not on Sundays or Federal holidays.

All noise-producing project equipment and vehicles using internal combustion engines would be equipped with properly operating mufflers and air inlet silencers, where appropriate, that meet or exceed original factory specification.

4.8 VISUAL RESOURCES

No avoidance and mitigation measures are required for visual resources.

5. REFERENCES

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