

# Haleakalā Sunrise Summit Visitation Environmental Assessment

## Contents

1	INTRODUCTION .....	1
1.1	Project Background.....	1
1.2	Purpose and Need for the Action .....	2
1.3	Management Context .....	2
1.3.1	Haleakalā National Park .....	2
1.3.2	Haleakalā National Park Resource Management Activities .....	3
1.4	Laws and Other Plans Related to the Alternatives .....	5
1.4.1	Pertinent Laws, Regulations, and Policies .....	5
1.4.2	Relationship to Haleakalā National Park Planning Documents .....	5
1.4.3	Relationship to Regional Planning Documents .....	6
1.5	Scoping and Consultations .....	6
1.5.1	Internal Scoping.....	6
1.5.2	External Scoping.....	6
1.5.3	Consultations .....	7
1.6	Issues and Impact Topics .....	7
1.6.1	Issues and Impact Topics Identified for Further Analysis .....	7
1.6.2	Impact Topics Considered but Dismissed from Further Consideration.....	8
2	ALTERNATIVES.....	9
2.1	Alternatives Considered and Dismissed.....	9
2.2	Alternative 1: No Action (Return to Unregulated Sunrise Visitation).....	10
2.3	Alternative 2: Proposed Action (Continue Reservation System).....	10
2.4	Alternative 3: Close at Capacity .....	11
3	AFFECTED ENVIRONMENT .....	12
3.1	Project Location .....	12
3.2	Physical Environment .....	12
3.2.1	Lightscares .....	12
3.2.2	Soundscapes.....	12
3.3	Biological Resources.....	13
3.3.1	Vegetation.....	13
3.3.2	Wildlife and/or Wildlife Habitat.....	13
3.3.3	Species of Special Concern or their Habitat .....	14
3.3.4	Nonnative or Exotic Species.....	18
3.4	Cultural Resources .....	19
3.4.1	Archaeological Resources .....	20
3.4.2	Cultural Landscapes .....	20
3.4.3	Ethnographic Resources .....	21
3.4.4	Prehistoric/Historic Structures.....	22
3.5	Socio-Economic Environment .....	22
3.5.1	Human Health and Safety .....	22
3.5.2	Visitor Use and Experience .....	23
3.5.3	Park Operations .....	23

4	ENVIRONMENTAL CONSEQUENCES.....	25
4.1	Methodology .....	25
4.2	Physical Environment .....	27
4.2.1	Lightscares .....	27
4.2.2	Soundscapes.....	27
4.3	Biological Resources.....	28
4.3.1	Vegetation.....	28
4.3.2	Wildlife and/or Wildlife Habitat.....	29
4.3.3	Species of Special Concern or their Habitat .....	30
4.3.4	Nonnative or Exotic Species.....	31
4.4	Cultural and Historic Resources .....	32
4.4.1	Archaeological Resources .....	32
4.4.2	Cultural Landscapes .....	32
4.4.3	Ethnographic Resources .....	33
4.4.4	Prehistoric/Historic Structures.....	34
4.5	Socio-Economic Resources.....	35
4.5.1	Human Health and Safety .....	35
4.5.2	Visitor Use and Experience .....	36
4.5.3	Park Operations .....	37
5	LIST OF PREPARERS AND CONTRIBUTORS.....	41
6	REFERENCES .....	42

## Tables

Table 1.	Special Status Bird, Mammal, and Plant Species in the Project Vicinity .....	14
Table 2.	Species with Designated Critical Habitat in the Project Area.....	18
Table 3.	Summary of Archaeological Sites In the Vicinity of the Project Area .....	20
Table 4.	Cumulative Actions and Potentially Affected Resources .....	26
Table 5.	Environmental Consequences Comparison .....	38

## Figures

Figure 1.	Overcrowded Lot during Sunrise Hour .....	1
Figure 2.	Haleakalā National Park and Surrounding Environs .....	4
Figure 3.	Traffic Backed Up on Haleakalā Highway Just Outside the Park Entrance.....	10

# 1 INTRODUCTION

This Environmental Assessment (EA) was prepared to analyze the effects of possible solutions to the problems of overcrowding at the Haleakalā summit during sunrise hours. A steady increase in sunrise summit visitation has raised concerns about safety of employees and visitors, as well as impacts to natural and cultural resources, and it was determined that a plan was needed to manage sunrise summit visitation in the park.

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations, 40 CFR § 1500-1508; the National Park Service (NPS) Director's Order #12 and associated *2015 NPS NEPA Handbook*; Section 106 of the National Historic Preservation Act of 1966 as amended, and implementing regulations, 36 CFR § 800. The NPS prepared this EA to evaluate potential issues and impacts to Park resources and values from three alternatives, and identify mitigation measures to lessen the degree or extent of these impacts.

## 1.1 Project Background

Sunrise viewing at the summit of Haleakalā is a top visitor attraction on Maui. Pre-dawn through sunrise is the busiest time of day and there has been an ongoing, steady, and significant increase in sunrise visitation. In recent years the increase has been particularly striking, with an average of 21% more cars arriving for sunrise between 2015 and 2016. As of September 2016, non-commercial vehicles were regularly exceeding available parking capacity by an average of 100 vehicles each morning (HNP, unpublished data) (Figure 1).



**Figure 1. Overcrowded Lot during Sunrise Hour**

In October of 2016, after concerns were raised about the safety of visitors and park staff, as well as damage to sensitive natural and cultural resources, the NPS implemented emergency restrictions to address the problem of overcrowding at the summit during sunrise hours. A pilot reservation system was developed to limit the number of non-commercial vehicles allowed into the four highest parking lots in the summit district of the park between 3:00 and 7:00 AM to no more than 150 (the total number of available parking spaces). Visitors planning to travel to the summit for sunrise viewing are now required to purchase a \$1.50 reservation online up to 60 days in advance at the recreation.gov website, and show photo identification matching the name on the reservation while paying their park entry fee at the entrance station. The reservation system was rolled out on February 1, 2017, and has dramatically reduced crowding at the summit during sunrise hours, along with the safety concerns and resource damage noted prior to implementation.

The emergency restrictions implemented in 2016 were intended to be temporary in nature and designed to reduce concerns about safety and resource damage while the NPS studies the issue in more detail to ensure the best possible long-term solution to the problem.

## **1.2 Purpose and Need for the Action**

The purpose of this action is to manage sunrise summit visitation at Haleakalā National Park (HNP) in a manner that provides for the safety of employees and park visitors, protects sensitive natural and cultural resources, and maintains a high quality visitor experience. Overcrowding during sunrise summit visitation prior to the initiation of the temporary reservation system led to situations in which the health and safety of both employees and visitors, as well as the natural and cultural resources present at the summit, were negatively impacted. Implementation of a well thought-out plan will accomplish this purpose by keeping visitation to levels that can be safely accommodated by the existing infrastructure at the summit. With cars limited to no more than the number of parking spaces, there will be less incentive for visitors to park off pavement and potentially damage sensitive cultural and natural resources, or to drive recklessly in search of a parking spot. Smaller crowds at viewpoints should result in fewer people wandering off established trails and viewpoints during dark or low-light conditions, with less resource damage or risk of accidents.

## **1.3 Management Context**

### **1.3.1 Haleakalā National Park**

Established in 1916, HNP manages over 33,000 acres of federal lands on the island of Maui (Figure 2). There are two districts in the Park, the Summit District and the Kīpahulu District. The Summit District includes a 10.6 mile portion of Haleakalā Highway (known as Crater Road within the park), Haleakalā Crater, Kaupō Gap, and Nu‘u. The Summit also includes service roads, public and service trails, buildings, and parking lots. The Kīpahulu District includes County Highway 31, ‘Ohe‘o Gulch, the Kīpahulu Valley, and Ka‘āpahu. Public use trails, roads, and buildings occur at ‘Ohe‘o. The remaining areas include trails, unimproved roads, and buildings for service use only. Buildings and facilities are located in both districts. These include Park Headquarters, two base yards, visitor centers, public campgrounds, and three backcountry visitor cabins located in the Summit District.

### ***Park Purpose and Significance of the Summit***

HNP was formed to preserve a nationally significant portion of Haleakalā Volcano and its unique native Hawaiian ecosystems, and to provide opportunities for the public to access many of its geologic, scientific, and historic features. The park's purpose is stated in the park's Foundation Document (NPS 2015): "For the inspiration of current and future generations, Haleakalā National Park protects a wild volcanic landscape with a wide array of fragile and diverse native ecosystems, including plant and animal species found nowhere else on Earth. Our stewardship perpetuates the unique and continuing connections between Hawaiian culture and this sacred and evolving land."

The Haleakalā Volcano is the larger of the two volcanoes that form the island of Maui. Its crater measures about 20 miles in circumference and dominates the volcanic landscape at the summit. In several places the rim of the crater rises more than 2,500 feet above the crater floor. For Native Hawaiians, the summit of Haleakalā is the *Wao Akua* ("Place of the Gods") where, according to one version of the legend, the demi-god Maui snared the sun. The summit of Haleakalā, including Kīpahulu Valley and Kaupō Gap, is also eligible for the national register as a traditional cultural property for its association with the cultural landscape of Maui and because of its known uses, oral history, *mele* (chants or poems), and legends. It remains a source of traditional materials and sacred uses, and a place of profound spiritual power. The majority of visitors who travel to the summit and headquarters/visitor center are drawn there to witness the awe-inspiring sunrise. In addition to these activities, guided hiking is available along 38 miles of trails. On clear nights, many enjoy world-renowned star gazing and astronomy-oriented activities because of the exceptional viewing conditions (NPS 2015).

### **1.3.2 Haleakalā National Park Resource Management Activities**

The management of natural and cultural resources in the Park is the responsibility of HNP's Division of Integrated Resource Management. The primary purpose of the Division is to uphold the federal mandate as defined in the NPS Organic Act (16 USC § 1) to preserve and protect natural and cultural resources. The Integrated Resource Management Division employs scientists, technical experts, biotechnicians, and cultural resource managers.

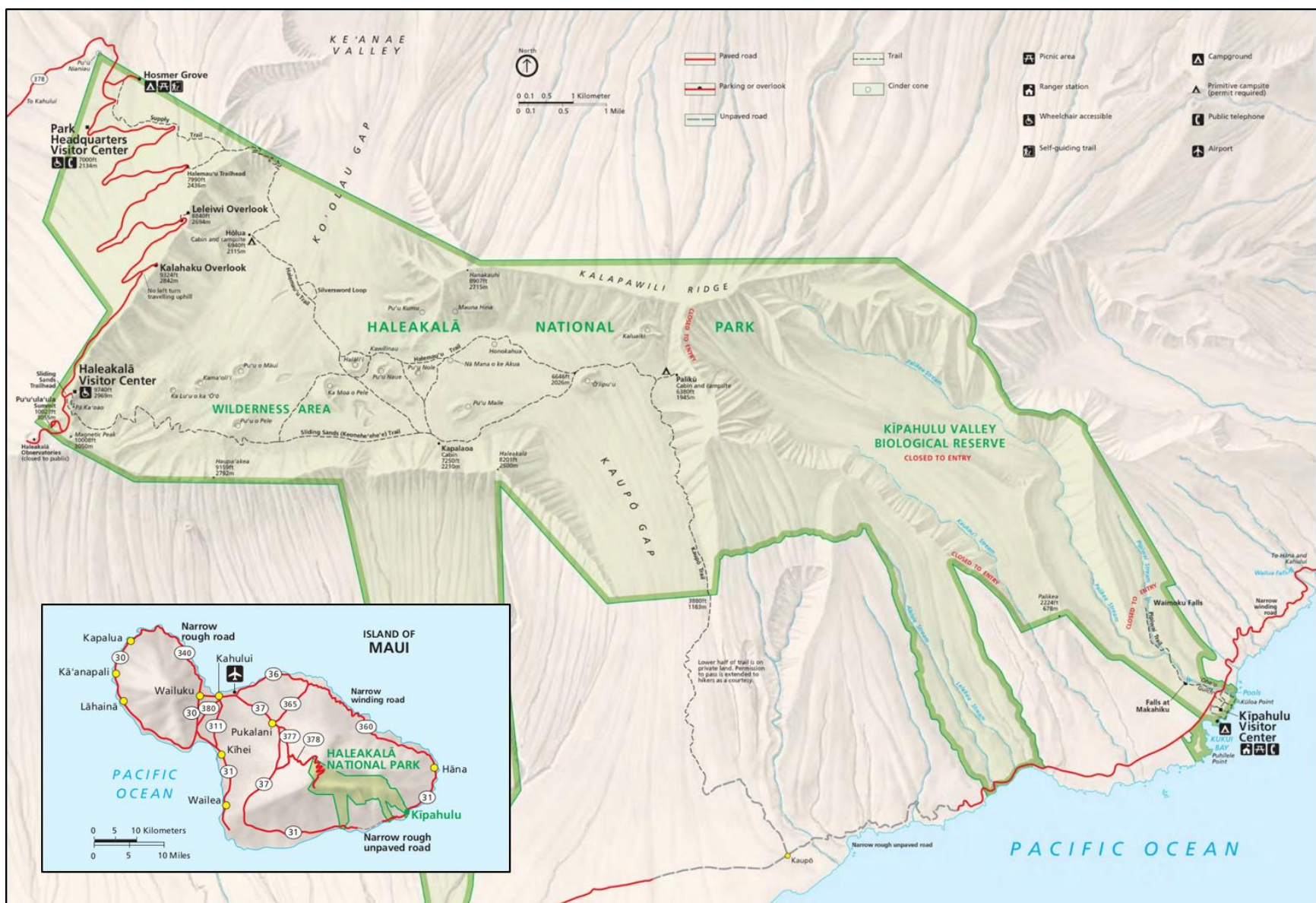


Figure 2. Haleakalā National Park and Surrounding Environs



## 1.4 Laws and Other Plans Related to the Alternatives

The potential impacts of the alternatives must be evaluated in the context of Park purpose, which is based on the Park's enabling legislation, and other federal laws that affect management of the Park. The NPS *Management Policies 2006* (NPS 2006) provides guidance for implementing these laws.

### 1.4.1 Pertinent Laws, Regulations, and Policies

- National Environmental Policy Act of 1969, As Amended (42 USC § 4321 et seq.)
- Endangered Species Act of 1973, As Amended (16 USC § 1531 et seq.)
- National Historic Preservation Act of 1966, As Amended (16 USC § 470; 36 CFR § 800)
- Migratory Bird Treaty Act of 1918, As Amended (16 USC § 703-712)
- Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (2001)
- Lacey Act of 1900, As Amended (18 USC § 42-43; 16 USC § 3371–3378)
- Act to Establish A National Park Service (Organic Act) of 1916 (16 USC § 1 et seq.)
- National Park Service NEPA Handbook (2015)
- National Parks Omnibus Management Act of 1998 (P.L. 105-391)
- Title 36, Code of Federal Regulations, Chapter 1
- Executive Order 13112, Invasive Species (1999)
- National Park Service Management Policies 2006
- National Park Service Director's Order #12 (2011)

### 1.4.2 Relationship to Haleakalā National Park Planning Documents

#### ***General Management Plan/Environmental Impact Statement Haleakalā National Park***

The General Management Plan/Environmental Impact Statement for HNP presents a framework to guide management, development, and use of HNP (NPS 1995). It contains the following broad management objectives: protection of unique geologic, biotic, and cultural resources of HNP; improvement in the quality of the visitor's experience; and helping sustain the traditional Hawaiian lifestyle in East Maui. The plan states that management and use of the west crater rim is "oriented toward providing for appreciation of the major geological features of Haleakalā Crater," as well as interpretation of biological and historic features present in the area (NPS 1995).

#### ***Foundation Document, Haleakalā National Park***

Foundation Documents provide a basic understanding of a park's resources, values, and history to support planning and management. Core components include a brief description of the park, the park's purpose, significance, fundamental resources and values, and interpretative theme. The HNP Foundation Document presents eight 'significance statements' including "Haleakalā National Park is known for its exceptional scenery, including sunrises and sunsets above the clouds...and sparkling, star-filled skies. These and countless other sights and scenes provide transformational experiences for residents and visitors alike."

#### ***Biological Opinion and Informal Consultation for the Operation and Management of the Haleakalā National Park***

A Biological Opinion was issued to address all operation and maintenance activities at HNP over a 20 year period and to facilitate Section 7 review in compliance with the Endangered Species Act (USFWS 2012a). Activities included in the Biological Opinion relevant to the Summit Sunrise Visitation EA are: vehicle use,

pedestrian activity, commercial activity, park maintenance and operation activities, road preservation, resource management activities, vegetation management, repointing and masonry maintenance and repairs, law enforcement, and interpretation and education. The Biological Opinion addresses all 65 listed or proposed species found within HNP as well as designated or proposed critical habitat.

### **1.4.3 Relationship to Regional Planning Documents**

#### ***US Fish and Wildlife Service, Regional Seabird Conservation Plan, Pacific Region***

The plan identifies priorities for regional seabird management, monitoring, research, outreach, planning, and coordination (USFWS 2005). This plan includes: a review of seabird resources and habitats, a description of issues and threats, and a summary of current management, monitoring and outreach efforts. The section covering ‘ua‘u notes that on Maui the birds “have been pushed to the limits of their habitat, nesting in the cold, xeric environment above 2,500 m.” This nesting habitat includes the cinder fields around the viewpoints at the summit.

## **1.5 Scoping and Consultations**

Scoping was conducted both internally and externally.

### **1.5.1 Internal Scoping**

Park personnel met multiple times to discuss methods for addressing the overcrowding at the Haleakalā summit during sunrise hours. Discussions held in 2016 examined potential solutions to the problem, and led to the implementation of the emergency restrictions and the reservation system now in place.

### **1.5.2 External Scoping**

An external scoping period was held from June 21 to July 21, 2017. External scoping was conducted to engage interested parties on matters related to sunrise summit visitation, including conditions before implementation of the emergency restrictions, how the current interim reservation system is functioning, what could be done to improve the reservation system, or if there are other approaches that would better address the problem of overcrowding at the summit. The NPS solicited feedback from the public, as well as governmental and non-governmental organizations that have an interest in conservation and recreation issues in Hawai‘i and specifically on Maui (NPS 2017). The NPS distributed information on overcrowding at the summit and what is currently being done to address the issue via a press release, a newsletter, agency/organizational letters, and the NPS Planning, Environment, and Public Comment (PEPC) and HNP websites. Two public meetings were held (June 21, 2017 in Pukalani and June 22, 2017 in Wailuku) to inform, answer questions, and collect comments.

Seventeen (17) comments were received during the scoping period. As the Haleakalā Sunrise Summit Visitation EA is being conducted following a categorical exclusion prepared to implement the emergency restrictions in 2016, some correspondence on the issue of sunrise visitation management had already been entered into the PEPC system prior to the scoping period. Additionally, a number of hard-copy comments had been submitted in person to the park since implementation of the reservation system. In total, 45 correspondence items were received in one format or another, covering the following topics:

- preservation of natural and cultural resources at the summit;



- shortcomings of the current reservation system;
- benefits of the current reservation system;
- alternative solutions including a shuttle system or expanded infrastructure at the summit;
- problems now occurring with (unregulated) sunset visitation; and
- special access for locals to visit the summit for sunrise.

Details of the public scoping, including a copy of all comments, are presented in a Public Scoping Report that was made available on the PEPC website in November 2017.<sup>1</sup> All comments were taken into consideration during the development of this EA.

### **1.5.3 Consultations**

#### ***US Fish and Wildlife Service***

Section 7 of the Endangered Species Act requires federal agencies to consult with the USFWS or the National Marine Fisheries Service when taking an action that may affect federally listed threatened or endangered species or designated critical habitat. In June 2017, a general scoping letter was sent to the USFWS to inform the agency of the initiation of the EA.

#### ***Hawai'i State Historic Preservation Division***

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their undertakings on historic properties and to provide state historic preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on the effects of agency actions. In June 2017, a general scoping letter was sent to the State Historic Preservation Division to inform the agency of the initiation of the EA.

## **1.6 Issues and Impact Topics**

Issues related to potential environmental effects of project alternatives were identified by the project interdisciplinary team, and are presented below.

### **1.6.1 Issues and Impact Topics Identified for Further Analysis**

These topics have been identified based on federal laws, regulations, and orders; the NPS *Management Policies 2006* (NPS 2006); the NPS knowledge of resources; input from natural resource managers; and public input.

- Nonnative or exotic species
- Species of special concern or their habitat
- Vegetation
- Wildlife and/or wildlife habitat
- Archaeological resources
- Cultural landscapes
- Ethnographic resources

---

<sup>1</sup> <https://parkplanning.nps.gov/projectHome.cfm?projectID=63985>

- Prehistoric/historic structures
- Lightscares
- Human health and safety
- Soundscapes
- Visitor use and experience
- Park operations

### **1.6.2 Impact Topics Considered but Dismissed from Further Consideration**

The following impact topics are not expected to be addressed in the EA since there are no potential effects to these resources, either because they are not in the project area or they would not be measurably impacted.

- Air quality
- Geology and soils
- Socioeconomics
- Water quality
- Wilderness

#### ***Air Quality***

Given the topographic position of the project area at the top of a high peak with frequent strong winds, the air quality is typically very good, and any affects resulting from the proposed alternatives would be negligible. This issue was considered and eliminated from further analysis in this EA.

#### ***Geology and Soils***

The proposed alternatives would primarily affect the flow of motor vehicles and pedestrians on paved surfaces, and would therefore have no effect on geologic resources. Any changes to pedestrian use of unpaved surfaces would be minimal, and therefore have negligible effects on soils. This issue was considered and eliminated from further analysis in this EA.

#### ***Socioeconomics***

No noticeable impact to the local economy would occur as a result of the proposed alternatives. This issue was considered and eliminated from further analysis in this EA.

#### ***Water Quality***

There are no surface water bodies in the vicinity of the project area, and the proposed alternatives would not affect water quality in any measureable way. This issue was considered and eliminated from further analysis in this EA.

#### ***Wilderness***

The wilderness area inside the Haleakalā Crater would not be impacted by the proposed alternatives, as the great majority of the sunrise visitors to the summit are only there to see the sunrise, remain outside of designated wilderness boundaries, and do not stay afterward to hike into the crater. This issue was considered and eliminated from further analysis in this EA.

## 2 ALTERNATIVES

This section outlines three alternatives for management of summit sunrise visitation in HNP. The No Action Alternative describes returning to the unregulated sunrise summit visitation in effect prior to implementation of the emergency restrictions in 2016. It is the basis for comparison for the two Action Alternatives and their environmental consequences, and is required under NEPA. The descriptions of alternatives include potential actions and results for each alternative. Alternatives considered but dismissed from detailed analysis are also discussed, as well as the reasons for dismissing them from consideration and analysis.

### 2.1 Alternatives Considered and Dismissed

Two alternative means of managing sunrise summit visitation were considered and dismissed: 1) increasing parking spaces and/or other infrastructure at the summit to accommodate more visitors, or 2) implementing a shuttle system to replace or complement the use of private vehicles by visitors.

During the initial public scoping period, several commenters suggested constructing more parking spaces at the summit, either by expanding the existing overlook parking lots or by creating new overlooks and parking lots. Some commenters also suggested constructing additional viewing platforms or bleachers to increase the number of people who could be accommodated for sunrise viewing. This option was considered and dismissed because it does not meet the purpose and need for the action. Construction of additional parking lots or spaces would require substantial ground disturbance in the sensitive summit area, with potentially significant negative affects to threatened or endangered wildlife and plants, as well as cultural resources such as archaeological sites. Furthermore, increasing the number of visitors allowed to the summit for sunrise would not only diminish the experience for those visitors, but would likely lead to more visitors walking off trail and exacerbate the damage to natural and cultural resources that was one of the original concerns triggering implementation of the emergency restrictions in 2016.

Another suggestion from numerous commenters was to implement a shuttle system, similar to visitor transportation systems of other large, popular parks such as Zion and Yosemite. For HNP, the shuttle could be utilized during sunrise hours or all day, and could either entirely replace the use of private vehicles or supplement them by allowing entry of a certain number of vehicles and then requiring additional visitors to use the shuttle. It was also suggested that a video or audio presentation could be provided during the drive to educate visitors about the sensitive natural and cultural resources at the summit and help reduce resource damage from visitors straying off established paths and viewing platforms. It was noted that depending on how it was implemented, a shuttle system could allow the park to manage not only the number of cars at the summit but also the overall number of visitors.

While the shuttle alternative fulfills some of the purpose and need for action – may reduce risks to employees and visitors and reduce impacts to natural and cultural resources - and was suggested by multiple commenters, it was considered and dismissed from this EA for several reasons. First, a shuttle system is not feasible at present because it would require a large financial investment from a relatively small national park and several years to implement. Costs would include some or all of the following: contracting or purchasing and maintaining buses/shuttles, construction of support facilities including a fueling station and maintenance yard, construction of a large new parking lot for visitors inside or outside the park, and hiring/contracting extra staff including bus drivers, mechanics, etc. to run and maintain the system. Additionally, there is concern that if visitors were

shuttled to the summit and dropped off before the visitor center opens, visitors would be left to the elements without shelter in case of severe weather. Finally, this EA is intended to address the problem of summit sunrise overcrowding within a relatively short timeframe, and the implementation of a shuttle system represents a more long-term potential solution to a larger problem of visitor transportation management throughout the Summit District and throughout the day. In the future, it is anticipated that the park will prepare a comprehensive travel management plan to address all aspects of transportation in the park, and this plan may consider a shuttle system. The shuttle system was ultimately dismissed from consideration because it would not meet the purpose and need within the necessary timeframe, and addresses issues that are beyond the scope of this EA.

## **2.2 Alternative 1: No Action (Return to Unregulated Sunrise Visitation)**

Implementation of the No Action Alternative would entail removal of the temporary reservation system originally implemented in October of 2016. Visitors would be free to visit the summit during sunrise hours without purchasing a reservation in advance, paying only the regular park entrance fee as during any other time of day. Park staff would work to fit private vehicles arriving for summit sunrise viewing into the available parking spaces and other areas in the summit district as efficiently and safely as possible. Vehicles that could not be accommodated in parking lots would back up on Crater Road, either within the park or at the park entrance, blocking all upbound traffic (Figure 3).



**Figure 3. Traffic Backed Up on Haleakalā Highway Just Outside the Park Entrance**

## **2.3 Alternative 2: Proposed Action (Continue Reservation System)**

In October of 2016, the NPS implemented emergency sunrise restrictions in response to threats to visitor and park staff safety, as well as potential damage to sensitive natural and cultural resources, due to overcrowding at

the summit during sunrise hours. The implemented interim reservation system was designed to limit the number of private vehicles allowed into the four highest parking lots in the summit district of the park between 3:00 and 7:00 AM to no more than 150, and was expected to also reduce the overall number of visitors during this period compared to the previous situation. The majority of the reservations for a given day are released 60 days in advance through the recreation.gov website, with the remainder released two days in advance to allow for more spontaneous trips. The Proposed Action is to continue the current reservation system as a long-term solution to the problem of overcrowding during Haleakalā summit sunrise viewing.

Modifications to the system may be required to optimize the number of visitors traveling to the summit each morning and further improve the visitor experience, while still ensuring visitor and staff safety and protection of the natural and cultural resources at the summit. Potential modifications could include increasing the number of reservations available each day (to account for frequent no-shows), adjusting the number of available reservations on a seasonal basis (if it is determined, for example, that there are more no-shows during the rainy season), adjusting the balance of reservations available 60 days versus two days in advance, or changing the advance release dates for reservations. Additionally, future modifications to the recreation.gov website could allow for cancellations (so that visitors who decide not to use a reservation could release it back into the pool for others to use), prevent visitors from reserving more than one day within a certain time period (to prevent “hoarding” of reservations over several days by visitors who only expect to use one day), and also allow visitors who are not able to purchase a reservation to sign up on a waiting list should a reservation become available.

## **2.4 Alternative 3: Close at Capacity**

Alternative 3 would remove the temporary reservation system and instead implement a “first come, first served” policy for summit sunrise visitation. Under this alternative, visitors hoping to view the sunrise from the summit would drive to the park entrance at an appropriate time, and park staff would allow the first 150 private vehicles into the park to ensure each vehicle has a parking space available. Once the 150-car limit is reached, the entrance gate would be closed and not reopened until after sunrise hours. Law Enforcement staff would potentially be required to manage and inform visitors who arrived after the park was full. Noncommercial vehicles in excess of 150 would be turned around at or prior to the park entrance station. Approved commercial tour vehicles or employees of the Haleakalā High Altitude Observatory would still be allowed entrance as needed during this time, but would likely have difficulty reaching the entrance due to backed up traffic (waiting non-commercial vehicles).

## 3 AFFECTED ENVIRONMENT

### 3.1 Project Location

The proposed project area includes the NPS-managed portion of the Haleakalā Highway (Crater Road) and the four summit parking lots used by visitors for summit sunrise viewing, as well as the area immediately surrounding the road and parking lots. Crater Road runs approximately 10.6 miles from the entrance station at approximately 6,800 feet above mean sea level (amsl) to the Red Hill Overlook at 10,023 feet amsl. The highway continues beyond this point and out of the park boundary to reach the Haleakalā High Altitude Observatory site, which is not included in this EA.

### 3.2 Physical Environment

#### 3.2.1 Lightscapes

##### ***Affected Environment***

NPS *Management Policies* (NPS 2006) state that “the service will preserve, to the greatest extent possible, the natural lightscapes of parks, which are natural resources and values that exist in the absence of human-caused light.” In the case of HNP, the lightscape during the early morning hours is predominantly composed of natural light sources such as the moon and stars, and the growing daylight through the hour or so prior to sunrise. Artificial light sources in the project area include minimal electric lighting at the entrance fee station and the summit visitor center; headlamps, flashlights, and laser pointers brought by visitors; and the headlights and tail lights of vehicles driving up to the summit. The latter is of course mobile and transient, but can nonetheless be visible for some distance, as for example when headlights from cars ascending the upper portions of the Crater Road can be seen from various locations near the entrance station.

#### 3.2.2 Soundscapes

##### ***Affected Environment***

NPS *Management Policies* (NPS 2006) state that the park's natural soundscape resources “encompass all the natural sounds that occur in the park, including the physical capacity for transmitting those natural sounds and the interrelationships among natural sounds of different frequencies and volumes.” It also states that “the NPS will preserve, to the greatest extent possible, the natural soundscapes of parks.” The frequencies, magnitudes, and durations of human-caused sound considered acceptable vary in the park, and are generally greater along roadways and in developed areas and less in undeveloped areas. The entire project area is along a roadway and adjacent to a road receiving high visitor use. Barring noise associated with human activity, however, the natural soundscape of the project area is extremely quiet, with the only sounds coming from the wind blowing past rocks and plants, or the occasional animal noises.

### 3.3 Biological Resources

#### 3.3.1 Vegetation

##### ***Affected Environment***

Vegetation in the vicinity of the project area consists of both native and non-native plants, with natives dominating all but a few areas near the park headquarters or in small patches along the road (USGS 2011). In general the northwest upper slopes of Haleakalā in which most of the project area is situated is dominated by montane and subalpine mesic to dry shrublands, with montane and subalpine mesic herbaceous vegetation near the summit. At the summit itself, the vegetation becomes extremely sparse in what is termed an aeolian desert, with scattered native shrubs and grasses amongst vast fields of volcanic cinders (Green et al. 2015).

Shrublands in the lower and middle elevations of the project area are dominated by native species such as *pūkiawe* (*Leptecophylla tameiameia*), *‘ōhelo* (*Vaccinium reticulatum*), *māmane* (*Sophora chrysophylla*), *pilo* (*Coprosma montana*), and *a‘ali‘i* (*Dodonaea viscosa*). Non-native species are primarily found near the park headquarters, where the herbaceous component of the shrubland is often dominated by exotics such as kikuyu grass (*Cenchrus clandestinus*) and buffelgrass (*Cenchrus ciliaris*), or in patches of the shrub *kiawe* (*Prosopis pallida*) scattered along the roadside at various elevations (USGS 2011). In the higher elevations of the project area the shrubs become more sparse, interspersed with grasslands dominated by alpine hairgrass (*Deschampsia nubigena*). In the aeolian desert environment of the summit, particularly in the vicinity of the two uppermost parking lots, broad cinder fields are punctuated by occasional shrubs and grasses from lower-elevation communities along with the iconic *‘āhinahina*, or Hawaiian silversword (*Argyroxiphium sandwicense* ssp. *macrocephalum*).

#### 3.3.2 Wildlife and/or Wildlife Habitat

##### ***Affected Environment***

Animal species that occur in the vicinity of the project area are primarily native species, although some non-native species are present as well. Animals found in the area include a bat, numerous birds, and various invertebrates.

The only native mammal found in and around the project area is the *‘ōpe‘ape‘a*, or Hawaiian hoary bat (*Lasiurus cinereus semotus*). Non-native mammals including Indian mongoose (*Herpestes javanicus*), rat (*Rattus* spp.), and feral cat (*Felis catus*) may also be found in the project area, although the park has implemented a robust predator control project for these species to minimize the harm they may cause to threatened and endangered native species. Feral goats (*Capra hircus*) and pigs (*Sus scrofa*) are occasionally seen in the area, but fencing and control actions exclude them from becoming established. Due to high elevations and cold temperatures, reptiles and amphibians are absent or at most found as occasional transients in the lower elevations of the project area (Kraus 2005). A number of bird species frequent the project area, including natives such as *‘apapane* (*Himatione sanguinea*), *‘amakihi* (*Hemignathus virens wilsoni*), *‘i‘iwi* (*Vestiaria coccinea*), and Maui creeper (*Paroreomyza montana*), as well as numerous non-natives. Various invertebrates are also found in the project area, including the endemic species such as the Hawaiian wolf spider (*Lycosa hawaiiensis*) and the Haleakalā flightless moth (*Thyrocopa apatela*), the latter of which is only found in the summit area of Haleakalā.



### 3.3.3 Species of Special Concern or their Habitat

#### Affected Environment

A number of federally threatened and endangered species are known to occur or may occur in the vicinity of the project area. The most prominent are the *nēnē* (*Branta sandvicensis*), 'ua'u (*Pterodroma sandwichensis*), and recently listed 'i'iwi. There are a number of other threatened or endangered birds, mammals, and plants that also are known to occur or may occur in the area (Table 1).

**Table 1. Special Status Bird, Mammal, and Plant Species in the Project Vicinity**

Scientific Name	Common Name	Hawaiian Name	Federal Status	Presence
<b>Birds</b>				
<i>Branta sandvicensis</i>	Hawaiian goose	<i>nēnē</i>	Endangered	Present
<i>Vestiaria coccinea</i>	Hawaiian honeycreeper, scarlet honeycreeper	<i>'i'iwi</i>	Threatened	Present
<i>Oceanodroma castro</i>	Band-rumped storm petrel	<i>'akē'akē</i>	Endangered	Potentially present
<i>Pterodroma sandwichensis</i>	Hawaiian petrel	<i>'ua'u</i>	Endangered	Present
<b>Mammals</b>				
<i>Lasiurus cinereus semotus</i>	Hawaiian hoary bat	<i>'ōpe'ape'a</i>	Endangered	Present
<b>Plants</b>				
<i>Argyroxiphium sandwicense</i> ssp. <i>macrocephalum</i>	Hawaiian silversword	<i>'ahinahina</i>	Threatened	Present
<i>Asplenium peruvianum</i> var. <i>insulare</i>	diamond spleenwort		Endangered	Potentially present
<i>Bidens micrantha</i> ssp. <i>kalealaha</i>		<i>ko'oko'olau</i>	Endangered	Potentially present
<i>Geranium arboreum</i>	Hawai'i red cranesbill	<i>noho-anu</i>	Endangered	Present
<i>Geranium multiflorum</i>	manyflower geranium	<i>noho-anu</i>	Endangered	Potentially present
<i>Phyllostegia bracteata</i>	bracted phyllostegia		Endangered	Potentially present
<i>Plantago princeps</i>	ale	<i>ale</i>	Endangered	Present
<i>Sanicula sandwicensis</i>	Hawai'i blacksnakeroot		Endangered	Potentially present
<i>Schiedea haleakalensis</i>	Haleakala schiedea		Endangered	Potentially present
<i>Zanthoxylum hawaiiense</i>	Hawai'i pricklyash	<i>a'e</i>	Endangered	Potentially present

## **Birds**

*Nēnē* are medium-sized geese in the family Anatidae that are endemic to Hawai‘i and historically occurred on all or most of the main Hawaiian Islands, and likely were widespread (USFWS 2012b). Although the population was near extinction in the late 1940s and early 1950s, captive breeding programs have resulted in over 2,700 captive-bred *nēnē* being released into the wild on both private and public lands. On Maui, *nēnē* fly throughout the island, and currently reside in and around the outer slopes of Haleakalā Crater, in West Maui at Hana‘ula, and in some lowland areas throughout Maui. Reintroduction of *nēnē* in HNP began in 1962 and the population in the Park is estimated at 200-250 individuals. Current threats to *nēnē* include habitat loss, predation, and collision with vehicles.

The ‘*i‘iwi* is an iconic Hawaiian species in the Fringillidae family, in the endemic Hawaiian honeycreeper subfamily, Drepanidinae, primarily found on the Big Island, east Maui, and Kauai (USFWS 2017). Historically they were found on all of the major islands, and were considered one of the most common native forest birds by early naturalists. The species is no longer found on Lanai, and only a few individuals may be found on Oahu, Molokai, and west Maui. Remaining populations tend to be located above the elevational zone at which avian malaria is readily transmitted, as the species is highly susceptible to the disease. East Maui is estimated to support roughly 60,000 ‘*i‘iwi* (USFWS 2017), and the birds are regularly sighted and detected throughout forested and shrubland areas of the Park (NPS 2012).

‘*Akē‘akē* are medium-sized, pelagic seabirds from the family Hydrobatidae (USFWS 2016a). ‘*Akē‘akē* have a widespread distribution with breeding sites on islands in the Pacific and Atlantic Oceans. When they are not breeding, ‘*akē‘akē* generally stay at sea, but may remain near breeding areas. The population size is not known but was estimated at 25,000 pairs worldwide in 2005 (DLNR 2005). The present breeding population in Hawai‘i is suspected to be very small based on confirmed sightings of birds and nests. Confirmed nesting sites in the Hawaiian Islands have been located at high elevations on Kaua‘i, Lehua, and the Big Island. On Maui, the species has been detected in the Haleakalā Crater (Natividad Hodges 1992) and at Nu‘u (HNP unpubl. data 2014). The species was only recently listed as Endangered, and has not yet been studied extensively in HNP or documented in the vicinity of the project area. Conservation actions geared towards recovery of endangered seabirds in Hawai‘i (e.g., Newell’s Shearwater and ‘*ua‘u*) also benefit ‘*akē‘akē*.

‘*Ua‘u* are medium-sized seabirds in the family Procellariidae that are endemic to Hawai‘i, and were once abundant and widely distributed throughout the archipelago. Today, the largest known breeding colony is found at Haleakalā Crater on Maui, with other colonies in high elevations on Mauna Loa and Mauna Kea, Hawai‘i Island, Kaua‘i and on the summit of Lāna‘i. ‘*Ua‘u* nest in burrows located mostly on steep slopes (HNP 2008). The population size at Haleakalā is estimated at 8,000 – 10,000 individuals (HNP unpubl. data 2014) and was estimated at 20,000 statewide in 2005 (DLNR 2005). ‘*Ua‘u* are known to utilize the upper elevations of the project area for breeding and nesting, primarily along the rim of the crater (NPS 2012). Current threats to ‘*ua‘u* include habitat loss, trampling of nests by feral ungulates, predation, groundings, and collision with vehicles and man-made objects/structures.

## **Mammals**

‘*Ōpe‘ape‘a*, from the family Vespertilionidae, are one of the largest bats in the Americas and are endemic to Hawai‘i. ‘*Ōpe‘ape‘a* is a nocturnal species that roosts solitarily during the day (except mothers and pups) in trees (both native and non-native) or sometimes in rock crevices (USFWS 2012c, Bonaccorso 2010). ‘*Ōpe‘ape‘a* forage in a variety of habitats including native and non-native forest and shrublands, open areas near forest edges, along roads, over agriculture fields and over areas of fresh/brackish water and open saltwater (Natureserve 2016,

Fraser et al. 2007). These bats are insectivorous and use echolocation to locate night flying insects which are captured in flight (Pacific Rim Conservation 2013). ‘Ōpe‘ape‘a eat both native and non-native insects including moths, beetles, crickets, mosquitoes and termites. Relatively little is known about the distribution and population status of ‘ōpe‘ape‘a, but these bats have been documented as occurring from sea level to the highest volcanic peaks (USFWS 2012c, Fraser et al. 2007). ‘Ōpe‘ape‘a have been documented in HNP and occur on lands within the project area (HNP unpubl. data 2017, Starr and Starr 2017).

## **Plants**

The Haleakalā subspecies of ‘āhinahina is a slow growing plant from the family Asteraceae that is endemic to Maui, where it occurs in the subalpine and alpine deserts of Haleakalā (USFWS 1997). The Haleakalā subspecies of ‘āhinahina, considered the Park’s hallmark plant species, was near extinction in the 1920s due to browsing and trampling by feral ungulates and cattle and vandalism by visitors. The population has increased considerably with intensive ecosystem management including the installation of ungulate control fencing. Individuals of the Haleakalā subspecies of ‘āhinahina occur in the aeolian desert of the crater, including along the rim in the vicinity of the project area.

Diamond spleenwort is a fern in the spleenwort family (Aspleniaceae) endemic to Maui and the Big Island, where it occurs in moist, dark microhabitats in various forest and shrubland ecosystems (USFWS 1998). The species was historically found near the summit of Haleakalā, but the five known populations on Maui at present are outside the project area (USFWS 2016b).

*Ko‘oko‘olau ssp. kalealaha* is an erect perennial herb in the family Asteraceae that is endemic to Hawai‘i. This species historically occurred in a diversity of habitats from open-canopy *koa* forests to montane shrublands to cliffs and sides of gulches (USFWS 1997). In East Maui *ko‘oko‘olau ssp. kalealaha* occurs from 5,200 to 7,700 ft. elevation, primarily on drainage headwalls (USFWS 2011). The species persists in places that are inaccessible to feral ungulates. The 1997 Recovery Plan contends that this subspecies “was probably once widespread on East Maui and Lanai, but has been drastically depleted by feral goats and has survived only on precipitous cliff faces inaccessible to goats” (USFWS 1997). Individuals of *ko‘oko‘olau ssp. kalealaha* occur in various locations within and around Haleakalā crater, but they are not known to occur in the project area.

*Noho-anu* may refer to either of two endangered plants in the Geraniaceae: *Geranium arboreum* and *Geranium multiflorum*. *Geranium arboreum* is a large, short-lived shrub endemic to East Maui. The species’ numbers have shrunk considerably in the recent past, and at present there are only five wild populations remaining, along with a number of outplantings in the park (USFWS 1997, 2016b). Several of the wild and outplanted populations are found in the general vicinity of the project area near the lower portion of the highway (NPS 2012).

*Geranium multiflorum* is a short-lived, compact shrub, also endemic to East Maui (USFWS 1997). Similar to *G. arboreum*, its numbers have also dropped significantly through the 20<sup>th</sup> century. An aggressive ecosystem management and species restoration program, however, has resulted in a significant recovery in recent years, with a number of outplantings in various locations around and in the crater (NPS 2012). None of the known occurrences of the species are in the general vicinity of the project area.

Bracted phyllostegia is a short-lived perennial herb in the Lamiaceae family, and endemic to the island of Maui. Historically it was found on both the east and west mountains of Maui. The species is ephemeral, typically appearing after disturbance, and therefore difficult to relocate, which makes it difficult to ascertain where it is still extant (USFWS 2016b). It is unknown whether it occurs in or near the project area.

*Ale* is a short-lived perennial shrub or herb in the Plantaginaceae family, known from Kauai, Oahu, Molokai, Maui, and the Big Island (USFWS 2016b). Its modern distribution has shrunk significantly, and it is currently only found in the wild in a few populations on East and West Maui. Outplanting in the park has expanded the population numbers and distribution, although the species is currently at risk from the invasive weed known as Koster's curse, which is rapidly displacing native species in rainforest habitats across Hawaii. One of the outplantings in the park is located in the vicinity of the project area (NPS 2012).

Hawaii blacksnakeroot is a stout perennial herb in the Apiaceae family, endemic to Maui and the Big Island. Currently it is known from shrubland and woodland in montane and subalpine ecosystems in both East and West Maui, but the population size is extremely small (USFWS 2016a). It is unclear if the species currently occurs in or near the project area, but the subalpine shrublands may provide suitable habitat.

Haleakala schiedea is a small shrub in the Caryophyllaceae family. Its historic distribution is unknown (USFWS 1997), but at present wild populations are found only in two locations on the slopes of Haleakalā Crater (NPS 2012). The park has also done significant work to cultivate the species, and outplantings have been made in numerous locations in and around the crater. None of the wild populations or outplantings are located within or immediately adjacent to the project area.

Hawaii pricklyash is a long-lived tree in the Rutaceae family that is endemic to the islands of Kauai, Molokai, Lanai, Maui, and the Big Island (USFWS 2016b). Last seen on Lanai in 1947, the species now only occupies the remaining four islands (USFWS 2015). The remaining population on East Maui is well outside of the park boundary in the Auwahi forest, but historically it also occurred in the subalpine and montane mesic ecosystems.

### **Critical Habitat**

The project area includes designated critical habitat for 10 federally listed species, including two birds and eight plants (Table 2). The 'ākohekohe is currently only known from a 58-square kilometer area outside the project area on the northeastern slope of Haleakalā volcano (USFWS 2006), although there have been unconfirmed sightings near Hosmer's Grove (not far from the lower end of the project area). The *kiwiku* has a very similar current range, and has been detected in rainforests in the park, but not in the shrublands and desert of the project area. Of the plant species with designated critical habitat in the project area, only the 'ahinahina and the *nohō-anu* (*Geranium arboreum*) have wild and/or outplanted individuals located in the vicinity of the project area. The other species have not been detected in the vicinity in the recent past, but critical habitat was designated due to historical populations in the subalpine shrubland and/or aeolian desert environments within which the project is situated.

**Table 2. Species with Designated Critical Habitat in the Project Area**

Scientific Name	Common Name	Hawaiian Name	Federal Status
<b>Birds</b>			
<i>Palmeria dolei</i>	crested honeycreeper	'ākohekohe	Endangered
<i>Pseudonestor xanthophrys</i>	Maui parrotbill	kiwikiu	Endangered
<b>Plants</b>			
<i>Argyroxiphium sandwicense</i> ssp. <i>macrocephalum</i>	Hawaiian silversword	'ahinahina	Threatened
<i>Asplenium peruvianum</i> var. <i>insulare</i>	diamond spleenwort		Endangered
<i>Bidens micrantha</i> ssp. <i>kalealaha</i>		ko'oko'olau	Endangered
<i>Geranium arboreum</i>	Hawai'i red cranesbill	noho-anu	Endangered
<i>Geranium multiflorum</i>	manyflower geranium	noho-anu	Endangered
<i>Phyllostegia bracteata</i>	bracted phyllostegia		Endangered
<i>Schiedea haleakalensis</i>	Haleakala schiedea		Endangered
<i>Zanthoxylum hawaiiense</i>	Hawai'i pricklyash	a'e	Endangered

### 3.3.4 Nonnative or Exotic Species

#### **Affected Environment**

Haleakalā National Park has experienced the introduction of numerous destructive non-native species that compete with and have in some cases displaced native plants and insects. In general the northwest upper slopes of Haleakalā in which most of the project area is situated is dominated by montane and subalpine mesic to dry shrublands, with montane and subalpine mesic herbaceous vegetation near the summit. Travel corridors such as roads or trail systems are vectors for dispersal and open up native ecosystems to possible invaders.

Invasive animal species can cause damage to the native Hawaiian ecosystems through predation of native species, increased competition for space, and increased ground disturbance. Goats, pigs, and deer cause damage to the landscape and vegetation through overgrazing and trampling, causing increased erosion potential and decreased biodiversity and girdling of trees and shrubs which can be potentially fatal for shrubs and young trees (NPS 2016). The Indian mongoose and feral cat are primary predators of the endangered *nēnē* and *ua'u*. Rats prey on native birds and have been observed consuming native vegetation (Bailey 2007). Indian mongoose populations are highest in areas below 2,000 ft. but have been found in small numbers above 8,000 ft. All rodent species and feral cats are found at all elevations throughout HNP but occur at low numbers in the subalpine regions (Bailey 2007). Goats occur throughout Maui and have been documented occurring at elevations from sea level to 9,000 ft. Pigs generally inhabit areas above 3,000 ft. Axis deer are spread throughout Maui with the highest numbers occurring in the southern portion of the park (NPS 2016). Fences have been built in areas around the park and efforts are being made to control feral goats, pigs, and axis deer throughout the park.

Accidental introduction of arthropod species can negatively impact native flora and fauna through competition and destruction. One destructive species that has been reported in low numbers is the yellowjacket (*Vespula pensylvanica*). In some places where yellowjacket populations have increased there has been a corresponding decline in native arthropod populations. No yellow jackets were found during a 2009 arthropod survey at the

HNP entrance and at the High Altitude Observatory, but their presence has been documented in the park. As of 2009 populations were estimated to be too low to contribute to a decline in native arthropods (Pacific Analytics 2009).

Forty-four nonnative ant species are present in Hawai‘i, all of which were accidentally introduced. The Hawaiian endemic arthropod populations are threatened due to the lack of adaptations to avoid predation by ants. The Argentine ant (*Linepithema humile*) is one of the most threatening species due to its prolific nature. A single colony can create 20 to 100 queens each producing a large number of eggs that ensure the colony keeps growing and expanding. Such large numbers of ants require a significant food source and the Argentine ants utilize every available source including the wind-borne food of naturally occurring species as well as the resident native arthropods. No Argentine ants were found during the 2009 study, but they are known to populate high elevation sites such as Haleakala National Park (Pacific Analytics 2009).

Nonnative plant species pose a threat to biodiversity by competing for resources and displacing native plant communities. The most common nonnative plant species to occur in the subalpine shrublands are an herb known as Hairy cat’s ear (*Hypochaeris radicata*) and a grass called Yorkshire fog (*Holcus lanatus*). The majority of non-native plants found in the subalpine shrubland are herbs and grasses, however two species of shrub (Maui pamakani [*Ageratina adenophora*] and pukamole [*Lythrum maritimum*]), one tree (Monterey pine [*Pinus radiata*]), and one rush (broadleaf rush [*Juncus planifolius*]) have also been documented (Gross et al. 2017).

### 3.4 Cultural Resources

Cultural resources were evaluated within and immediately adjacent to the project area. Cultural resources contain significant information about a culture, and include both tangible entities and cultural practices (NPS-28). For NPS resource management purposes, tangible cultural resources are defined in NPS-28 as “districts, sites, buildings, structures, and objects for the National Register of Historic Places and categorized as archaeological resources, cultural landscapes, structures, museum objects, and ethnographic resources.” The term “ethnographic resources” is defined as: a site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it (NPS-28). The term, “historic resources” includes districts, sites, structures, or landscapes that are significant in American history, architecture, engineering, archeology or culture (NPS-28). Archaeological resources are defined as “any material remains or physical evidence of past human life or activities which are of archaeological interest, including the record of the effects of human activities on the environment” (NPS-28). They have the “potential to describe and explain human behavior” (NPS-28). Each of these resources within the project area was evaluated in the subsections below.

The entire project area lies within the boundaries of the Crater Historic District, which is listed on both the State Inventory of Historic Places SIHP (SIHP 50-50-11-12-1739) and on the National Register of Historic Places (NRHP), listed in November 1, 1974. In addition to the sites listed on the Crater Historic District nomination that fall within the project area, there are many other cultural sites within the project area that are eligible to the SIHP and NRHP. NPS is required to consider the effects of proposed undertakings on the integrity of all sites listed or eligible for listing on the SIHP and NRHP

### 3.4.1 Archaeological Resources

#### ***Affected Environment***

There are 15 archaeological sites located within or adjacent to the project area (Table 3), as identified in the 2007 Archaeological Survey conducted by International Archaeological Research Institute, Inc. (IARI, 2007). Most of these sites are eligible for listing in the NRHP under Criterion “D”, and one is eligible under both NRHP and state Criteria “C” and “D.” Criterion D indicates sites “that have yielded, or may be likely to yield, information important in prehistory or history.” Criterion “C” indicates sites “that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction” (NPS 1990). These sites include short-term camp sites associated with pre-historic and/or historic activities, cairns that appear to be trail markers and segments of a wall associated with cattle ranching (IARI 2007). Three archaeological cave sites are associated with the construction of the road and were likely used as temporary campsites by road construction workers (SIHP sites #50-50-11-3600, -3644, and -3688) (NPS 2008). These sites are located near the road and contain historic materials such as empty dynamite boxes, sawed wood, and ceramic serving plates and vessels” (IARI 2007).

**Table 3. Summary of Archaeological Sites In the Vicinity of the Project Area**

Site numbers are prefaced by 50-50-11: 50=State of Hawai‘i, 50=Maui, 11=Kilohana quadrangle.

SIHP SITE #	Description (Number of Features)	Age	NRHP Significance Criterion
2511	Enclosures (18)	Unknown	D
3600	Cave	Historic	D
3637	Enclosures (110), mound, possible defensive post	Pre-historic, also historic	C, D
3641	Platform	Probable historic	D
3642	Cairn (2), rock shelter	Historic	D
3643	Cairn	Probable historic	D
3645	Enclosures (4), alignments (2)	Unknown	D
3646	Enclosures (4)	Unknown	D
3651	Multiple wall segments	Historic	D
3659	Platform	Pre-historic	D
3660	Cairn	Unknown	D
3673	Wall	Unknown	D
3684	Rock shelter	Unknown	D
3687	Cairn	Unknown	D
3688	Rock shelter, wall	Historic	D

(IARI, 2007)

### 3.4.2 Cultural Landscapes

#### ***Affected Environment***

In 2008 the Haleakalā Highway Historic District was determined eligible for listing in the NRHP as an historic cultural landscape with contributing historic features. The applicable eligibility criteria include Criterion “A” (for its development of the National Park System, the development of early NPS landscape architectural design



styles, and the craftsmanship of the Civilian Conservation Corps [CCC]) and Criterion “C” (for its association with rustic Park design that characterized early NPS development during the 1930s). In addition, the Crater Road corridor is within the boundaries of the Crater Historic District, which is listed on both the SIHP (SIHP 50-50-11-12-1739) and on the NRHP. The period of historical significance for the Crater Road corridor extends from 1933, when development of the road began, to 1966, when the improvements and expansions of development nodes (such as Pu‘u ‘Ula‘ula, White Hill, Kalahaku, and Leleiwi) along the road designed to enhance the visitor’s access to the Haleakalā Crater were completed (NPS 2008). The end of the significance period is important to recognize because the last development areas, including the Pu‘u ‘Ula‘ula, Leleiwi, and Kalahaku Overlooks, were built as part of the “NPS Mission 66 Program”. This Program, which was intended to modernize or update Park facilities and, at the same time, decrease the cost of development, ended in 1966; the date was chosen to commemorate the NPS’ 50th year anniversary (NPS 2008).

Some of the remains of the Kalahaku Resthouse, which was originally built in 1894 and rebuilt in 1914 by the Chamber of Commerce, are still extant in the Kalahaku area. The Resthouse, also known as Craigielea, was designated a Maui landmark and was later demolished by the Park Service in 1957. The rest house was linked to the development of tourism at Haleakala and later served as a CCC camp while a crew constructed the White Hill trail and cleared the area for construction of the White Hill Observation Station (NPS 2008). Kalahaku was the location originally recommended during the planning phase of the road project to be the terminus of the road; the park service eventually chose Pu‘u ‘Ula‘ula, or “Red Hill” as the terminus (NPS 2008).

### 3.4.3 Ethnographic Resources

#### ***Affected Environment***

The summit of Haleakalā is eligible for listing on the NRHP as a “Traditional Cultural Property” (TCP) through consultation with the State Historic Preservation Division (SHPD) under Criterion “A” for its association with the cultural landscape of Maui. This is reflected in the number of known uses, oral history, *mele* and legends surrounding Haleakalā. The term, “Traditional Cultural Property” is used in the NRHP to identify a property “that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that, (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community” (DOI, 1994). The summit is also eligible under NRHP Criterion “C” because it is an example of a resource type, a natural summit, a source for both traditional materials and sacred uses. The value ascribed to Haleakalā as a TCP can be expressed in five distinct attributes, solidifying the role of the summit as a place of value.

1. Haleakalā summit is considered by Kanaka Maoli, as well as more recent arrivals to Hawai‘i, as a place exhibiting spiritual power.
2. The summit of Haleakalā is significant as a traditional cultural place because of practice. For both Hawaiians and non-Hawaiians who live and visit here, the summit is a place of reflection and rejuvenation.
3. The *mo‘olelo* and *oli* surrounding the summit present a cluster of stories suggesting the significance of Haleakalā as a TCP.
4. Some believe that the summit possesses therapeutic qualities.
5. The summit provides an “experience of place” that is remarkable.

Traditionally it was believed that the gods dwelled on the summit. There are numerous legends about Haleakalā, including that the demigod Maui lassoed the sun to slow it down and lengthen the day so his mother could dry

her *kapa* (an article of clothing), and that the volcano goddess Pele created the mountain and the crater (along with the smaller cinder cones within) (CKM Cultural Resources 2006). The summit has also been a site for numerous traditional cultural practices, including gathering of plants for medicinal, practical, and spiritual purposes; hunting birds for food and feathers; and ceremonial practices (Cultural Surveys Hawai'i 2007); as well as astronomical observations; travel (Haleakalā was traditionally utilized as a travel route through East Maui, particularly through the Kaupō and Koolau Gaps); and basalt collection for the making of stone tools (IARI 2008).

Prior to the implementation of the reservation system, the ethnographic resource may have been somewhat diminished for cultural practitioners, as large, sometimes noisy crowds can disrupt the atmosphere of quiet contemplation often sought for cultural practices, and crowds wandering carelessly off trail can be seen as disrespectful to native Hawaiians.

### **3.4.4 Prehistoric/Historic Structures**

#### ***Affected Environment***

Prehistoric structures within the project area include a few of the archaeological sites listed above in Table 3, which are primarily rock enclosures constructed to provide shelter from the elements, or in one case a stone-filled platform that may have been used for ceremonial activities (IARI 2007).

A number of historic structures are located within the project area, primarily associated with Crater Road. As mentioned above, the Haleakalā Highway Historic District has been determined to be eligible for the NRHP, with numerous contributing historic structures. The highway itself and its associated structures (a bridge and numerous culverts with mortared stone headwalls) were constructed between 1933 and 1935. The White Hill Observatory (now known as the Haleakalā Visitor Center) was also constructed during this early period, in 1936. Additional historic structures, built during the Mission 66 Program, include the Red Hill Observatory and its associated infrastructure (constructed 1963), and the Kalahaku and Leleiwi Overlooks and associated infrastructure (constructed between 1954 and 1966) (NPS 2008).

## **3.5 Socio-Economic Environment**

### **3.5.1 Human Health and Safety**

#### ***Affected Environment***

The safety of park employees and visitors has been a concern during sunrise summit visitation, particularly prior to the implementation of the temporary reservation system now in place. With more vehicles arriving at the summit than designated parking spaces, visitors would sometimes drive fast in an attempt to get a space, in the dark, on unfamiliar roads, and often in unfamiliar (rental) cars. Near-miss collisions between visitor vehicles and employees have occurred in parking lots. Fender-bender accidents were a regular occurrence, and fights among visitors were not uncommon. Large crowds at sunrise viewpoints led to visitors walking and climbing off-trail in poor light to get better views, sometimes resulting in accidents. Additionally, medical emergencies, both crowd-related and not (e.g. altitude, cardiac) occur with some frequency at the summit (in 2016, 46% of all medical calls occurred during sunrise hours [NPS, unpublished data]). When visitor vehicles outnumber parking spaces, visitors park on road shoulders or even in the middle of the road, and can block emergency vehicle access.

Since the implementation of the reservation system, these health and safety concerns have decreased significantly, as there are no longer more vehicles present than available parking spaces, and crowds at the overlooks are smaller and more manageable by park staff and volunteers.

### **3.5.2 Visitor Use and Experience**

#### ***Affected Environment***

The NPS *Management Policies* (NPS 2006) state that the enjoyment of park resources and values is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. A mission of the park is to provide opportunities for public education, enjoyment, and safe access to the park and its resources. Prior to the implementation of the reservation system, it may be said that visitor use was maximized (in that as many people who wanted to visit the summit for sunrise were allowed to do so), but the experience for many visitors was likely diminished due to the hassle of trying to park in extremely overcrowded lots and jostle for space at the viewpoints.

A study of HNP visitors was conducted in 2015 to examine a variety of issues related to visitor use and enjoyment of the park. Of the roughly 170 visitor groups polled about their experiences viewing the sunrise from the summit, 59% indicated that the summit felt more crowded than they expected during sunrise viewing, and 31% stated that that crowding at sunrise detracted from their visit, primarily because their views were blocked by others or they were disturbed by noisy/loud/rude behavior (Le and Strawn 2015).

Since the implementation of the temporary reservation system, numerous visitors have commented that the sunrise viewing experience was greatly improved. For example, one commenter noted:

“For anyone who spends time in the summit area of the park reducing non-commercial traffic was a benefit to the natural resources of the area as well as the experience for all during the sunrise hours. The spacing of traffic reduced impacts on the native habitat as well as overall light, air & sound pollution. During sunrise the atmosphere was improved and there was space for people watching so they did not overflow onto protected habitat around the visitor center” (HNP 2017).

Others, however, have commented that the experience is worse after the implementation of the reservation system, since some visitors are not now able to view the sunrise from the summit during their trip:

“However, it can also be argued that a large number of people are now having a horrid experience because they were denied entry to Haleakalā sunrise viewing” (HNP 2017).

### **3.5.3 Park Operations**

#### ***Affected Environment***

Park Operations include various activities such as natural and cultural resource management, visitor interpretive services, visitor and resource protection, maintenance of facilities such as buildings, roads, trails, etc., and park administration (e.g. personnel support, budgeting, fee collection) (NPS 2012). All of these activities are pertinent to this analysis of summit sunrise visitation management.

Park resource staff manage programs to care for the natural and cultural resources in the summit district, such as special status plant and animal species, or archaeological sites. Park staff (along with Hawai'i Pacific Parks Association employees) provide interpretive services at the summit during and after sunrise hours. Law enforcement personnel provide protection for visitors and resources at the summit overlooks. Maintenance staff keep the facilities in the summit district (roads, buildings, trails, etc.) clean and functioning. Park administrative staff collect fees at the entrance station, manage budgeting for park operations and projects, and provide personnel support for park employees.

Prior to implementation of the temporary reservation system, park staff were often overextended working to manage the large numbers of people and vehicles traveling to the summit each morning for sunrise viewing.

## 4 ENVIRONMENTAL CONSEQUENCES

This section describes the potential environmental impacts of implementing each alternative on the physical environment, biological resources, cultural and historic resources, and the socioeconomic environment. *Note that for the purpose of this analysis, the baseline condition against which impacts are evaluated is considered to be the situation prior to implementation of the interim reservation system.*

### 4.1 Methodology

The impact analysis and conclusions contained in this EA are based on existing literature; previous and ongoing HNP research and findings; information provided by experts within the NPS, other agencies and partners, and professionals; NPS professional opinion; and public input. Impacts to resources as a result of each alternative were evaluated to determine whether the impacts were considered beneficial or negative; if impacts had direct, indirect or cumulative impacts; and measures to mitigate impacts. The following terms are used in the discussion describing the environmental consequences of implementing the No Action Alternative or the Action Alternatives.

An impact is considered *beneficial* if actions improve the resource or the quality or quantity of the resource. An negative impact is one that harms or depletes the resource or the quality or quantity of the resource.

*Direct impacts* are impacts “which are caused by the action and occur at the same time and place” (40 CFR 1508.8(a)). For example, if there is a proposal to pave a dirt road to a wilderness trailhead in a park unit, construction activities might directly affect wildlife due to noise and ground disturbance, and air quality through equipment-related exhaust emissions and production of fugitive dust.

*Indirect impacts* are impacts “which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR 1508.8(b)). For example, consider the road paving proposal discussed above. A reasonably foreseeable consequence of taking the action would be increased visitor use of the wilderness area accessible from the trailhead. The resulting negative impact to wilderness would represent an indirect impact. It would occur later in time and at a greater distance than the action of paving the road, but would nonetheless be a consequence of the proposal.

A *cumulative impact* is an “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). A cumulative impact analysis must consider the overall impacts of the direct and indirect impacts of the proposed action when added to the impacts of past, present, and reasonably foreseeable actions on a given resource.

The cumulative impacts addressed in this analysis include past and present actions, as well as any planning or development activity currently being implemented or planned for implementation in the reasonably foreseeable future. Past, present and future projects relevant to this EA are described in Table 4.

A summary of the impacts for all topics analyzed is presented at the end of this chapter in Table 5.

**Table 4. Cumulative Actions and Potentially Affected Resources**

Action	Description	Resources Potentially Affected*
<b>Past Projects</b>		
US Air Force Guidestar laser upgrade	The Guidestar laser at the Maui Space Surveillance System, located in the Haleakalā High Altitude Observatory site and used to correct for atmospheric distortion and provide clearer images, was upgraded from an older laser technology to state-of-the-art technology in mid-2017.	1, 8, 9, 12
<b>Present Projects</b>		
Invasive pine tree removal	Helicopters have been, and continue to be used to treat invasive pine trees with herbicide in inaccessible portions of the summit district.	2, 3, 4, 5, 6, 8, 9, 12, 13
Daniel K. Inouye Solar Telescope	The solar telescope is currently being constructed in the Haleakalā High Altitude Observatory site, just outside the project area at the end of Crater Road.	2, 3, 4, 5, 6, 7, 8, 9, 10, 12
Crater Road pullout improvements project	Pullouts and road shoulders along Crater Road are being improved by the addition of gravel road base and drainage systems for the safety of motorists.	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Improve bird watching at Hosmer Grove	This project includes Installation of two permanently mounted weatherproof binoculars and three new benches along trail, and replacement of the wayside exhibit.	8, 10, 12, 13
<b>Future Projects</b>		
Kalahaku Overlook area management	An Environmental Assessment has recently been initiated to examine alternatives for rehabilitating the Kalahaku Overlook area.	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Rehabilitate Haleakalā Visitor Center wastewater system	Rehabilitation and modernization of the Haleakalā Visitor Center wastewater system is underway and includes replacing septic system and underground water tanks, and repairing parking lot asphalt, sidewalk, and rail fence.	2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13
New concession contracts	An Environmental Assessment was completed to implement a commercial services plan to guide concessions in the park.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

\* 1=Lightscapes, 2=Soundscapes, 3=Vegetation, 4=Wildlife and/or Wildlife Habitat, 5=Species of Special Concern or their Habitat, 6=Nonnative or Exotic Species, 7=Archaeological Resources, 8=Cultural Landscapes, 9=Ethnographic Resources, 10=Prehistoric/Historic Structures, 11=Human Health and Safety, 12=Visitor Use and Experience, 13=Park Operations.

## 4.2 Physical Environment

### 4.2.1 Lightscares

#### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to lightscares. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). These include alteration of the natural lightscape by the addition of numerous artificial light sources during the early morning hours such as visitors' headlamps, flashlights, and laser pointers, as well as vehicle headlights and taillights. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have negative direct impacts to lightscares in the project area. Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to lightscares in the area would continue to be negative.

#### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to lightscares as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer artificial light sources during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Proposed Action alternative are primarily beneficial and direct, the cumulative impacts to lightscares in the area would likely continue to be negative.

#### ***Alternative 3: Close at Capacity***

Implementation of the Alternative 3 would result in direct beneficial impacts to lightscares as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer artificial light sources at the summit during this period (although traffic would likely back up on the Haleakalā Highway outside the park, resulting in negative effects to lightscares in this area). Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from Alternative 3 are primarily beneficial and direct, the cumulative impacts to lightscares in the area would likely continue to be negative.

### 4.2.2 Soundscapes

#### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to soundscapes. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). These include degradation of the natural soundscape by the addition of sounds associated with hundreds of motor vehicles and visitors during the sunrise hours. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have negative direct impacts to soundscapes in the project area. Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to soundscapes in the area would continue to be negative.



### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to soundscapes as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer motor vehicle and human sounds during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Proposed Action alternative are primarily beneficial and direct, the cumulative impacts to soundscapes in the area would likely continue to be negative.

### ***Alternative 3: Close at Capacity***

Implementation of the Alternative 3 would result in direct beneficial impacts to soundscapes as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer motor vehicle and human sounds in the summit area during this period. As with lightscapes, however, the fact that traffic would likely back up on the Haleakalā Highway outside the park may result in negative impacts to soundscapes in this area. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Alternative 3 are primarily beneficial and direct, the cumulative impacts to soundscapes in the area would likely continue to be negative.

## **4.3 Biological Resources**

### **4.3.1 Vegetation**

#### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to vegetation. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). These include the crushing of vegetation from vehicles parking off paved surfaces and trampling of vegetation from large numbers of visitors hiking and climbing off trails and viewpoints. Seedlings and outplantings are small and difficult to see in low light, making them particularly susceptible to inadvertent human damage. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have negative direct impacts to vegetation in the project area. Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to vegetation in the area would continue to be negative.

#### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to vegetation as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer (if any) vehicles parking off paved surfaces and visitors wandering off established trails and viewpoints potentially crushing vegetation during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Proposed Action alternative are primarily beneficial and direct, the cumulative impacts to vegetation in the area would likely continue to be negative.

### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial impacts to vegetation as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer (if any) vehicles parking off paved surfaces and visitors wandering off established trails and viewpoints potentially crushing vegetation during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from Alternative 3 are primarily beneficial and direct, the cumulative impacts to vegetation in the area would likely continue to be negative.

## **4.3.2 Wildlife and/or Wildlife Habitat**

### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to wildlife and/or wildlife habitat. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). These include the potential wildlife strikes by vehicles traveling roadways in the project area, as well as damage to wildlife habitat from vehicles parking off paved surfaces and large numbers of visitors walking and climbing outside designated areas in sensitive habitats. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have negative direct impacts to wildlife and/or wildlife habitat in the project area. Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to wildlife and/or wildlife habitat in the area would continue to be negative.

### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to wildlife and/or wildlife habitat as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning. Fewer vehicles on the road during sunrise hours would likely result in fewer wildlife strikes during this period, both because of the overall reduction in traffic volume and because visitors may be less inclined to speed if they know there are parking spaces available for them. Admitting no more vehicles than available parking spaces should also result in less damage to wildlife habitat as drivers would not need to park off paved areas. Finally, with fewer visitors to the summit during sunrise hours the temptation to walk outside designated areas for better views would be lessened, also resulting in less damage to wildlife habitat. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Proposed Action alternative are primarily beneficial and direct, the cumulative impacts to wildlife and/or wildlife habitat in the area would likely continue to be negative.

### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial impacts to wildlife and/or wildlife habitat as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning. Fewer vehicles on the road during sunrise hours would likely result in fewer wildlife strikes during this period, both because of the overall reduction in traffic volume and because visitors may be less inclined to speed if they know there are parking spaces available for them. Admitting no more vehicles than available parking spaces should also result in less damage to wildlife habitat as drivers would not feel compelled to park off paved areas. Finally, with fewer visitors to the summit during sunrise hours the temptation to walk outside designated areas for better views would be lessened, also resulting in less damage to wildlife habitat. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise

visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from Alternative 3 are primarily beneficial and direct, the cumulative impacts to wildlife and/or wildlife habitat in the area would likely continue to be negative.

#### **4.3.3 Species of Special Concern or their Habitat**

##### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to species of special concern or their habitat. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). Negative impacts to wildlife species of special concern include potential strikes of *nēnē*, *‘ua’u*, or others by vehicles traveling roadways in the project area, the threat of disturbance to nests and injury or death to ground-dwelling species from vehicles parking off paved surfaces and large numbers of visitors walking and climbing outside designated areas, and potential disorientation of *‘ua’u* and *‘akē’akē* from artificial light sources associated with visitors. Negative impacts to plant species of special concern such as the iconic *‘āhinahina*, as well as wildlife habitat, could result from vehicles parking off paved surfaces and large numbers of visitors walking and climbing outside designated areas. Many of these species or their dwellings are particularly susceptible to damage in low-light situations: *‘ua’u* burrows can be extremely difficult to see even during daylight hours, and (as mentioned above) seedlings and outplantings are often small and inconspicuous. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have negative direct impacts to species of special concern or their habitat in the project area. Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to species of special concern or their habitat in the area would continue to be negative.

##### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to species of special concern or their habitat as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning. Fewer vehicles on the road during sunrise hours would likely result in fewer wildlife strikes during this period (particularly of *nēnē*), both because of the overall reduction in traffic volume and because visitors may be less inclined to speed if they know there are parking spaces available for them. Admitting no more vehicles than available parking spaces should result in less damage to species of special concern or their habitat as drivers would not feel compelled to park off paved areas. Fewer visitors to the summit during sunrise hours should decrease the temptation to walk outside designated areas for better views, also resulting in less damage to species of special concern or their habitat. Finally, fewer vehicles on the road during sunrise hours and visitors means fewer artificial light sources during this period, and therefore less chance of disorienting night-flying *‘ua’u* and *‘akē’akē*. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Proposed Action alternative are primarily beneficial and direct, the cumulative impacts to species of special concern or their habitat in the area would likely continue to be negative.

##### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial impacts to species of special concern or their habitat as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning. Fewer vehicles on the road during sunrise hours would likely result in fewer wildlife strikes during this period (particularly of *nēnē*), both because of the overall reduction in traffic volume and because visitors may be less inclined to speed if they know there are parking spaces available for them. Admitting no more vehicles than

available parking spaces should result in less damage to species of special concern or their habitat as drivers would not feel compelled to park off paved areas. Fewer visitors to the summit during sunrise hours should decrease the temptation to walk outside designated areas for better views, also resulting in less damage to species of special concern or their habitat. Finally, fewer vehicles and visitors means fewer artificial light sources during this period, and therefore less chance of disorienting night-flying 'ua'u and 'akē'akē. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from Alternative 3 are primarily beneficial and direct, the cumulative impacts to species of special concern or their habitat in the area would likely continue to be negative.

#### **4.3.4 Nonnative or Exotic Species**

##### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to the ongoing issues associated with nonnative or exotic species. Under this alternative, existing negative impacts associated with the problem of nonnative species in the area would continue (or worsen with future growth in visitation). Direct negative impacts stem from the introduction of nonnative or exotic species by visitors and their vehicles. For example, plant seeds may cling to clothing or tires, or invertebrate species may end up “hitchhiking” in or on vehicles. Indirect negative impacts may be incurred through ground disturbance associated with parking off paved surfaces and walking or climbing outside designated areas, which can facilitate the introduction or spread of nonnative or exotic plant species. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have negative direct and indirect impacts associated with the problem of nonnative species in the project area. The No Action alternative would also result in direct and indirect negative impacts, and the cumulative impacts to native habitats in the area would continue to be negative.

##### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in a reduction of the negative direct and indirect impacts caused by the issues associated with nonnative or exotic species. With fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, there would be fewer opportunities to introduce or spread nonnative or exotic species during this period. With no more vehicles than available parking spaces and smaller crowds at the summit overlooks, there would be less parking off pavement or wandering outside designated viewing areas, resulting in less ground disturbance that could facilitate the introduction or spread of nonnative or exotic species. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although the Proposed Action alternative would result in a reduction of negative impacts, the cumulative impacts associated with the problem of nonnative species in the area would likely continue to be negative.

##### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in a reduction of the negative direct and indirect impacts caused by issues associated with nonnative or exotic species. With fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, there would be fewer opportunities to introduce or spread nonnative or exotic species during this period. With no more vehicles than available parking spaces and smaller crowds at the summit overlooks, there would be less parking off pavement or wandering outside designated viewing areas, resulting in less ground disturbance that could facilitate the introduction or spread of nonnative or exotic species. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3

if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although Alternative 3 would result in a reduction of negative impacts, the cumulative impacts associated with the problem of nonnative species in the area would likely continue to be negative.

## **4.4 Cultural and Historic Resources**

### **4.4.1 Archaeological Resources**

#### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to archaeological resources. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). Negative impacts to archaeological resources include the potential for damage due to visitors parking their vehicles off paved surfaces, and walking outside designated areas where archaeological resources could be present. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have negative direct impacts to archaeological resources in the project area. Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to archaeological resources in the area would continue to be negative.

#### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to archaeological resources as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer (if any) vehicles parking off paved surfaces and visitors wandering off established trails and viewpoints during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Proposed Action alternative are primarily beneficial and direct, the cumulative impacts to archaeological resources in the area would likely continue to be negative.

#### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial impacts to archaeological resources as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer (if any) vehicles parking off paved surfaces and visitors wandering off established trails and viewpoints during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from Alternative 3 are primarily beneficial and direct, the cumulative impacts to archaeological resources in the area would likely continue to be negative.

### **4.4.2 Cultural Landscapes**

#### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to cultural landscapes. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). Negative impacts to cultural landscapes include potential damage to features of the Haleakalā Highway Historic District from large numbers of visitors parking their vehicles off paved areas, walking off designated trails, and climbing on structures to obtain better views. Past, current, and planned projects in the area (see Table 4) may

have had and may continue to have negative direct impacts to cultural landscapes in the project area. Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to cultural landscapes in the area would continue to be negative.

***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to cultural landscapes as there would be fewer visitors allowed access to the summit each morning, and therefore fewer (if any) vehicles parking off paved areas and fewer visitors wandering off established trails or climbing on structures during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Proposed Action alternative are primarily beneficial and direct, the cumulative impacts to cultural landscapes in the area would likely continue to be negative.

***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial impacts to cultural landscapes as there would be fewer visitors allowed access to the summit each morning, and therefore fewer (if any) vehicles parking off paved areas and fewer visitors wandering off established trails or climbing on structures during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from Alternative 3 are primarily beneficial and direct, the cumulative impacts to cultural landscapes in the area would likely continue to be negative.

#### **4.4.3 Ethnographic Resources**

***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to ethnographic resources. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). Negative impacts to ethnographic resources include the potential for disruption of native Hawaiian cultural practices due to large crowds at the summit during sunrise hours, as well as the disrespect some native Hawaiians may see as being expressed toward the sacred land of the summit when sometimes noisy groups of visitors crowd the overlooks and people wander carelessly off designated trails to get better views. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have negative direct impacts to ethnographic resources in the project area. Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to ethnographic resources in the area would continue to be negative.

***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to ethnographic resources as there would be fewer vehicles allowed access to the summit each morning and smaller crowds at the overlooks, and therefore less chance of disrupting native Hawaiian cultural practices or showing disrespect to the land during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Proposed Action alternative are primarily beneficial and direct, the cumulative impacts to ethnographic resources in the area would likely continue to be negative.

### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial impacts to ethnographic resources as there would be fewer vehicles allowed access to the summit each morning and smaller crowds at the overlooks, and therefore less chance of disrupting native Hawaiian cultural practices or showing disrespect to the land during this period. It is possible that there would also be indirect negative impacts, however, if traffic backs up on the Haleakalā Highway outside the park and prevents cultural practitioners from being able to access the summit. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from Alternative 3 are primarily beneficial and direct, the cumulative impacts to ethnographic resources in the area would likely continue to be negative.

#### **4.4.4 Prehistoric/Historic Structures**

### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to prehistoric/historic structures. Under this alternative, existing negative impacts to prehistoric/historic structures in the summit district would continue (or worsen with future growth in visitation). Negative impacts to prehistoric/historic structures include the potential for damage due to visitors parking their vehicles off paved surfaces, and climbing on prehistoric/historic structures in search of unobstructed views. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have negative direct impacts to prehistoric/historic structures in the project area. Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to prehistoric/historic structures in the area would continue to be negative.

### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to prehistoric/historic structures as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer (if any) vehicles parking off paved surfaces and fewer visitors climbing on structures in search of unobstructed views during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from the Proposed Action alternative are primarily beneficial and direct, the cumulative impacts to prehistoric/historic structures in the area would likely continue to be negative.

### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial impacts to prehistoric/historic structures as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning, and therefore fewer (if any) vehicles parking off paved surfaces and fewer visitors climbing on structures in search of unobstructed views during this period. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Although impacts resulting from Alternative 3 are primarily beneficial and direct, the cumulative impacts to prehistoric/historic structures in the area would likely continue to be negative.

## 4.5 Socio-Economic Resources

### 4.5.1 Human Health and Safety

#### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to human health and safety. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). Negative impacts to human health and safety include the risk of injury from motor vehicle accidents; fights between visitors over parking spaces; falls or other accidents related to visitors walking or climbing off trails or established viewing areas; the potential spread of disease from increased human waste deposited outside restrooms; and the safety impacts on employees from interacting with reckless drivers and large crowds at the summit. Past, current, and planned projects in the area (see Table 4) may have had and may continue to have beneficial direct impacts to human health and safety in the project area. Impacts resulting from the No Action alternative are negative and direct, and the cumulative impacts to human health and safety in the area would likely be negative.

#### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial impacts to human health and safety as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning. Fewer vehicles during this period would likely result in fewer motor vehicle accidents and fights between visitors, both because of the overall reduction in traffic volume and because visitors may be less inclined to speed or fight over parking spaces if they know there are enough spaces available for them. Fewer visitors to the summit during sunrise hours should decrease the temptation to walk or climb outside designated areas for better views, resulting in less likelihood of falls or similar accidents. Fewer visitors should also allow for easier access to the restrooms at the Kalahaku overlook and the Haleakalā Visitor Center, resulting in less human waste deposited outside restrooms. Finally, the reduction in the number of vehicles and the size of crowds from the Proposed Action alternative would reduce the impacts to the safety of employees working in the summit district during sunrise hours. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Impacts resulting from the Proposed Action alternative are primarily beneficial and direct, and the cumulative impacts to human health and safety in the area would also be beneficial.

#### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial impacts to human health and safety as there would be fewer vehicles (and fewer overall visitors) allowed access to the summit each morning. Fewer vehicles during this period would likely result in fewer motor vehicle accidents and fights between visitors, both because of the overall reduction in traffic volume and because visitors may be less inclined to speed or fight over parking spaces if they know there are enough spaces available for them. Fewer visitors to the summit during sunrise hours should decrease the temptation to walk or climb outside designated areas for better views, resulting in less likelihood of falls or similar accidents. Fewer visitors should also allow for easier access to the restrooms at the Kalahaku overlook and the Haleakalā Visitor Center, resulting in less human waste deposited outside restrooms. The reduction in the number of vehicles and the size of crowds from the Proposed Action alternative would reduce the impacts to the safety of employees working in the summit district during sunrise hours. However there would be indirect negative impacts to human health and safety in that once the gate is closed at capacity visitors who are parked on Haleakalā Highway outside the gate may leave their vehicles, turn their vehicles



around, or try to pass stopped vehicles, all in the dark, which could lead to accidents of one sort or another. Indirect negative impacts similar to those of the No Action alternative may also result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Impacts resulting from Alternative 3 are primarily beneficial and direct, and the cumulative impacts to human health and safety in the area would also be beneficial.

#### **4.5.2 Visitor Use and Experience**

##### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to visitor use and experience. Under this alternative, existing beneficial and negative impacts would continue. Beneficial impacts to visitor use and experience include the ability for essentially anyone who wants to view the sunrise from the summit of Haleakalā on a given day to do so. Negative impacts to visitor use and experience include crowd-related diminishment of the experience resulting from the stress of finding a place to park one's vehicle, potential disputes with other visitors, the difficulty in finding a spot from which to view the sunrise at crowded overlooks, and a general reduction in peace and quiet (which would only increase with future growth in visitation). Past, current, and planned projects in the area (see Table 4) may have had and may continue to have beneficial and negative, direct and indirect impacts to visitor use and experience in the project area. Impacts resulting from the No Action alternative are also beneficial and negative, direct and indirect, and the cumulative impacts to visitor use and experience in the area would continue to be both beneficial and negative.

##### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial and negative impacts to visitor use and experience. Beneficial impacts to visitor use and experience would result from the reduction in the number of vehicles admitted to the summit during sunrise hours. With no more vehicles than available parking spaces there would be less stress on drivers to find a parking space at one of the summit overlooks. The resulting smaller crowds at the summit overlooks would also likely result in less stress and conflict between visitors in finding a place from which to view the sunrise, and a quieter, more peaceful experience overall. Negative impacts to visitor use and experience would result from the requirement to plan ahead to purchase a summit sunrise reservation. Visitors who fail to secure a reservation (or are unaware of the reservation system) may also experience negative impacts from being turned around at the entrance gate. As the summit sunrise viewing is considered a "must" for many visitors to the island of Maui, missing out on the event because they were not aware of the reservation requirement or failed to plan ahead could distinctly diminish their experience in the park. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Impacts resulting from the Proposed Action alternative are beneficial and negative, direct and indirect, and the cumulative impacts to visitor use and experience in the area would continue to be both beneficial and negative.

##### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial and negative impacts to visitor use and experience. Beneficial impacts would stem from the smaller crowds at the summit overlooks, as there would likely be less stress and conflict between visitors in finding a place from which to view the sunrise, as well as a quieter, more peaceful experience overall. Negative impacts to visitor use and experience may result from the requirement to get up and on the road very early to secure entrance to the park for summit sunrise viewing. As word spreads about the 150-vehicle limit, visitors may attempt to arrive earlier and earlier to ensure admittance

to the park. Negative impacts would also be felt by visitors who do not arrive at the park early enough to be admitted with the first 150 vehicles. As the summit sunrise viewing is considered a “must” for many visitors to the island of Maui, missing out on the event because they were not aware of 150-vehicle limit or failed to plan ahead could distinctly diminish their experience in the park. It is likely that additional law enforcement staff may need to be stationed at the entrance to manage visitors angry at being denied admission. Additionally, visitors who did not make it in time would then have to make the decision to either wait outside the park entrance until after sunrise hours or turn around; with potentially a great number of visitors making the same decision simultaneously, the experience outside the entrance gate could be very unpleasant and chaotic for some time after the gate is closed. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours. Impacts resulting from Alternative 3 are beneficial and negative, direct and indirect, and the cumulative impacts to visitor use and experience in the area would continue to be both beneficial and negative.

#### **4.5.3 Park Operations**

##### ***Alternative 1: No Action (Return to Unregulated Sunrise Visitation)***

The No Action alternative would not result in any new negative direct or indirect impacts to park operations. Under this alternative, existing negative impacts would continue (or worsen with future growth in visitation). Negative impacts to park operations include the strain on park staff and budgets to provide enough personnel to manage sunrise crowds without damage to resources or facilities, and to provide a safe and enjoyable experience for summit sunrise visitors. Past, current, and planned projects in the area (see Table 4) have had and will continue to have negative direct impacts to park operations (in the form of project related costs and personnel demands). Impacts resulting from the No Action alternative are also negative and direct, and the cumulative impacts to park operations would continue to be negative.

##### ***Alternative 2: Proposed Action (Continue Reservation System)***

Implementation of the Proposed Action alternative would result in direct beneficial and negative impacts to park operations. Beneficial impacts would result from the decrease in the number of vehicles and visitors at the summit, therefore reducing the budgetary and personnel impacts of managing sunrise summit visitation, as well as reducing maintenance needs for park facilities at the summit (e.g., less trash and human waste to manage). Minor negative impacts to budgeting and personnel would stem from the need to manage visitors arriving at the entrance station without reservations. Indirect negative impacts similar to those of the No Action alternative may result from implementation of the Proposed Action alternative if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours, putting pressure on staffing and park operations to manage the growing crowds and minimize potential resource damage. Impacts resulting from the Proposed Action alternative are beneficial and negative, and the cumulative impacts to park operations would continue to be negative.

##### ***Alternative 3: Close at Capacity***

Implementation of Alternative 3 would result in direct beneficial and negative impacts to park operations. Beneficial impacts would result from the decrease in the number of vehicles and visitors at the summit, therefore reducing the budgetary and personnel impacts of managing sunrise summit visitation, as well as reducing maintenance needs for park facilities at the summit (e.g., less trash and human waste to manage). Negative impacts to budgeting and personnel would stem from the need to manage visitors forced to wait or turn back at the entrance station because they arrived after the first 150 vehicles, as law enforcement staff may be required

to maintain order and peace if visitors become irate at not being allowed in the park, and from park staff waiting in long lines or being unable to get to work due to long backups at the entrance. Indirect negative impacts similar to those of the No Action alternative may result from implementation of Alternative 3 if its restrictions on sunrise visitation lead to an increase in the numbers of visitors at the summit during sunset hours, putting pressure on staffing and park operations to manage the growing crowds and minimize potential resource damage. Impacts resulting from Alternative 3 are beneficial and negative, and the cumulative impacts to park operations would continue to be negative.

**Table 5. Environmental Consequences Comparison**

Impact Topic		Impacts	Alternative 1: No Action	Alternative 2: Proposed Alternative	Alternative 3: Close at Capacity
Physical Environment	Lightscapes	Direct	Negative	Beneficial	Beneficial (in project area) Negative (outside entrance gate)
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative
	Soundscapes	Direct	Negative	Beneficial	Beneficial (in project area) Negative (outside entrance gate)
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative
Biological Resources	Vegetation	Direct	Negative	Beneficial	Beneficial
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative
	Wildlife and/or Wildlife Habitat	Direct	Negative	Beneficial	Beneficial
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative
	Species of Special Concern or their	Direct	Negative	Beneficial	Beneficial
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative

Impact Topic		Impacts	Alternative 1: No Action	Alternative 2: Proposed Alternative	Alternative 3: Close at Capacity
Cultural and Historic Resources	Nonnative or Exotic Species	Direct	Negative	Beneficial	Beneficial
		Indirect	Negative	(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative
	Archaeological Resources	Direct	Negative	Beneficial	Beneficial
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative
	Cultural Landscapes	Direct	Negative	Beneficial	Beneficial
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative
	Ethnographic Resources	Direct	Negative	Beneficial	Beneficial
		Indirect		(Negative possible at sunset)	(Negative possible if traffic backs up and blocks cultural use) (Negative possible at sunset)
		Cumulative	Negative	Negative	Negative
	Prehistoric/Historic Structures	Direct	Negative	Beneficial	Beneficial
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative
Socio-Economic Resources	Human Health and Safety	Direct	Negative	Beneficial	Beneficial
		Indirect		(Negative possible at sunset)	Negative (outside entrance gate) (Negative possible at sunset)
		Cumulative	Negative	Beneficial	Beneficial
	Visitor Use and Experience	Direct	Beneficial Negative	Beneficial Negative	Beneficial Negative
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Beneficial Negative	Beneficial Negative	Beneficial Negative

Impact Topic		Impacts	Alternative 1: No Action	Alternative 2: Proposed Alternative	Alternative 3: Close at Capacity
	Park Operations	Direct	Negative	Beneficial Negative	Beneficial Negative
		Indirect		(Negative possible at sunset)	(Negative possible at sunset)
		Cumulative	Negative	Negative	Negative

DRAFT

## 5 LIST OF PREPARERS AND CONTRIBUTORS

### ***National Park Service, Haleakalā National Park***

Natalie Gates, Superintendent  
Cathleen Natividad Bailey, Supervisory Wildlife Biologist  
Rachel Hodara, Archaeologist  
Linette King, Environmental Compliance Coordinator  
Greg Page, Fee & Commercial Services Program Specialist  
Glen Fickbohm, Facility Management Specialist

### ***EnviroSystems Management, Inc.***

Stephanie Treptow, Principal  
Mark Daniels, Senior Ecologist/Environmental Engineer  
Jean Marie Rieck, Wildlife Biologist  
Megan Hosterman, Environmental Planner

## 6 REFERENCES

Bailey, C.N. (ed.)

2007. Forest Bird and Non-native Mammal Inventories at Ka'Āpahu, Haleakalā National Park, Maui, Hawai'i. Pacific Cooperative Studies Unit, University Of Hawai'i at Mānoa, Technical Report 145.

Bonaccorso, F.

2010. 'Ōpe'ape'a: Solving the Puzzles of Hawai'i's Only Bat. *Bats* 28: 10-12.

CKM Cultural Resources L.L.C.

2006. Cultural Resource Evaluation and Traditional Practices Of the Proposed Advanced Technology Solar Telescope (ATST) at Haleakalā High Altitude Observatories.

Cultural Surveys Hawai'i, Inc.

2007. Supplemental Cultural Impact Assessment for the Proposed Advanced Technology Solar Telescope (ATST) at Haleakalā High Altitude Observatories Papa'anui Ahupua'a, Makawao District, Island of Maui.

Department of the Interior (DOI)

1994. Guidelines for Evaluating and Documenting Traditional Cultural Properties, National Register Bulletin 38.

Department of Land and Natural Resources (DLNR)

2005. Hawaii's Comprehensive Wildlife Conservation Strategy Fact Sheets. Accessed October 26, 2017. <https://dlnr.hawaii.gov/wildlife/hswap/cwcs/hawaii/species/fact-sheets/>.

Fraser, H., Parker-Geisman, V., and Parish IV, G.

2007. Hawaiian hoary bat inventory in national parks on the islands of Hawai'i, Maui and Moloka'i. Technical Report 140. Pacific Cooperative Studies Unit, University of Hawai'i at Mānoa, Honolulu, Hawai'i.

Green, K., Schulz, K., Lopez, C., Ainsworth, A., Selvig, M., Akamine, K., Meston, C., Mallinson, J., Urbanski, E., Fugate, S., Hall, M., and Kudray, G.

2015. Vegetation mapping inventory project: Haleakalā National Park. Natural Resource Report NPS/PACN/NRR—2015/986. National Park Service, Fort Collins, Colorado

Gross, J., Simon, M., Ainsworth, A., and Mallinson, W.

2017. Natural Resource Report NPS/PACN/NRR—2017/1417. National Park Service, Fort Collins, Colorado.

Haleakalā National Park (HNP)

2008. Hawaiian Petrel Fact Sheet. Haleakalā National Park Endangered Species Management. Haleakalā National Park, Maui, Hawai'i.

2014. Hawaiian Petrel Activity Information. Unpublished Data.

2017. Haleakalā Sunrise Summit Visitation Environmental Assessment: Public Comment Analysis Report, August 2017.

International Archaeological Research Institute, Inc. (IARI)

2007. Archaeological Survey of Previously Recorded Sites in Front Country Areas in the Summit District of Haleakalā National Park, Maui Island, Hawai‘i. December 2007.
2008. An Ethnographic Overview and Study of the Cultural Impacts of Commercial Air Tours Over Haleakalā National Park, Island of Maui.

Kraus, F.

2005. Inventory of Reptiles and Amphibians in Hawaii Volcanoes, Haleakalā, and Kalaupapa National Parks. Bishop Museum, Honolulu, Hawaii.

Le, Y. and Strawn, M.

2015. Haleakalā National Park Visitor Study: Summer 2015. Pullman, WA: Social and Economic Sciences Research Center at Washington State University.

National Park Service (NPS), US Department of the Interior

1990. National Register Bulletin: How to Apply the National Register Criteria for Evaluation. U.S. Department of the Interior, National Park Service, Cultural Resources. Revised 1991, 1995, 1997.
1995. General Management Plan/Environmental Impact Statement, Haleakalā National Park, Hawaii.
1998. NPS-28: Cultural Resource Management Guidelines, June 11, 1998.
2006. Management Policies.
2008. Cultural Landscapes Inventory 2008: Haleakalā Highway, Haleakalā National Park.
2012. Information for Programmatic Section 7 Consultation, Haleakalā National Park, Maui, Hawaii.
2015. Foundation Document. Haleakalā National Park.
2016. Environmental Assessment: Management and Removal of Feral Animals in Upper Elevations of Nu‘u, Maui.
2017. Haleakalā Sunrise Summit Visitation Environmental Assessment: Public Scoping Comment Analysis Report.

Natividad Hodges, C.

1992. Band-rumped Storm Petrel Observations. Haleakalā National Park, in-house report.

NatureServe Explorer

2016. *Lasiurus cinereus semotus*. Accessed October 27, 2017.  
[http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=tabular\\_report.wmt&loadTemplate=species\\_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular\\_report.wmt&elKey=102007&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=102007&offPageSelectedElType=species&offPageYesNo=true&post\\_processes=&radiobutton=radiobutton&selectedIndexes=102007](http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=102007&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=102007&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=102007)



Pacific Analytics, L.L.C.

- 2009. Arthropod Inventory and Assessment at the Haleakalā National Park Entrance Station and at the Haleakalā High Altitude Observatories, Maui, Hawai'i in Support of the Advanced Technology Solar Telescope Environmental Impact Analysis Process.

Pacific Rim Conservation

- 2013. Hawaiian Hoary Bat. Accessed October 27, 2017. <http://www.pacificrimconservation.org/wp-content/uploads/2013/10/Hawaiian%20Hoary%20Bat.pdf>.

Starr, F., and Starr, K.

- 2017. Investigator's Annual Report. Unpublished report prepared for Haleakalā National Park.

US Geological Survey (USGS)

- 2011. National Gap Analysis Program: Land Cover Data Portal. Accessed October 24, 2017. <https://gapanalysis.usgs.gov/gaplandcover/viewer/>.

US Fish and Wildlife Service (USFWS), US Department of the Interior

- 1997 Recovery Plan for the Maui Plant Cluster. U.S. Fish and Wildlife Service, Portland, Oregon.
- 1998 Recovery Plan for Four Species of Hawaiian Ferns. U.S. Fish and Wildlife Service, Portland, Oregon.
- 2005. Regional Seabird Conservation Plan, Pacific Region. U.S. Fish and Wildlife Service, Migratory Birds and Habitat Programs, Pacific Region, Portland, Oregon.
- 2006. Revised Recovery Plan for Hawaiian Forest Birds. Region 1, US Fish and Wildlife Service, Portland, Oregon.
- 2011. 5-Year Review Short Form Summary. Species Reviewed: *Bidens micrantha* subsp. *kalealaha*.
- 2012a. Biological Opinion and Informal Consultation for the Operation and Management of the Haleakalā National Park, Island of Maui. (Service File) 2013-F-0049. December 12, 2012.
- 2012b. Endangered Species in the Pacific Islands. Hawaiian goose (*Branta sandvicensis*) nēnē. Accessed October 26, 2017. <http://www.fws.gov/pacificislands/fauna/HIgoose.html>.
- 2012c. Endangered Species in the Pacific Islands. Hawaiian hoary bat (*Lasurus cinereus semotus*) 'ope'ape'a. Accessed October 26, 2017. <https://www.fws.gov/pacificislands/fauna/HIhoarybat.html>.
- 2015. 5-Year Review Short Form Summary. Species Reviewed: *Zanthoxylum hawaiiense*.
- 2016a. Endangered Status for 49 Species From the Hawaiian Islands: Final Rule. FR 81(190) 67786-67860.
- 2016b. Designation and Nondesignation of Critical Habitat on Molokai, Lanai, Maui, and Kahoolawe for 135 Species: Final Rule. FR 81(61) 17790-18110.
- 2017. Threatened Species Status for the Iiwi (*Drepanis coccinea*). FR 82(181) 43873-43885.