

**Draft Environmental Assessment for an Air Tour
Management Plan for Hawai'i Volcanoes National Park**

Table of Contents

1	PURPOSE AND NEED	1
1.1	INTRODUCTION	1
1.2	BACKGROUND.....	2
1.3	PROPOSED ACTION	3
1.4	PURPOSE AND NEED	3
1.5	ENVIRONMENTAL IMPACT CATEGORIES NOT ANALYZED IN DETAIL	4
2	ALTERNATIVES	8
2.1	ALTERNATIVES DEVELOPMENT	8
2.2	ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY.....	9
2.2.1	<i>Air Tours at or above Existing Levels</i>	9
2.2.2	<i>Public Scoping Alternative 3</i>	11
2.2.3	<i>Alternatives Authorizing between 1,565 Commercial Air Tours per Year and Existing Conditions</i>	11
2.3	ATMP PLANNING AREA FOR THE DEVELOPMENT OF THE ALTERNATIVES	11
2.4	ALTERNATIVE 1 (NO ACTION ALTERNATIVE)	12
2.4.1	<i>Commercial Air Tours per Year</i>	13
2.4.2	<i>Commercial Air Tour Routes and Altitudes</i>	14
2.4.3	<i>Commercial Air Tour Operators and Aircraft Types</i>	14
2.5	ALTERNATIVE 2	16
2.5.1	<i>Commercial Air Tour Routes and Altitudes</i>	17
2.5.2	<i>Monitoring and Enforcement</i>	18
2.6	ALTERNATIVE 3 (PREFERRED ALTERNATIVE)	19
2.6.1	<i>Commercial Air Tours per Year</i>	20
2.6.2	<i>Commercial Air Tour Routes and Altitudes</i>	20
2.6.3	<i>Commercial Air Tour Aircraft Type</i>	21
2.6.4	<i>Commercial Air Tour Day/Time</i>	21
2.6.5	<i>Restrictions for Particular Events</i>	22
2.6.6	<i>Additional Requirements</i>	22

2.6.7	<i>Quiet Technology Incentives</i>	23
2.6.8	<i>Initial Allocation and Competitive Bidding</i>	23
2.7	SUMMARY COMPARISON OF THE ATMP ALTERNATIVES.....	25
3	AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	29
3.1	NOISE AND NOISE-COMPATIBLE LAND USE.....	29
3.1.1	<i>Affected Environment</i>	30
3.1.2	<i>Environmental Consequences</i>	34
3.2	AIR QUALITY AND CLIMATE CHANGE	50
3.2.1	<i>Affected Environment</i>	50
3.2.2	<i>Environmental Consequences</i>	52
3.3	BIOLOGICAL RESOURCES	55
3.3.1	<i>Affected Environment</i>	56
3.3.2	<i>Environmental Consequences</i>	68
3.4	CULTURAL RESOURCES	80
3.4.1	<i>Affected Environment</i>	82
3.4.2	<i>Environmental Consequences</i>	91
3.5	WILDERNESS	99
3.5.1	<i>Affected Environment</i>	100
3.5.2	<i>Environmental Consequences</i>	103
3.6	VISITOR USE AND EXPERIENCE AND OTHER RECREATIONAL OPPORTUNITIES.....	108
3.6.1	<i>Affected Environment</i>	109
3.6.2	<i>Environmental Consequences</i>	111
3.7	ENVIRONMENTAL JUSTICE AND SOCIOECONOMICS	120
3.7.1	<i>Affected Environment</i>	121
3.7.2	<i>Environmental Consequences</i>	125
3.8	VISUAL EFFECTS	131
3.8.1	<i>Affected Environment</i>	131
3.8.2	<i>Environmental Consequences</i>	132
3.9	COASTAL RESOURCES	136
3.9.1	<i>Affected Environment</i>	137
3.9.2	<i>Environmental Consequences</i>	137

3.10 DEPARTMENT OF TRANSPORTATION (DOT) ACT SECTION 4(F) RESOURCES 138

 3.10.1 *Affected Environment* 139

 3.10.2 *Environmental Consequences* 141

3.11 SUMMARY OF ENVIRONMENTAL CONSEQUENCES..... 147

List of Appendices

Appendix A: References

Appendix B: List of Acronyms, Abbreviations, and Glossary

Appendix C: List of Preparers

Appendix D: Distribution List

Appendix E: Environmental Impact Analysis Methodology

Appendix F: Noise Technical Analysis

Appendix G: Cultural Resources Consultation and Summary

Appendix H: Section 7 Consultation

Appendix I: Section 4(f) Analysis

Appendix J: Public Scoping Newsletter and Comment Summary Report

Appendix K: CZMA Compliance

List of Figures

Figure 1. Graphic depiction of the ATMP planning area.	12
Figure 2. Alternative 1 (No Action)	16
Figure 3. Alternative 2.....	19
Figure 4. Alternative 3.....	25
Figure 5. Natural Ambient L_{50}	33
Figure 6. 12-hour Cumulative Existing Ambient Sound Level (Daytime) for Current Conditions	34
Figure 7. 12-hour Equivalent Sound Level ($L_{Aeq,12h}$) for No Action Alternative.....	38
Figure 8. Time Above 35 dBA for No Action Alternative	39
Figure 9. 12-hour Equivalent Sound Level ($L_{Aeq,12h}$) for Alternative 3 (Standard Day)	41
Figure 10. Time Above 35 dBA for Alternative 3 (Standard Day)	42
Figure 11. 12-hour Equivalent Sound Level ($L_{Aeq,12h}$) for Alternative 3 (Quiet Technology-Only Day)	44
Figure 12. Time Above 35 dBA for Alternative 3 (Quiet Technology-Only Day).....	45
Figure 13. Affected Environment for Biological Resources.	68
Figure 14. Biological Resources Environmental Consequences for Alternative 3.....	78
Figure 15. Affected Environment for Cultural Resources.	91
Figure 16. Cultural Resources Environmental Consequences for Alternative 3.....	97
Figure 17. Affected Environment for Wilderness.	101
Figure 18. Wilderness Environmental Consequences for Alternative 3.....	107
Figure 19. Affected Environment for Visitor Use and Experience.....	111
Figure 20. Visitor Use and Experience Environmental Consequences for Alternative 3.....	119
Figure 21. Affected Environment for Environmental Justice.....	123
Figure 22. Environmental Justice Environmental Consequences for Alternative 3.	129
Figure 23. Affected Environment for Visual Effects.....	132
Figure 24. Visual Effects Environmental Consequences for Alternative 3.	135
Figure 25. Affected Environment for Section 4(f) Properties.....	141
Figure 26. Section 4(f) Environmental Consequences for Alternative 3.	146

List of Tables

Table 1. Commercial air tour operators, aircraft type, reported tours, and IOA	15
Table 2. Initial Allocation of Air Tour Operations by Operator under Alternative 3	24
Table 3. Summary Comparison of the ATMP Alternatives	25
Table 4. Primary Metrics Used for the Noise Analysis.....	35
Table 5. Summary of Noise Modeling Metric Results Under the No Action Alternative	37
Table 6. Summary of Noise Modeling Metric Results for Alternative 3, Standard Days.....	40
Table 7. Summary of Noise Modeling Metric Results for Alternative 3, Quiet Technology-Only Days.....	42
Table 8. Summary of Criterial Pollutant Annual Emissions in Tons per Year (TPY) Under the No Action Alternative	52
Table 9. Summary of Change in Criterial Pollutant Annual Emissions in TPY Under Alternative 3 as Compared to No Action Alternative	53
Table 10. National Register Eligible, Listed, or Unevaluated Eligible Properties within the APE and Section 4(f) Resources	89
Table 11. Management Standards for Visitor Use Zones at the Park.....	112
Table 12. Evaluation of Compliance with NPS Management Standards for Visitor Use Zones at the Park for the No Action Alternative.	113
Table 13. Evaluation of Compliance with NPS Management Standards for Visitor Use Zones at the Park for Alternative 3.	117
Table 14. Minority and Low-income Population Data within Hawai'i County and the Study Area	122
Table 15. Section 4(f) Resources.....	140
Table 16. Summary of Environmental Consequences of the ATMP Alternatives	148

1 PURPOSE AND NEED

1.1 Introduction

The Federal Aviation Administration (FAA) and the National Park Service (NPS) (collectively, the “agencies”) are working together to develop an air tour management plan (ATMP) pursuant to the National Parks Air Tour Management Act of 2000 (the Act) and an Environmental Assessment (EA) for Hawai'i Volcanoes National Park (hereafter referred to as the “Park”). The Act was signed into law on April 5, 2000. The Act applies to all commercial air tour operations over a unit of the National Park System.

The Act requires the FAA, in cooperation with the NPS, to develop an ATMP or Voluntary Agreement for parks and tribal lands where operators have applied to conduct commercial air tours. The Act provided for existing commercial air tour operations occurring at the time the law was enacted to continue until an ATMP for the Park was implemented by expressly requiring the FAA to grant interim operating authority (IOA) to existing operators.^{1, 2} Currently, there are 10 air tour operators conducting air tours over the Park with a combined IOA for 26,664 commercial air tours annually. IOA includes only an annual cap on the number of commercial air tours that may be conducted by an operator, but does not designate the routes, time-of-day, altitudes, or other conditions for such tours.

The objective of the ATMP, under the Act, is to develop acceptable and effective measures to mitigate or prevent significant adverse impacts, if any, of commercial air tour operations on the Park's natural and cultural resources, Native Hawaiian sacred sites and ceremonial areas, Wilderness character, and visitor experience. The regulations implementing the Act are found in Title 14, Code of Federal Regulations (CFR), Part 136, *Commercial Air Tours and National Parks Air Tour Management* (14 CFR Part 136). This draft EA is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code (U.S.C.), 4321 et seq.), Council on Environmental Quality (CEQ) NEPA implementing regulations (40 CFR Parts 1500-1508), the 2015 FAA 1050.1F Order, *Environmental Impacts: Policies and Procedures*, and NPS NEPA policies and procedures (2015 NPS NEPA Handbook and 2015 NPS NEPA Handbook Supplemental Guidance - *Writing Impact Analysis Sections for EAs and EISs*).

The term commercial air tour operation is defined as any flight conducted for compensation or hire in a powered aircraft, where a purpose of the flight is sightseeing over a park or within ½-

¹ 49 U.S.C. § 40128(c)(2)(A)(i-ii).

² 70 Fed. Reg. 58,778 (Oct. 7, 2005).

mile outside a park's boundary during which the aircraft flies below 5,000 feet (ft.) above ground level (AGL). This area is referred to as the ATMP planning area, see Figure 1.

1.2 Background

On February 14, 2019, Public Employees for Environmental Responsibility and Hawai'i Coalition Malama Pono filed a petition in the U.S. Court of Appeals for the District of Columbia Circuit requesting that the Court order the agencies to complete ATMPs for seven parks including Hawai'i Volcanoes National Park. On May 1, 2020, the Court granted the petition and ordered the agencies to submit a schedule for bringing 23 eligible parks (based on reported air tour data from 2018) into compliance with the Act within two years or to show specific, concrete reasons why doing so will take longer. Consistent with the Court's order, agencies submitted a proposed plan and schedule (Compliance Plan) on August 31, 2020. On June 21, 2022, the Court ordered the agencies to file a joint supplemental report and propose firm deadlines for bringing each of the parks included in the Compliance Plan into compliance with the Act. On July 21, 2022, the agencies filed their report and provided a deadline of December 31, 2023, to complete the ATMP for the Park.

In order to conduct the planning processes consistent with the Court's decision, the agencies formally terminated longstanding ATMP planning processes for several parks via a September 3, 2020 Federal Register notice.³ The previous planning process for an ATMP for the Park was initiated in 2003. In 2004, the FAA published a notice of the agencies' intent to prepare an environmental assessment for that ATMP.⁴ In 2006, the FAA published a notice of intent to prepare an environmental impact statement for that ATMP.⁵ Due to the passage of the 2012 amendments to the Act, work on the previous planning process was paused until the time it was terminated in order to initiate the current planning process.

On February 28, 2022, the FAA and the NPS initiated a 30-day NEPA public scoping process and put forth four potential alternatives for public and stakeholder review and comment. The comments received were used to further refine or dismiss alternatives as described in this draft

³ Termination of Previously Initiated Processes for the Development of Air Tour Management Plans and Environmental Assessments/Environmental Impact Statements for Various National Park Units and Notice of Intent to Complete Air Tour Management Plans at 23 National Park Units, 85 Fed. Reg. 55,060 (Sept. 3, 2020).

⁴ Environmental Assessments for the Air Tour Management Plan Program at Haleakalā National Park, Hawai'i Volcanoes National Park, Pu'ukoholā Heiau National Historic Site, Kaloko-Honokōhau National Historical Park, Kalaupapa National Historical Park, and Pu'uhonua O Honaunau National Historical Park, 69 Fed. Reg. 9,420 (February 27, 2004).

⁵ Notice of intent to prepare an Environmental Impact Statement (EIS) and initiation of public and agency scoping for the Hawai'i Volcanoes National Park Air Tour Management Plan, 70 Fed. Reg. 44,416 (August 2, 2005).

EA and were also used to inform the environmental analysis. Refer to Appendix J, *Public Scoping Newsletter and Comment Summary Report*, for more information.

1.3 Proposed Action

The proposed action is to implement an ATMP for the Park. The Act defines an ATMP as a plan used to develop acceptable and effective measures to mitigate or prevent the significant adverse impacts, if any, of commercial air tour operations upon natural and cultural resources, visitor experiences, and tribal lands. An ATMP describes conditions for the conduct of air tour operations over a park, including routes, altitudes, time-of-day restrictions, restrictions for particular events, maximum numbers of flights, or other provisions. The Act and implementing regulations found in 14 CFR Part 136 state that the ATMP for a park:

- May prohibit commercial air tour operations over a national park in whole or in part;
- May establish conditions for the conduct of commercial air tour operations, including, but not limited to, commercial air tour routes, maximum number of flights per unit of time, maximum and minimum altitudes, time of day restrictions, restrictions for particular events, and mitigation of noise, visual, or other impacts;
- Shall apply to all commercial air tour operations over a national park or within ½-mile outside the park's boundary;
- Shall include incentives (such as preferred commercial air tour routes and altitudes, relief from caps and curfews) for the adoption of quiet aircraft technology by commercial air tour operators conducting commercial air tour operations at the park;
- Shall provide for the initial allocation of opportunities to conduct commercial air tour operations if the plan includes a limitation on the number of commercial air tour operations for any time period;
- Shall justify and document the need for measures taken pursuant to the items above and include such justifications in the record of decision.

The ATMP will prescribe operating parameters to mitigate impacts from commercial air tours on Park resources. Three alternatives for the Park's ATMP are considered and evaluated in this document.

1.4 Purpose and Need

Purpose: The purpose of the ATMP is to comply with the Act and other applicable laws, consistent with the *Plan and Schedule for Completion of Air Tour Management Plans at Twenty-Three Parks* approved by the U.S. Court of Appeals for the District of Columbia Circuit on November 20, 2020, in Case No. 19-1044, *In Re Public Employees for Environmental Responsibility and Hawai'i Coalition Malama Pono* (Compliance Plan).

Need: The Act requires an ATMP or voluntary agreement to be developed for the Park. Air tours have the potential to impact natural and cultural resources, Native Hawaiian sacred sites

and ceremonial areas, Wilderness character, and visitor experience. The Act requires that the FAA and the NPS develop acceptable and effective measures to mitigate or prevent significant adverse impacts, if any, of commercial air tour operations on natural and cultural resources, Wilderness character, visitor experience, and Native Hawaiian Traditional Cultural Properties (TCPs) including Native Hawaiian sacred sites and ceremonial areas. In order to address potential impacts from commercial air tours, the agencies have decided to prepare an ATMP for the Park.

1.5 Environmental Impact Categories Not Analyzed in Detail

The following environmental impact categories were considered but not analyzed in detail in this draft EA because:

- the issues do not exist in the analysis area, or would not be affected by the ATMP; or
- the likely impacts are not reasonably expected.

Biological Resources (Fish, Invertebrates and Plants)

The ATMP would not result in ground disturbance or in-water activities that could affect plants, fish or invertebrates. The proposed minimum altitudes included in the alternative under which commercial air tours would be permitted within the ATMP planning area (1,500 to 2,000 ft. AGL) would create sufficient separation between commercial air tours and fish such that impacts are not expected to occur, either directly or indirectly.

Noise from aircraft have been demonstrated to influence the behavior of ecologically significant pollinators and seed dispersers in natural and human altered landscapes (Francis et al., 2012; Gallardo et al., 2021). Specifically, Francis et al. (2012) studied the effect of compressor noise running continuously and generating noise at high amplitudes (greater than 95 decibels at a distance of 1 meter). Within the study, experimental sites were established 125-150 meters from the noise source. Noise exposure had an indirect positive effect on pollination by hummingbirds, but an indirect negative effect on piñon pine seedling establishment by altering the composition of animals preying upon or dispersing seeds. In contrast to the experimental design of this study, commercial air tours do not generate continuous noise, and proposed minimum altitudes in the alternatives in which air tours would be permitted range from 1,500 to 2,000 ft. AGL, which provide much greater spatial separation as compared to the study sites. Therefore, the agencies have determined that noise associated with the ATMP is unlikely to result in impacts to plants or plant pollination.

Native invertebrates in Hawai'i are largely restricted to areas of predominantly native vegetation (Magnacca and Foote, 2006) and insects comprise 87% of the invertebrate fauna of the Park. Many native Hawaiian insects are host-specific, and could be in danger of extirpation because many native Hawaiian host plants are rare or endangered (e.g., Mauna Loa silverswords). These native plant-dependent insects (e.g., *Drosophila*, moths, and

planthoppers) are in turn hosts of native specialist predators and parasitoids (e.g., *Sierola*), which can follow their host into extinction (Fung Associates and SWCA Environmental Consultants, 2019). The proposed altitudes included in the action alternative under which air tours would be permitted within the ATMP planning area (1,500 to 2,000 ft. AGL) create sufficient separation between commercial air tours and invertebrates such that impacts are not expected to occur, either directly or indirectly.

Air tours could result in some effects on air quality, such as emissions or the potential for low-flying aircraft to generate dust, which could indirectly affect plants. While air quality is a topic that is analyzed in detail in this draft EA, the minimum altitudes considered by the alternative in which air tours would be permitted (1,500 to 2,000 ft. AGL) create sufficient separation between plants and aircraft such that it is unlikely that the dust or changes in air quality would have a meaningful effect on plants.

In summary, for these reasons, the agencies have dismissed these environmental impact categories from detailed analysis.

Children's Environmental Health and Safety Risks

The ATMP would not affect products or substances that a child would be likely to come into contact with, ingest, use, or be exposed to, and would not result in environmental health and safety risks that have the potential to lead to a disproportionate health or safety risk to children. Therefore, this environmental impact category has not been analyzed in detail in this draft EA.

Hazardous Materials, Solid Waste, and Pollution Prevention

Applicable FAA air tour regulations include restrictions to protect individuals and property on the ground, and prevent collisions between aircraft, land or water vehicles, and airborne objects. The FAA has issued safety standards for safe air tour operations to reduce the potential for air tour crashes. Even so, there are various circumstances that can lead to an air tour crash or emergency landing, including but not limited to poor weather, pilot error, mechanical failure, or faulty maintenance. The agencies acknowledge that in the unlikely event of an accident, there could be potential impacts to Park resources from associated debris and aircraft fuel. Consistent with 43 CFR 1502.21(c)(1)-(4), the agencies are disclosing that information necessary to analyze site-specific impacts from an air tour crash is not available. The agencies cannot speculate if, where, or when an air tour accident or incident may occur or the degree of Park resource damage.

In order to limit potential impacts to Park resources in the event of an emergency landing inside the Park, once the aircraft has safely landed and any medical or other emergency issues have been addressed, the operator shall immediately notify the Park through Park dispatch of the incident and location. Prior approval from the Park superintendent or designee is required for

the removal or take off of the landed aircraft in order to coordinate joint resources for the safety of visitors and Park resources (36 CFR 2.17). Prior approval from the Park superintendent or designee is required for any non-emergency landing of aircraft within the Park boundaries, including replacement aircraft deployed to retrieve passengers who are not able to exit via ground transportation.

If an air tour crash occurs, the NPS or a cooperating emergency response agency such as Hawai'i County police or fire departments, or the U.S. Coast Guard would respond as soon as possible to provide life-saving search and rescue efforts. If the crash resulted in fire or hazardous materials contamination, responding personnel would attempt to secure the area and control the fire or contain potential contaminants while mitigating impacts to Park resources to the greatest extent possible. The Park's Wildland Fire Management Plan (NPS, 2007) would guide fire response and associated resource protection. Assessment of resource damage, initiation of restoration, and financial compensation sought would be guided by the System Unit Resource Protection Act, 54 U.S.C. § 100721 et seq.

Air tour operators must comply with all applicable federal, state, and local rules and regulations pertaining to the proper storage, handling, and use of hazardous materials. The ATMP would not result in impacts regarding hazardous materials, solid waste, and pollution prevention because it would not 1) violate laws or regulations regarding hazardous materials and/or solid waste management; 2) involve a contaminated site; 3) produce an appreciably different quantity or type of hazardous waste; 4) generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal; 5) exceed local capacity; or 6) adversely affect human health and the environment. Therefore, the ATMP is not expected to result in impacts related to hazardous materials and this environmental impact category has not been analyzed in detail in this draft EA.

Farmlands

The ATMP planning area, as described in Section 2.3, contains soils that are designated as prime/unique farmland soils. However, the ATMP would not involve ground disturbance that would have the potential to convert farmland to non-agricultural uses. Therefore, this environmental impact category has not been analyzed in detail in this draft EA.

Land Use

Land use refers to the general characteristics of how land is allocated among various administrative, preservation, recreational, and development needs. The ATMP would not result in ground-disturbing activities, and commercial air tours would not take off or land within the ATMP planning area. The impacts to land use are not reasonably expected; therefore, land use is not analyzed in detail in this draft EA.

Natural Resources and Energy Supply

Commercial air tours have been ongoing within the ATMP planning area prior to enactment of the Act. The ATMP would not result in the extraction of resources or cause measurable increases in the consumption of energy resources that would exceed available or future supplies of natural or energy resources. Therefore, this environmental impact category is not analyzed in detail in this draft EA.

Visual Effects – Light Emissions

Commercial air tours do not fly at night as it creates safety concerns when flying in areas with little artificial light on the ground surface, and points of interest that could otherwise be seen from an air tour are not visible at night. Any lights from commercial air tour aircraft are not likely to be noticeable. Therefore, light emissions are not expected to occur as a result of the ATMP and this environmental impact category has not been analyzed in detail in this draft EA.

Water Resources (Including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)

Due to the geological substrate which results in a lack of water resources within the Park, including the absence of Wild and Scenic Rivers, absence of ground-disturbing activities, and the proposed altitudes in the alternative that would permit commercial air tours within the ATMP planning area, the ATMP is unlikely to directly or indirectly adversely affect water resources. As noted above in the analysis for Hazardous Materials, Solid Waste, and Pollution Prevention, the agencies are unable to speculate if, where, or when an air tour accident or incident could occur and the Park resource damage that could result, including that related to hazardous material entering water resources within the ATMP planning area. Therefore, water resources are not expected to be impacted as a result of the ATMP and have not been analyzed in detail in this draft EA.

2 ALTERNATIVES

2.1 Alternatives Development

Prior to public scoping, the preliminary alternatives were developed primarily by an NPS interdisciplinary team comprised of subject matter experts from the NPS's Natural Sounds and Night Skies Division, Environmental Quality Division, Pacific West Regional Office, and the Park. In developing the alternatives, the team considered the noise impacts of existing air tour routes and operations, the Park's cultural and natural resources, Native Hawaiian sacred sites and ceremonial areas, the Park's existing and natural acoustic environment, visitor experience, as well as potential protective measures that could be included in an ATMP. The team also considered input received during past ATMP planning efforts and park specific planning and management documents. The alternatives identified by the NPS and justifications for restrictions on commercial air tours were reviewed by the FAA, including the FAA's local Flight Standards District Office (FSDO) who noted any aviation safety concerns.

The agencies also conducted a preliminary environmental analysis earlier in the planning process to identify the appropriate level of NEPA review for a draft ATMP. In 2021, using routes, altitudes, reporting data provided by commercial air tour operators, and other relevant information, the agencies modeled existing air tour conditions over the Park using the FAA's Aviation Environmental Design Tool (AEDT), a software system that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality. This information was then considered, in addition to acoustic monitoring information, and analyzed by the NPS's interdisciplinary planning team. The FAA, in coordination with the NPS, also initiated consultation pursuant to Section 106 of the National Historic Preservation Act of 1966 (NHPA) (54 U.S.C §§ 300101 et seq.), including consultation with Native Hawaiian individuals and Native Hawaiian Organizations (NHOs). The input from consultation and preliminary environmental analysis was used to further refine or dismiss potential alternatives prior to the public scoping period. Ultimately, four potential alternatives (No Action Alternative (Alternative 1), Alternative 2 which would not permit air tours within the ATMP planning area, and Alternatives 3 and 4 which would permit limited numbers of air tours in the ATMP planning area on various routes) were released for review and comment during the public scoping period in February 2022. Refer to the public scoping newsletter in Appendix J, *Public Scoping Newsletter and Comment Summary Report*, for details on the alternatives included in public scoping.

As further discussed in Section 2.4, Alternative 1 (No Action Alternative), after the public scoping period, the agencies refined the No Action Alternative to be the three-year average instead of the IOA, recognizing that IOA is not reasonably foreseeable. As a result of the comments received from the February 2022 public scoping period, the agencies also dismissed Public Scoping Alternative 3 from further consideration (see Section 2.2.2, Public Scoping

Alternative 3 for additional details on this dismissal). The FAA and the NPS further refined the time-of-day restrictions, restrictions for particular events, and training and education ATMP elements described in Public Scoping Alternative 4 based on public and stakeholder feedback. There were no changes made to Public Scoping Alternative 1 or 2, no air tours within the ATMP planning area, as shared during public scoping. The three alternatives presented in this draft EA, including the No Action Alternative, represent the refined alternatives following the public scoping period. Refer to Appendix J, *Public Scoping Newsletter and Comment Summary Report*, for additional details on the alternatives that were released for public scoping. Alternatives may be further developed or modified through the NEPA process in response to public, consulting party, and agency comments on this draft EA and draft ATMP.

2.2 Alternatives Considered but Eliminated from Further Study

2.2.1 Air Tours at or above Existing Levels

The agencies considered but eliminated alternatives that would allow air tour operations at or above existing numbers. These alternatives were eliminated from further study because the NPS determined they would result in unacceptable impacts to the Park's natural and cultural resources, Wilderness character, and visitor enjoyment, (NPS Management Policies 1.4.7.1, 2006), and do not meet the purpose and need for the plan.

The NPS determined the existing level of air tours is inconsistent with the Park's purpose and values, as described in its Foundation Document (NPS, 2017), which states:

The purpose of Hawai'i Volcanoes National Park is to protect, study, and provide access to Kīlauea and Mauna Loa, two of the world's most active volcanoes, and perpetuate endemic Hawaiian ecosystems and the traditional Hawaiian culture connected to these landscapes.

The Park's purpose includes perpetuating the traditional Hawaiian cultural connections to the Park's landscapes (NPS, 2017). Noise from the existing level of air tours inhibits the Park's ability to meet this purpose. Noise and visual effects from air tours negatively impact existing Native Hawaiian sacred sites and areas where traditional cultural practices occur within the Park associated with Native Hawaiian people. The NPS Management Policies direct the NPS to avoid adversely affecting the physical integrity of sacred sites to the extent practicable (NPS Management Policies § 5.3.5.3.2, 2006). Additionally, culturally appropriate sounds are important elements of the national park experience in many parks, and therefore, the NPS is directed to "prevent inappropriate or excessive types and levels of sound (noise) from unacceptably impacting the ability of the soundscape to transmit the cultural and historic resource sounds associated with park purposes" (NPS Management Policies § 5.3.1.7, 2006). Native Hawaiians have consistently noted that persistent air tours over the Park unreasonably interfere with Native Hawaiian connections to the Park's sacred areas. Noise and visual

intrusion from air tours also negatively impacts the setting, feeling and association of other historic properties within the Park.

Additionally, existing air tour operations result in frequent and loud noise disruptions in many areas of the Park. Existing air tours over the Park impede the NPS's ability to fully meet the Park's purpose of perpetuating endemic Hawaiian ecosystems and does not support the perpetuation of biological diversity and ecological integrity which are fundamental resources and values of the Park (NPS, 2017). A recent study in Hawai'i documented that loud, frequent helicopter noise results in changes in avian vocalization (Gallardo Cruz et al., 2021). Helicopter noise could detrimentally affect physiology, pairing and breeding success, and territory size of birds by limiting communication between individuals (Habib et al., 2007; Nemeth and Brumm 2010; Halfwerk et al., 2011; Kleist et al., 2018). These effects could have a greater impact on Hawaiian endemics, many of which are federally listed under the Endangered Species Act (ESA) and already face a number of stressors (Atkinson and Lapointe 2009; Pratt and Atkinson, 2009; LaPointe et al., 2010) compared to non-native species. The NPS has determined that the existing level of air tours also diminishes visitor opportunities to learn about and be inspired by Park resources and values and unreasonably interferes with Park programs, activities, the atmosphere of peace and tranquility and the natural soundscapes in Wilderness (see 2006 NPS Management Policies 1.4.7.1). As determined by the NPS, existing air tours repeatedly interrupt and unreasonably interfere with interpretive programs and visitor activities at many sites, including Uēkahuna Bluff, Kīlauea Overlook, Steam Vents, Volcano House, Kīlauea Visitor Center, Kūpina'i Pali, Kīlauea Iki, Devastation, Pu'upua'i, Keanakāko'i, Maunaulu, Puhimau, Kīpukapua'ulu, and Mauna Loa (lookout and trail). Visitor complaints and staff observations indicate that noise from air tours impedes visitors from enjoying and learning about existing Park resources in these and other areas of the Park.

The NPS has determined that the existing air tour operations also unreasonably interfere with the natural soundscape maintained within the Park's four designated Wilderness areas, Mauna Loa, 'Ōla'a, East Rift, and Ka'ū Desert, as well as the eligible (Kahuku) and potential (Great Crack) Wilderness areas (see NPS Management Policies 1.4.7.1). Persistent noise within Wilderness interferes with the opportunity for solitude and detracts from the undeveloped and natural qualities of Wilderness.

Therefore, authorizing commercial air tours at or above the existing level of operations would not meet the objective of an ATMP. The NPS has determined that the existing level of air tours cannot be mitigated to avoid or prevent unacceptable impacts and therefore any alternative that would maintain or increase the existing number of air tours over the Park does not meet the purpose and need for the plan. For all of these reasons, the agencies have considered but dismissed alternatives that would continue air tours at or above existing air tour numbers.

2.2.2 Public Scoping Alternative 3

As noted above, four potential alternatives were released for public comment in February 2022. The public scoping comments ultimately resulted in the dismissal of Public Scoping Alternative 3 (refer to the Public Scoping Newsletter in Appendix J, *Public Scoping Newsletter and Comment Summary Report*, for additional details on this alternative). Specifically, several commenters provided information during public scoping about sensitive resources that would be overflowed by the Northern Route included in that alternative. The NPS considered adjustments to the route which would avoid those sensitive resources, but ultimately found that they were unable to be avoided or minimized by adjusting ATMP route parameters. Therefore, the agencies dismissed Public Scoping Alternative 3 from further consideration because the alternative would not meet the objectives of the ATMP.

2.2.3 Alternatives Authorizing between 1,565 Commercial Air Tours per Year and Existing Conditions

The agencies considered but dismissed alternatives that would authorize fewer air tours than existing conditions but more than the 1,565 annual air tour operations (estimated to be equivalent to five per day on the 313 days when air tours would occur) evaluated in Alternative 3. Based on a preliminary noise modeling analysis, the agencies evaluated a range of daily air tour numbers to determine potential noise impacts to visitor experience, biological resources, Hawaiian cultural connections, and Wilderness character, including the opportunity for solitude and the natural quality of Wilderness. Similar to the description above in Section 2.2.1, these higher numbers of air tours per year would inhibit the NPS's ability to perpetuate traditional Hawaiian cultural connections to the Park's landscapes, impede the NPS's ability to fully meet the Park's purpose of perpetuating endemic Hawaiian ecosystems, and diminish the visitor experience and unreasonably interfere with Park programs, activities, and the atmosphere of peace and tranquility. The agencies also considered whether different routes and a higher number of air tours would meet Park objectives for visitor experience, biological resources and Wilderness protection and found that they would not. The evaluation indicated that daily operations above five per day (on days when air tours would occur) would continue to result in severe noise impacts that would preclude the Park from adequately protecting visitor experience, biological resources, and Wilderness character. Alternatives authorizing air tours above five per day (equivalent to 1,565 air tours per year) were dismissed because the NPS found that the level of impacts to Park resources did not meet Park preservation objectives and the impacts associated with air tours could not be further mitigated.

2.3 ATMP Planning Area for the Development of the Alternatives

An ATMP regulates commercial air tours over a national park or within ½-mile outside the park's boundary during which the aircraft flies below 5,000 ft. AGL. This is referred to as the ATMP planning area in this document and as the ATMP boundary in the ATMP itself. Air tours outside of the ATMP planning area are not subject to the Act and are therefore not regulated

under the ATMP. As air tours outside of the ATMP planning area are outside the jurisdiction of the ATMP, there would be no limitations on the annual number of such air tours that could occur, and no designated routes could be set outside the ATMP planning area under any alternative. Refer to Figure 1 for a graphic depiction of the ATMP planning area. Although they may occur within the ATMP planning area, general aviation flights, overflights by commercial airlines, and military flights would not be regulated by the ATMP because they are not commercial air tours subject to regulation under the Act.

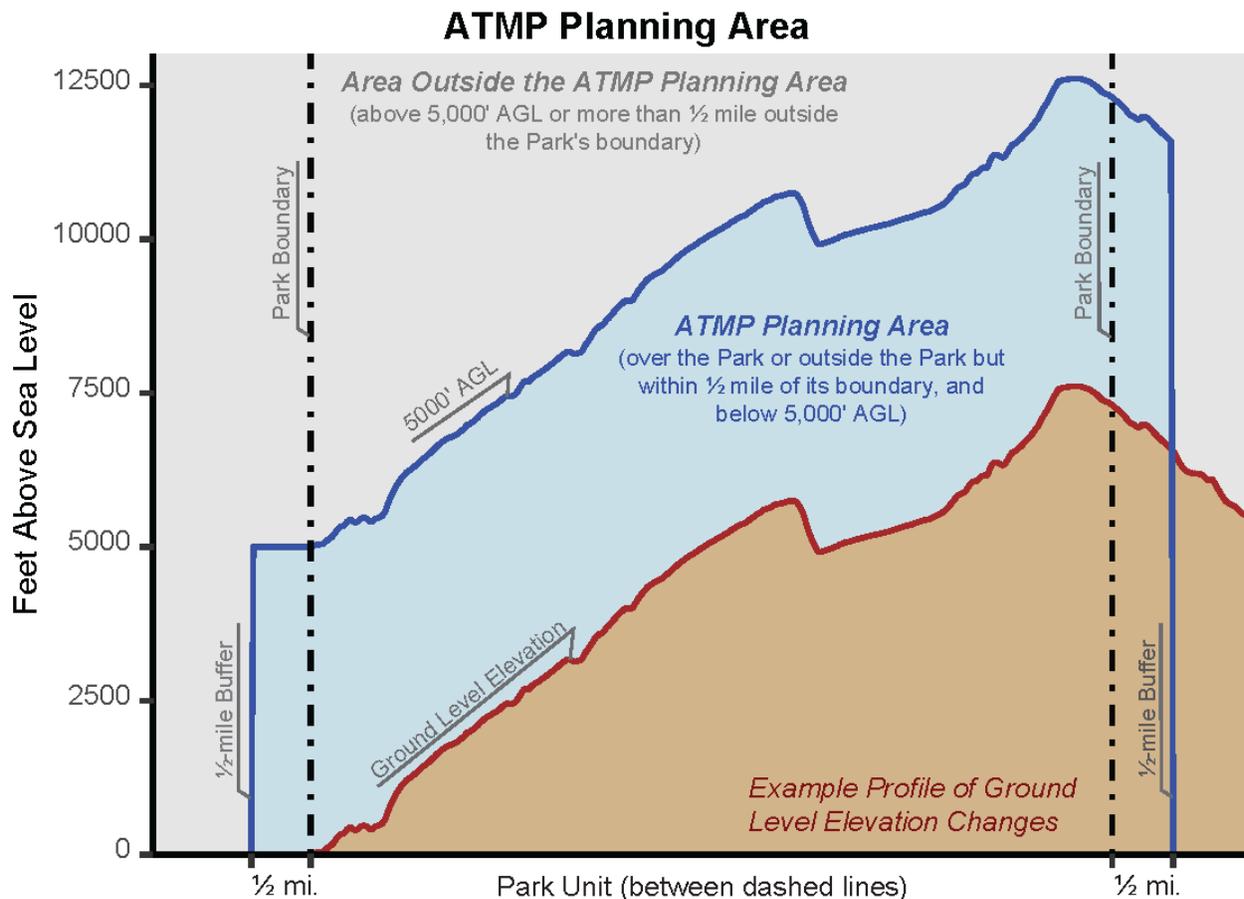


Figure 1. Graphic depiction of the ATMP planning area.

2.4 Alternative 1 (No Action Alternative)

The No Action Alternative represents a continuation of what is currently flown under existing conditions including applicable regulations that govern aviation safety (14 CFR Part 136, Appendix A, Special Operating Rules for Air Tour Operators in the State of Hawai'i (formerly Special Federal Aviation Regulation 71)) and any FAA exceptions issued to individual operators

as outlined by the 2008 FAA Hawai'i Air Tour Common Procedures Manual (Hawai'i Common Procedures Manual).⁶

The No Action Alternative provides a basis for comparison but is not a selectable alternative because it does not meet the purpose and need for the ATMP (refer to Section 1.4, Purpose and Need).

2.4.1 Commercial Air Tours per Year

Ten commercial air tour operators currently hold IOA to fly up to a combined total of 26,664 commercial air tours over the Park each year (see Table 1). The yearly average number of commercial air tours conducted over the Park from 2017-2019 across all operators is 11,376 tours per year. The agencies consider the 2017-2019, three-year average, the existing baseline for the purposes of understanding the existing number of commercial air tours over the Park. The requirement for commercial air tour operators to report annual commercial air tour operations to the agencies was implemented in 2013. Reporting data from 2013 and 2014 are considered incomplete as reporting protocols were not fully in place at that time and likely do not accurately reflect number of air tours conducted. Flight numbers from a single year were not chosen as the existing baseline because the three-year average accounts for both variation across years and takes into account the most recent pre-pandemic years. Reporting data from 2020 was not used because the 2020 COVID-19 pandemic resulted in lower than normal commercial air tour operations due to travel restrictions and closures in the State of Hawai'i, which does not represent the conditions in a typical year. The agencies also decided against using 2021 or 2022 data due to continued abnormalities associated with the COVID-19 pandemic and the unavailability of reporting data for 2021 or 2022 during most of the planning effort.

Although 26,664 commercial air tours per year are authorized under IOA, the operations reported by air tour operators reflect an average of 11,376 commercial air tours per year. While it is possible that air tour operations could increase to the level authorized by IOA and thus dramatically change potential impacts to Park resources, the data does not support such changes in the way commercial air tour operations have occurred over the reporting years. The three-year average of commercial air tours from 2017-2019 is 11,376 per year, which is less than 50 percent of IOA, and reflective of data collected. The agencies determined that air tour operations up to current IOA is not reasonably expected to occur within the life of the plan because IOA was based on numbers reported by operators more than 20 years ago and does not represent the most current or reliable operational data. There is no verifiable data demonstrating that operators have ever flown the number of commercial air tours authorized

⁶ Hawai'i Air Tour Common Procedures Manual, FAA Document Number: AWP13-136A, 2008, https://www.faa.gov/about/office_org/field_offices/fsdo/hnl/local_more/media/hawaii_air_tour_common_proc.pdf

by IOA or will fly this number of tours in the future. Thus, the No Action Alternative is a continuation of existing conditions and uses the three-year average of flights from 2017-2019 for this draft EA analysis and impacts of IOA are not analyzed nor included as the baseline condition.

2.4.2 Commercial Air Tour Routes and Altitudes

There are no designated flight routes or no-fly zones under the No Action Alternative. The figure for this alternative (Figure 2) depicts both general route information provided by existing commercial air tour operators and Automatic Dependent Surveillance-Broadcast (ADS-B) flight tracking data of likely commercial air tour operations over and adjacent to the Park. Likely commercial air tour operations are dispersed around the generalized routes provided by operators depicted on Figure 2. The ADS-B tracking data is more reflective of existing operations for various reasons including deviations that may occur due to weather. There are currently no route limitations on air tours and routes may change, depending on an operator's preference to change routes or fly higher or lower than they currently are flying. For purposes of defining the No Action Alternative, the route information in Figure 2 is considered in this draft EA.

Air tour operators authorized to fly below 1,500 ft. AGL (14 CFR Part 136, Appendix A, Special Operating Rules for Air Tour Operators in the State of Hawai'i) within the ATMP planning area must comply with requirements such as training and limitations set forth by the FAA in the Hawai'i Common Procedures Manual. Minimum altitudes for commercial air tours within the ATMP planning area are flown in accordance with the Hawai'i Common Procedures Manual, from 500-1,500 ft. AGL, weather dependent and contingent on location over the island. Refer to Figure 2 for details.

All air tour operators are required to report to the FAA and the NPS,⁷ on a semi-annual basis, the number of commercial air tour operations they have conducted within the ATMP planning area. The operators must provide the date and time each tour occurred, the make/model of aircraft used, and the route on which the tour was conducted.

2.4.3 Commercial Air Tour Operators and Aircraft Types

Seven of the ten operators that hold IOA for the Park reported flying commercial air tours over the Park between 2013 and 2020. Five operators fly helicopters, and two operators fly fixed-wing aircraft. Air tours occur year-round on an average of 345 days per year based on 2017-2019 reporting data. Table 1 summarizes each operator's aircraft type, IOA, reported tours, and three-year average number of reported air tours over the Park from 2017-2019:

⁷ See *Air Tour Reporting Guidance Memo* (2020), https://www.faa.gov/sites/faa.gov/files/about/office_org/headquarters_offices/arc/Air-Tour-Reporting-Guidance.pdf

Hawai'i Volcanoes National Park ATMP Draft Environmental Assessment

Table 1. Commercial air tour operators, aircraft type, reported tours, and IOA

Operator	Aircraft Type	2013	2014	2015	2016	2017	2018	2019	2020 ⁸	2017-2019 Avg.	IOA
Above it All Inc. (Sporty's Academy Hawai'i, Hawai'i Island Hoppers, Hawai'i Airventures, Benchmark Flight Center)	no data	0	0	0	0	0	0	0	0	0	3,878
Big Island Air Inc.	CE-337-T337H, CE-421-C (fixed-wing)	92	74	48	55	102	7	0	0	36	1,643
Hawai'i Helicopters Inc. (Helicopter Consultants of Maui, Inc.)	AS-350-B2 (helicopter)	0	0	0	104	139	50	67	0	85	141
Helicopter Consultants of Maui Inc. (Hawai'i Helicopter, Blue Hawaiian Helicopters)	AS-350-B2, EC-130-B4, EC-130-T2 (helicopter)	12,540	11,815	12,280	12,088	12,300	6,059	7,325	1,018	8,561	12,413
K&S Helicopters (Paradise Helicopters)	BHT-407-407, BHT-430-430, MD-369-D, MD-369-E (helicopter)	108	123	140	650	877	552	248	54	559	1,684
Manuiwa Airways Inc. (Volcano Helicopters, Volcano Heli-Tours)	no data	0	0	0	0	0	0	0	0	0	800
Mokulele Flight Service Inc. (Mokulele Airlines)	C208B (fixed-wing)	0	0	0	0	0	15	0	0	5	60
Safari Aviation Inc. (Safari Helicopter Tours)	AS-350-B2 (helicopter)	1,680	1,431	1,408	1,748	1,977	1,050	995	116	1,341	3,920
Schuman Aviation Company, Ltd. (Makani Kai Helicopters)	no data	0	0	0	0	0	0	0	0	0	25

⁸ Based on unpublished reporting data.

Hawai'i Volcanoes National Park ATMP Draft Environmental Assessment

Operator	Aircraft Type	2013	2014	2015	2016	2017	2018	2019	2020 ⁸	2017-2019 Avg.	IOA
Sunshine Helicopters Inc.	AS-350-BA, EC-130-B4 (helicopter)	990	984	769	844	1,125	600	641	62	789	2,100
TOTAL		15,410	14,427	14,645	15,489	16,520	8,333	9,276	1,250	11,376	26,664

Source: 2013-2019 Annual Reports, "Reporting Information for Commercial Air Tour Operations over Units of the National Park System". See: <https://www.nps.gov/subjects/sound/airtours.htm>.

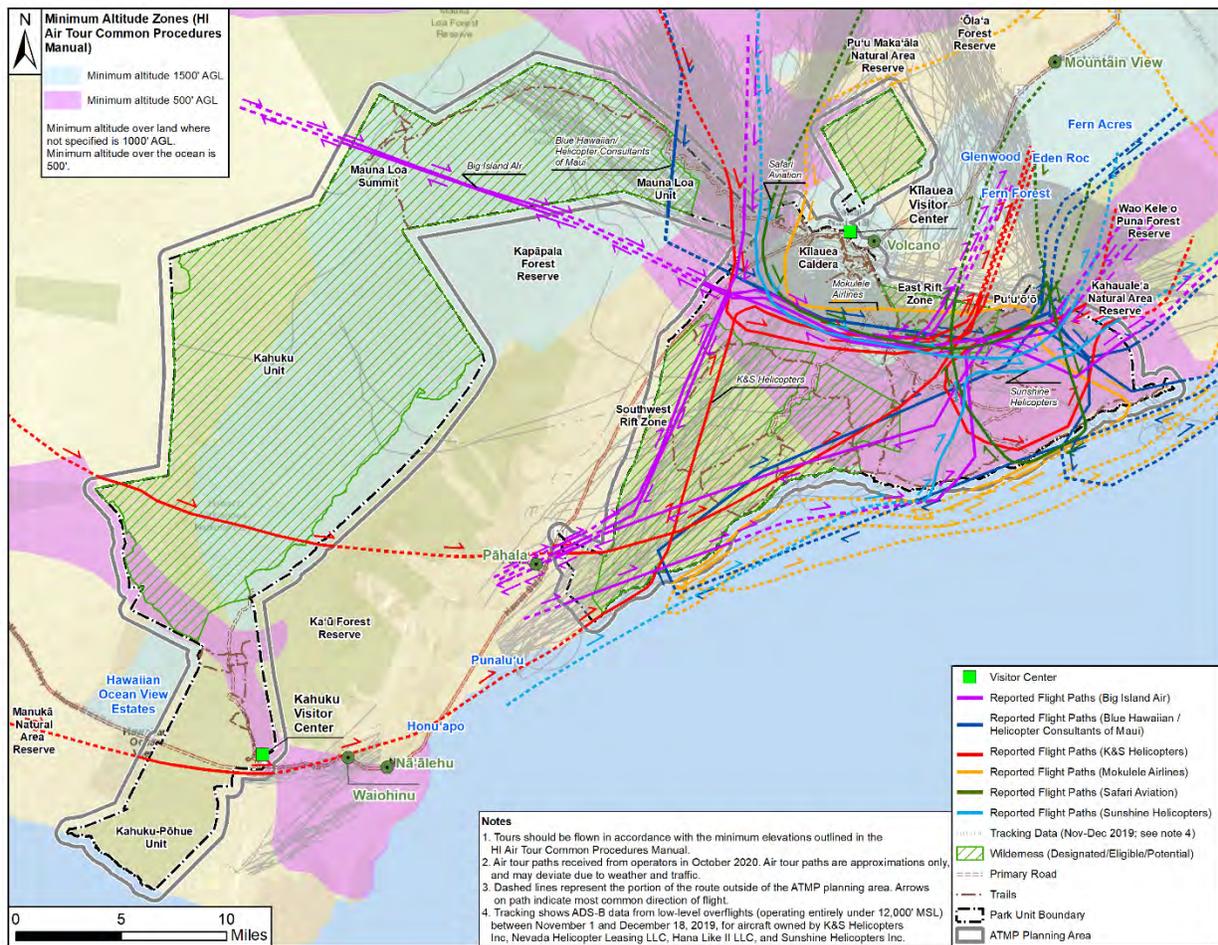


Figure 2. Alternative 1 (No Action)

2.5 Alternative 2

Alternative 2 would provide the greatest level of protection for the purposes, resources, and values of the Park because it would not authorize air tours in the ATMP planning area. Under this alternative, the heart of the Park, including the summit of Kilauea, all Wilderness areas, and cultural and visitor use areas, would be free of commercial air tours.

Alternative 2 would prohibit commercial air tours within the ATMP planning area no later than 180 days after the ATMP is signed by all required signatories from both agencies (the ATMP's effective date). Operators will be permitted to continue to conduct air tours within the ATMP planning area up to the limit of their IOA until their operations specifications are rescinded or amended to incorporate the ATMP's operating parameters, which will occur no later than 180 days after the effective date of the ATMP.

Air tours outside of the ATMP planning area (i.e., at or above 5,000 ft. AGL or more than ½-mile outside the Park boundary) are not subject to the Act and are therefore not regulated under the ATMP. Thus, there would be no limitations on the number of air tours that could occur outside the ATMP planning area. Refer to Figure 3 for a depiction of this alternative.

Because air tours outside of the ATMP planning area are not regulated by the ATMP, air tour routes outside of this area are difficult to predict with specificity. Operators could fly routes outside the ATMP planning area similar to existing flight paths, or routes could vary greatly from those currently flown and would depend on operator preference and weather conditions at the time of the tour.

Aircraft monitoring and enforcement would still occur under this alternative to ensure that commercial air tour operators are complying with the terms and conditions of the ATMP by not conducting commercial air tours within the ATMP planning area. The NPS and the FAA would both be responsible for the monitoring and oversight of the ATMP.

All IOA for the Park would terminate by operation of law 180 days after the establishment (effective date) of the ATMP, 49 U.S.C. § 40128(c)(2)(E), after which time no operator could continue to rely on any operations specifications issued under IOA as authority to conduct commercial air tours within the ATMP planning area. Operations specifications will be rescinded or amended to incorporate the operating parameters set forth in the ATMP within 180 days after the effective date of the ATMP.

The FAA reviewed the alternative to ensure it is safe.

2.5.1 Commercial Air Tour Routes and Altitudes

Air tours could be conducted only outside the ATMP planning area. An unknown number of air tours originating on Hawai'i Island from Hilo, Kailua-Kona, Hāpuna and Waikoloa, and airports on Maui and O'ahu may still continue to fly more than ½-mile outside of the Park's boundary at or above minimum altitudes ranging from 500 to 1,500 ft. AGL, depending on location on the island, in accordance with the Hawai'i Common Procedures Manual. Operators may continue to fly to points of interest on the island outside of the ATMP planning area where they already fly or fly routes over or around the ATMP planning area similar to existing flights paths but outside of the ATMP planning area. The actual flight path of air tours outside the ATMP planning area would vary based on operator preference, volcanic activity, and weather

conditions at the time of the air tour. For air tours conducted just outside the perimeter of the ATMP planning area, it is reasonably foreseeable that operators would fly just outside of the ATMP planning area surrounding the volcanoes in order to view Kīlauea crater or any active lava. If operators chose to fly above the ATMP planning area, they would be required to maintain altitudes at or above 5,000 ft. AGL while over the ATMP planning area. Operators would likely keep to an altitude close to but just above 5,000 ft. AGL, as flights at higher altitudes would provide limited value to a sightseeing operation. The preciseness of routes and altitudes for air tours flown on alternative routes are generally subject to Visual Flight Rules⁹ which is based on the principle of “see and avoid”, and therefore, may vary greatly.

2.5.2 Monitoring and Enforcement

Aircraft monitoring and enforcement would occur to ensure that commercial air tour operators are complying with the terms and conditions of the ATMP. The NPS would conduct ADS-B aircraft monitoring when possible and work with the FAA to identify and respond to any instances of noncompliance. The agencies would both be responsible for the monitoring and oversight of the ATMP. If the NPS identifies instances of noncompliance, the NPS would report such findings to the FAA's Honolulu FSDO. The FSDO would investigate and respond to all written reports consistent with applicable FAA guidance. The public may also report allegations of noncompliance with the ATMP to the FSDO, which may result in an FAA investigation. FAA determination of noncompliance may result in legal enforcement actions. Any violation of operations specifications would be treated in accordance with FAA Order 2150.3, *FAA Compliance and Enforcement Program*.

⁹ FAA Advisory Circular 91-36D Visual Flight Rules Flight Near Noise-Sensitive Areas

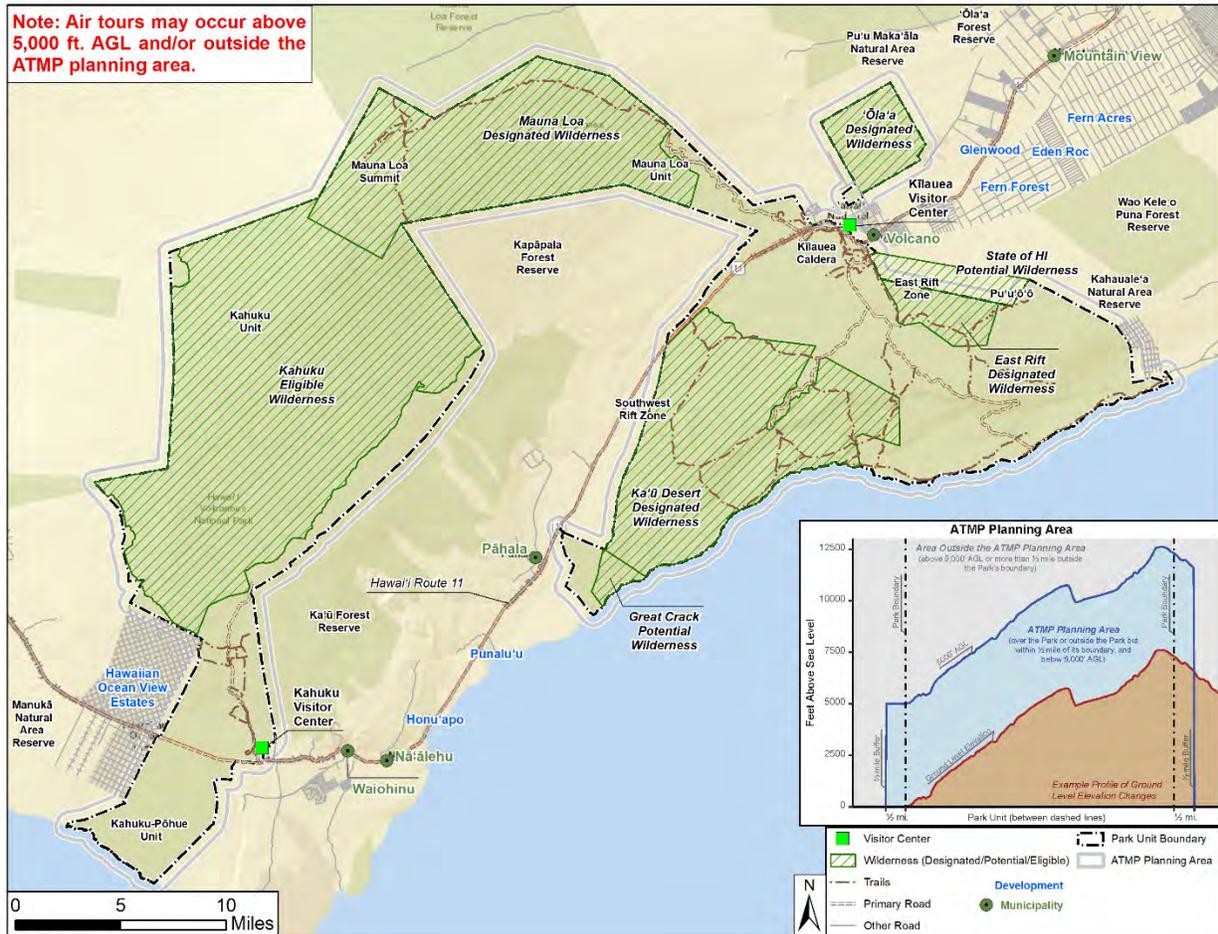


Figure 3. Alternative 2

2.6 Alternative 3 (Preferred Alternative)

The NPS developed Alternative 3 (formerly known as “Public Scoping Alternative 4”), which reflects refined parameters from Public Scoping Alternative 4 to provide an air tour route for access to the historically active east rift zone of Kilauea, a route for air tours across lower Kahuku to allow expansive views of Mauna Loa, and an offshore coastal flight route that would protect Wilderness areas and backcountry campgrounds. The heart of the Park, including the summit of Kilauea, designated Wilderness areas, and key cultural and visitor use areas, would be free of commercial air tours. This alternative would avoid or minimize potential impacts to Park soundscapes based on Park management zones. This alternative would avoid flights over the coastal lands to minimize impacts on coastal backcountry, Wilderness users and sensitive resources (refer to Figure 4).

The FAA reviewed the alternative to ensure it is safe.

2.6.1 Commercial Air Tours per Year

Alternative 3 would authorize 1,565 commercial air tours per year within the ATMP planning area. Thus, it would authorize 14% of the existing number of flights to travel within the ATMP planning area based on the three-year average of reporting data from 2017-2019. The number of flights authorized per year was selected to avoid or minimize impacts to Wilderness values, cultural resources including Native Hawaiian traditional practices and sacred sites, the natural acoustic environment, and visitor experience.

The ATMP would be established and effective as of the date it is signed by all required signatories from both agencies. No later than 180 days after the effective date of the ATMP, the number of flights authorized each year would be proportionally allocated to each of the seven operators that reported operations over the Park in the period from 2017-2019. Each operator's initial allocation would reflect the proportion of their average number of reported flights from 2017-2019 as compared to all operators that reported flying over the Park during this period. The initial allocation would remain in place until a competitive bidding process could occur.

All IOA for the Park would terminate by operation of law 180 days after the establishment (effective date) of the ATMP, 49 U.S.C. § 40128(c)(2)(E), after which time no operator could continue to rely on any operations specifications issued under IOA as authority to conduct commercial air tours within the ATMP planning area. Amended operations specifications that incorporate the operating parameters set forth in the ATMP shall be issued within 180 days of the effective date of the ATMP.

2.6.2 Commercial Air Tour Routes and Altitudes

Figure 4 shows flight routes where air tours could occur within the ATMP planning area. Alternative 3 includes three flight paths with minimum altitude requirements of 1,500 – 2,000 ft. AGL. Air tour routes within the ATMP planning area are represented by a line with a ¼-mile buffer on either side of the route that indicates the acceptable range of deviation that would not trigger enforcement action. The route details are described below:

- **Pu'u'ō'ō Route:** The Pu'u'ō'ō Route consists of a route on the east rift of Kīlauea in the Pu'u'ō'ō area with a single entry and exit over the ocean. As described in Section 2.6.7, Quiet Technology Incentives, operators that have converted to quiet technology aircraft may request to be allowed to conduct air tours using quiet technology aircraft in an expanded fly zone directly west of this route near Pu'u'ō'ō (i.e., the "Pu'u'ō'ō Quiet Technology Zone"). The Pu'u'ō'ō Quiet Technology Zone avoids the designated Wilderness boundary at Nāpau. Commercial air tours conducted on the Pu'u'ō'ō Route and in the Pu'u'ō'ō Quiet Technology Zone would be flown at minimum 1,500 ft. AGL over land and 2,000 ft. AGL over the water. Hovering, loitering, and/or circling for up to five minutes is allowed on the Pu'u'ō'ō Route and in the Pu'u'ō'ō Quiet Technology Zone.

- **Coastal Route:** The Coastal Route runs bi-directionally offshore along the edge of the Park boundary, but within ½-mile of the Park boundary. Air tours on the Coastal Route would maintain 2,000 ft. lateral distance from shore and a minimum altitude of 2,000 ft. AGL. The Coastal Route is available for use only if commercial air tour operators can safely adhere to the required altitude and distance to the shore. If an operator is not able to safely fly offshore in accordance with the prescribed altitude and distance requirements, the operator would not utilize that route. This route provides expansive views of the pali (cliffs) and coastal areas. The route would protect Wilderness areas, backcountry campgrounds, cultural, and sensitive resources within the Park.
- **Kahuku Route:** The Kahuku Route runs bi-directionally across the south side of the Kahuku Unit following Highway 11. Air tours on the Kahuku Route would maintain a minimum altitude of 1,500 ft. AGL. This route would provide access for Kailua-Kona flights and circle island tours to provide expansive views of Mauna Loa from the summit to the sea and past volcanic activity while protecting endangered birds found at higher elevations and eligible Wilderness in Kahuku.

If pilots are on or are entering a route and encounter weather that does not allow them to proceed further along the route at the prescribed altitude, they would be required to safely exit the route and either follow another route where weather conditions allow or would exit the ATMP planning area.

Operators may not deviate from the designated routes and altitudes except as necessary for safe operation of an aircraft as determined under Federal Aviation Regulations requiring the pilot-in-command to take action to ensure the safe operation of the aircraft.

Under Alternative 3, no air tours could occur within the ATMP planning area, except air tours authorized on the designated routes and at designated altitudes described above. Refer to Figure 4 for a depiction of flight routes and altitudes. Because air tours outside of the ATMP planning area are not regulated by the ATMP, air tour routes outside of this area are difficult to predict with specificity. Operators could fly routes outside the ATMP planning area similar to existing flight paths, or routes could vary greatly from those currently flown and would depend on operator preference and weather conditions at the time of the tour.

2.6.3 Commercial Air Tour Aircraft Type

Operators would be limited to using the aircraft types reported in the period from 2017-2019 (see Table 1). Any new or replacement aircraft would not exceed the noise level produced by the aircraft being replaced. Operators would notify the FAA and the NPS in writing of any prospective new or replacement aircraft and obtain concurrence before initiating air tours with the new or replacement aircraft.

2.6.4 Commercial Air Tour Day/Time

Except as provided in Section 2.6.7, air tours could operate from 10:00 AM to 2:00 PM local time on Monday, Tuesday, Thursday, Friday, and Saturday. Air tours would not be allowed on

Sundays. As described in Section 2.6.7, operators that have converted to quiet technology aircraft could request to be allowed to conduct air tours on Wednesdays and 9:00 AM – 5:00 PM Monday through Saturday.

The Sunday no-fly day would provide opportunities for visitor enjoyment, such as bird watching. Sunday was selected as a no-fly day for consistency with the Park's Mission Critical Administrative Aviation Plan and Environmental Assessment, would allow for one weekend flight-free day at the Park, and would address comments and requests from the local community and Native Hawaiian cultural practitioners.

2.6.5 Restrictions for Particular Events

In addition to the weekly no-fly day on Sundays, this alternative would include a mandatory 5-mile standoff for special events that could be impacted by air tours, limited to the day of the event. Special events could include Native Hawaiian events or other natural and cultural resource programs. Two months' notice would be provided to commercial air tour operators prior to the event. The standoff would not extend outside the boundary of the ATMP planning area. If the standoff overlaps with a route, that route cannot be utilized while the standoff is in effect.

2.6.6 Additional Requirements

- **Hovering, Loitering, and Circling:** Hovering, loitering, and/or circling for up to five minutes would be permitted on the Pu'u'ō'ō Route and in the Pu'u'ō'ō Quiet Technology Zone. Circling aircraft would have to turn away from the advancing blade as much as possible to minimize noise. Hovering, loitering and/or circling is prohibited on the Kahuku Route and the Coastal Route.
- **Interpretive Training and Education:** When made available by Park staff, operators/pilots would take at least one training course per year conducted by the NPS. The training would include the Park information that operators could use to further their own understanding of Park priorities and management objectives as well as enhance the interpretive narrative for air tour clients and increase understanding of the Park by air tour clients. Helicopter operators would also be required to complete the FAA Introduction to Fly Neighborly training.¹⁰ The Fly Neighborly Noise Abatement Training program, created by the FAA and endorsed by Helicopter Association International, teaches pilots and operators noise abatement procedures and situational awareness tools that can be used to minimize the effects of helicopter noise emissions.
- **Annual Meeting:** The Park staff, the local FAA FSDO, and all operators would be required to meet once per year to discuss the implementation of the ATMP and any amendments or other changes to the ATMP.

¹⁰ https://www.faa.gov/gslac/ALC/course_content.aspx?CID=500&SID=841&preview=true&d=1

- **Adaptive Management:** Adaptive management is a systematic approach for improving resource management and ensuring the continued effectiveness of the ATMP over time through the monitoring of Park conditions and by learning from management actions or choices. Adaptive management is also used to address changed conditions such as if the breeding habitat of a sensitive species moves to a new area. Monitoring and adaptive management of the ATMP would occur under this alternative to ensure that the terms and conditions of the ATMP would continue to address Park management objectives. The FAA and the NPS will provide additional information for interested parties about the notice and process for adaptive management changes.
- **Reporting, Monitoring and Enforcement:** Operators would be required to equip all aircraft used for air tours with flight monitoring technology, to use flight monitoring technology during all air tours under the ATMP, and to report flight monitoring data as an attachment to the operator's semi-annual reports. FAA determination of noncompliance may result in loss of authorization to conduct commercial air tours authorized by the ATMP. Any violation of operational specifications would be treated in accordance with FAA Order 2150.3, *FAA Compliance and Enforcement Program*.

2.6.7 Quiet Technology Incentives

The Act requires that the ATMP include incentives for the adoption of quiet technology by commercial air tour operators. This alternative incentivizes the use of quiet technology aircraft by relaxing the time-of-day restrictions to allow quiet technology aircraft to fly from 9:00 AM to 5:00 PM (four hours more than non-quiet technology aircraft), relaxing the day-of-week restrictions to allow quiet technology aircraft to fly on Wednesdays, and allowing quiet technology aircraft to conduct commercial air tours in additional locations in the Pu'u'ō'ō viewing area (see Figure 4 for a depiction of these areas). In order to qualify for quiet technology incentives, operators would be required to follow a process to be defined by the agencies.

2.6.8 Initial Allocation and Competitive Bidding

The Act states whenever an ATMP limits the number of commercial air tour operations during a specified time frame, a competitive bidding process must occur pursuant to the criteria set forth in 49 U.S.C. § 40128(a)(2)(B). Since the number of flights would be limited for Alternative 3, competitive bidding would be required. Initially, commercial air tour operators would be allocated a certain number of commercial air tours over the Park, referred to as the initial allocation, until a competitive bidding process can be conducted. Table 2 identifies the operators that would be authorized to conduct commercial air tours and annual flight allocations.

Table 2. Initial Allocation of Air Tour Operations by Operator under Alternative 3

Air Tour Operator	Annual Operations
Big Island Air Inc.	5
Hawai'i Helicopters Inc. (Helicopter Consultants of Maui, Inc.)	12
Helicopter Consultants of Maui Inc. (Hawai'i Helicopter, Blue Hawaiian Helicopters)	1,176
K&S Helicopters (Paradise Helicopters)	77
Mokulele Flight Service Inc. (Mokulele Airlines)	1
Safari Aviation Inc. (Safari Helicopter Tours)	185
Sunshine Helicopters Inc.	109

Competitive bidding may also be appropriate to address, for example, a new entrant application; a request by an existing operator for additional operating authority; or consideration by the agencies of Park-specific resources, impacts, or safety concerns. The Act directs the agencies to consider various factors during the competitive bidding process including known resource issues, reporting, and compliance concerns. Competitive bidding may necessitate an amendment to the ATMP, additional environmental review, and/or the issuance of new or amended operations specifications. If operations specifications are required, they would be issued by the FAA.

Hawai'i Volcanoes National Park ATMP Draft Environmental Assessment

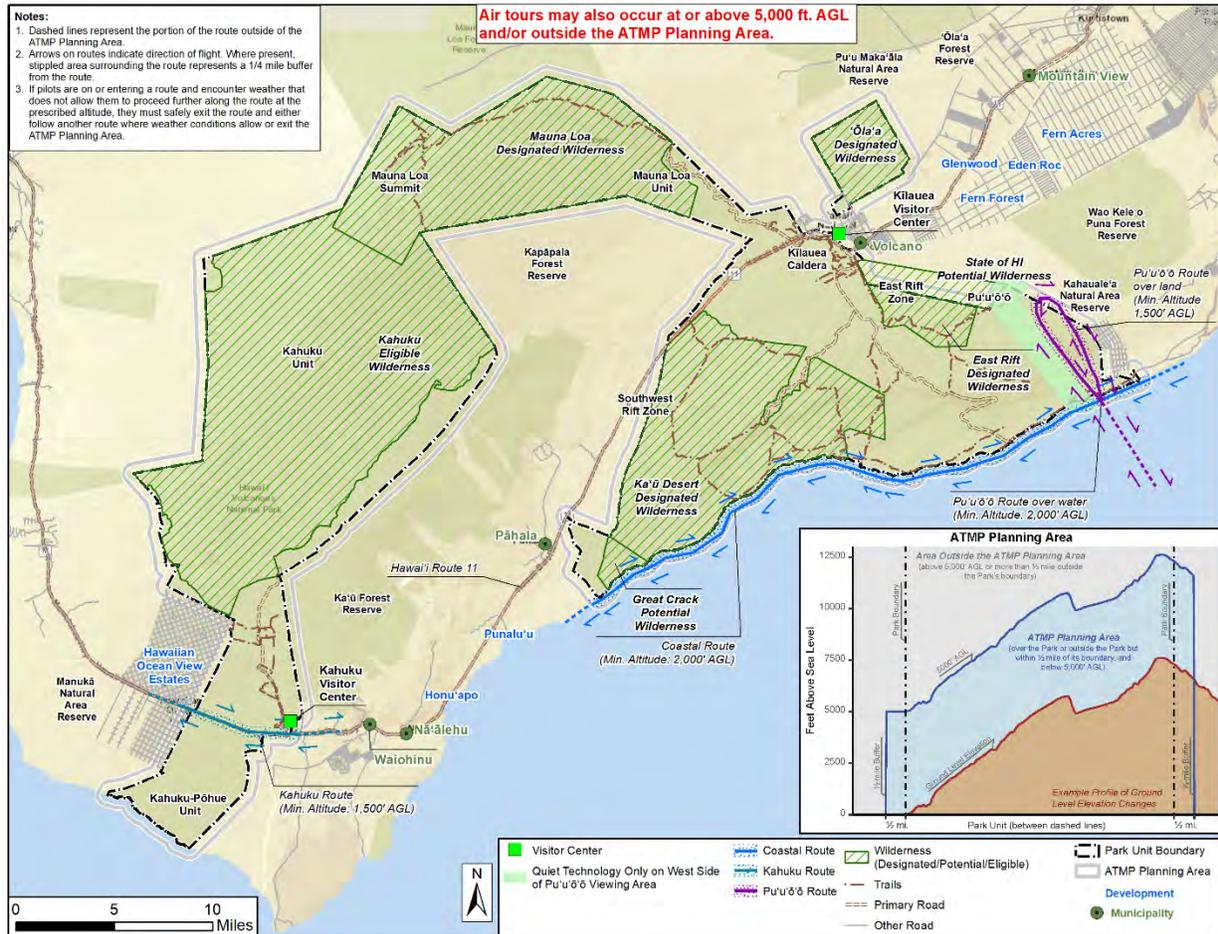


Figure 4. Alternative 3

2.7 Summary Comparison of the ATMP Alternatives

Table 3. Summary Comparison of the ATMP Alternatives

Alternative Attributes	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
General Description and Objectives	Allows a continuation of air tours without implementation of an ATMP or voluntary agreement. Does not meet the purpose and need for the ATMP.	Prohibits air tours within the ATMP planning area to maximize Park resource protection. Air tours could continue to fly outside the ATMP planning area (i.e., above 5,000 ft. AGL or more than 1/2-mile outside of the Park's boundary).	Three routes provide air tour access over the Park with soundscape mitigations, while keeping the heart of the Park free of air tours. Avoids flights over the summit of Kilauea and minimizes impacts on coastal backcountry users. Air tours could continue to fly outside the ATMP planning area (i.e., above

Hawai'i Volcanoes National Park ATMP Draft Environmental Assessment

Alternative Attributes	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
			5,000 ft. AGL or more than ½-mile outside of the Park's boundary).
Annual Number of Flights	Considers the three-year average of 11,376 flights per year (based on 2017-2019 reporting) as the existing condition.	None in ATMP planning area.	Authorizes 1,565 flights per year.
Routes	No mandatory routes or no-fly zones. See Figure 2 for depiction of reported routes and actual operations.	None in ATMP planning area. Operators may continue to fly to points of interest on the island outside of the ATMP planning area where they already fly, fly around the ATMP planning area similar to existing flights, or above the ATMP planning area (at or above 5,000 ft. AGL).	Three routes (Kahuku Route, Coastal Route, Pu'u'ō'ō Route).
Minimum Altitudes	Flown in accordance with the Hawai'i Common Procedures Manual, generally between 500-1,500 ft. AGL.	No minimum altitude would be set. However, flights over the Park that are at or above 5,000 ft. AGL would continue to occur as they are outside the ATMP planning area. Flights more than ½-mile outside the Park boundary would continue to occur and are also outside the ATMP planning area and are subject to the altitude restrictions of the Hawai'i Common Procedures Manual.	Minimum 1,500 ft. AGL over land and minimum 2,000 ft. AGL over water. Flights outside the ATMP planning area are subject to the altitude restrictions of the Hawai'i Common Procedures Manual.
Time of Day	No Restrictions.	N/A	On days where air tours are permitted: 10:00 AM – 2:00 PM for non-quiet technology flights. 9:00AM – 5:00 PM for quiet technology flights.
Day of Week	No Restrictions.	N/A	No-fly days on Sunday. Air tours are permitted on the remaining weekdays, except that air tours conducted on Wednesdays must use quiet technology aircraft.

Hawai'i Volcanoes National Park ATMP Draft Environmental Assessment

Alternative Attributes	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
Hovering, Loitering, and/or Circling	None.	N/A	Permits limited hovering, loitering, and/or circling (up to 5 minutes) on the Pu'u'ō'ō Route and in the Pu'u'ō'ō Quiet Technology Zone .
Quiet Technology Incentives	None.	N/A	Quiet technology flights may fly 9:00 AM – 5:00 PM. Quiet technology flights may fly on Wednesday. Additional fly location in the Pu'u'ō'ō Quiet Technology Zone.
Interpretative Training and Education	None.	N/A	Mandatory.
Annual Meeting	None.	N/A	Mandatory.
Restrictions for Particular Events	None.	N/A	Mandatory 5-mile standoff distance limited to the ATMP planning area. Two months' notice provided to operators.
Adaptive Management	None.	N/A	Monitoring by the NPS would occur to ensure the ATMP addresses park management objectives.
Monitoring and Enforcement	Operators report the number of tours, aircraft type, route, and day/time of tour to the FAA and the NPS on a semi-annual basis.	The NPS would conduct ADS-B aircraft monitoring and work with the FAA to respond to instances of noncompliance. The FAA FSDO would investigate all reports of noncompliance. FAA determination of noncompliance may result in legal enforcement actions.	Operators would provide semi-annual reports, including the flight monitoring data. Additional monitoring and enforcement would occur as described in Alternative 2.
Operators, Initial Allocation of Air Tours, and Aircraft Types	Reflects existing conditions of ten operators with reported data from 2017-2019.	The establishment of the ATMP would result in the termination of IOA for the Park.	The initial allocation would reflect the proportional number of air tours reported over the Park and the existing aircraft types of each of the seven operators that have reported operating in the period from 2017-2019 (see Table 2). Then it would move to competitive bidding. Any new or

Hawai'i Volcanoes National Park ATMP Draft Environmental Assessment

Alternative Attributes	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
			<p>replacement aircraft must not exceed the noise level produced by the aircraft being replaced.</p> <p>The establishment of the ATMP would result in the termination of IOA for the Park.</p>

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter includes a description of each environmental impact category. This chapter also includes the environmental consequences of the alternatives and evaluates how the direct, indirect, and cumulative impacts on those environmental impact categories may change by implementing the No Action Alternative or an action alternative at the Park. The analysis methodology for assessing impacts for each environmental impact category is in Appendix E.

As described in Section 1.1, Introduction, under the Act and its implementing regulations, an ATMP regulates commercial air tours over a national park or within ½-mile outside the park's boundary during which the aircraft flies below 5,000 ft. AGL (ATMP planning area). Air tours outside of the ATMP planning area are not regulated under the ATMP. Unless otherwise noted, the study area, referred to as the ATMP planning area, for each environmental impact category includes the Park and areas outside the Park within ½-mile of its boundary. Environmental impact categories (Cultural Resources, Wilderness, Environmental Justice and Socioeconomics, Visual Effects, and Department of Transportation (DOT) Act Section 4(f) Resources) that considered a study area different from the ATMP planning area are noted as such in that section.

This draft EA analyzes the following environmental impact categories in detail: Noise and Noise-Compatible Land Use; Air Quality and Climate Change; Biological Resources; Cultural Resources; Wilderness; Visitor Use and Experience and Other Recreational Opportunities; Environmental Justice (EJ) and Socioeconomics; Visual Effects; Coastal Resources; and DOT Act Section 4(f) Resources. The FAA, in cooperation with the NPS, considered the impact categories specified in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* (FAA, 2015) and NPS Director's Order #12 Conservation Planning, Environmental Impact Analysis, and Decision-making, and other categories identified during the agency and public scoping process. See Section 1.5, Environmental Impact Categories Not Analyzed in Detail, for environmental impact categories not analyzed in detail.

3.1 Noise and Noise-Compatible Land Use

FAA Order 1050.1F, Appendix B, paragraph B-1.3, Affected Environment, requires the FAA to identify the location and number of noise sensitive uses in addition to residences such as schools, hospitals, parks, and other recreation areas, that could be significantly impacted by noise. As defined in Paragraph 11-5.b(10) of FAA Order 1050.1F, a noise sensitive area is “[a]n area where noise interferes with normal activities associated with its use. Normally, noise sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife refuges, and cultural and historical sites.” Noise sensitive areas within the ATMP planning area include the Park, cultural resources discussed in Section 3.4, parks and Section 4(f) resources discussed in Section 3.10, as well as residential areas outside of the Park boundary but within the ½ mile buffer.

Section 4.9, Soundscape Management, of NPS Management Policies (2006) directs the NPS to preserve the Park's natural soundscape and acoustic environment which refer to the combination of all the natural sounds occurring within the Park, absent the human-caused sounds, as well as the physical capacity for transmitting those natural sounds and the interrelationships among Park natural sounds of different frequencies and volumes. This management policy directs the NPS to preserve soundscapes and the acoustic environment to the greatest extent possible and restore these resources to their natural condition wherever they have become degraded by noise and unwanted sounds. The NPS defines the acoustic environment as the aggregate of all sounds within an area; it is the total acoustic environment in the Park. The soundscape is the human perception of the acoustic environment. In a national park setting, the soundscape can be composed of both natural ambient sound and a variety of human-made sounds.

3.1.1 Affected Environment

The NPS defines acoustic resources as physical sound sources, including both natural sounds (wind, water, wildlife, vegetation) and cultural and historic sounds (battle reenactments, Native Hawaiian ceremonies, quiet reverence). The acoustic environment includes both natural and human generated sounds and the physical capacity for transmitting those natural sounds and the interrelationships among Park natural sounds. Within the Park, natural sounds are considered part of the biological or other physical resource components. Examples of natural sounds include:

- Sounds produced by birds, such as the nēnē (Hawaiian goose), to define territories, communicate with dependent offspring, or aid in attracting mates;
- Sounds produced by bats to locate prey or navigate which are not audible to humans; and
- Sounds produced by physical processes, such as wind in the trees, claps of thunder, falling rain, clinking of lava flows, etc.(NPS Management Policies, 2006, Section 4.9).

Natural sounds are a fundamental resource and value of the Park. The natural soundscape is a highly desired value for Park visitors and low ambient sounds plays a vital role in the health of Park natural ecosystems (NPS, 2017).

One of the natural resources of the Park is the natural soundscape, also referred to as the natural ambient or "natural quiet." The natural ambient includes all naturally occurring sounds, as well as the quiet associated with still nights and certain seasons. It excludes all mechanical, electrical and other human-caused sounds. An important part of the mission of the NPS is to preserve or restore the natural soundscapes associated with units of the National Park System (NPS, 2006).

The term existing ambient refers to the sound level of all sounds in a given area, and includes all natural sounds as well as all mechanical, electrical, and other human-caused sounds. Human-generated noise sources may include wheeled vehicles on roads, such as passenger vehicles and tour buses, and cyclists, and aircraft overflights consisting of high-altitude commercial jet aircraft, occasional NPS flights for research or other purposes, commercial air tour operations, and private general aviation aircraft.

Overall, in the absence of air tours the soundscapes of the Park are characteristically quiet and dominated by natural sound. Buffered by adjoining protected natural environments or rural landscapes, the Park is remote from urban development and its attendant human-caused noise. The Park also instituted quiet zones along the Crater Rim Trail for the benefit of visitor experience and cultural practitioners.

The main sources of anthropogenic noise are vehicles on paved roadways, aircraft from commercial air tours, and, less commonly, administrative activities of the NPS and its partners (NPS, 2015). Park visitors are often concentrated along road corridors, such as along Highway 11 or Crater Rim Drive, and there is minimal military, high-altitude commercial jet aircraft, and general aviation in the airspace over and adjacent to the Park. Air tour noise is most prevalent at the Kīlauea caldera and the Kīlauea summit, the historically active area along the east rift zone from Maunaulu to Nāpau to Pu'u'ō'ō craters, in addition to near 'Āinahou Ranch, along Mauna Loa Road, and past lava viewing areas at the end of Chain of Craters Road. The sites on the higher elevations of Mauna Loa and along Mauna Loa Road such as Kīpukakī are some of the quietest environments in the Park sampled to date (NPS, 2015) in the absence of air tours. Nāpau Crater in the East Rift Wilderness can also be very quiet in the absence of air tours. The Ka'ū Desert area also has some of the quietest natural soundscapes within the Park.

To characterize the natural and existing ambient (both with and without air tours) detailed sound level measurements were conducted at 22 locations across the Park from 2002-2003 (Lee et al., 2016). From the detailed data collected in 2002-2003, an ambient "map" of the natural soundscape of the ATMP planning area was developed to be used in computer modeling (Figure 5). For more explanation of how sound is described, see *Noise Technical Analysis*, (Appendix F, Table 1). These acoustic sampling locations were chosen to be representative of the natural ecological zones or broad ecosystems of the Park and ATMP planning area. Median daytime natural ambient (L_{50}) sound levels¹¹ ranged from 20 decibels

¹¹ Natural Ambient (L_{50}): The sound level exceeded 50 percent of the time determined from the natural sound conditions found in a study area, including all sounds of nature (i.e., wind, streams, wildlife, etc.), and excluding all human and mechanical sounds. Ambient data were based on a 12-hour, daytime, time period, 7:00 AM to 7:00 PM, typical operating hours for air tours.

(dB), A-weighted (dBA)¹² in backcountry areas to 54 dBA along the shoreline; median daytime existing ambient (L_{50}) sound levels for these areas exhibit similar variability, ranging from 20 dBA in the backcountry to 54 dBA in the front-country where visitors are more prevalent. The median or L_{50} sound level (in decibels) is the sound level exceeded 50 percent of the day. Table 2 in the *Noise Technical Analysis* (Appendix F) contains additional breakdown of the ambient sound level data by zone.

Additional sound level data was collected at four locations in the Kahuku Unit in 2013 to assist with air tour management planning and to determine ambient sound levels (Beeco and Pipkin, 2018). The locations were chosen to best assess noise impacts to sites at varying elevations and habitats within the Kahuku Unit. It was found that the Kahuku Unit is dominated by natural sounds impacted very little by anthropogenic noise. All four sites had nearly untouched natural soundscapes with no more than 0.3 dBA added to the natural ambient sound level from anthropogenic sound sources. Locations at higher elevations were found to be particularly quiet. Results indicated that the natural ambient sound levels (L_{nat})¹³ during the monitoring period ranged from 16.8 to 27.7 dBA during the daytime.

The contribution of aircraft noise during sound level measurements only provides a snapshot in time at a particular location and is not necessarily a representative characterization of current conditions. Current conditions were determined by adding the noise exposure due to air tours ($L_{Aeq, 12h}$), based on a peak month average day (PMAD) and modeled using the FAA AEDT version 3e, to the Existing Ambient without Air Tours (L_{50})¹⁴ (see Appendix F, *Noise Technical Analysis*, Figure 3). The result of this process is the Cumulative Existing Ambient, Figure 6.

¹² dBA (A-weighted decibels): Sound is measured on a logarithmic scale relative to the reference sound pressure for atmospheric sources, 20 μ Pa. The logarithmic scale is a useful way to express the wide range of sound pressures perceived by the human ear. Sound levels are reported in units of decibels (dB) (ANSI S1.1-1994, American National Standard Acoustical Terminology). A-weighting is applied to sound levels in order to account for the sensitivity of the human ear (ANSI S1.42-2001, Design Response of Weighting Networks for Acoustical Measurements). To approximate human hearing sensitivity, A-weighting discounts sounds below 1 kHz and above 6 kHz.

¹³ It should be noted that different techniques have been used to calculate natural ambient, resulting in two different descriptor notations. Natural ambient L_{50} refers to the natural ambient computation process described in Lee 2016, while L_{nat} refers to the natural ambient process described in Lynch 2012 and Job 2018. Although different, the processes are highly correlated and yield similar results; differences are generally less than 1 dB (Rapoza, 2008).

¹⁴ The Existing Ambient without Air Tours (L_{50}) is defined as the composite, all-inclusive sound associated with a given environment, excluding the sound source of interest, in this case, commercial air tour aircraft. It does include all other human-caused sound sources that were audible at the measurement site; hikers, visitor centers, commercial jets, general aviation aircraft, military aircraft, and administrative aircraft operations. Ambient data were based on a 12-hour, daytime, time period, 7:00 AM to 7:00 PM, typical operating hours for air tours.

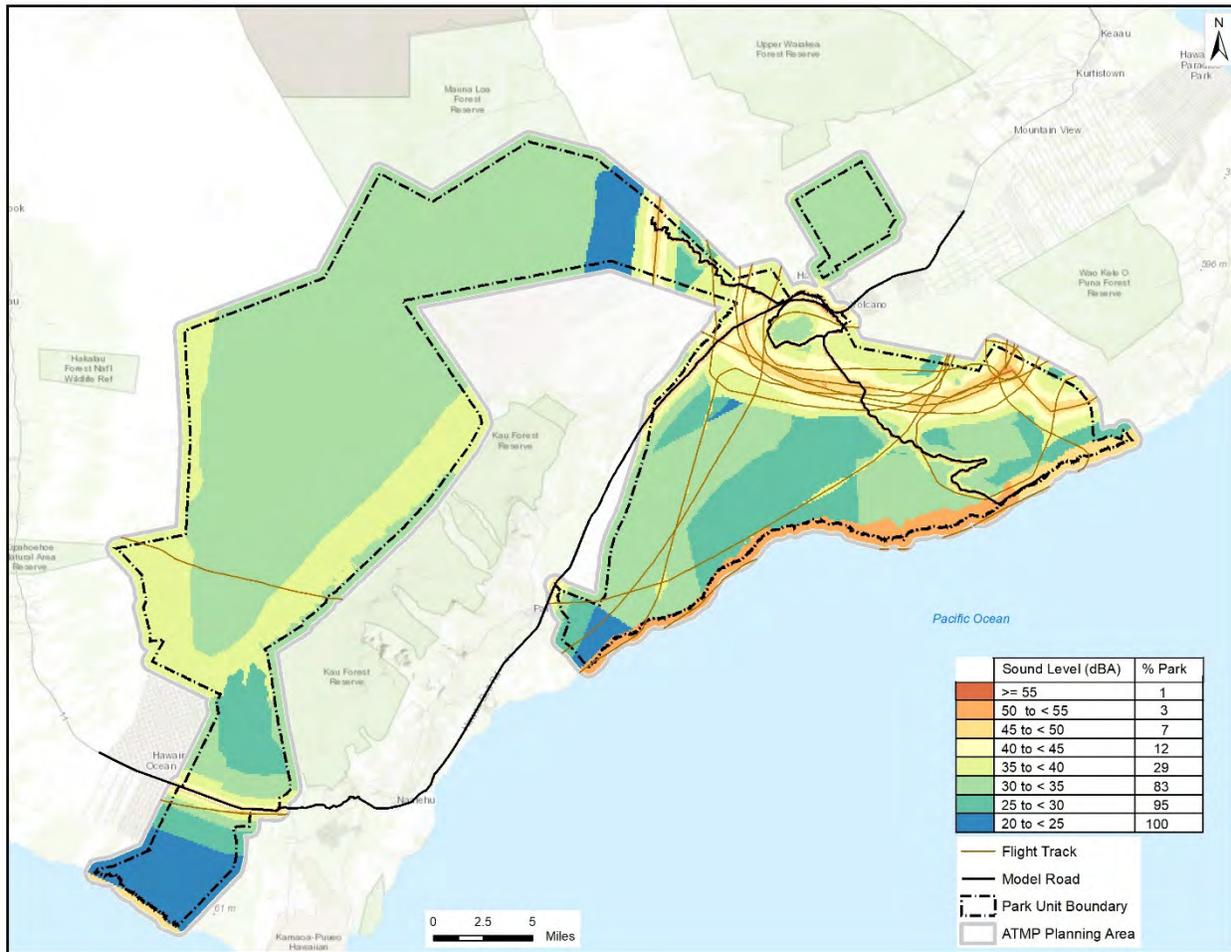


Figure 6. 12-hour Cumulative Existing Ambient Sound Level (Daytime) for Current Conditions

3.1.2 Environmental Consequences

There are numerous ways to measure the potential impacts of noise from commercial air tours on the acoustic environment, including intensity, duration, and spatial footprint of the noise. The affected environment and impact analysis discloses noise metrics consistent with both FAA and NPS noise guidance. The FAA’s primary noise metric established in FAA Order 1050.1F is the yearly Day-night Average Sound Level (DNL, denoted by the symbol L_{dn}) metric; the cumulative noise energy exposure from aircraft over 24 hours. The NPS considers various metrics to analyze impacts to Park resources and values from noise, including equivalent continuous sound level (L_{Aeq}), time audible (the amount of time you can hear air tour aircraft noise), the amount of time that the noise from a commercial air tour operation would be above specific sound levels that relate to different Park management objectives (e.g., 35 and 52 dBA), and maximum sound level (L_{max}). These metrics are discussed further in Table 4; a comparison

of the sound levels noted in Table 4 to values for a range of everyday sounds can be found in Figure 1 of the *Noise Technical Analysis* (Appendix F).

Table 4. Primary Metrics Used for the Noise Analysis

Metric	Relevance and citation
Equivalent sound level, $L_{Aeq, 12\text{ hr}}$	The logarithmic average of commercial air tour sound levels, in dBA, over a 12-hour day. The selected 12-hour period is 7:00 AM to 7:00 PM to represent typical daytime commercial air tour operating hours.
Day-night average sound level, L_{dn} (or DNL)	<p>The logarithmic average of sound levels, in dBA, over a 24-hour day, DNL takes into account the increased sensitivity to noise at night by including a 10 dB penalty on noise events occurring between 10:00 PM and 7:00 AM local time.</p> <p>Note: Both $L_{Aeq, 12hr}$ and DNL characterize:</p> <ul style="list-style-type: none"> • Increases in both the loudness and duration of noise events • The number of noise events during specific time period (12 hours for $L_{Aeq, 12hr}$ and 24-hours for DNL) <p>If there are no nighttime events, then $L_{Aeq, 12hr}$ is arithmetically three dBA higher than DNL as the events are averaged over 24 hours instead of 12 hours.</p> <p>The FAA's (2015 Exhibit 4-1) indicators of significant impacts are for an action that would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe.</p>
Time Audible Natural Ambient	<p>The total time (minutes) that aircraft noise levels are audible to an attentive listener with normal hearing under natural ambient conditions.</p> <p>The natural ambient is the sound level exceeded 50 percent of the time L_{50}, determined from the natural sound conditions found in an ATMP planning area, including all sounds of nature (i.e., wind, rain, ocean waves, wildlife, etc.), and excluding all human and mechanical sounds. Time audible does not indicate how loud the event is, only if it might be heard.</p>

<p>Time Above 35 dBA</p>	<p>The amount of time (in minutes) that aircraft sound levels are above a given threshold (i.e., 35 dBA).</p> <p>In quiet settings, outdoor sound levels exceeding this level degrade experience in outdoor performance venues (American National Standards Institute (ANSI), 2007); blood pressure increases in sleeping humans (Haralabidis et al., 2008); maximum background noise level inside classrooms (ANSI/Acoustical Society of America S12.60/Part 1-2010).</p>
<p>Time Above 52 dBA</p>	<p>The amount of time (in minutes) that aircraft sound levels are above a given threshold (i.e., 52 dBA).</p> <p>At this background sound level, normal voice communication at five meters (two people five meters apart), or a raised voice to an audience at ten meters would result in 95% sentence intelligibility (United States Environmental Protection Agency, Office of Noise Abatement and Control, 1974). This metric represents the level at which one may reasonably expect interference with Park interpretive programs, activities that require communication from a distance and other general visitor communication.</p>
<p>Maximum sound level, L_{max}</p>	<p>The loudest sound level, in dBA, generated by the loudest event; it is event-based and is independent of the number of operations. L_{max} does not provide any context of frequency, duration, or timing of exposure.</p>

Acoustic metrics were modeled using the FAA’s AEDT, Version 3e and results are described below for each alternative. After completing noise modeling for Alternative 3, a minor altitude adjustment was made for which the impacts are not represented in the *Noise Technical Analysis*. The Pu’u’ō’ō Route minimum altitude was raised from 1,500 ft. to 2,000 ft. AGL over the ocean. The overall result of this would be a slight (< 3 dBA) decrease in the intensity of noise ($L_{Aeq, 12\text{ hr}}$ and L_{max} metrics) and a potential increase in time audible and time above. The *Noise Technical Analysis* in Appendix F contains figures and tables showing the detailed noise results for two types of analyses: 1) contour analysis and 2) representative location point analysis. A noise contour presents a graphical illustration or “footprint” of the area potentially affected by the noise. Location point results present the metric results at specific points of interest.

Alternative 1: No Action

Under the No Action Alternative, the acoustic conditions described in the affected environment would be expected to continue. Air tour noise would vary depending on how many commercial air tours are flown, but because air tour numbers are expected to stay near the three-year

average, noise conditions are likely to be similar to existing conditions. Refer to Section 2.4 and the *Noise Technical Analysis* in Appendix F for additional details on the No Action Alternative. Modeling results for the No Action Alternative are presented in Table 5 below. See Figure 7 and Figure 8 for noise metrics results that would be experienced within the ATMP planning area under the No Action Alternative.

Table 5. Summary of Noise Modeling Metric Results Under the No Action Alternative

Metric	No Action Alternative
12-hour Equivalent Sound Level	<ul style="list-style-type: none"> • Maximum value approximately 53 dBA • Affected portions of the ATMP planning area will continue to be 35 to <50 dBA (representing 13% of the Park)
Day-night Average Sound Level	<ul style="list-style-type: none"> • DNL would be 3 dB less than the 12-hour equivalent sound level, and therefore approximately 50 dB
Time Audible Natural Ambient	<ul style="list-style-type: none"> • The maximum time that air tours may be audible would be between 360 and 480 minutes a day, representing less than 1% of the Park • 27% of the Park would continue to experience audible air tour noise for more than 120 minutes a day (non-contiguous) • 82% of the Park would continue to experience audible air tour noise
Time Above 35 dBA	<ul style="list-style-type: none"> • The maximum time that noise from air tours would be above 35 dBA equals or exceeds 120 minutes a day, representing less than 1% of the Park • 15% of the Park would continue to experience noise above 35 dBA for more than 30 minutes a day
Time Above 52 dBA	<ul style="list-style-type: none"> • The maximum time above 52 dBA experienced across all points modeled would be 18.9 minutes • 85% of points modeled would experience time above 52 less than 1 minute
Maximum Sound Level	<ul style="list-style-type: none"> • The maximum sound level (i.e., the loudest sound level generated by the loudest event independent of the

	number of operations) would be 72.0 dBA at Point Location #5 (Cone Peak, Nēnē Area)
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For purposes of assessing noise impacts from commercial air tours on the acoustic environment under FAA's policy for NEPA, the analysis indicates that the resultant DNL is expected to be 50 dB and below.

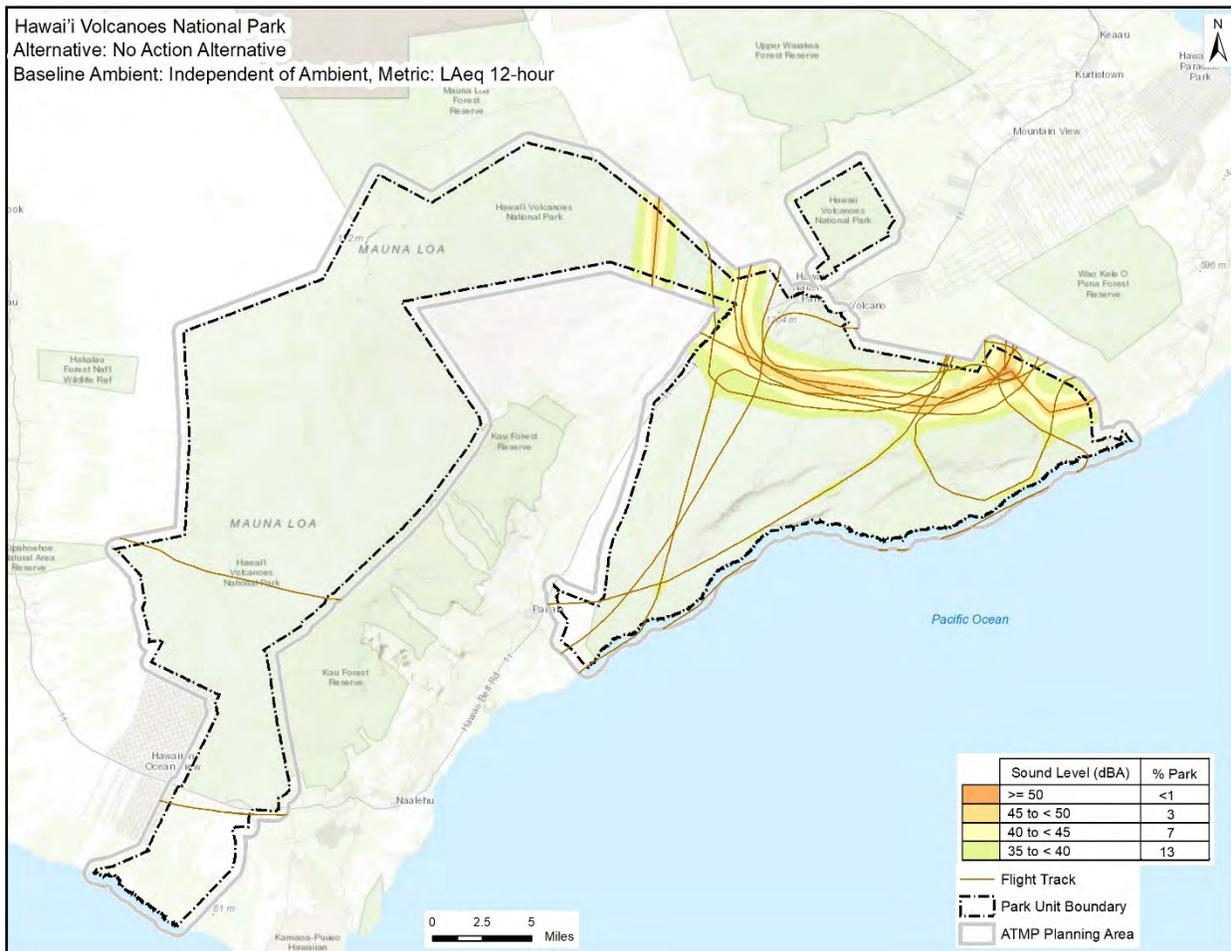


Figure 7. 12-hour Equivalent Sound Level ($L_{Aeq,12h}$) for No Action Alternative

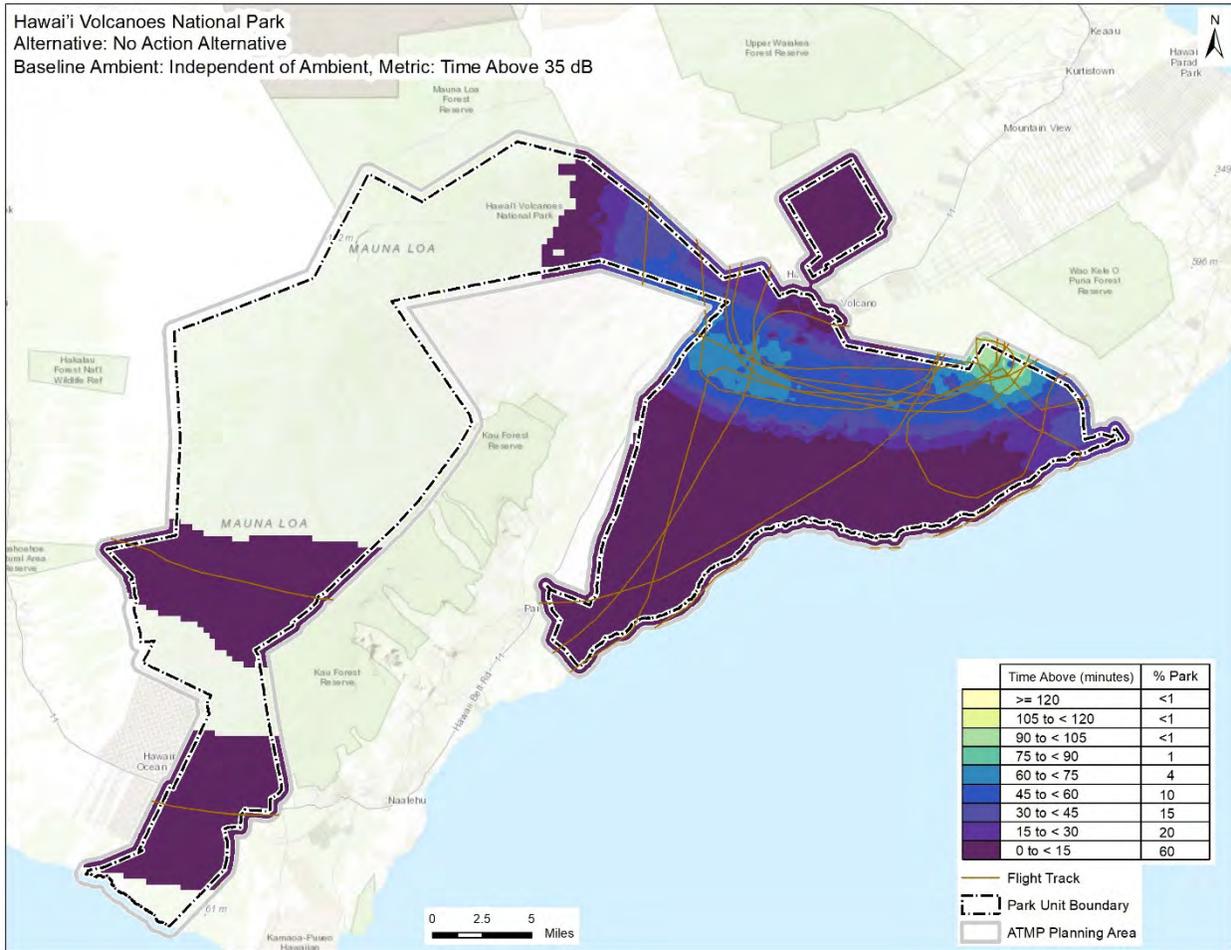


Figure 8. Time Above 35 dBA for No Action Alternative

Alternative 2

Under Alternative 2, commercial air tours would not fly within the ATMP planning area which would reduce this source of noise originating from within the ATMP planning area. Compared to current conditions, Alternative 2 would result in direct beneficial effects on the Park’s acoustic environment. The acoustic impacts of Alternative 2 cannot be modeled because, although some speculation about air tour routes can be made, it is unknown where air tours would fly when outside the ATMP planning area. Alternative 2 would provide 365 days per year without noise from air tours within the ATMP planning area and would reduce noise in the most noise sensitive regions of the Park resulting in direct beneficial effects compared to the No Action Alternative and Alternative 3.

Alternative 3

Compared to current conditions, Alternative 3 would result in direct beneficial effects on the Park’s acoustic environment. This alternative would provide 52 days per year without air tours within the ATMP planning area and a reduction in the overall noise footprint (average sound level over a 12-hour day) compared to current conditions. Compared to current conditions, Alternative 3 also eliminates or reduces noise in many of the noise sensitive regions of the Park. Alternative 3 contains provisions for both a standard day and a quiet technology-only day and Table 6 summarizes the modeled noise metric results that would be experienced within the ATMP planning area under Alternative 3 during standard days. Figure 9 and Figure 10 display noise metrics results for standard day operations.

Table 6. Summary of Noise Modeling Metric Results for Alternative 3, Standard Days

Metric	Alternative 3 – Standard Day
12-hour Equivalent Sound Level ¹⁵	<ul style="list-style-type: none"> • Maximum value <45 dBA • Affected portions of the ATMP planning area would generally be 35 to <40 dBA, representing 3% of the Park
Day-night Average Sound Level	<ul style="list-style-type: none"> • Maximum DNL would be 3 dB less than the maximum 12-hour equivalent sound level, and therefore less than 45 dB
Time Audible Natural Ambient	<ul style="list-style-type: none"> • The maximum time that air tours could be audible would be less than 150 minutes a day, representing 2% of the Park • 18% of the Park would experience audible air tour noise for at least 60 minutes a day (non-contiguous)
Time Above 35 dBA	<ul style="list-style-type: none"> • The maximum time that noise from air tours would above 35 dBA is between 30 and 45 minutes a day, representing 1% of the Park • 29% of the Park would experience noise above 35 dBA for at least 0.1 minutes a day
Time Above 52 dBA	<ul style="list-style-type: none"> • The maximum time above 52 dBA experienced across all points modeled would be 5.8 minutes

¹⁵ If air tours are restricted to operating between 9:00 AM and 5:00 PM (i.e., 8 hours), then the 8-hour equivalent sound level would be 1.8 dBA greater than the 12-hour equivalent sound level.

	<ul style="list-style-type: none"> 83% of points modeled would not experience sound levels above 52 dBA (i.e., time above 52 dBA is 0 minutes)
Maximum Sound Level	<ul style="list-style-type: none"> The maximum sound level (i.e., the loudest sound level generated by the loudest event independent of the number of operations) would be 63.7 dBA at Point Location #17 ('Āpua Pt. Camp)



Figure 9. 12-hour Equivalent Sound Level ($L_{Aeq,12h}$) for Alternative 3 (Standard Day)

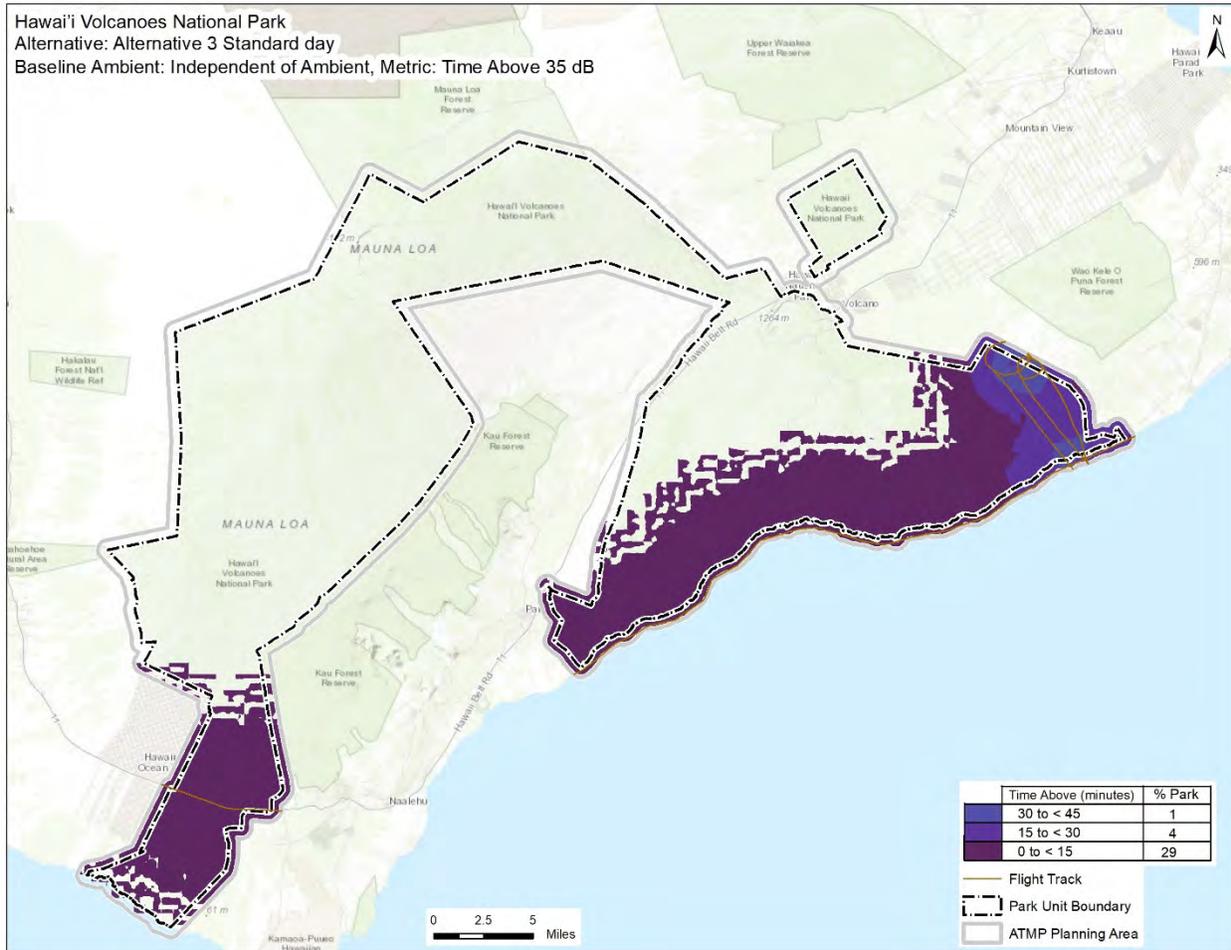


Figure 10. Time Above 35 dBA for Alternative 3 (Standard Day)

Table 7 summarizes the modeled noise metric results that would be experienced within the ATMP planning area under Alternative 3 during quiet technology-only days. Figure 11 and Figure 12 display noise metrics results for quiet technology-only days.

Table 7. Summary of Noise Modeling Metric Results for Alternative 3, Quiet Technology-Only Days

Metric	Alternative 3 – Quiet Technology-Only Day
12-hour Equivalent Sound Level	<ul style="list-style-type: none"> Maximum value <45 dBA Affected portions of the ATMP planning area would generally be 35 to <40 dBA, representing 2% of the Park
Day-night Average Sound Level	<ul style="list-style-type: none"> DNL would be 3 dB less than the 12-hour equivalent sound level, and therefore less than 45 dB

<p>Time Audible Natural Ambient</p>	<ul style="list-style-type: none"> • The maximum time that air tours could be audible would equal or exceed 135 minutes a day, representing less than 1% of the Park • 9% of the Park would experience audible air tour noise for at least 60 minutes a day (non-contiguous)
<p>Time Above 35 dBA</p>	<ul style="list-style-type: none"> • The maximum time that noise from air tours would be above 35 dBA is between 45 and 60 minutes a day, representing less than 1% of the Park • 21% of the Park would experience noise above 35 dBA for at least 0.1 minutes a day
<p>Time Above 52 dBA</p>	<ul style="list-style-type: none"> • The maximum time above 52 dBA experienced across all points modeled would be 9.7 minutes • 85% of points modeled would not experience sound levels above 52 dBA (i.e., time above 52 dBA is 0 minutes)
<p>Maximum Sound Level</p>	<ul style="list-style-type: none"> • The maximum sound level (i.e., the loudest sound level generated by the loudest event independent of the number of operations) would be 61.5 dBA at Point Location #9 (Pu'u'ō'ō)

Hawai'i Volcanoes National Park ATMP Draft Environmental Assessment



Figure 11. 12-hour Equivalent Sound Level ($L_{Aeq,12h}$) for Alternative 3 (Quiet Technology-Only Day)

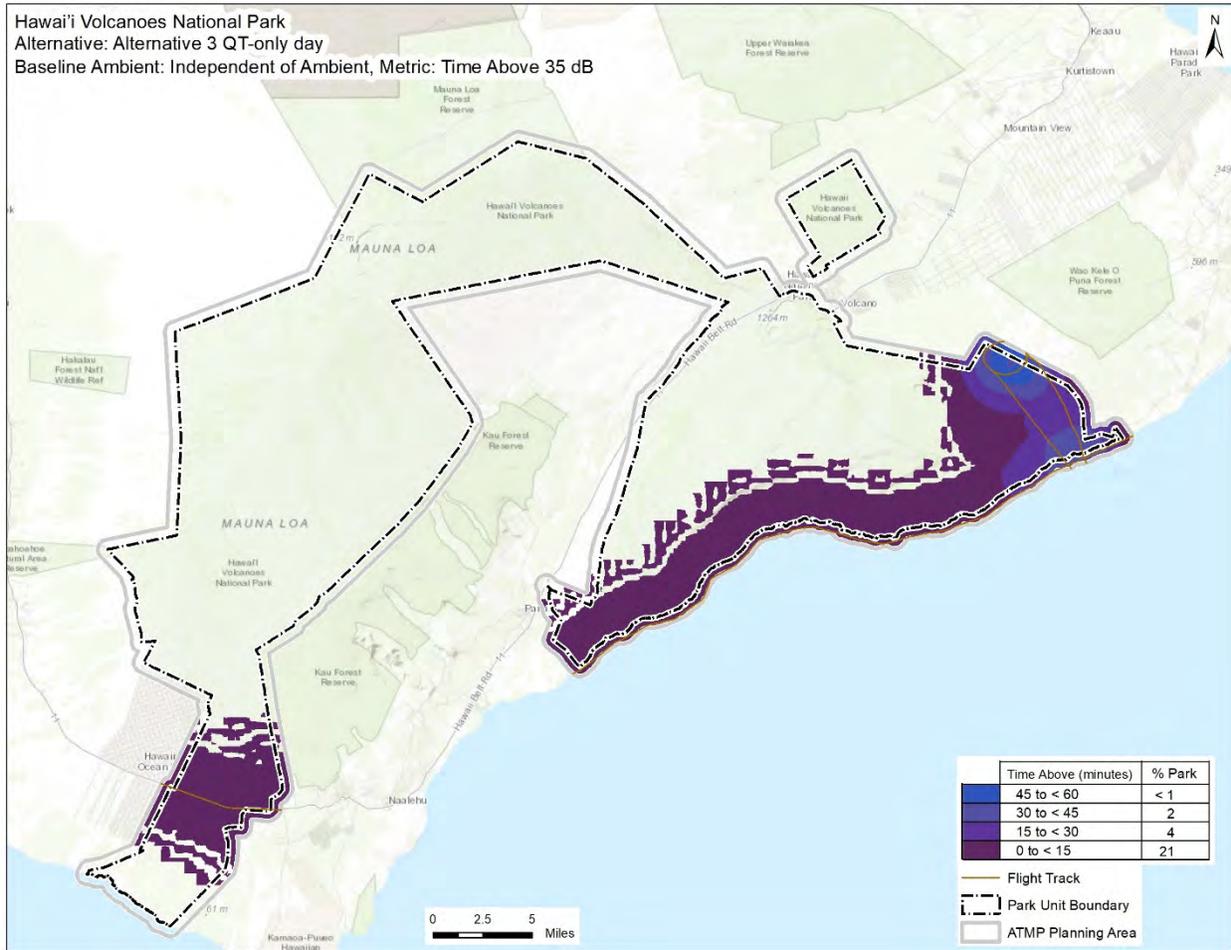


Figure 12. Time Above 35 dBA for Alternative 3 (Quiet Technology-Only Day)

The resultant DNL for Alternative 3 is expected to be below 45 dB. Refer to the *Noise Technical Analysis* in Appendix F for more information.

A comparison of impacts to noise and noise-compatible land use between Alternative 3 (on days when air tours operate) and the No Action Alternative is provided below. Because the noise impacts of Alternative 2 cannot be modeled, Alternative 2 was not included in this analysis:

- **12-hour Equivalent Sound Level:** Compared to the No Action Alternative, the average sound levels under Alternative 3 would be lower for the regions of the Park near Halema'uma'u Crater and the Kīlauea Visitor Center but would be higher in coastal regions. The noise footprint for Alternative 3 potentially affects 10% less of the ATMP planning area on standard days, and 11% less on quiet technology-only days.
- **Time Audible Natural Ambient:** Compared to the No Action Alternative, the overall time audible noise footprint for Alternative 3 standard day potentially is 2% larger than the No

Action Alternative due to higher aircraft altitudes under Alternative 3. For the quiet technology-only day, the overall time audible noise footprint potentially is 32% smaller than the No Action Alternative. The approximately 25% of the Park where time audible exceeds 150 minutes under the No Action Alternative would no longer exceed this threshold on both standard and quiet technology-only days under Alternative 3. The largest reductions would be at Pu'u'ō'ō (301-321 minutes) and Top of Mauna Loa Road (247 minutes). However, increases in time audible would occur at 14 locations.

- *Time Above 35 dBA:* Compared to the No Action Alternative, the time above 35 dBA under Alternative 3 would be up to 70 minutes less (see Pu'u'ō'ō). However, time above 35 dBA would be greater under Alternative 3 at ten locations (up to 11 minutes). The noise footprint for Alternative 3 (standard day) potentially affects 31% less of the ATMP planning area and 39% less for Alternative 3 quiet technology-only day.
- *Time Above 52 dBA:* Compared to the No Action Alternative, the time above 52 dBA under Alternative 3 would be up to 19 minutes less (see Cone Peak, Nēnē Area). Time above 52 dBA would be only slightly greater (up to 2.2 minutes) under Alternative 3 at seven locations. Sound levels above 52 dBA would occur in fewer locations under Alternative 3 (six locations) compared to the No Action Alternative (24 locations).
- *Maximum Sound Level:* Compared to the No Action Alternative, the maximum sound levels under Alternative 3 would be notably lower (more than 20 dBA) in 27 locations in areas surrounding Halema'uma'u Crater and the Kīlauea Visitor Center. However, maximum sound levels under Alternative 3 on a standard day may be greater at points such as Frontcountry Kahuku (5 dBA greater), Halapē Wilderness Camp (8 dBA greater), and 'Āpua Point Camp (5 dBA greater), as well as two other locations. These increases are mitigated under quiet technology-only days as the maximum sound levels are 5-10 dBA lower than on standard days.

Indirect and Cumulative Effects

Indirect Effects: Under the No Action Alternative, commercial air tour operations within the ATMP planning area would remain consistent with existing conditions, thus there are no indirect impacts that would be expected to occur under this alternative.

For any alternative (Alternatives 2 and 3) that would limit the number of flights per year to a level below existing conditions (11,376 flights per year), it is reasonably foreseeable that current air tour operators could seek to make up lost revenue in other ways. One of the ways that operators could potentially generate revenue is by offering air tours outside of the ATMP planning area, as these would not be regulated by the ATMP. This type of shift in air tour activity is referred to as "air tour displacement," and could consist of air tour operators shifting routes or altitudes to just outside the ATMP planning area. This could result in impacts to resources to the extent that they are present near the locations where the displaced air tours would occur.

It is difficult to predict with specificity if, where, and to what extent any air tours would be displaced to areas outside of the ATMP planning area, including at altitudes at or above 5,000 ft. AGL. The preciseness of routes and altitudes for air tours flown on displaced routes are generally subject to Visual Flight Rules which are based on the principle of “see and avoid” and may vary greatly. It is reasonably foreseeable that operators would continue to fly to points of interest on the island outside of the ATMP planning area where they already fly, or fly routes over or around the Park similar to existing flight paths but outside of the ATMP planning area. Air tour operators are likely to continue to fly some air tours along the perimeter of the ATMP planning area where Kīlauea Crater or any active lava may be visible. While operators currently fly along most of the eastern boundary of the ATMP planning area and along the flight paths proposed under Alternative 3, ADS-B systems data of flight paths shows an absence of existing flights in a small area to the southwest of the ‘Ōla‘a Forest tract. It is reasonably foreseeable that if operators are unable to fly within the ATMP planning area, the implementation of Alternatives 2 or 3 may result in more flights in this area as they may be able to hover and view the crater. If operators choose to fly above the vertical limit of the ATMP planning area, they would likely keep to an altitude close to, but just above 5,000 ft. AGL, as higher flights would provide limited value to a sightseeing operation. Operators may choose to fly just above 5,000 ft. AGL over some parts of the ATMP planning area. See Figure 1 for an example profile of ground level elevation changes relative to feet above ground level.

The exactness of routes and altitudes for tours flown at altitudes below 5,000 ft. AGL flying Visual Flight Rules could vary depending on client demand, weather, fuel load, and other costs. Specific routes, altitudes and numbers would be relevant in assessing noise and other potential indirect and cumulative impacts associated with eliminating air tours within the ATMP planning area. Consistent with the CEQ regulations, the agencies are disclosing that specific air tour routes, altitudes, and numbers of tours are not available to assess noise and other potential indirect and cumulative impacts associated with reducing or eliminating air tours within the ATMP planning area. In addition, because specific air tour routes are not available, it is not possible to identify all the other potential noise sources that might contribute to the acoustic conditions outside the ATMP planning area where operators may fly. Agencies are not required to conduct new scientific or technical research to analyze impacts and may rely on existing information to assess impacts. See 40 CFR 1502.21(c). For the purposes of disclosing the potential indirect effects of these alternatives, the agencies have considered the potential noise effects of operations above or along the perimeter of the ATMP planning area.

Indirect effects to ATMP planning area: Displaced air tours above the ATMP planning area (at or above 5,000 ft. AGL) would result in noise within the ATMP planning area. Compared to current conditions, the noise would be spread over a larger geospatial area and would be audible for a longer period, but at lower intensity. Thus, under Alternatives 2 and 3, some locations within the ATMP planning area may experience less intense noise but for a longer

period when compared to current conditions. Additionally, other locations within the ATMP planning area not currently experiencing air tour noise may experience some noise under these alternatives when compared to current conditions. However, in both cases, the intensity of noise would likely be low given the aircraft altitude; any noise that might result could also be more easily masked by opportunistic sounds such as wind and various anthropogenic noise sources. In summary, while the area of noise could be greater under these alternatives, the intensity of noise, especially when compared to current conditions at locations near or directly below existing air tour routes, would be less.

Indirect effects outside the ATMP planning area: Displaced air tours have the potential to affect noise-sensitive locations outside the ATMP planning area. However, it is unlikely that displaced air tours would generate noise at or above DNL 65 dB. To illustrate this, a conservative, screening-level noise analysis was conducted, refer to Appendix F, *Noise Technical Analysis*, Section 8 for a full description of this analysis. The analysis indicates that it would be highly unlikely that air tours that are displaced to outside the ATMP planning area under these alternatives would generate noise at or above DNL 65 dB.

Cumulative Effects: The cumulative impact of an alternative is the overall acoustic condition of the environment including existing and future noise from sources other than air tours plus anticipated noise from air tours under the alternative. The existing ambient condition of the acoustic environment is disclosed in Affected Environment Section 3.1, Noise and Noise-Compatible Land Use. Impacts from non-commercial air tour aircraft operations that currently occur outside the ATMP planning area are not regulated by the ATMP and will continue to occur.

As part of the cumulative effects assessment, the FAA and NPS considered other ongoing and planned actions. The NPS performs routine maintenance of Park buildings, utilities, roads, and trails that may include short-term noise associated with these actions. The frequency and duration of these activities vary depending on the project scope and Park mitigations. Noise-generating work is only permitted between one hour after sunrise and one hour before sunset, and in some areas of the Park, the timing of these activities is further restricted such as near lodging and housing areas. The Park's Superintendent's Compendium restricts the maximum noise levels generated to not more than 60 dBA.

The NPS and Park partners also use helicopters to transport supplies, equipment, or personnel to various locations for resource management actions, volcanic monitoring, search and rescue, and maintenance activities. These flights contribute noise to the Park's acoustic environment. These actions are performed in accordance with the best management practices for helicopter use as outlined in the Park's 2014 Mission Critical Aviation Plan and EA to minimize the impacts to natural and cultural resources, visitors, and Wilderness character. Helicopter use for these activities within the Park boundary averaged approximately 250 hours per year in 2014,

although this has continued to decrease in recent years. With the exception of regular flights (every 1-2 weeks) by the United States Geological Survey (USGS) to monitor the active volcanic areas, flights are typically dispersed across the Park landscape and the frequency determined by the type of activity. The NPS has an established program for ungulate animal control involving an extensive fence system designed to prevent entry of non-native ungulates into the Park through implementation of the Protecting and Restoring Native Ecosystems by Managing Non-Native Ungulates Plan/EIS (NPS, 2013). Temporary localized noise-producing activities associated with this work includes the use of jackhammers when fence post installation or replacement is necessary and the use of vehicles to drive to locations of fence installation or replacement (when accessible by roads). Most fence work includes the replacement of the mesh fence material and does not require mechanized equipment. The NPS also has an established program to conduct native plant restoration and invasive plant control within the Park, primarily focused on Special Ecological Areas. This work consists of manual techniques of cutting, digging, and pulling invasive plants, as well as the use of chainsaws for removal of invasive trees, which generates temporary noise in these areas. Planned future projects at the Park include a disaster recovery project, consisting of entrance road realignment, demolition of damaged structures at Uēkahuna bluff, replacement of waterline and fiber optic lines in the developed area, and construction of a replacement USGS field station. This project will last one to two years, during which there will be some construction noise generated most days, but mitigation measures will be used to ensure that noise is minimized as much as possible. The Park is also undertaking the development of a 0.3 mile trail segment to connect the access road in the Kahuku-Pōhue parcel to an existing historic trail, as well as a project to rehabilitate water systems in the Kīlauea unit of the Park. Both of these may result in some localized, temporary construction noise throughout the duration of the project.

Alternatives 2 and 3 would likely result in a noticeable beneficial effect on the overall acoustic environment of the Park from reducing or eliminating air tours within the ATMP planning area since the intensity of noise directly around and below existing air tour routes would decrease as described above. Alternative 3 would result in less cumulative noise in the ATMP planning area than the No Action Alternative, given the reduced number of flights, designated routes, and other conditions. However, it would allow for more cumulative noise in the ATMP planning area than Alternative 2, where flights would not be authorized in the ATMP planning area. Ongoing present and future Park management actions by the NPS within the ATMP planning area would continue to occur under any of the alternatives.

3.2 Air Quality and Climate Change

3.2.1 Affected Environment

Air Quality

The Park is a designated Class I Airshed, which means that it is afforded the highest degree of protection (NPS, 2015). Air quality within the Park is affected by several emission sources, primarily from Kīlauea volcano. Emissions of sulfur dioxide (SO₂) and other gases from Kīlauea chemically interact with sunlight, oxygen, water, and dust to form acidic volcanic smog or “vog.” Vog creates a haze that obscures visibility and can contribute to acid rain that can degrade human health, natural resources, and cultural resources.

In addition to vog, another source of volcanic activity that affects air quality is known as laze, which is created when hot lava reaches sea water and forms large clouds of mist. Laze often contains hydrochloric acid other airborne contaminants that impact human health.

Other sources of emissions that impact air quality within the Park include marine aerosols, motor vehicles, non-road combustion engines, helicopters, and wildfires. These activities can release nitrogen oxides, particulate matter (PM), and other pollutants that affect air quality and visibility.

The National Ambient Air Quality Standards (NAAQS) determine whether a region is in an air quality attainment or nonattainment area. An area is considered to be in attainment if it meets the federal standard for all criteria pollutants. Subsequently, an area is in nonattainment if it does not meet (or contributes to ambient air quality in a nearby area that does not meet) the standard. When this occurs, states must submit implementation plans to the Environmental Protection Agency (EPA) discussing programs to improve air quality within that region. The Park is currently in an area of attainment for all NAAQS.

A monitoring program was implemented in 1986 to assess volcanic emissions within the Park, in addition to monitoring atmospheric deposition, ultraviolet radiation, ozone, visibility, and haze to obtain information on air quality (NPS, 2015). Air quality is regularly monitored at two primary monitoring stations near the Kīlauea Visitor Center and Jaggar Museum/Ūekahuna bluff in addition to a network of low resolution SO₂ sensors that serve the visitor SO₂ alert system. The NPS and the USGS operate an advisory program that is updated every 15 minutes and informs the public of current SO₂ levels within the Park (NPS, 2015). The Park has an air quality protocol to guide the response during periods of poor air quality. The air quality advisory level for the Park and each of its monitoring sites for SO₂ and PM sized 2.5 micrometers in aerodynamic diameter and smaller (PM_{2.5}) is considered Good, which is the best classification for air quality advisories (NPS, 2022a).

The NPS' Air Resources Division identifies ozone (O₃), visibility, and atmospheric wet deposition of nitrogen and sulfur as key indicators of air quality in national parks. Sulfur dioxide (SO₂) concentrations are also used as an additional measure for the Park. Monitoring for volcanic SO₂ emissions is vital to the safety of Park visitors and staff. This indicator is important in the Park given its potential to adversely impact natural resources and human health in the Park (Fung Associates and SWCA Environmental Consultants, 2019). Air quality status information including air quality alerts are posted daily to the NPS website for the Park.¹⁶

Greenhouse Gases

Of growing concern is the impact of proposed projects on climate change. The Intergovernmental Panel on Climate Change (IPCC) estimates that aviation accounted for 4.1% of global transportation greenhouse gas (GHG) emissions (FAA, 2020). GHGs are those that trap heat in the earth's atmosphere. Naturally occurring and anthropogenic (human-made) greenhouse gases include carbon dioxide (CO₂), water vapor (H₂O), methane (CH₄), nitrous oxide (N₂O), and O₃. The EPA data indicates that commercial aviation contributed to 6.6% of CO₂ emissions in 2013 in the United States (EPA, 2015).

In response to the increasing need for understanding and action related to climate change impacts in the parks, the NPS launched the Climate Friendly Parks program in 2002, creating opportunities to educate staff about climate change issues, assess each park's contribution to GHG emissions, create short and long-term strategies for reducing emissions, determine potential effects of climate change on park resources, and develop skills and strategies for communicating these effects to the public (NPS, 2015). As a part of the Park's participation in this program, the NPS developed a long-term Climate Action Plan (2007) that involved analyzing the anthropogenic carbon footprint of the Park using the Climate Leadership in Parks tool, a greenhouse gas emissions inventory model jointly developed by the EPA and the NPS. Data used to perform the calculations included the amount of electricity purchased, waste sent to the landfill, and fuels consumed.

An initial inventory completed in 2007 discloses Park emissions and includes contributions from administrative activities as well as Park visitors. Initial findings by the NPS show that transportation was the largest contributor to total GHG emissions for the Park (73% of emissions); energy was the next highest contributor, with 15% of emissions; solid waste and other emission sources (such as stationary combustion and refrigeration) also contributed to overall Park emissions (NPS, 2007). These findings provide an initial overview of the carbon footprint of the Park. Further monitoring and analysis using the Climate Leadership in Parks tool will track progress in reducing the Park's carbon footprint into the future.

¹⁶ <https://www.nps.gov/havo/air-quality-alert.htm>

3.2.2 Environmental Consequences

Alternative 1: No Action

The No Action Alternative represents existing air tour conditions. Modeling results for the No Action Alternative are presented in Table 8 for the criteria pollutants. Note that ozone is not reported as it is not directly emitted in aircraft exhaust. Pollutant emissions are based on annual flight miles and routes for each aircraft type operating within the ATMP planning area. The emission rates (pounds of emissions per mile flown) used in modeling are aircraft engine- and fuel-specific. The results in Table 8 describe baseline emissions under existing conditions; emissions under alternatives can be compared to baseline emissions to indicate potential impacts on air quality within the ATMP planning area.

Table 8. Summary of Criteria Pollutant Annual Emissions in Tons per Year (TPY) Under the No Action Alternative

Criteria Pollutant	Total Annual Emissions (TPY)
Carbon monoxide (CO)	0.845
Lead (Pb)	0.000
Nitrogen dioxide (NO ₂)	6.830
Particulate matter: aerodynamic diameter ≤ 2.5 μm (PM _{2.5})	0.062
Particulate matter: aerodynamic diameter ≤ 10 μm (PM ₁₀)	0.062
Sulfur dioxide (SO ₂)	0.757

Total annual GHG emissions for the No Action Alternative are modeled to be 1,851 metric tons (MT) of CO₂. The No Action Alternative would not cause pollutant concentrations to exceed one or more of the NAAQS for any of the time periods analyzed.

Alternative 2

Under Alternative 2, commercial air tours would not fly within the ATMP planning area which would eliminate direct emissions within the planning area and would not cause pollutant concentrations to exceed one or more of the NAAQS for any of the time periods analyzed. Therefore, Alternative 2 would result in direct beneficial effects on air quality compared to the No Action Alternative, due to lower commercial air tour emissions within the ATMP planning area. Direct emissions in the ATMP planning area would be expected to decrease by the amount reported in the No Action Alternative (Table 8) and would result in zero emissions from the elimination of commercial air tours within the ATMP planning area. The direct effects of this alternative would be the reduction of the emissions within the ATMP planning area reflected in Table 8; however, emissions could still be generated from displaced air tours (refer to indirect effects analysis below).

Alternative 3

Under Alternative 3, commercial air tour aircraft would still fly within the ATMP planning area; however, the total number of flights per year would be reduced and the routes flown would be modified as compared to existing conditions. Direct emissions in the ATMP planning area would be expected to decrease by the amount reported in Table 9 as compared to the No Action Alternative and would result in reduced emissions from the reduction of commercial air tours within the ATMP planning area. The direct effects of this alternative would be the reduction of the emissions within the ATMP planning area reflected in Table 9; however, emissions could still be generated from displaced air tours (refer to indirect effects analysis below). Modeling results for Alternative 3 are presented in Table 9 for the criteria pollutants in terms of change in emissions as compared to the No Action Alternative. Note that ozone is not reported as it is not directly emitted in aircraft exhaust. Similar to the No Action Alternative, these results are based on annual flight miles and routes for each aircraft type and the emission rates used in modeling are aircraft engine- and fuel-specific. Alternative 3 contains provisions for both a standard day and a quiet technology-only day. The results in Table 9 show that emissions from air tours for all criteria pollutants would decrease or remain unchanged under Alternative 3.

Table 9. Summary of Change in Criterial Pollutant Annual Emissions in TPY Under Alternative 3 as Compared to No Action Alternative

Criteria Pollutant	Change in TPY as Compared to No Action Alternative*
Carbon monoxide (CO)	-0.676
Lead (Pb)	0.000
Nitrogen dioxide (NO ₂)	-5.192
Particulate matter: aerodynamic diameter ≤ 2.5 μm (PM _{2.5})	-0.047
Particulate matter: aerodynamic diameter ≤ 10 μm (PM ₁₀)	-0.047
Sulfur dioxide (SO ₂)	-0.567

*Negative values represent a reduction in total emissions.

The total change in annual GHG emissions for Alternative 3 as compared to the No Action Alternative is modeled to be a reduction of 1,388 MT CO₂ within the ATMP planning area. Alternative 3 would not cause pollutant concentrations to exceed one or more of the NAAQS for any of the time periods analyzed. Compared to the No Action Alternative, Alternative 3 would result in beneficial impacts to air quality due to lower commercial air tour emissions within the ATMP planning area. Alternative 3 could result in an approximately 75 percent

reduction in both criteria pollutant and GHG emissions as compared to the No Action Alternative.

Indirect and Cumulative Effects

Indirect Effects: For any alternative that limits the number of flights per year to a level below existing conditions (11,376 flights per year), as described above, it is reasonably foreseeable that operators could potentially generate revenue by offering air tours outside of the ATMP planning area, as the areas outside this area would not be regulated by the ATMP. Some of this displaced activity could result in impacts to air quality, although, it is difficult to predict with specificity if, where, and to what extent any displaced air tours would result in impacts in different and/or new areas. The preciseness of routes and altitudes for tours flown on displaced routes are generally subject to Visual Flight Rules and may vary greatly.

Under the No Action Alternative, commercial air tour operations within the ATMP planning area would remain consistent with existing conditions, thus there are no indirect impacts that would be expected to occur under this alternative.

Alternatives 2 and 3 limit the number of flights per year as compared to existing conditions and would therefore have the potential to result in some displacement of air tours outside the ATMP planning area. Air tours occurring outside the ATMP planning area, if any, would not result in direct effects from emissions within the ATMP planning area. However, prevailing winds may transport some of the emissions outside the ATMP planning area to within the ATMP planning area (i.e., indirect effects). Additionally, some areas that are not currently exposed to emissions from air tours (outside the ATMP planning area) may be exposed to emissions in these scenarios thus affecting the air quality in these areas.

For purposes of assessing indirect air quality and GHG impacts that would occur as a result of Alternatives 2 or 3, this analysis considers whether aircraft currently operating over the Park would generate significant emissions to affect the attainment status of the Park. Based on the analysis, the emissions of all criteria pollutants (excluding ozone) and GHGs from the current number of air tours flown over the Park are minimal. Operations that may occur outside the ATMP planning area as a result of Alternative 2 or Alternative 3, may shift where emissions occur but the total annual emissions are not likely to change substantially.

Because of both the number of air tours and the likely dispersal of air tours outside the ATMP planning area, it is unlikely that air tours that are displaced to outside the ATMP planning area under these alternatives would result in air quality impacts under NEPA or change the current attainment status of the Park. Changes in air tour operations under these alternatives would also likely have minimal impact, if any, to regional air quality.

Cumulative Effects: The cumulative impact of an alternative is the overall air quality of the environment including existing and future emissions from sources other than air tours plus anticipated emissions from air tours under the alternative. The existing air quality in the Park is disclosed in Section 3.2.1, Affected Environment. Other ongoing actions related to air quality and GHGs include: the monitoring program to assess air quality and to monitor visibility; an air quality protocol to guide the response during periods of poor air quality; and continued work related to the Climate Action Plan (2007). Alternatives 2 and 3 would likely result in no noticeable change to a slight improvement in overall air quality in the Park, with no change in the current NAAQS attainment status. Ongoing present and future Park management actions by the NPS would continue to occur under any of the alternatives.

3.3 Biological Resources

The area of analysis for biological resources, including but not limited to species listed as threatened or endangered, in this draft EA includes the Park and areas outside the Park but within ½ mile of its boundary, also known as the ATMP planning area. This area encompasses all effects of the proposed action for biological resources. To the extent that habitat and species occurrences correlate, impacts to biological resources are expected to be similar within the ATMP planning area. Therefore, if habitat exists for a species but occurrence is unknown, the assumption is that the species could be present and therefore will be analyzed accordingly.

The environmental effects of commercial air tour operations are evaluated for biological resources and their habitats. The analysis discloses the context of natural variability and ecosystem integrity, as well as effects on individuals and populations. Some impacts are species specific and are identified accordingly.

The ESA is the primary federal statute regulating federally listed threatened and endangered species and critical habitat. The United States Fish and Wildlife Service (USFWS) is the federal agency responsible for administration of the ESA, the Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act (MBTA). The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) is the regulatory agency with oversight of the ESA for marine mammals and fishes. Jurisdiction over the Marine Mammal Protection Act (MMPA) is shared between USFWS and NMFS. Under the Hawai'i State Endangered Species Statute, Hawai'i Revised Statute 195D, any federally listed endangered or threatened species are also listed under Hawai'i Revised Statute 195D. The NPS 2006 Management Policies direct the NPS to meet its obligations under the NPS Organic Act and the ESA to both proactively conserve listed species and prevent detrimental effects on these species (NPS Management Policies § 4.4.2.3, 2006).

A threatened species is defined under the ESA as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its

range.” An endangered species is defined under the ESA as “any species which is in danger of extinction throughout all or a significant portion of its range.” Species designated as threatened or endangered are collectively referred to as listed species in this draft EA. Critical habitat has been designated by USFWS or NMFS as the habitat needed to support recovery of listed species.

3.3.1 Affected Environment

The Park protects a wide diversity of wildlife and habitat. Approximately 90% of all native wildlife on the Island of Hawai'i is endemic (National Parks Conservation Association, 2008). There are hundreds of native species within the Park, many of which are recognized as threatened or endangered (NPS, 2019). All native mammals and several bird species in the Park are listed as federally and state listed threatened or endangered species. The biological resources analyzed in this section include both listed and non-listed wildlife most likely to be affected by the alternatives. As discussed in Section 1.5, Environmental Impact Categories Not Analyzed in Detail, it is unlikely that plants, invertebrates and fish species would be affected by air tours, therefore they are not considered for further analysis in this draft EA.

Many of the Park's native wildlife species face pressure from nonnative species, including invasive ungulates. Other ongoing stressors to specific species are discussed below.

Federally Listed Species

Mammals

Hawaiian Hoary Bat

The Hawaiian hoary bat (*Lasiurus semotus*), or 'ōpe'ape'a, is the only fully terrestrial native mammal in the Hawaiian Islands and is federally listed as endangered. 'Ōpe'ape'a are found from sea level to 11,800 ft., with most observations occurring in native rain forests up to at least 6,000 ft. (Bonaccorso et al., 2015). Data indicates that 'ōpe'ape'a commonly traverse and forage throughout the ATMP planning area and are likely to be roosting within this area. Detections were reported from within the Park or the vicinity of the ATMP planning area, and activity peaked 40-60 minutes after sunset (Fraser et al., 2007). Females typically give birth to twin pups from June to August, and juveniles are typically volant by mid-September.

'Ōpe'ape'a are known to roost solitarily in tree foliage in a variety of tree species and in an assortment of habitats and elevations (native and non-native habitats). Roost trees are usually larger than surrounding trees (Montoya-Aiona, 2020). 'Ōpe'ape'a is vulnerable to roost disturbance during pupping and pup care (June-September). Noise exposure to bat species during daytime roosting and while rearing young can lead to abandonment of their roosts and young (California Department of Transportation, 2016). Noise from a variety of sources, including commercial air tours, occur over 'ōpe'ape'a habitat during these sensitive months.

'Ōpe'ape'a is an insectivore, and prey include a variety of night-flying insects, primarily moths and beetles (Whitaker and Tomich, 1983; Pinzari et al., 2019). Acoustic detection studies show seasonal patterns of habitat occupancy with increased activity in the higher elevations (higher than 3,300 ft.) during the non-breeding season (November to April), and increased activity in the low elevations during the breeding season (Bonaccorso et al., 2015).

Due to its solitary and cryptic roosting behavior (Bonaccorso et al., 2015), robust estimates of the population size and trend of the 'ōpe'ape'a are currently unavailable. 'Ōpe'ape'a can be injured and killed from collisions with man-made structures including barbed wire fences, wind turbines, and communication towers; however, limiting factors are poorly understood. There is one documented rotor strike of 'ōpe'ape'a on the Island of Hawai'i (Yuen, 2012). Other threats to this species include the elimination of roosting sites, habitat destruction, pesticides, and introduced species such as non-native insects or disease.

Hawaiian Monk Seal

The 'īlio holo i ka uaua or Hawaiian monk seal (*Neomonachus schauinslandi*) is the only native marine mammal within the Park and is listed as endangered. This species is gray to brown in color, with a yellow-brown ventral pelage and an average length of 7 ft. for adult individuals (NMFS and NOAA, 2007). Monk seal births are most common between February and August, peaking in March and April (NMFS and NOAA, 2007). Monk seals inhabit the remote beaches of the Park where they rest and bask along the shore for several days throughout the year. They also use these beaches for hauling out, pupping, and nursing, and utilize the vegetation further inland on the beaches for protection from weather elements. The critical habitat of this species is designated in ten areas of the Northwestern Hawaiian Islands and six areas in the main Hawaiian Islands, including the Island of Hawai'i. Critical habitat is located along the southeastern coast of the Park (see Figure 13). See Appendix H, *Section 7 Consultation*, for additional information about critical habitat.

The Hawaiian monk seal was first listed as endangered on the Endangered Species List in 1976, where it currently remains, in addition to being protected under the MMPA. Population sizes across the Park and the greater Hawaiian Islands have declined over the past 20 years (NMFS and NOAA, 2007). The NMFS recovery plan for this species was implemented in 2007, and today their total global population is estimated to be 1,200 individuals. Although this species has a high recovery potential, the magnitude of threats has caused the current total population to be relatively small and in decline, so much so that there is concern about long-term maintenance of genetic diversity (NOAA, 2020).

A study of ringed seal responses to fixed-wing airplanes and helicopters in Greenland (Born et al., 1999) found that 6% of the seals showed escape behavior in response to low altitude fixed-wing aircraft overflights at 500 ft. and responded at an average distance of 1,214 ft. in front of

the aircraft. Escape response occurred at a maximum distance of 1,970 ft. In contrast, 50% of seals showed escape behavior in response to helicopters flying at this same altitude at 1,640 ft. in front of the helicopter and showed a maximum escape distance of 4,760 ft. (Born et al., 1999). Although the aircraft and helicopter surveys were conducted at different locations, the magnitude of these differences indicates that seals show a heightened response to helicopters versus fixed-wing aircraft (NMFS, 2015). Threats to this species include food limitation, entanglement, predation, infectious disease, habitat loss, and human disturbance (NMFS and NOAA, 2007).

Other Marine Mammals

Other marine mammals that are protected under the ESA may be present within the ATMP planning area. This includes several species of whale: blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), Main Hawaiian Islands Insular false killer whale (*Pseudorca crassidens*), North Pacific right whale (*Eubalaena japonica*), sei whale (*Balaenoptera borealis*), and sperm whale (*Physeter macrocephalus*). Whales within the Pacific Ocean have experienced population declines due to commercial whaling throughout the 1900s. Although commercial whaling has largely been banned, populations are still recovering. Today, threats to whales include vessel strikes, interactions with fisheries, pollution, and climate change.

Blue whales are the largest mammal on Earth. The Central North Pacific stock of blue whales feed in the summer throughout the Gulf of Alaska and migrate to the Hawaiian Islands in the winter. Blue whales are listed as endangered under the ESA. From 1910 to 1965, approximately 9,500 blue whales were killed from commercial whaling; their population today ranges from 38 to 81 individuals and is increasing as a result of the prohibition of commercial whaling across much of their range (NMFS, 2017).

The fin whale inhabits deep, offshore waters of all major oceans. Tens of thousands of fin whales have been killed in the Pacific Ocean since the early 1900s due to commercial whaling. The estimated population size for fin whales across the State of Hawai'i ranges from 27 to 58 individuals (NMFS, 2017). While population trends for the State of Hawai'i stock are undetermined, other populations of fin whales have had stable abundance, with some stocks in the Pacific Ocean increasing at a rate of 4.8% per year (NMFS, 2017). Fin whales are listed as endangered under the ESA.

The Main Hawaiian Islands Insular false killer whale is one of three stocks of false killer whales in the State of Hawai'i. Critical habitat for this species occurs throughout the Hawaiian Islands and extends approximately 50 kilometers off of the coast of each island, portions of which overlap with the ATMP planning area (see Figure 13). The population of the Main Hawaiian Islands Insular false killer has declined from 162 to 92 individuals from 2000 to 2009 and is expected to continue to decline due to threats such as inbreeding, pollution, and commercial

fishery activity that increases competition for food, entanglement, and intentional harm by fishermen (NMFS, 2017). This population of false killer whale is considered to be genetically distinct to other populations of false killer whale. This species was listed as endangered under the ESA in 2012.

The North Pacific right whale is one of the most endangered whale species in the world. Critical habitat for this species is located in the Gulf of Alaska and the Southeast Bering Sea, both of which lay outside of the ATMP planning area. North Pacific right whales migrate to temperate waters, such as those surrounding the State of Hawai'i, in the winter months to reproduce. The Eastern North Pacific stock of right whales has a population that is smaller than the western stock; population size is believed to be less than 100 individuals, with several sampling studies estimating that the population size ranges from 23 to 31 whales (NMFS, 2017).

Sei whales are distributed worldwide. They winter at low latitudes for reproduction and travel to high latitudes in summer where they feed on zooplankton and schools of fish. Two subspecies of sei whale are recognized, *B. b. schlegellii* in the Southern Hemisphere and *B. b. borealis* in the Northern Hemisphere, the latter of which could be present in the waters around the State of Hawai'i. Population estimates of the North Pacific population have declined from 42,000 individuals to 8,600 from 1963 to 1974 and were estimated to be 29,632 between 2010 and 2012 (NMFS, 2017). Of the three small stocks that are present in U.S. waters, the State of Hawai'i population is estimated to be 93 to 178 individuals (NMFS, 2017). Sei whales are listed as endangered under the ESA.

Sperm whales are the most abundant large whale species and found in all major oceans. They forage at higher latitudes in the summer and breed at lower latitudes during the winter. Of the three U.S. stocks of sperm whales that occur in the Pacific Ocean, the State of Hawai'i stock is estimated to be 2,539 to 3,354 individuals (NMFS, 2017). Globally, higher estimates of sperm whale abundance are approaching pre-whaling levels.

Reptiles

There are five species of sea turtle that are protected under the ESA and could occur in the ATMP planning area: the green sea turtle (*Chelonia mydas*), or honu, hawksbill sea turtle (*Eretmochelys imbricata*), or honu'ea, leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), and olive ridley sea turtle (*Lepidochelys olivacea*). Threats to sea turtles include interactions with fisheries, poaching, and nesting habitat degradation due to coastal development.

Honu are listed as threatened under the ESA. The Central North Pacific population, which includes the State of Hawai'i, has approximately 3,710 breeding females (Seminhoff et al., 2015). More than 96% of nesting occurs at one site in the northwest Hawaiian Islands; the highly concentrated nesting population makes honu vulnerable to stochastic events (events

that can alter population dynamics, such as floods or droughts) and threats from climate change that impact their low-level nesting habitat (Seminhoff et al., 2015). However, monitoring over the past 40 years has indicated that overall nesting is increasing in the State of Hawai'i. In 2011, a honu was documented nesting on a beach that is now part of the Park (Sietz, 2012). Critical habitat for this species is designated around Culebra Island, Puerto Rico, which is located outside of the ATMP planning area.

Honu'ea are found in all major oceans and are the only sea turtle that can survive on a diet that consists mostly of sponges. Critical habitat for this species is located outside of the ATMP planning area in the waters surrounding Mona and Monito Islands, Puerto Rico, but there are several beaches along the south coast of the Park that are protected for nesting females. Less than 20 females per year nest in the Park, which makes it one of the smallest nesting populations in the world but the largest in the Central North Pacific Ocean (NOAA, 2022). Honu'ea exhibit high site fidelity, and regularly return to Āpua Point, Halapē, and Pōhue to lay eggs from late July to mid-September (Seitz, 2012; Fung Associates and SWCA Environmental Consultants, 2019). A prominent threat to honu'ea is hunting, where they are targeted for their shells whose "tortoise shell" pattern is used to create jewelry and crafts. Honu'ea are listed as threatened under the ESA, and their populations are declining.

Leatherback sea turtles are the largest turtle in the world and highly migratory. In the Pacific Ocean, nesting is common in Mexico, Nicaragua, and Indonesia, but rare across the State of Hawai'i. Abundance estimates for leatherback sea turtles are less than 1,000 nesting females for the East Pacific population, and have been declining (NMFS and USFWS, 2020a). This species is currently listed as endangered. Critical habitat for leatherback sea turtles is designated outside of the ATMP planning area.

The loggerhead sea turtle is the most abundant sea turtle that nests in the United States and has nine distinct populations. The ATMP planning area is included under the North Pacific population; turtles mate on the coasts of Japan and forage in the western Pacific. The number of nesting females was estimated to be 8,733 individuals and are overall increasing, but population trends are an estimate and can vary by location (NMFS and USFWS, 2020b). Loggerhead sea turtles are listed as endangered and have designated critical habitat that is located outside of the ATMP planning area.

Olive ridley sea turtles are one of the world's smallest sea turtles and are found worldwide, notably in Pacific subtropical waters from California to Peru. An olive ridley nest was documented in 2020 at a beach neighboring Park lands outside of the ATMP planning area. Population estimates of this species vary by nesting location, but are believed to be declining overall (NMFS and USFWS, 2014). In the Pacific, large nesting populations are present in Mexico and Costa Rica. Olive ridley are listed as threatened under the ESA.

Birds

Forest Birds

'Akiapōlā'au (*Hemignathus wilsoni*), an endangered honeycreeper species, is extremely rare in the Park and only found along the northeast boundary of Kahuku, close to Ka'ū Forest Reserve, in mixed 'ōhi'a-koa mesic to wet forest above 4,300 ft. elevation. This species has previously been observed in the Mauna Loa Strip area, but there is currently no resident population in this region of the Park. These endemic honeycreepers are insectivores that forage on koa, 'ōhi'a, kōlea, and 'ie'ie vegetation. 'Akiapōlā'au nest almost exclusively in the tops of 'ōhi'a trees. 'Akiapōlā'au breeds and fledges young throughout the year, although more predictably from March to July. This species had an estimated population size of 1,500 individuals in the late 1970s, and surveys conducted between 1990 and 1995 estimated that the population size decreased to around 1,110 individuals (State of Hawai'i, 2015), and then conservation actions resulted in increasing trends to the most recent estimate of 1,900 birds (Kendall et al., 2022).

Populations of the Hawai'i creeper (*Loxops mana*), also known as 'alawī, are concentrated in a small area in mesic to wet forest in the Kahuku Unit above 4,300 ft. elevation. Also insectivores, Hawai'i creeper primarily forage along the trunks and branches of 'ōhi'a and koa. Hawai'i creepers tend to build their nests at mid-canopy. This species was first listed as endangered in 1970, and its first recovery plan was created in 1983. Population estimates for the Hawai'i creeper remained stable at around 12,500 individuals until 2010, when a five-year status review was conducted indicating that their populations across the Island of Hawai'i increased to approximately 14,000 birds (USFWS, 2020). There are four distinct populations on the Island of Hawai'i. Within the Park's Kahuku unit, the densities of this species are increasing (Judge et al., 2017).

The Hawai'i 'ākepa (*Loxops coccineus*), which are more abundant and widely distributed throughout Kahuku than 'akiapōlā'au and Hawai'i creepers, forage almost exclusively on buds and new flush of 'ōhi'a foliage in single trees or small stands within subalpine shrublands and adjacent old growth 'ōhi'a forest of Kahuku. Their breeding season is from March to late May, and they have been observed nesting in cavities of large 'ōhi'a trees. The Hawai'i 'ākepa was first listed as endangered in 1970 and had recovery plans created and revised in 1983 and 2006, respectively. The total population estimate of the Hawai'i 'ākepa is greater than 16,000 birds, with the population in the Park and the Ka'ū Forest Reserve being the second largest on the Island of Hawai'i. Their population at Kahuku was estimated to be 3,663 individuals (Judge et al., 2018).

The 'i'iwi (*Drepanis coccinea*), federally listed as threatened, is a honeycreeper historically widespread and occurring at all elevations, but now persists only in the high-elevation forests primarily on the Islands of Hawai'i, Maui, and Kaua'i (Scott et al., 1986; USFWS, 2016; Fancy and

Ralph, 2020). The population on the Island of Hawai'i was estimated to be greater than 543,000 birds (Kendall et al., 2022). At the Park, 'i'iwi is generally restricted to elevations above 4,900 ft. where the disease vector mosquito for avian malaria is absent. 'i'iwi population trends are variable within the Park. Populations in Kahuku and on the eastern side of the Park within the Mauna Loa Unit are both declining; populations within Northwest Kahuku and 'Ōla'a are considered to be stable; populations in Pāpā are increasing (Judge et al., 2017). Breeding may occur all year, but peak breeding occurs from February through June (Fancy and Ralph, 2020). The 'i'iwi is a strong flier capable of high, long flights to locate nectar sources (Guillaumet et al., 2017; Fancy and Ralph, 2020). 'i'iwi are primarily nectivorous, but also eat small arthropods. USFWS has proposed critical habitat for the species (USFWS, 2022a), which includes portions of the ATMP planning area.

Another endangered forest bird species, 'alalā or Hawaiian crow (*Corvus hawaiiensis*), was once common throughout their range on the Island of Hawai'i. The last 'alalā in its native habitat was thought to have been confined to higher elevations in South Kona. 'Alalā became extinct in their native habitat. The last observation of 'alalā in the wild was in 2002 (USFWS, 2009). It remains a captive breeding population at Keauhou Bird Conservation Center where propagation efforts have been successful. Release of 'alalā is being considered for several areas across the State of Hawai'i and may include areas within the ATMP planning area.

Today, most Hawaiian forest birds persist only in high-elevation forests where the risk of malaria transmission is lower due in part to cooler temperatures (van Riper et al., 1986; Scott et al., 1986; Atkinson and LaPointe, 2009; Atkinson et al., 2014). Even though much of the high elevation threatened and endangered bird habitat in the ATMP planning area is largely protected from feral ungulates and direct human-caused habitat loss, there is evidence of continuing range contraction and population declines, especially from lower-elevation portions of their ranges since 1980 (Baker and Baker, 2000; Camp et al., 2009; Vetter et al., 2012). Other surveys have shown that the overall condition of landbird populations within the Park are considered to be stable; while no species of landbirds have been found to experience an overall decline in the Park, several species are decreasing in specific areas (Fung Associates and SWCA Environmental Consultants, 2019). Under existing conditions, noise from ongoing air tours is present within the ATMP planning area. This noise affects biological resources in various ways, including bird species that occur throughout the ATMP planning area. Specifically, noise from aircraft has been demonstrated to influence bird vocalizations to overcome the masking effects from aircraft noise in areas where loud and frequent helicopter traffic occurs (Gallardo Cruz et al., 2021). While altering vocalizations may not result in death of impacted birds, this change in behavior is likely to be indicative of other effects (e.g., stress response) seen in numerous bird species in response to noise disturbance (Francis et al., 2009; Barber et al., 2010; Shannon et al., 2016; Buxton et al., 2017). Stress is well known to reduce survival and reproductive success in birds (Delaney et al., 1999; Kleist et al., 2018). As air tours are currently occurring within the

ATMP planning area, these effects are ongoing and part of the affected environment for bird species that occur within the ATMP planning area.

Seabirds

There are three listed seabirds confirmed or potentially occurring within the ATMP planning area during nesting season, traveling outside of the ATMP planning area during the day to feed and return to the nest at night. 'Akē'akē, or band-rumped storm-petrel (*Oceanodroma castro*), is a small black pelagic seabird that breeds on steep, remote cliffs and high-elevation volcanic terrain above 6,900 ft. (Slotter-back, 2002; Antaky et al., 2019). The species was listed as endangered in 2016 after the first active nests were discovered in the Hawaiian Islands (USFWS, 2016).

Once widespread in the main Hawaiian Islands, the 'a'ō, or Newell's shearwater (*Puffinus newelli*), is federally listed as threatened. 'A'ō breed on the ground in excavated burrows often surrounded with dense vegetation, including native 'ōhi'a (*Metrosideros polymorpha*) and uluhe ferns (*Dicranopteris linearis*), at elevations ranging from 500 to 4,000 ft. on steep slopes and near-vertical volcanic crater walls (Ainley et al., 2019). Populations are historically known to breed in rainforest dominated by an uluhe fern understory in areas of the lower East Rift Zone outside the boundary of the Park; however, much of the area was covered in lava in 2018 during the lower Puna eruption, including Pu'ulena Crater where surveyors in 1993 confirmed a breeding colony (Reynolds and Ritchotte, 1997). Before the 2018 eruption, potential colonies were suspected to be under the threat of predation by barn owls (*Tyto alba*), which have devastated seabird colonies in areas of Hawai'i (Byrd and Telfer, 1980); the owls were recorded frequently in known breeding locations (Reynolds et al., 1994). In the early 1970's there was a carcass and bird calls recorded at Makaopuhi Crater within the Park (Banko, 1980) and there were incidental reports of calls near the Kalapana Trailhead (Banko, 1980; Swift and Burt-Toland, 2009), but there were no detections of Newell's shearwater during radar and auditory/visual surveys conducted between 2001 and 2005 (Swift and Burt-Toland, 2009). Using population estimates of 2,000 birds for both 'ua'u or 'ao, Day et al. (2004) estimated that 0.00016% of the population would be killed/year from collisions with an 85 ft. radio tower located near Park headquarters. It is assumed that some birds may still be nesting in areas of the East Rift Zone. No focused monitoring has occurred since the early 2000s (Swift and Burt-Toland, 2009).

The Hawaiian Petrel (*Pterodroma sandwichensis*), known as 'ua'u, is an endangered seabird that forages widely across the Pacific and nests only in the Hawaiian Islands, which is the only time they utilize land. Their nesting habitat is variable, ranging from heavily vegetated, forested slopes on the Islands of Lāna'i and Kaua'i to subalpine and alpine environments on the Islands of Maui and Hawai'i. They have been observed nesting in shallow pits, cracks and lava tubes within sparsely vegetated, weathered pāhoehoe lava flows on Mauna Loa, in addition to

underground burrows at high elevations (above 5,500 ft.) in sparsely vegetated terrain on the western slope of Kahuku and in upper subalpine and alpine habitat on the eastern side of Mauna Loa above 8,000 ft. elevation. Adult petrels and fledglings are believed to enter and exit their underground nests at dusk and dawn. This species was first listed as endangered in 1978, and a recovery plan was created in 1983 by the USFWS. A 5-year status review was conducted in 2011, where 'ua'u populations statewide had increased from the low thousands to around 19,000 individuals, allowing some of their delisting criteria to be partially fulfilled due to conservation efforts such as predator management (USFWS, 2022b). Another 5-year status review began in 2022. 'Ua'u populations on the Island of Hawai'i number in the low hundreds and within the Park there are approximately 55 to 75 known active nests. Data from this review and fulfillment of delisting criteria is still being analyzed, but populations of 'ua'u on the Island of Hawai'i are expected to increase due to predator management actions such as installing predator-proof fencing, however, nests outside of protective fences remain extremely vulnerable to predation.

Climate change affects seabirds' breeding success with increasing variability in the distribution and availability of at-sea prey, which is being affected by rising ocean temperatures; however, little is known about the potential effects of climate-driven changes in the prey available for 'akē'akē, 'a'o, and 'ua'u. Expanding invasive species are also associated with climate change scenarios, which could potentially degrade the breeding habitat of the 'akē'akē, 'a'o, and 'ua'u. (Ainley et al., 2019). Current threats to seabirds include habitat loss, trampling of nests by feral ungulates, predation, light pollution, and collision with vehicles and man-made objects/structures.

Hawaiian Goose

The Hawaiian goose (*Branta sandvicensis*), known as nēnē, occur in the Park and the greater Hawaiian Islands, often flying between roosting and foraging sites multiple times throughout the day. Nēnē use diverse habitats including sub-alpine grasslands, open native shrubland and grasslands as well as mid- and low-elevation pasture and managed grasslands, to forage on leaves of grass, berries, seeds, and flowers; some make elevational movements for breeding, foraging, and molting (Leopold and Hess, 2014; Banko et al., 2020).

Nēnē were extirpated from all islands except the Island of Hawai'i by the early 1900s. In 1967, this species was listed as federally endangered under the ESA. In 2019, the nēnē were down listed from endangered to threatened. Currently, the population size of nēnē within the Park is estimated to be fewer than 200 individuals; nēnē have multiple breeding areas in the Park, which is nearly 20% of the population of nēnē on the Island of Hawai'i. Their population continues to decline despite conservation efforts such as habitat management, predator control, and restrictions on areas where nēnē are present. Threats to nēnē include vehicle collisions, wind farm turbine collisions, human or vehicle-related injuries and trauma, predation

by small mammals, toxoplasmosis (a pathogen carried by feral cats), and mosquito-borne avian pox virus (Work et al., 2015; Banko et al., 2020).

Based on the biology of this species, there may be the potential for aircraft noise to affect communication and flock and family interactions of this social species. For example, aircraft may disturb nesting birds, with the female tending the nest, the male standing guard, and the need for communication about predators. The Park's nēnē population is most vulnerable to aircraft impacts in areas when nesting and brood rearing is occurring. Several studies have documented that noise from helicopters and fixed-wing aircraft can elicit behavioral responses, including flushing and reduced foraging, to various waterbird species at close elevations (Ward et al., 1999; Komenda-Zehnder et al., 2003; Williams, 2007). Results of an experimental procedure for one species, the crested tern (*Sterna bergii*), indicate that the maximum responses observed, preparing to fly or flying off, were restricted to exposures at sound levels greater than 85 dBA (Brown, 1990). This study also showed scanning behavior involving head-turning was the minimum response at lower noise levels, and this, or a more intense response, was observed in nearly all birds at all levels of exposure (Brown, 1990). In addition to these studies, NPS staff have observed nēnē react to air tours at existing altitudes over the Park by exhibiting alert behavior.

Other Native Birds

Within the ATMP planning area, there are other native bird species including those protected under the MBTA but are not classified as endangered or threatened under the ESA.

Hawai'i 'amakihi (*Chlorodrepanis virens*) is a common, widely distributed omnivorous forest bird most abundant in upland mesic forest and subalpine woodland. The breeding season for Hawai'i 'amakihi occurs from November to May. The Island of Hawai'i hosts a population of over 800,000 birds (Gorresen et al., 2009; Kendall et al., 2022). Based on population trend studies, this species appears to have mixed trends across the Park (Judge et al., 2017).

'Apapane (*Himatione sanguinea*), a species in the Hawaiian honeycreeper family, is the most abundant native forest bird in the Park, occurring in relatively high numbers in Kahuku, Kīlauea, and Mauna Loa Road portions of the Park. 'Apapane occupy habitats predominated by 'ōhi'a and koa and often travel in flocks to different flowering vegetation. Breeding occurs from January to July with nests throughout 'ōhi'a canopy or in other vegetation. The response of 'apapane vocalizations has been specifically studied in relation to helicopter noise on the Island of Hawai'i, which actively changed the amount of time they vocalized in relation to loud and frequent helicopter noise, suggesting the presence of vocal plasticity in this species (Gallardo Cruz et al., 2021). Based on population studies, the trends of 'apapane are mixed within the Park (Judge et al., 2017; NPS unpublished report).

Hawai'i 'elepaio (*Chasiempis sandwichensis*) a non-migratory native Hawaiian insectivorous flycatcher with declining populations in the leeward, lower mid-elevations and Kīlauea caldera rainforest where it is rarely observed. However, this species occurs in mixed mesic forest and native koa forest along Mauna Loa Road, and have been occasionally observed in wet forest at 'Ōla'a. 'Elepaio catch insects aerially and forage for a variety of arthropods along branches, foliage, and on the ground. Breeding occurs from March through May, and they create their nests using a wide range of vegetative species including 'a'ali'i, koa, 'ōhi'a, māmane, and naio (VanderWerf, 2020). Surveys indicate an Island of Hawai'i population of approximately 200,000 birds (Gorresen et al., 2009; Kendall et al., 2022), with an approximate estimate of less than 10,000 birds within the Park (Judge et al., 2017). Recent population trends in the Park are mixed based on location (NPS unpublished data). It is one of three island specific 'elepaio species (Kauai, Oahu, and Hawai'i) of which the Oahu 'elepaio is listed as endangered under the ESA.

The Hawaiian hawk (*Buteo solitarius*), known as 'io, is a small broad-winged hawk with light and dark plumage. Its habitat includes most native and non-native forests (including papaya, guava, and macadamia orchards), grasslands, and cane fields (Clarkson and Laniawe, 2020). This species prefers open savanna or denser rainforests and will avoid dry scrub areas. Nesting occurs March through September where this species constructs their nests in the branches of high trees. Found only on the Island of Hawai'i, 'io can be found at elevations from sea level to 8,500 ft. 'Io was formerly listed as endangered, then listed as threatened under the ESA, and was recently removed in 2020, as range-wide population estimates have been stable for over 30 years and are not expected to decline. This species is state listed as endangered. Threats to this species include destruction or disturbance of nesting habitat, predation, avian diseases, and extensive modification and reduction of native forest habitat. Although no incidences of 'io and helicopter collisions have been documented in the State of Hawai'i, in the continental U.S. over a 10 year period there were 446 collisions documented between a closely related species (red tailed hawks - also genus *Buteo*) and civilian aircraft resulting in eight fatalities and nearly \$43 million in damages (Dolbeer et al., 2021).

'Ōma'o (*Myadestes obscurus*) is a predominantly fruit-eating Hawaiian thrush with variable populations in wet and mesic environments of the Park. Populations of 'ōma'o increased in Kahuku and along the 'Ōla'a tract, and experienced a sharp decline in the East Rift Zone (Judge et al., 2017). Declining population trends of 'ōma'o occurred in the northwest Kahuku and Pāpā tracts, and densities were stable in the Mauna Loa south flank and Mauna Loa Strip tracts (Judge et al., 2017). This species is most abundant along the Kīlauea caldera and flanks, wet-mesic forests of Kahuku that extend broadly into the Ka'ū Forest Reserve, and along Mauna Loa Road in mesic forest through subalpine shrublands. 'Ōma'o forage primarily for fleshy fruits in both canopy and understory but also feed on seeds and arthropods, even on the forest floor. Nests have been found in a variety of habitats including tree cavities, tree ferns, rock cracks,

and lava tube openings. Their breeding season is not well defined but believed to occur in the spring and summer. 'Ōma'ō is only found on the Island of Hawai'i, and consists of three populations (Hawai'i Department of Land and Natural Resources, 2023).

The pueo (*Asio flammeus sandwichensis*), or Hawaiian short-eared owl, are found on all the main Hawaiian Islands at elevations ranging from sea level to 8,000 ft. Pueo occupy a variety of habitats, including agricultural lands, grasslands, wetlands, shrublands, and native forests. Ground nests are well concealed and lined with grasses and feather down (Price and Cotín, 2018). Threats to this species include loss and degradation of habitat, predation by invasive mammals, vehicle and wind turbine collisions, and other human interaction (Pueo Project, 2019).

Other birds that are year-round residents in the Park include the noio or Hawaiian black noddy (*Anous minutus melanogenys*) which nests on the coasts; and koa'e kea or white-tailed tropicbird (*Phaethon lepturus*), which are known to nest on the walls of craters such as Kīlauea caldera and other nearby craters.

Migrant or transiting birds that occur in the ATMP planning area include the kōlea or Pacific golden plover (*Pluvialis fulva*), an overwintering migrant shorebird that have been observed in disturbed grasslands in the Park during the winter months.

Special Ecological Areas

Special Ecological Areas (SEAs) provide focal sites for the active recovery of threatened and endangered species, as well as opportunities for researchers and the public to study and learn about native species. The first six SEAs were designated in 1985 (Loh and Tunison, 2009). There are currently 38 SEAs in the Park today that span approximately 112,100 acres of the Park. Refer to Figure 13 for a depiction of SEAs across the Park. Occurring throughout the various ecological zones of the Park, SEAs are selected based on criteria such as ecological zone or vegetation type, potential for native species recovery, species diversity, and value for research and interpretation (Tunison and Stone, 1992; Loh and Tunison, 2009). In SEAs, non-native plant populations occur in low densities, allowing the control of invasive species to be more feasible in SEAs than in other regions of the Park. The NPS's program to conduct native plant restoration and invasive plant control within Park boundaries consists of chemical treatment and manual techniques of cutting, digging, and pulling invasive plants.

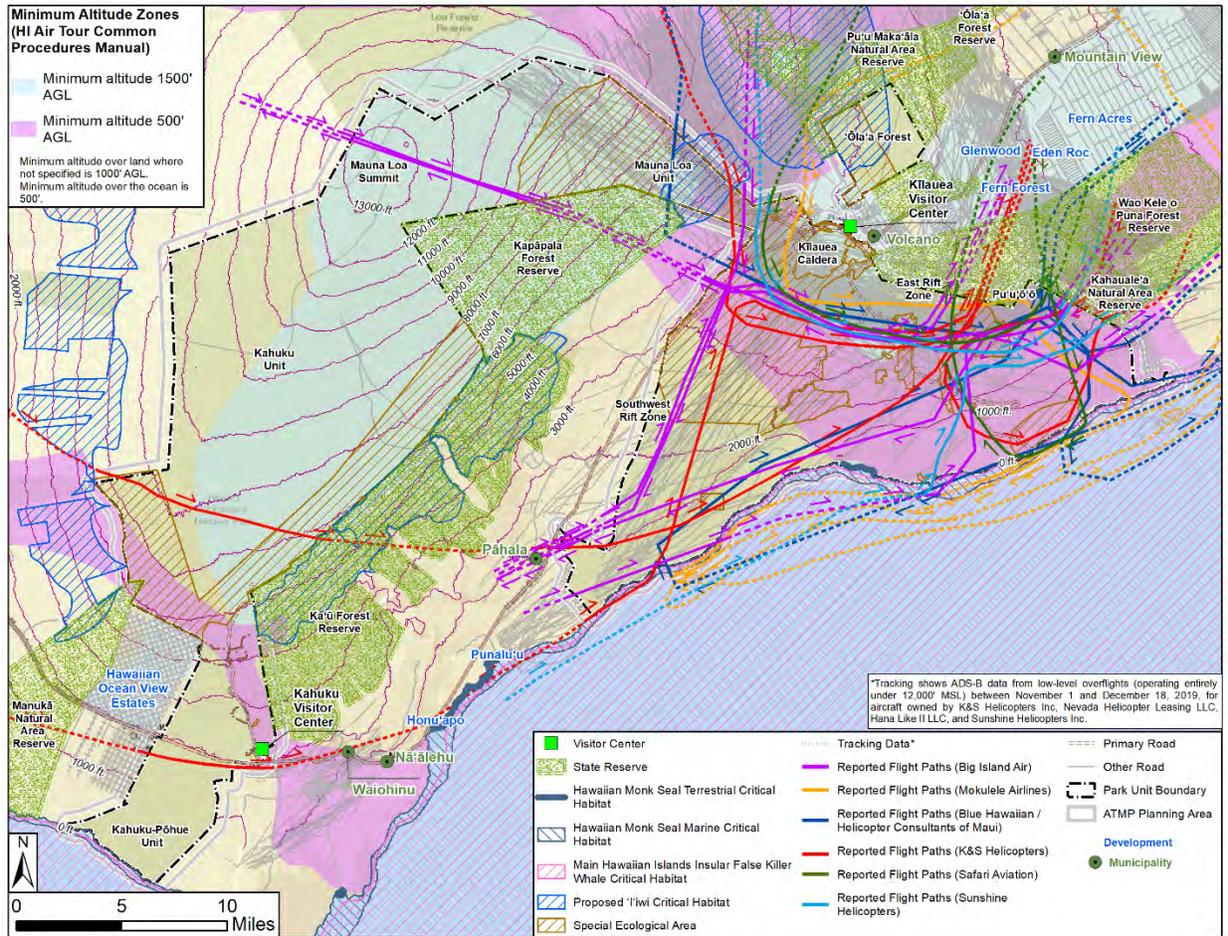


Figure 13. Affected Environment for Biological Resources.

3.3.2 Environmental Consequences

Noise from commercial air tours may impact wildlife in a number of ways, including altered vocal behavior, breeding relocation, changes in vigilance and foraging behavior, direct collisions, and impacts on individual fitness and the structure of ecological communities to name a few (Shannon et al., 2016; Kunc et al., 2016; Kunc and Schmidt, 2019; Dolbeer et al., 2021). Understanding the relationships between noise attributes (e.g., timing, intensity, duration, and location) and ecosystem responses is essential for understanding impacts to these species and developing management actions to address them (Gutzwiller et al., 2017). To capture how noise may affect quieter natural sounds or conversations, the resource impacts analysis below primarily examines the time above 35 dBA (for quieter natural sounds and impacts to natural resources). Refer to the *Noise Technical Analysis* in Appendix F for more information.

The FAA and the NPS initiated technical assistance with the USFWS and NMFS in December 2022 during which all three alternatives were reviewed. Based on these discussions, the agencies initiated informal consultation with the USFWS and NMFS for those federally listed species and/or designated critical habitat described in Section 3.3.1, Affected Environment, in accordance with 50 CFR 402.02. Through this process, the agencies have determined that the preferred alternative (Alternative 3) **may affect**, but is **not likely to adversely affect** federally listed threatened or endangered species, nor would it result in the destruction or adverse modification of federally designated critical habitat. See Appendix H, *Section 7 Consultation* for the correspondence submitted to the USFWS and NMFS which includes the agencies' analysis.

Alternative 1: No Action

Under the No Action Alternative, noise from commercial air tours would continue to affect wildlife throughout the ATMP planning area. Ongoing noise from commercial air tours currently disturbs the Park's wildlife and could result in changes in wildlife behavior, such as bird vocalizations, or other effects that cause wildlife to change their behavior or avoid an area, such as nest abandonment or flushing, and when flown at low altitudes, commercial air tours may result in direct strikes to airborne species. These effects would be expected to continue to occur under the No Action Alternative.

SEAs throughout the Park are valued for their contribution to research, education, and species conservation for many different types of biological resources, and they would continue to be affected by noise from commercial air tours under the No Action Alternative. Under existing conditions, the SEAs which experience the heaviest concentrations of commercial air tour overflights are those in the area near Kīlauea caldera, Mauna Loa, and the East Rift Zone. This noise may interfere with species behavior for any noise sensitive species that occur in these areas or could interfere with research and education activities if it resulted in augmented wildlife behavior or impeded wildlife observations, such as listening to or recording bird vocalizations. This interference could impede the NPS's ability to fully meet the Park's purpose of preserving endemic Hawaiian ecosystems and would not support the perpetuation of biological diversity and ecological integrity which are fundamental resources and values of the Park since the NPS cannot successfully monitor these species without the ability to listen and record bird vocalizations. Effects for specific categories of biological resources are described below.

Mammals

Mammals within the ATMP planning area have a variety of sensitivities to noise from commercial air tours. For nocturnal species, such as the 'ōpe'ape'a (Hawaiian hoary bat), impacts associated with air tours would be less likely to occur, as commercial air tours do not fly at night. However, this species could be susceptible to disturbance from air tour noise if

tours were conducted near sunrise and sunset. Based on reporting data from 2017-2019, air tours typically departed between 6:00 AM and 4:00 PM, which may coincide with sunrise and sunset during certain times of the year. This could expose the 'ōpe'ape'a to noise that could lead to abandonment of their roosts and young, and these effects would continue to occur under the No Action Alternative. There is one documented rotor strike of 'ōpe'ape'a on the Island of Hawai'i (Yuen, 2012), and since under the No Action Alternative there would be no change to the altitudes reported by commercial air tour operators over the Park, the risk of a rotor strike to 'ōpe'ape'a would remain the same as current conditions.

Marine mammals could also be disturbed by noise, including the Hawaiian monk seal and whale species, including critical habitat for the Main Hawaiian Islands Insular false killer whale. Current flight tracking data of commercial air tours shows lower concentrations of aircraft flying over beaches that are considered Hawaiian monk seal habitat, including those where known sightings have occurred. Under the No Action Alternative, flights could continue to be flown as low as 500 ft. AGL in accordance with the Hawai'i Common Procedures Manual, which could cause Hawaiian monk seals to exhibit escape behavior impacting pupping and nursing (Richardson et al., 1995). Whale species have also been found to exhibit behavior responses that might constitute a disruption of their normal behavior patterns (Patenaude et al., 2002) for altitudes under the No Action Alternative. Physical and biological features essential to conservation for the Main Hawaiian Islands Insular false killer whale could also be impacted, specifically where sound from air tours could impair whale's use or occupancy of critical habitat.

Reptiles

Sea turtles, hauled out in coastal areas, could be adversely impacted by aircraft noise and alter their behavior (interrupt their rest periods on shore). Honu'ea, or hawksbill turtles, range from inshore reefs to the open ocean; they bask and nest on sandy beaches with strand vegetation. Low numbers of this endangered turtle are found in waters off the Islands of O'ahu, Moloka'i, Maui, and Hawai'i, with 90% of documented nests occurring on the south coast of Hawai'i (Pratt et al., 2011). However, no impacts to nesting are anticipated because this typically occurs at night for these species. Due to the poor sound transference from air to water, noise would be unlikely to illicit a response for individual turtles underwater. While sea turtles could be disturbed by noise, it would result in short-term behavioral reactions, such as swimming away from the aircraft, which is not expected to have fitness consequences (NMFS, 2022).

Forest Birds

Endangered forest birds are vulnerable to the effects of low-level overflights including commercial air tours because many forest birds forage and nest in the upper parts of the forest canopy that are most exposed to noise and physical effects from aircraft.

The No Action Alternative would be expected to have limited to no impacts on 'akiapōlā'au and Hawai'i creeper, which are primarily found in the northeast boundary of Kahuku close to Ka'ū Forest Reserve above 4,300 ft. elevation, because there are very few air tours that occur in proximity to this area under existing conditions. Under the No Action Alternative, flight patterns would be expected to be similar to those flown under existing conditions. The *Noise Technical Analysis* (Appendix F) shows that noise above 35 dBA would occur for less than 15 minutes a day in areas that provide habitat for these species, and in many places would not occur under the No Action Alternative, so there would be limited to no impacts that would be expected. The effects on the Hawai'i 'ākepa would be expected to be similar, though they may be exposed to slightly more noise since their habitat is present in a larger extent of the Kahuku Unit.

The No Action Alternative could affect 'i'iwi and proposed critical habitat that occur at elevations above 4,900 ft. in forested areas that are near Kīlauea and Mauna Loa where heavy concentrations of commercial air tours have been reported under existing conditions. In those areas, the *Noise Technical Analysis* (Appendix F) shows that noise above 35 dBA could occur for up to 75 minutes a day under the No Action Alternative. While the specific effects of noise on this species have not been studied, noise from aircraft has been demonstrated to influence forest bird vocalizations to overcome the masking effects from aircraft noise in areas where loud and frequent helicopter traffic occurs (Gallardo Cruz et al., 2021). This species would continue to be subjected to noise from commercial air tours under the No Action Alternative if operators continued to fly on routes similar to those reported during the period from 2017-2019.

Seabirds

Within the ATMP planning area, the 'akē'akē breeds within high-elevation volcanic terrain above 6,900 ft. found on Mauna Loa. Flight tracking data from 2017-2019 shows a moderate concentration of air tours flying over or near this area which could subject this species to noise. The *Noise Technical Analysis* (Appendix F) shows that noise above 35 dBA would occur up to 30 minutes a day under the No Action Alternative.

Habitat for Newell's shearwater and Hawaiian petrel is generally more widespread throughout the ATMP planning area which could subject these species to more noise. The Newell's shearwater generally occupies steep slopes and near-vertical volcanic crater walls at elevations ranging from 500 to 4,000 ft. (Reynolds and Ritchotte, 1997; Ainley et al., 2019) which are present on Kīlauea along the East Rift Zone. These areas also experience the heaviest concentrations of commercial air tours under existing conditions based on flight tracking data from 2017-2019. The *Noise Technical Analysis* (Appendix F) shows that noise above 35 dBA would occur in excess of 120 minutes a day in these areas under the No Action Alternative which would subject the Newell's shearwater to this aircraft noise. The Hawaiian petrel

occupies high elevation environments from 5,500 ft. to above 8,000 ft. on Mauna Loa. These upper elevation areas are generally subjected to less noise from commercial air tours under existing conditions than those near Kīlauea and the East Rift Zone, so noise effects on the Hawaiian Petrel would be similar to those experienced by the 'ake'ake. These species would continue to be subjected to noise from commercial air tours under the No Action Alternative.

These seabirds only inhabit areas of the Park during the nesting season, returning and exiting the nest at dusk and dawn to forage and feed chicks. Under the No Action Alternative, there would be no limits on the time of day the tours could be conducted, which may result in some tours being flown near dusk and dawn which increases the likelihood of a direct strike with species active during this time.

Hawaiian Goose

Habitat for the nēnē occurs throughout the ATMP planning area, and observational evidence by the NPS indicates temporary response to low-level helicopter flights by nēnē (NPS, 2014). There is no published, direct evidence that aircraft disturb nēnē (Hu, 2012), though based on the biology of this species, there may be the potential for aircraft noise to affect communication and flock and family interactions of this social species. For example, aircraft may disturb nesting birds, with the female tending the nest, the male standing guard, and the need for communication about predators. The Park's nēnē population is most vulnerable to aircraft impacts in areas when nesting and brood rearing is occurring (NPS, 2014). This would continue to occur under the No Action Alternative, particularly in the Kīlauea summit and East Rift Zone areas of the ATMP planning area which generally experience the highest density of commercial air tour aircraft based on flight tracking data. Administrative flights conducted by the NPS utilize a minimum altitude of 2,000 ft. AGL to protect this species (NPS, 2014) which would not be met by commercial air tours under the No Action Alternative, as flights could fly as low as 500 ft. AGL according to the Hawai'i Common Procedures Manual.

Other Native Birds

Other native birds that occur throughout the majority of the ATMP planning area, including Hawai'i 'amakihi, 'apapane, 'io, 'ōma'ō, pueo, and other migratory or transiting birds would be exposed to noise at a similar frequency and duration as other species described above. The 'apapane has specifically been studied to understand its response to helicopter noise, which shows that the species responds by changing the amount of time they vocalized in relation to loud and frequent helicopter noise. These effects would continue to occur under the No Action Alternative as helicopter noise is present within 'apapane habitat under existing conditions.

Alternative 2

Under Alternative 2, commercial air tour aircraft would not fly within the ATMP planning area which would eliminate this source of noise from the planning area. Therefore, there would be a direct beneficial effect on biological resources since the intensity and likely presence of noise from commercial air tours would be less than under the No Action Alternative. The impacts described above under the No Action Alternative would be less likely to occur as a result of air tours since they would no longer be flying within the ATMP planning area.

Alternative 3

The routes, altitudes, and time-of-day restrictions included in Alternative 3 would provide protection to biological resources as compared to the No Action Alternative. Refer to Figure 14 for a depiction of this alternative in the context of biological resources and their habitats. This both reduces the frequency and duration of noise and the sound levels experienced by wildlife within the ATMP planning area, as well as reduces the likelihood of collisions with aircraft. Under current conditions, 60% of the Park would experience noise above 35 dBA on days when air tours occurred, with some portions of the ATMP planning area experiencing noise above 35 dBA exceeding 120 minutes a day. In contrast, under Alternative 3, 1% of the Park would experience noise above 35 dBA between 30 and 45 minutes a day on a standard day. When compared to existing conditions, in which air tours are flying at 500 ft. AGL minimum, Alternative 3 would increase the minimum altitudes for air tours within the ATMP planning area anywhere from 1,500 to 2,000 ft. AGL. Higher altitudes both reduce the likelihood of bird strikes and reduce maximum sound levels at sites directly below the flight path. It should be noted that when the altitude of an aircraft is increased, the total area exposed to the noise from that aircraft may also increase depending on the surrounding terrain. Although the area exposed to noise might increase, this would not meaningfully affect wildlife because of the attenuation of the noise from higher altitude and reduced number of flights.

As it relates to the Park's SEAs, Alternative 3 would result in less noise than the No Action Alternative which would enhance research conditions in the SEAs and allow the Park to meet its fundamental resources and values to a greater extent. Effects for specific categories of species are described below.

Mammals

Alternative 3 would provide protection to the 'ōpe'ape'a (Hawaiian hoary bat) primarily by limiting the hours of operation for commercial air tours within the ATMP planning area to 10:00 AM to 2:00 PM for non-quiet technology flights and 9:00 AM to 5:00 PM for quiet technology flights. Since the 'ōpe'ape'a is a nocturnal species that may be active near dawn and dusk hours, these restrictions would provide protection to those that may be active during this time.

Based on the analysis described in this draft EA and Appendix H, *Section 7 Consultation*, Alternative 3 *may affect, not likely to adversely affect* 'ōpe'ape'a.

Alternative 3 would also provide protection to the Hawaiian monk seal by increasing the minimum altitude at which commercial air tours may fly over monk seal habitat as compared to existing conditions. The Coastal Route included in Alternative 3 is located near beaches that are used by Hawaiian monk seals, and the alternative sets the minimum altitude for air tours using this route to 2,000 ft. AGL and would be located 2,000 ft. laterally from the land. Compared to related species, Hawaiian monk seals have reduced sensitivity to airborne sounds and a reduction in terrestrial hearing ability (Ruscher et al., 2021). Although this species has a broad range of hearing while in water, they are not sensitive to noise that is less than 73 dB while in water (Sills et al., 2021). Under Alternative 3, noise over critical habitat and beach areas used by Hawaiian monk seals for hauling out or pupping is not expected to exceed 75 dBA. The value for L_{max} generated by commercial air tours in the Park on a standard day would be 63.7 dBA and would occur at 'Āpua Point Camp, which is located near marine critical habitat for the Hawaiian monk seal; however, the L_{max} noise metric is event based and does not provide any context of frequency, duration, or timing of exposure. At this location, time above 52 dBA would occur for 2.1 minutes on a standard day and 2.5 minutes on a quiet technology-only day. Coastal beaches along the Coastal Route would experience noise above 52 dBA between 0.8 and 1.2 minutes on a standard day, and 0.4 to 2.5 minutes on a quiet technology-only day (refer to Tables 8 and 9 in Appendix F, *Noise Technical Analysis*). A specific regulation, issued pursuant to the ESA and published at 50 CFR 224.103 (a), created a protective zone around humpback whales requiring vessels not to approach humpback whales, within 100 yards by vessel or 1,000 ft. by aircraft, when these whales are within 200 nautical miles of the Hawaiian Islands. In addition, when aircraft fly below certain altitudes (about 500 meters [1,640.4 ft.]), they have caused cetaceans to exhibit behavioral responses that might constitute a significant disruption of their normal behavioral patterns (Patenaude et al., 2002). Although effects vary between cetaceans and pinnipeds and no such standoff zone has been established for Hawaiian monk seals, the 2,000 ft. AGL altitude requirement under Alternative 3 for routes over coastal areas would exceed altitudes that have been shown to cause effects.

Based on the analysis described in this draft EA and Appendix H, *Section 7 Consultation*, Alternative 3 *may affect, not likely to adversely affect* Hawaiian monk seal.

Whale species have been known to occur near a portion of the flight path for Alternative 3. Richter et al. (2006) evaluated aircraft effects on blow duration, vocalization patterns, and surface time for sperm whales and found that there was little change in blow duration when exposed to aircraft used for aerial whale watching. When aircraft were flown at 150 meters (492 ft.), surface time differed between resident and transient whale populations, where resident whales had a slightly longer surface duration when exposed to aircraft, while transient

whales had a shorter surface duration when exposed to aircraft (Richter et al., 2006). Sperm whales did not alter the frequency of their vocalization patterns, but did take longer to make their first click sound after a tail fluke-up dive when aircraft were present.

Noise from air tours may impact marine species in a number of ways: altered vocal behavior, changes in behavior such as retreating underwater and surface times, and pod formation, among others (Kunc et al., 2016; Kunc and Schmidt, 2019; Gomez et al., 2016; Richardson et al., 1995). Visually, aircraft can be difficult for cetaceans to locate since they are not in the water and move rapidly (Richter et al., 2006). As noted above, aircraft that fly below 500 meters (about 1,640 ft.) have caused cetaceans to exhibit behavioral responses that might constitute a significant disruption of their normal behavioral patterns (Patenaude et al., 2002). Commercial air tours have the potential to generate noise that could be audible to whales. However, these noise events are not expected to be stressors on these species as they are infrequent and of short duration (likely limited to no more than a few minutes of exposure). Noise underwater is the loudest when aircraft are directly overhead, and generally decreases as altitude increases. As noted above, a specific regulation, issued pursuant to the ESA and published at 50 CFR 224.103 (a), created a protective zone around humpback whales requiring vessels not to approach humpback whales, within 100 yards by vessel or 1,000 ft. by aircraft, when these whales are within 200 nautical miles of the Hawaiian Islands. No such standoff zone has been established for other whale species within the action area. However, the agencies believe the 2,000 ft. AGL minimum flight altitude for routes over the ocean would be protective of whale species. In addition, due to the poor sound transference from air to water, noise would be unlikely to illicit a response for whale species at these altitudes. Based on the analysis described in this draft EA and Appendix H, *Section 7 Consultation*, Alternative 3 would have *no effect* on the listed whale species described in Section 3.3.1, Affected Environment, Mammals.

Critical habitat for the Main Hawaiian Islands Insular false killer whale would not be impacted because noise levels under Alternative 3 would not impair the species use or occupancy of the area.¹⁷ Therefore the agencies have determined Alternative 3 would have *no effect* on critical habitat for the Main Hawaiian Islands Insular false killer whale.

Reptiles

Due to the poor sound transference from air to water, noise would be unlikely to illicit a response for individual turtles underwater. Underwater noise thresholds in the loggerhead sea turtle were measured by Martin et al. (2012) that indicated potential behavioral thresholds observed at about 100 dB at 100 hertz, much higher than the maximum sound levels of 63.7 dBA at 'Āpua Point Camp associated with Alternative 3. Other beaches had lower values for

¹⁷ https://media.fisheries.noaa.gov/dam-migration/1514-13_ifkw_ch_final_bio_rpt_041017_clean.pdf

maximum sound level (see Tables 8 and 9 in Appendix F, *Noise Technical Analysis*). Sea turtle ears are adapted to hearing underwater, and they are more sensitive to underwater sounds than sounds above water. Therefore, while sea turtles hauled out on shore could be exposed to noise, it is unlikely this would elicit a response for individual turtles. Because there is not existing research directly examining this impact, the agencies have determined that this alternative *may affect, is not likely to adversely affect* sea turtles.

Based on the analysis described in this draft EA and Appendix H, *Section 7 Consultation*, Alternative 3 *may affect, not likely to adversely affect* the listed reptile species when under USFWS jurisdiction and have *no effect* to listed species when under NMFS jurisdiction described in Section 3.3.1, Affected Environment, Reptiles.

Forest Birds

The routes included in Alternative 3 would avoid most forest bird habitat that is present within the ATMP planning area. Specifically, the Kahuku Route and Coastal Route would not fly over forested areas that could provide habitats for these species which would limit the maximum sound levels that would occur from commercial air tours in forested areas near these routes. While the Pu'u'ō'ō Route overlaps with some forested areas in the East Rift Zone, the route avoids the most forested areas in this region to provide the best habitat protection to support forest bird populations. Other parameters included in this alternative including the annual limit on the number of flights and limits on hovering, loitering and/or circling will reduce the frequency and duration of noise exposure to forest birds. Across the entire ATMP planning area, the *Noise Technical Analysis* (Appendix F) shows that on a standard day, noise above 35 dBA would occur for less than 45 minutes a day, and on a quiet technology-only day would occur for less than 60 minutes a day. Under both types of operational days, most areas of the ATMP planning area that provide forest bird habitat (particularly in the Kahuku Unit) would not experience noise above 35 dBA from commercial air tours. Collectively, these operational parameters represent an improvement to the protection of forest bird habitat as compared to existing conditions because forest birds will be exposed to less noise throughout the ATMP planning area.

Based on the analysis described in this draft EA and Appendix H, *Section 7 Consultation*, Alternative 3 *may affect, not likely to adversely affect* the listed forest bird species and proposed critical habitat for 'i'iwi described in Section 3.3.1, Affected Environment, Forest Birds.

Seabirds

High and mid-elevation seabirds would experience greater protection from noise associated with commercial air tours as compared to the No Action Alternative because of the placement of the routes included in Alternative 3. Specifically, routes would avoid high and mid-elevation

seabird habitat in all areas of the ATMP planning area, except for those near Pu'u'ō'ō, and limits the number of commercial air tours to no more than 1,565 tours per year. This represents an improvement compared to current conditions for these species. The *Noise Technical Analysis* (Appendix F) shows that for portions of the ATMP planning area that are at or above 500 ft. elevation (which corresponds with areas utilized by mid-elevation seabirds), noise above 35 dBA could occur for up to 45 minutes a day on a standard day and up to 60 minutes on a quiet technology-only day, depending on the location being utilized. Most areas within the Newell's shearwater habitat would have less than 15 minutes a day with noise above 35 dBA. This would result in beneficial improvements for the habitat conditions for this species compared to current conditions.

The *Noise Technical Analysis* (Appendix F) shows that commercial air tour noise above 35 dBA would not occur within the high-elevation seabird habitat under Alternative 3.

Based on the analysis described in this draft EA and Appendix H, *Section 7 Consultation*, Alternative 3 *may affect, not likely to adversely affect* the listed seabird species described in Section 3.3.1, Affected Environment, Seabirds.

Hawaiian Goose

The nēnē would also experience improved habitat conditions under Alternative 3 as compared to current conditions due to the placement of the authorized routes, altitude restrictions, and limited number of flights on an annual basis. As nēnē habitat occurs throughout most of the ATMP planning area, restricting the authorized routes to limited areas limits the spatial spread of noise that would occur under Alternative 3. Across the entire ATMP planning area, the *Noise Technical Analysis* (Appendix F) shows that on a standard day, noise above 35 dBA would occur for less than 45 minutes a day, and on a quiet technology-only day would occur for less than 60 minutes a day. The altitude restrictions that raise the minimum altitude as compared to existing conditions would reduce the likelihood of a bird strike with aircraft. Collectively, these operating parameters represent an improvement for nēnē within the ATMP planning area compared to current conditions.

Based on the analysis described in this draft EA and Appendix H, *Section 7 Analysis*, Alternative 3 *may affect, not likely to adversely affect* nēnē.

Other Native Birds

Other protected native birds that occur throughout the majority of the ATMP planning area, including Hawai'i 'amakihi, 'apapane, 'io, 'ōma'ō, pueo, and other migratory or transiting birds would be exposed to noise at a similar frequency and duration as seabirds and nēnē described above for Alternative 3, which represents a reduction in noise compared to current conditions.

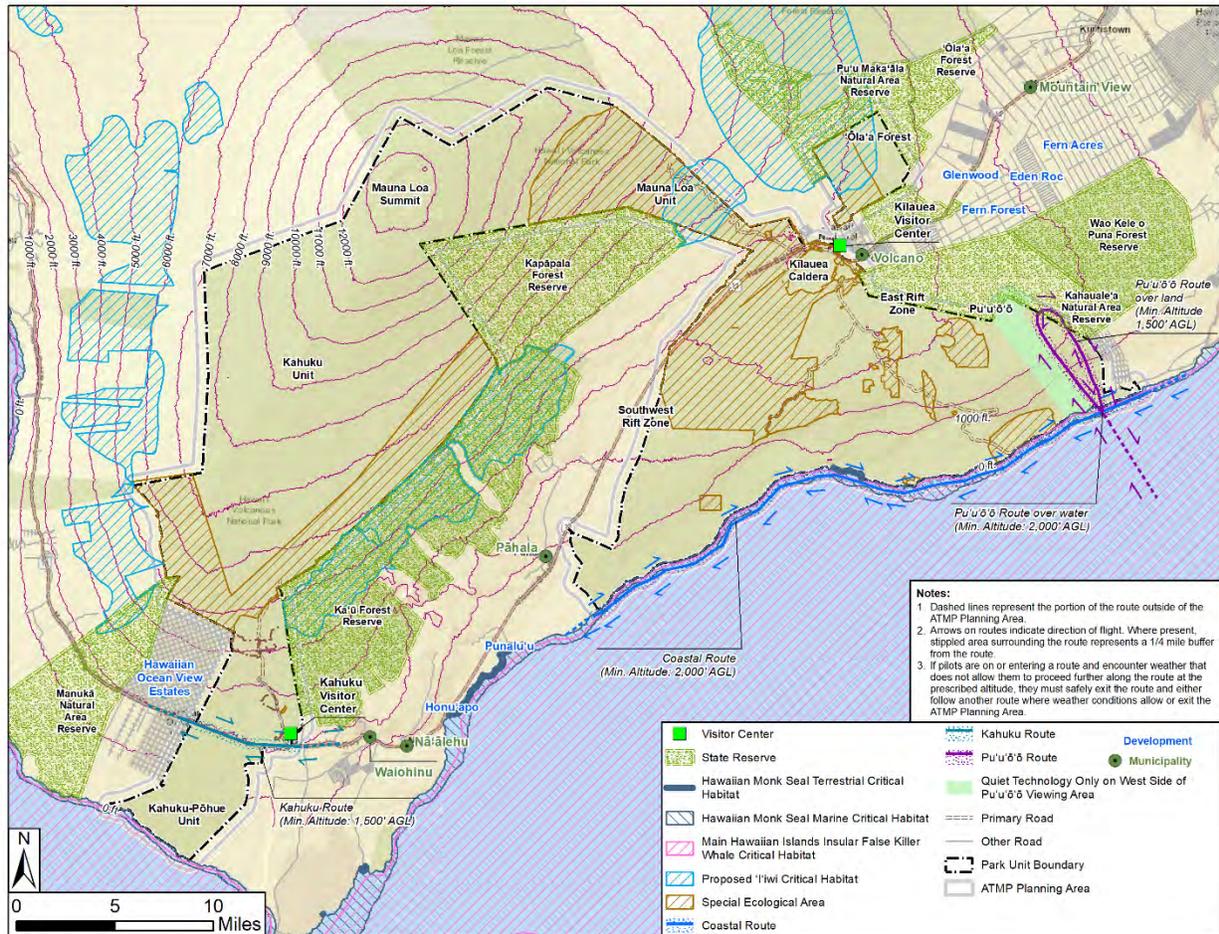


Figure 14. Biological Resources Environmental Consequences for Alternative 3.

Indirect and Cumulative Effects

Indirect Effects: Indirect effects to biological resources could occur as a result of noise caused by air tours flying outside of the ATMP planning area. As noted in Section 3.1.2, Indirect and Cumulative Effects for Noise and Noise-Compatible Land Use, indirect noise impacts would have the potential to occur under Alternatives 2 and 3 as these alternatives could result in the displacement of air tours outside the ATMP planning area. Operators may choose to fly along existing flight paths but at or above 5,000 ft. AGL; however, the increase in altitude would likely decrease impacts on ground level resources as compared to current conditions. Operators may also choose to fly just outside of the perimeter of the ATMP planning area surrounding the volcanoes in order to view Kīlauea crater or any active lava. Air tours outside the ATMP planning area may occur in the area southwest of the 'Ōla'a Forest tract to view lava in Kīlauea caldera. Therefore, under Alternatives 2 or 3, some indirect impacts to biological resources could occur if flights were displaced to outside the ATMP planning area. This would likely affect

forest birds that are found at higher elevations on Mauna Loa and near the Kīlauea caldera and surrounding areas, or species that have more widespread habitat, such as nēnē for air tours conducted just outside the ATMP planning area. Since Alternative 2 would displace more flights outside the ATMP planning area than Alternative 3, Alternative 2 could result in more indirect effects to biological resources than Alternative 3.

Indirect impacts could also occur to 'ālalā or other bird species if they are released within the ATMP planning area at some time in the future. Impacts to 'ālalā or other bird species are expected to be similar to other forest bird species. Under existing conditions, air tours over suitable 'ālalā habitat within the ATMP planning area include Kahuku and the adjacent Ka'ū Forest Reserve, and the 'Ōla'a and Mauna Loa Units of the Park, resulting in noise impacts to the species under the No Action Alternative. Under Alternative 2, commercial air tour aircraft would not fly within the ATMP planning area which would eliminate potential impacts to 'ālalā. While it is not known where this species would be introduced, the higher altitudes prescribed in Alternative 3 would limit the potential for noise impacts if 'ālalā were to be reintroduced or recolonize after reintroduction elsewhere. Based on the analysis described in this draft EA and Appendix H, *Section 7 Consultation*, Alternative 3 may affect, not likely to adversely affect 'ālalā.

Cumulative Effects: The NPS would continue current management actions and respond to future needs and conditions for biological resources without major changes in the present course. The administrative flights and associated noise levels (see Section 3.1.1, Affected Environment for Noise and Noise-Compatible Land Use for more information) and wildlife disturbance risks within the ATMP planning area would likely continue at current levels. Non-native ungulates have extensively modified biological resources at the Park and throughout the Hawaiian Islands, and the presence of non-native ungulates remains a major management concern. The Park has an established program for ungulate animal control involving an extensive fence system designed to prevent entry of non-native ungulates into the Park, which has allowed many natural ecosystems to recover from this stressor. These trends, and the management response by the NPS to control ungulate populations and restore ecosystems would continue at current levels, therefore noise generated by mechanized equipment during fencing and restoration activities may have infrequent, short term and transient effects on species in the localized area of the work. There are no anticipated changes to public access within the ATMP planning area, so ongoing impacts to wildlife from visitors would remain unchanged in the foreseeable future.

Changes in environmental conditions in the ATMP planning area that may ensue from global climate change include increasing temperatures, decreasing precipitation, increasing storm intensities, and increasing variability in weather patterns (Thomas et al., 2004; Frazier and Giambelluca, 2017). Changes in microclimatic conditions in the habitats of endemic invertebrates and their host plants may lead to the loss of native species due to direct

physiological stress, the loss or alteration of habitat, increasing distribution and abundance of invasive species, and changes in disturbance regimes (e.g., droughts, fire, storms, and hurricanes). Alternative 3 would result in less cumulative noise and wildlife disturbance in the ATMP planning area than the No Action Alternative, given the reduced number of flights, higher altitudes, designated routes, and other conditions that would be required under Alternative 3. However, it could allow for more cumulative noise and associated wildlife disturbance than Alternative 2, where flights would not be authorized in the ATMP planning area. Ongoing present and future Park management actions by the NPS would continue to occur under any of the alternatives.

3.4 Cultural Resources

The NHPA (54 U.S.C. §§ 300101 et seq.) is comprehensive federal preservation legislation intended to protect cultural resources. Section 106 of the NHPA (54 U.S.C. § 306108), as implemented in 36 CFR Part 800, requires federal agencies to consider the effects of undertakings on historic properties, should any such properties exist. Historic property is defined in 54 U.S.C. § 300308 and 36 CFR 800.16(l)(1) as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (National Register). This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or NHO and that meet the National Register criteria. The FAA's environmental impact category discussing cultural resources is titled as Historical, Architectural, Archeological and Cultural Resources in FAA Order 1050.1F. These categories include historic properties as well as any cultural resources identified that may not be eligible for listing in the National Register including those otherwise protected as tribal resources or by local and state laws. Sacred sites, for example, are considered significant cultural resources and are also protected under the American Indian Religious Freedom Act. The methodology in Appendix E as well as the Section 106 documentation in Appendix G further describe the identification and treatment of cultural resources for the project.

In addition to Section 106 of the NHPA, the NPS's Organic Act and Section 110 of the NHPA apply to and provide for the preservation of historic, ethnographic and cultural resources on Park land. NPS policies and directives also apply to Park cultural and ethnographic resources, and provide direction for their management including the 2006 NPS Management Policies, Chapter 5 and Director's Order 28: Cultural Resource Management. Executive Order (EO) 13007 provides direction regarding Indian Sacred Sites. NPS Management Policies (2006) Section 5.3.1.7, Cultural Soundscape Management, also acknowledges that culturally appropriate sounds are important elements of the national park experience in many parks, and that the NPS will preserve soundscape resources and values of the parks to the greatest extent possible to protect opportunities for appropriate transmission of cultural and historic sounds

that are fundamental components of the purposes and values for which the parks were established. NPS Management Policies identify and define five types of cultural resources for consideration in NEPA evaluation: Archeological Resources, Cultural Landscapes, Ethnographic Resources, Historic and Prehistoric Structures, and Museum Collections. These resource types correlate generally with the FAA categories as described further below. Museum Collections is dismissed from consideration due to the nature of the project.

Section 106 consultation with the Hawai'i State Historic Preservation Division (SHPD) was initiated via formal letter dated March 29, 2021. On April 28, May 4, and May 6, 2021, the agencies held initial Section 106 consultation webinars to provide background information on ATMPs and the ATMP development process. The agencies identified consulting parties that may have an interest in the undertaking and its effects on historic properties. They initiated consultation with consulting parties in three phases in order to include additional parties that were identified as the process moved forward (see Appendix G, *Cultural Resources Consultation and Summary*, for correspondence and list of consulting parties). These letters were dated April 16, August 6, and October 1, 2021. The last letter included an invitation to the October 28, 2021, informational webinar held to provide background on the ATMP development process. A listening session was held December 10, 2021, with the Park's Kūpuna consultation group and other consulting parties and individuals. A second listening session with the Park's Kūpuna consultation group and other consulting parties and individuals was held on March 11, 2022.

The NEPA study area for cultural resources corresponds with the Area of Potential Effects (APE) identified as part of the Section 106 process and encompasses the potential effects of all alternatives under consideration. As defined at 36 CFR 800.16(d), the APE is the geographic area or areas within which the undertaking may directly or indirectly cause alterations in the character or use of any historic properties, if any such properties exist. The proposed undertaking does not require land acquisition, construction, or ground disturbance, and the FAA anticipates no physical effects to historic properties. The APE therefore includes areas where any historic property present could be affected by the potential introduction of visual or audible elements that could diminish the integrity of any identified significant historic properties. The APE has been defined to include the ATMP planning area as well as a small area to the southwest of the 'Ōla'a Forest tract outside of the ATMP planning area. The APE extends upwards vertically from ground level with no upper ceiling to encompass areas where historic properties may be affected by operators flying above the ATMP planning area. Refer to Figure 15 for a depiction of the APE identified for the undertaking.

The agencies consulted with the Hawai'i SHPD, NHOs, the Park's Kūpuna consultation group, operators, and other consulting parties prior to finalizing the APE. The agencies initiated consultation with six newly identified consulting parties via formal letter dated November 8,

2022 and held a Section 106 consultation meeting with all consulting parties on November 21, 2022 to inform them of the proposed APE and to seek comment on identification of historic properties within the APE. The agencies subsequently expanded the boundaries of the APE to incorporate additional areas potentially affected by the undertaking. The FAA sent a letter dated December 23, 2022, to the SHPD requesting their input on the APE. SHPD responded with no objection in a letter dated January 24, 2023. The agencies shared the revised APE and updated list of historic properties with the consulting parties in a letter dated February 21, 2023. See Appendix G, *Cultural Resources Consultation and Summary*, for Section 106 correspondence.

3.4.1 Affected Environment

The affected environment includes prehistoric or historic districts, sites, buildings, structures, and/or objects, as well as TCPs (inclusive of ethnographic resources and sacred sites) and cultural landscapes that have been previously documented in the APE or identified through consultation. Under existing conditions, based on flight tracking data and reported routes, the heaviest concentrations of commercial air tours occur around Kīlauea caldera then along the East Rift Zone. Throughout the Section 106 process, the agencies requested consulting party input to help identify historic properties within the APE. The agencies provided an initial historic property identification list to consulting parties in a March 8, 2022, letter accompanying the public scoping newsletter and at the November 21, 2022, Section 106 Consulting Party meeting and requested further input on the identification of historic properties within the proposed APE. Consulting parties provided comments during the meeting as well as in emails, written letters, and phone calls following the meeting regarding the identification of historic properties, and the agencies took into consideration the input from the consulting parties in identifying additional historic properties. The agencies again requested input on historic property identification in the revised APE in the letter dated February 21, 2023. A final historic properties list was provided in the March 27, 2023 finding of effects letter.

Cultural Resources (including Ethnographic Resources, Sacred Sites and Traditional Cultural Properties)

Ethnographic resources are resources that are associated with the customs, habits, or behaviors of a cultural group, including those that possess religious and cultural significance. A sacred site, as defined in EO 13007, is any specific location that is identified to be an appropriately authoritative representative of an indigenous religion as sacred by virtue of its established religious significance to, or ceremonial use by, an indigenous religion. A TCP is a property significant due to its association with past and continuous cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community. TCPs possess traditional cultural significance derived from the role the property plays in a community's historically rooted

beliefs, customs, and practices (NPS, 1992). TCPs are treated as historic properties for the purpose of evaluating effects under Section 106 and NEPA (FAA, 2020).

The volcanic landscape found throughout the Park and beyond is considered an ethnographic landscape that is very important to Native Hawaiians. Sacred or religious sites occur within the Park and include natural features such as active lava flows, the Kīlauea and Mauna Loa summit areas, native forests, sulphur deposits, volcanic steam cracks, volcanic craters and gases, the air space above the land, petroglyph fields, and additional constructed features such as shrines, heiau, or burial sites. The Kīlauea Crater is listed on the National Register for its ethnographic and scientific significance with the boundary encompassing the crater's edge. Based on an ethnographic study (Langlas, 2003), Native Hawaiians view the entire Kīlauea Crater as sacred and as the "origin of new land." Many Native Hawaiian cultural practitioners come to Kīlauea for ceremonies, ho'okupu, and paying tribute to the deity Pelehonuamea, also referred to as Pele, who resides at Halema'uma'u. Chants and recorded oral accounts say that Pele and her family traveled to the Island of Hawai'i from Kahiki, searched the island chain, and settled at Kīlauea. Pele is an 'aumakua (ancestral god) for some Hawaiians and an akua (unrelated god) for others. Those that are descended from Pele have a special relationship with her; they may pray for help and have the right to be united with her after death. For some, Pele is important as the goddess who controls and is embodied in volcanic phenomena. She must be respected and given offerings by those seeking protection from her forces. Pele is manifested in molten lava, steam, earthquakes, and thunder and lightning connected with volcanism. She is present at Halema'uma'u crater, within Kīlauea caldera, but also at other pit craters around Kīlauea, and in east and southwest rift zone eruptions and the other volcanoes on the Island of Hawai'i. Traditionally, Hawaiians leave offerings to her, especially when there is an eruption, and the whole area around Kīlauea caldera is sacred (Langlas, 2003). Langlas (2003) also found that religious rituals and collection of plants for religious or medicinal purposes, in particular 'a'ali'i (*Dodonaea viscosa*) and liko lehua (the leaf buds of the 'ōhi'a tree), occur throughout the Park. Plants are collected to wear as lei in performing hula, for medicines, and other purposes.

Vegetation and forested areas within the Park are an important source of spirituality and self-identification for many residents of the Island of Hawai'i. One study examining resident connection with nature found that cultural heritage is strongly linked to forest for many residents of the Island of Hawai'i, particularly for Native Hawaiians (Gould et al., 2014). Similarly, a study prepared for the Park (Keali'ikanakoleohaililani, 2009) found that ceremony and ritual take place most commonly in the kīpuka, the forested areas at Kīlauea, at other craters, at the coast where new land is being formed, and at places where private family ceremonies are conducted, including the visiting of grave sites. The unevaluated Kīpukakī, for example, is considered an 'Ōiwi holy place of worship. Medicine collection requires lightly and densely forested regions. Many chants that are found in written and published stories of Pele reiterate the importance of silence. Silence, in most traditions of Hawaiian practice, is essential

for learning, understanding, observing, and respecting another's space, thoughts and kapu. Silence, in the presence of Pelehonuamea, reflects one form of ultimate respect (Keali'ikanakoleohaililani, 2009).

A study completed by Kumu Pono Associates (2004) states the following:

“We find in native traditions and beliefs, that Hawaiians shared spiritual and familial relationships with the natural resources around them. Each aspect of nature from the stars in the heavens, to the winds, clouds, rains, growth of the forests and life therein, and everything on the land and in the ocean, was believed to be alive. Indeed, every form of nature was a body-form of some god or lesser deity. In the Hawaiian mind, care for each aspect of nature, the kino lau (myriad body-forms) of the elder life forms, was a way of life. This concept is still expressed by Hawaiian Kūpuna (elders) through the present day, and passed on in many native families. Also, in this cultural context, anything which damages the native nature of the land, forests, ocean, and kino lau therein, damages the integrity of the whole. Thus caring for, and protecting the land and ocean resources, is important. In the traditional context above referenced, we find that the land, the native plants and life-forms, and the intangible components therein, are a part of a sacred Hawaiian landscape. Thus, the landscape itself is a highly valued cultural property.”

Natural resources such as rock outcrops, pools of water, forests, ocean, mountains, land, and air are all valuable natural resources that define the significant body of TCPs and cultural practices of the Hawaiian people (Kumu Pono Associates, 2001).

Other traditional practices that occur within the Park include the collection of marine resources such as fish, crab, and shellfish. The Puna coastline located in the Park is another important resource for Native Hawaiians who live in the Kalapana extension area and continue to practice their fishing rights along the coastal areas of the Park. The extension area extends from Kupapa'u Point on the east to Keauhou on the west.

The NPS has a strong commitment to include native voices in Park planning and interpretive materials. The NPS acknowledges the Park's living culture and embraces the sacredness of the volcanic landscapes and the summit areas of Kīlauea and Mauna Loa volcanoes. Additionally, the NPS maintains relationships with several elders, or Kūpuna, from the adjacent communities of Puna and Ka'u, NHOs such as the Office of Hawaiian Affairs, and non-profits such as the Edith Kanaka'ole Foundation.

Archeological Resources

Archeological resources are the physical evidence of past human activity, including evidence of the effects of that activity on the environment. Archeological resources located within the Park

are diverse and include a wide temporal range spanning multiple centuries, consisting of the material remains of various groups and activities that left their mark on the landscape. This includes the physical evidence of pre- and post-contact Native Hawaiian life ways to historic, Euro-American, and African American sites.

Pre- and proto-historic archeological features and sites within the APE include ancient village sites, petroglyphs, trails, fossil footprints, burials, heiau, shrines, caves with cultural deposits, resource procurement areas, agricultural mounds, animal corrals, canoe shelters, lithic and volcanic glass quarries, rock shelters, and house platforms. Archeological resources in the Park document the Native Hawaiian way of life (ka noho 'ana) in traditional land divisions, or ahupua'a, extending from the uplands to the sea and wao or vertical land divisions. Historic features include rock walls, roads, trails, structures, buildings, water collection features, ranching features, landing fields, and trash disposal sites amongst dozens of other feature types.

There are two historic districts related to archeological resources in the Park. This includes the Puna-Ka'u Historic District that spans over 129,000 acres and contains a density of prehistoric and protohistoric archeological features. Within the district there are vestiges of ancient Hawaiian villages, ancient agricultural areas, large petroglyph fields, and where the Waha'ula Heiau once stood. The heiau was the first luakini or human sacrificial temple to be established by Pā'ao, a priest that arrived at the Island of Hawai'i from Kahiki in the 1200s, marking a new era of religion and cultural change on the Island of Hawai'i.

The second archeologically significant historic district is the 1790 Footprints. The district contains ancient fossilized footprints that were impressed in the hardened ash layers from the explosive Kīlauea eruptions that occurred in the 1700s. In addition to the footprints, the district contains an ancient trail system that connected villages of Ka'u with Kīlauea Crater, upper Puna, and Hilo. Hundreds of temporary camp sites and volcanic glass quarries are found along the route. The outdated 1974 nomination forms include 4,000 acres in the boundary; however, subsequent studies have shown that the boundary actually extends over 12,000 acres.

A new recent addition to the Park boundary is significant in part for its archeological and ethnographic resources. Located on the southern flank of Mauna Loa, the Kahuku-Pōhue parcel is home to numerous well-preserved Hawaiian cultural sites, including the largest recorded abrader quarry in the State of Hawai'i, lava tubes, burial site, mauka-makai (mountain to sea) trails, fishing shrines, remains of once-thriving coastal villages, and petroglyphs. A well-preserved portion of the Ala Kahakai National Historic Trail or Ala Loa, an ancient coastal trail system, hugs the coastline.

While the Park contains a vast number of archeological sites, only four sites are actively interpreted for the public. One of the highest-profile and most heavily visited archeological

sites in the Park is the Pu'uloa Petroglyph Field, a contributing cultural landscape to the Puna-Ka'ū Historic District. This site contains more than 23,000 petroglyphs that depict people, canoes, geometric shapes, and cupules, where babies' umbilical cords were placed in hopes of long life. While petroglyphs are found throughout the Hawaiian Islands, the Pu'uloa Petroglyph Field is the largest concentration of petroglyphs in the State of Hawai'i.

Additional interpreted archeological sites include the 1790 Footprints, the Pulu Station, and the Ka'ū Agricultural Field Systems. The Pulu Station is located in the East Rift Wilderness unit and is made up of three structures that are the only currently identified and recorded tangible remnants of a once thriving industry that occurred for several decades in the mid-1800s. People collected the soft downy fur (pulu) from the hāpu'u ferns to use for stuffing mattresses, pillows, and upholstery. The pulu was shipped globally from the Puna coastal area that now falls within the Park, but was a short-lived venture as it was eventually discovered that pulu would break down and cause lung irritations.

A vestige of the Ka'ū Agricultural Field system is actively interpreted in the Kahuku unit. The 1400-era site contains a portion of a larger earthwork made of rock walls, mounds, and structures. The site is an example of the ingenious engineering that was developed for ancient agricultural pursuits that took advantage of wind and rain patterns and volcanic soils in order to maximize food production.

Across the entire Park, more than 700 archeological sites made up of tens of thousands of features have been identified, evaluated, and recorded in the Cultural Resource Inventory System, the NPS database of cultural resource information. There are still many areas of the Park that have yet to be surveyed; therefore, this number is anticipated to grow as projects are implemented in the future.

Historical and Architectural Resources (including Cultural Landscapes and Prehistoric/Historic Structures)

A cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided. Cultural landscapes are geographic areas associated with specific cultures or historical events, and they help illustrate how humans have adapted to and altered their surroundings. The NPS recognizes four cultural landscape categories: historic designed landscapes, historic vernacular landscapes, historic sites, and ethnographic landscapes.

The Park contains cultural landscapes that are architecturally and historically significant. The seven designated cultural landscapes of the Park are: 'Āinahou Ranch House and Gardens, Crater Rim Historic District, Kahuku Ranch Cultural Landscape, Kīlauea Administration and Employee Housing Historic District, Kīlauea Military Camp Historic District, Pu'uloa Petroglyph

Field Cultural Landscape, and Nāhuku Cultural Landscape (Thurston Lava Tube Cultural Landscape).

The Park retains several architectural and engineering resources that are listed in, or eligible for listing in, the National Register, including historic trails, roads, shelters, campsites, and historic districts. Historic districts located within the Park that emphasize architecture and the built environment include the Kīlauea Administration and Employee Housing Historic District, the Nāmakanipaio Cabin Camp District, the Kahuku Ranch Base Camp, the Crater Rim Historic District, and the Kilauea Military Camp.

The Kīlauea Administration and Employee Housing Historic District covers 43 acres along Crater Rim Drive. The housing and administrative district was determined eligible for listing in the National Register for its association with early Park planning and with the Civilian Conservation Corp (CCC) program. It is also significant at the state level for distinctive architectural design, because its contributing features exemplify the “Park Service Rustic” style. The period of significance spans 1927 to 1942, covering the years of initial master planning efforts, development, and CCC involvement.

The Nāmakanipaio Cabin Camp was built in the 1960s and encompasses rustic cabins, camp sites, comfort stations, and picnic areas. It is eligible for listing in the National Register for its association with early Park planning and development and in the areas of entertainment and recreation. It is also eligible as a rare example of Mission 66-era design and development at the Park. Mission 66 was an NPS program that was intended to expand NPS visitor services by 1966. The Nāmakanipaio Cabin Camp’s period of significance spans 1960 to 1965, which reflects its planning, development, and construction.

The Crater Rim Historic District is an approximately 5,000-acre historic district that extends in and around Kīlauea Crater. The boundary of the Crater Rim Historic District encompasses Crater Rim Drive, an approximately 10-mile scenic road that takes visitors around the crater rim and onto the crater floor, which is listed on the Hawai'i State Register of Historic Places. The district also includes the road’s associated features, parking lots, trails, overlooks, and the buildings and developed areas on the crater rim. The historic district is eligible for listing in the National Register for its association with early Park planning, its association with the CCC program, and for its distinctive design, which exemplifies the “Park Service Rustic” style and naturalistic landscape architecture perpetuated by the NPS in the period between the World Wars I and II. The period of significance for the historic district spans the years 1916 to 1942, covering the period of primary Park development and CCC involvement.

The Kilauea Military Camp Historic District encompasses 52.7 acres at the northern edge of Kīlauea caldera and has been evaluated and determined to be significant for its association with historic events involving the early establishment and development of the U.S. Army on the

Island of Hawai'i, and its role during World War II as the U.S. Army Hawai'i District headquarters, as a detention center for Japanese-American civilians rounded up in the aftermath of the December 7, 1941, attack on Pearl Harbor, and as a prisoner-of-war camp in the late years of the war. It has also been determined to be eligible as an intact example of a lengthy period of military construction in the State of Hawai'i beginning in 1916 and extending to just after World War II. It represents some of the earliest military construction in the Hawaiian Islands, and its initial development was the earliest important event in U.S. military history on the Island of Hawai'i. The camp is also architecturally significant for its Hawai'i-focused architectural styles (Plantation and Vernacular), use of local materials, particularly lava rock, and the adaptation of the camp buildings to the mountain environment. The period of significance is 1916, when the first three buildings (Buildings 34, 35, and 40) were constructed, to 1947 following the last period of major development in the camp.

Other resources are significant for their association with the history of visitation to the Park. The 1877 Volcano House was once attached to a larger Victorian style hotel addition that was constructed in 1891. The 1877 structure was detached from the 1891 addition and moved to its current location in 1921 sparing it from the fire that burnt and demolished the 1891 structure in 1940. The unique historic building now houses a non-profit partner, the Volcano Art Center Gallery. Significant infrastructure that was key in the development of the Park includes the large rain shed first constructed in the 1920s that provides water for the Park. The Park also retains resources associated with strategic operations of World War II in the Kahuku Ranch Base Camp, which was used by the U.S. military as a radar station for detection of planes and ships between 1939 and 1947. Other resources that relate to World War II history in the Park include landing fields around the Kīlauea caldera, buildings at Kilauea Military Camp used for the temporary detainment of Japanese Issei and Nissei and prisoners of war, and natural areas that were used for military training and bombing ranges.

The Park also has a history of scientific research that is represented in some of its architectural features. The Jaggar Museum, which is a part of the Crater Rim Historic District, and the Whitney Seismograph Vault reflect the beginnings of volcanology studies in the Park. The Wilkes Campsite served as the location of a scientific expedition in the early 1840s led by Lieutenant Charles Wilkes and the U.S. Exploring Expedition on Mauna Loa, which was meant to expand the geographic knowledge of the area and its coasts.

Historic roads within the Park, including Crater Rim Drive, Hilina Pali Road and Mauna Loa Road, convey NPS road design and construction principles dating to the 1930s. Contributing features to the historic roads include stone lined culverts, retaining walls, shelters, lookouts, and nodes of development that are a part of the unique historic character. Historic and ancient trails are found throughout the Park that weave through the landscape of the Crater Rim, descend into

the caldera, as well as reach far into the summits, backcountry, and Wilderness areas of the Park.

Cultural Resources List

There are 43 identified cultural resources within the APE, listed in Table 10 below and depicted in Figure 15. The locations of some archeological sites are considered sensitive information and are therefore not included in Figure 15. Descriptions of each can be found in Appendix G, *Cultural Resources Consultation and Summary*.

Table 10. National Register Eligible, Listed, or Unevaluated Eligible Properties within the APE and Section 4(f) Resources

Property Name	Eligibility Status	Property Type
1790 Footprints	Listed	District, Site
‘Āinahou Ranch House and Gardens	Listed	Cultural Landscape
‘Āinapō Trail	Listed	Structure
Ala Wai‘i Parcel	Unevaluated	TBD
Boles Field (Kīlauea Airfield Study Areas)	Eligible	Site
Chain of Craters Road	Unevaluated	Structure
Crater Rim Drive	Listed	District, Structure
Crater Rim Drive Historic District	Listed	Cultural Landscape, District
Great Crack Parcel	Unevaluated	TBD
Hale ‘Ōhi‘a Tract Historic District	Listed	District
Hawai‘i Volcanoes National Park	Eligible	TCP
Hilina Pali Road	Listed	District
Historical Corral and Chute	Eligible	Structure
Historic Trails	Eligible	Structure
Johnston Summer Residence (Hale Ohia Cottages, Uluwena)	Listed	Building
Kahuku Ranch Base Camp	Eligible	Cultural Landscape, Site
Kahuku Shrines	Eligible	Site
Kahuku Ranch Cultural Landscape	Eligible	Cultural Landscape, District
Kahuku-‘Āinapō Trail	Eligible	Structure
Kahuku-Pōhue Parcel Archaeological Sites	Eligible	Site
Kalapana Fishing and Homesteading Rights	Eligible	TCP
Kīlauea Administration and Employee Housing Historic District	Eligible	Cultural Landscape, District

Property Name	Eligibility Status	Property Type
Kīlauea Crater	Listed	Site
Kīlauea Landing Field (Kīlauea Airfield Study Areas)	Eligible	Site
Kīlauea Military Camp Historic District	Eligible	Cultural Landscape, District
Kīpuka Ka'ōpapa	Eligible	Site
Kīpukakī	Unevaluated	Site
Lithic Block Quarry	Eligible	Site
Mauna Loa Road	Listed	District
Moku'āweoweo Caldera	Eligible	Site
Nāhuku (Thurston Lava Tube) Cultural Landscape	Eligible	Cultural Landscape, District
Nāmakanipaio Cabin Camp District	Eligible	District
1877 Volcano House (Old Volcano House No. 42)	Listed	Building
Pi'i Mauna Dump Site	Unevaluated	Site
Puna-Ka'ū Historic District	Listed	District
Punalu'u Heiau	Unevaluated	Site
Punalu'u Springs	Unevaluated	Site
Pu'uloa Petroglyphs	Eligible	Cultural Landscape
Rain Shed, Building 43	Eligible	Building
Volcano Residential District	Eligible	District
Whitney Seismograph Vault No. 29	Listed	Building
Wilkes Campsite	Listed	Site
World War II Scrape Mounds (Kīlauea Airfield Study Areas)	Eligible	Site

Sources: NPS Cultural Resource Managers and Hawai'i State Historic Preservation Division staff.

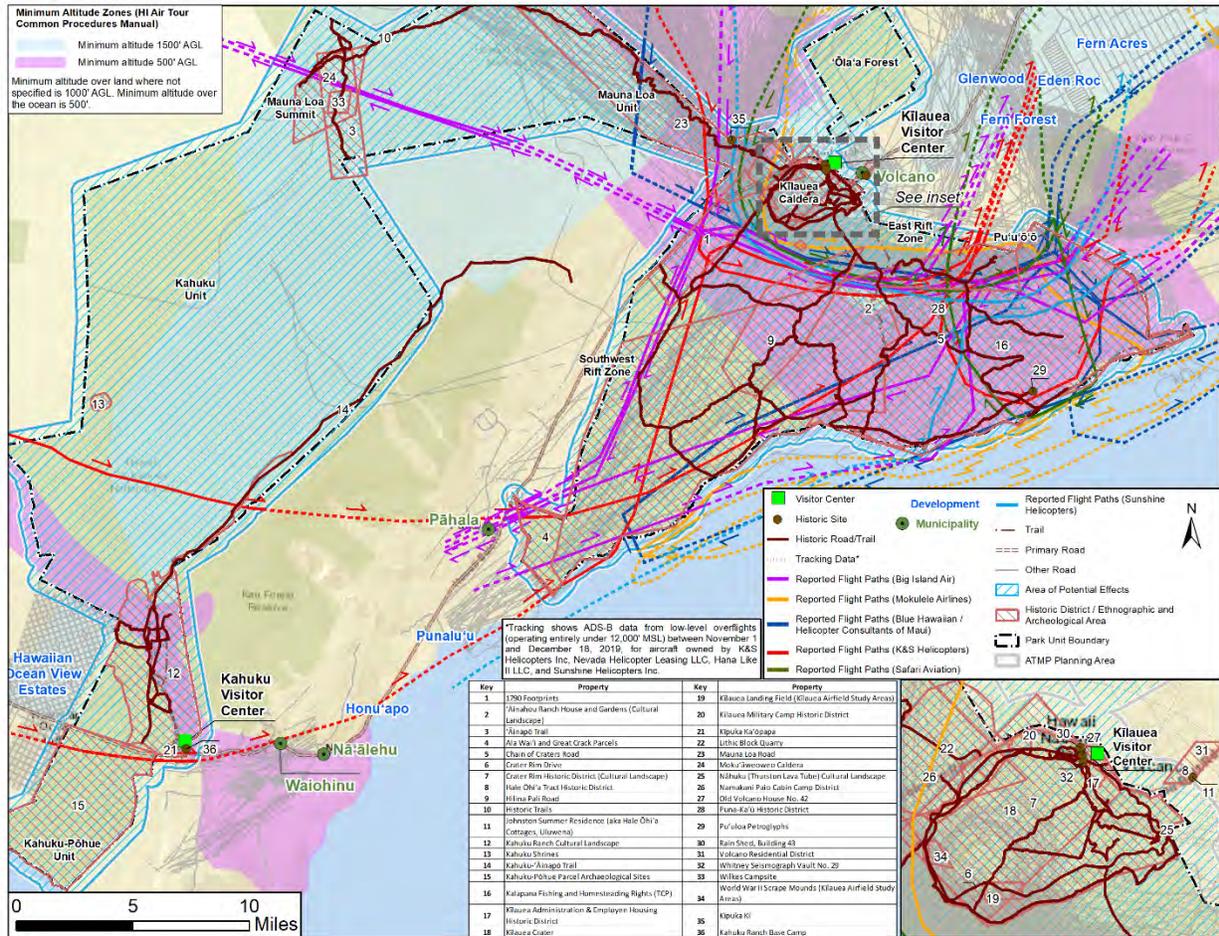


Figure 15. Affected Environment for Cultural Resources.

3.4.2 Environmental Consequences

Cultural resources within the APE include historic, architectural, archeological, and cultural resources, inclusive of ethnographic resources, TCPs, sacred sites, cultural landscapes, historic districts, and prehistoric and historic buildings and structures. Adverse impacts to these resources would occur if the alternative would alter the characteristics of a cultural resource that contribute to its significance in a manner that diminishes the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Commercial air tours, by their nature, have the potential to impact resources for which feeling and setting are contributing elements.

For all alternatives, the proposed action would not limit access to or change ceremonial use of Native Hawaiian sacred sites on federal lands. Sacred ceremonies or other Native Hawaiian activities occur in the Park routinely without notice to the NPS and may be interrupted by noise. Under Alternative 3, larger events, such as Merrie Monarch Festival-related Native Hawaiian

practices, or the Park Cultural Festival, would have a mandatory standoff to limit interruptions by noise from commercial air tours. Commercial air tours have no impact on Native Hawaiian access. Additionally, the proposed action would not involve any ground disturbing or other activities that would adversely affect the physical integrity of sacred sites.

The agencies requested and received consulting party input on the potential impacts of the alternatives on cultural resources throughout the Section 106 process, including at the October 28, 2021, informational webinar, December 10, 2021, listening session, March 11, 2022, listening session, and the November 21, 2022, Section 106 Consulting Party meeting. Consulting parties provided comments during the meetings as well as in emails, written letters, and phone calls following the meetings, and the agencies took into consideration the input from the consulting parties in evaluating the impacts of the preferred alternative on cultural resources.

Alternative 1: No Action

Under the No Action Alternative, cultural resources within the APE would continue to be impacted by air tours, as noise and visual impacts would alter the feeling and setting of those resources. As described in Section 2.2.1, Air Tours at or above Existing Levels, noise and visual impacts from existing air tours impact existing Native Hawaiian ethnographic resources, sacred sites, and TCPs. Native Hawaiians have consistently noted that the persistent air tours over the Park unreasonably interfere with the silence needed to perform ceremonies conducted by Native Hawaiian practitioners at these sacred sites, some of which rely on hearing natural sounds. Under the No Action Alternative, these impacts to ethnographic resources would continue to occur. Reporting data from 2017-2019 indicates that on average, air tour aircraft fly over the APE approximately 31 times per day, and the maximum number of tours reported over the Park during that period was 90 tours in a day, creating the potential for multiple audible intrusions of Native Hawaiian ceremonial practices when the noise from those tours is audible. Based on the *Noise Technical Analysis* (see Appendix F, Section 6, Figure 10), air tour noise above 35 dBA would occur in excess of 120 minutes a day. Noise above 35 dBA would occur across 60% of the Park. The 12-hour equivalent sound level would be up to 46.8 dBA (location point #5), just southeast of the Kīlauea caldera. Under the No Action Alternative, flights over significant features would continue to occur, resulting in visual and audible intrusions that detract from the sanctity of the entire Park as a TCP.

Air tours within the APE may also impact the Park's historical, architectural, and archeological resources, including cultural landscapes and prehistoric and historic structures when air tour noise and visual impacts detract from the feeling and setting of those resources. As noted in Appendix G, *Cultural Resources Consultation and Summary*, the Hawai'i Volcanoes National Park TCP, Footprints National Register District, Puna Ka'ū Historic District, Kalapana Fishing and Homesteading Rights (TCP), Kīlauea Crater, Kīpukakī, and Lithic Block Quarry, as well as several

other historic roads and trails are the cultural resources that experience the most air tours flying directly over or near them under existing conditions. Based on the significant characteristics that make them eligible for listing in the National Register, all of these resources currently have their feeling or setting impacted by the noise and visual impacts of air tours. These impacts would continue to occur under the No Action Alternative.

Alternative 2

Under Alternative 2, commercial air tour aircraft would not fly within the ATMP planning area. The elimination of commercial air tours from the ATMP planning area would reduce the noise and visual intrusions from directly impacting the feeling and setting of cultural resources within the APE and result in beneficial impacts to ethnographic resources and sacred sites, TCPs, archeological resources, cultural landscapes, historic districts, and prehistoric and historic buildings and structures compared to current conditions.

Alternative 3

Alternative 3 would reduce the overall number of air tours in the ATMP planning area and establish flight paths that do not cross directly over most cultural resources in the APE except for the Hawai'i Volcanoes National Park TCP, over part of the Puna-Ka'ū Historic District, over the edge of the Kahuku-Pōhue Parcel Archaeological Sites, and over the Kahuku Ranch Cultural Landscape. The authorized flights paths under Alternative 3 would not fly directly over many sacred sites and ethnographic resources within the APE, including the Moku'āweoweo Caldera, Kīlauea Crater, and many contributing resources to the Hawai'i Volcanoes National Park TCP. Overall, Alternative 3 would eliminate or reduce noise and visual impacts that could detract from the feeling and setting of these resources. Some points in or near the following cultural resources may experience a slight increase in noise intensity and/or duration as compared to current conditions as more flights may fly near these resources than currently pass those areas: the Hawai'i Volcanoes National Park TCP, Kahuku-Pōhue Parcel Archaeological Sites, Kīpuka Ka'ōpapa, Kahuku Ranch Base Camp, Kahuku Ranch Cultural Landscape, Kahuku-'Āinapō Trail, Ala Wai'i/Great Crack Parcels, Pu'uloa Petroglyphs, Puna-Ka'ū Historic District, Kalapana Fishing and Homesteading Rights (TCP), coastal Historic Trails, and Chain of Craters Road.

Overview of Noise Effects Throughout the APE

Under Alternative 3, the *Noise Technical Analysis* (Appendix F, Section 6, Figures 13 and 16) indicates that compared to the No Action Alternative, the time above 35 dBA across the Park would be reduced by up to 70 minutes on days when air tours would occur (see Point 9, Pu'u'ō'ō), and the noise footprint for Alternative 3 as measured by time above 35 dBA potentially affects 31% less of the ATMP planning area on a standard day and 39% less on a quiet technology-only day. Compared to the No Action Alternative, the time above 52 dBA would be up to 19 minutes less on days when air tours would occur (see Point 5, Cone Peak,

Nēnē Area). At some points, time above 35 dBA or 52 dBA may be higher for quiet technology-only days compared to standard days because some quiet technology aircraft, while quieter, are modeled to be audible for a slightly longer period of time than standard aircraft based on the location, route, and type of aircraft modeled for those points.

Compared to current conditions, the $L_{Aeq,12h}$ sound levels would be lower for the interior regions of the Park but may be higher in coastal regions and along the proposed Kahuku Route. As a whole, the noise footprint for Alternative 3, as measured by areas where the $L_{Aeq,12h}$ sound levels would exceed 35 dBA, would be reduced from 13% of the Park to 3% of the Park on standard days and 2% of the Park on quiet technology-only days (see Appendix F, Section 7, Table 10). Alternative 3 would also reduce $L_{Aeq,12h}$ sound levels to zero or near zero for locations near the heart of the Park (e.g., Halema'uma'u Crater and the Kīlauea Visitor Center). Portions of the APE along the proposed flight paths would experience $L_{Aeq,12h}$ sound levels between 35 dBA and 40 dBA, with small areas rising above 40 dBA but below 45 dBA.

Points with Increased Noise

Nine noise points in the ATMP planning area (14, 17, 18, 19, 20, 24, 39, 40, 41) are modeled to experience increases in noise under the FAA and NPS metrics. The agencies identified whether these points were near any cultural resources that have a quiet setting or natural sounds and setting as a significant characteristic. The agencies then analyzed additional noise metrics to determine changes in noise duration and intensity that would be experienced at those properties under Alternative 3 compared to current conditions. Table 13 in Appendix F, *Noise Technical Analysis*, compares the $L_{Aeq, 12 hr}$ under the No Action Alternative to the modeled $L_{Aeq, 12 hr}$ under Alternative 3, Table 14 compares time audible for natural ambient, Table 15 compares time above 35 dBA, Table 16 compares time above 52 dBA, and Table 17 compares the maximum sound levels. The analysis in the Section 106 finding of effects letter interprets the modeled noise metrics in these tables and if any changes in noise have the potential to cause adverse effects to historic properties in the APE. See Appendix G, *Cultural Resources Consultation and Summary* for more information.

The following noise points may experience an increase in duration of noise, but not intensity: 14, 18, 19, 20 (see Appendix F, Section 5, Figure 7 for modeled point locations and Tables 13-17 for comparison of point data). Each of these points represents a coastal area of a cultural resource, many of which include contributing features or as a whole have a quiet or natural setting as a significant characteristic. At most of these points, time above 35 dBA would increase when compared to the No Action Alternative. These points would also see an increase in time audible. However, $L_{Aeq, 12 hr}$ would remain similar to or less than current conditions and the maximum sound levels would substantially decrease at all these points under Alternative 3. This indicates that due to the increased altitudes of the flights under Alternative 3, the air tours

may be audible for a longer amount of time, but they would not be as loud as current conditions.

Points 17, 24, 40, and 41 would have increases in noise duration and intensity on standard days on which air tours would be permitted. Maximum sound levels would decrease on quiet technology-only days when compared to current conditions. There would be increases in the $L_{Aeq,12hr}$ but sound levels would remain under 35 dBA. The increases in time above metrics would be minimal on both standard and quiet technology-only days: time above 35 dBA would increase by up to 11.2 minutes, and time above 52 dBA would increase by up to 2.2 minutes total each operating day. The time audible would increase at all points but less on quiet technology-only days. Each of these points represents coastal or slightly inland locations of multiple cultural resources, many of which include or have contributing features that include a quiet or natural setting as a significant feature. Resources in the vicinity of these points include fishing shrines, trails, traditional fishing areas, culturally sensitive sites, culturally used lava tubes, and other features that require a quiet and/or natural setting.

Only Point 39 increases in all modeled noise metrics although noise levels generally remain low. Point 39 represents a coastal point within the Hawai'i Volcanoes National Park TCP, the Puna-Ka'ū Historic District and is also near the Kalapana Fishing and Homesteading Rights (TCP) and coastal Historic Trails. Contributing features to the TCPs and Historic District in the vicinity of Point 39 include traditional fishing areas, trails, and other features that require a quiet and/or natural setting. $L_{Aeq,12h}$ would increase almost 10 dBA at Point 39, which means sound exposure would almost double on standard days and quiet technology-only days; however, overall, the sound levels would remain low (20-30 dBA). The maximum sound level would increase by 2 dBA on quiet technology-only days and almost 8 dBA on standard days. Increases below ± 3 dBA are generally not perceptible, and the maximum sound level of 60.7 dBA is similar to a commercial area or dishwasher in the next room. Time above 35 dBA and 52 dBA are modeled to slightly increase under Alternative 3, with time above 35 dBA experienced for a total of 7 minutes on a standard day and 10 minutes on a quiet technology-only day, and time above 52 dBA experienced for 1 minute on both a standard day and on a quiet technology-only day. Therefore, while increasing, noise levels generally remain low. At Point 39, air tours would be audible for 36 minutes on quiet technology-only days and about an hour on standard days, which is an increase from current conditions where air tours are not audible and could disrupt experiences that require a quiet setting if they take place during hours that air tours are in operation. However, as further discussed below and in the Section 106 consultation, the measures included in Alternative 3 would reduce the likelihood that traditional uses of cultural resources will be impacted as they would reduce the number of air tours overall and restrict the days of the week and times of day air tours can take place. Any impacts would be temporary and infrequent, and therefore would not result in adverse effects to these cultural resources.

Summary of Effects

Because noise is modeled using conservative assumptions and implementing the ATMP under Alternative 3 would result in limiting the number of flights to 14% of the three-year average of flights flown from 2017-2019 using three consolidated routes and the same aircraft to fly at higher altitudes than existing conditions, noise and visual impacts to cultural resources are expected to overall be reduced under Alternative 3. Alternative 3 would not introduce new audible or visual elements into the APE because air tours are currently occurring in this area. Alternative 3 would substantially reduce the number of air tours within the ATMP planning area, move the air tours away from most sensitive cultural resources and avoid direct overflights of cultural resources, and increase the altitude at which air tours must fly, which would result in beneficial impacts to many cultural resources in the APE. Although Alternative 3 would shift authorized air tour operations to the three proposed flight paths and may expose some cultural resources to increased noise and visual impacts, any increases in noise and visual impacts would not overall substantially diminish the integrity of these resources. The inclusion of no-fly days, time-of-day restrictions to avoid sunrise and sunset, quiet technology incentives, and limiting flights to certain days of the week minimizes impacts to the cultural resources and reduces the likelihood that an air tour would interrupt Native Hawaiian traditional practices. Furthermore, air tours are transitory in nature, and any noise and visual impacts to cultural resources would be temporary, infrequent, and in many cases less intrusive than existing conditions in the Park. Therefore, Alternative 3 would not result in any adverse effects to cultural resources in the APE.

The agencies continued consultation under Section 106 with an evaluation of the effects of Alternative 3, as the preferred alternative, on historic properties. A letter was sent on March 27, 2023, to the Hawai'i SHPD and all consulting parties outlining the Section 106 process, including a description of the undertaking, delineation and justification of the APE, identification of historic properties and an evaluation and proposed finding of effects. Based on this consultation, the FAA proposes a finding that the ATMP will not adversely affect historic properties. See Appendix G, *Cultural Resources Consultation and Summary*, for more information.

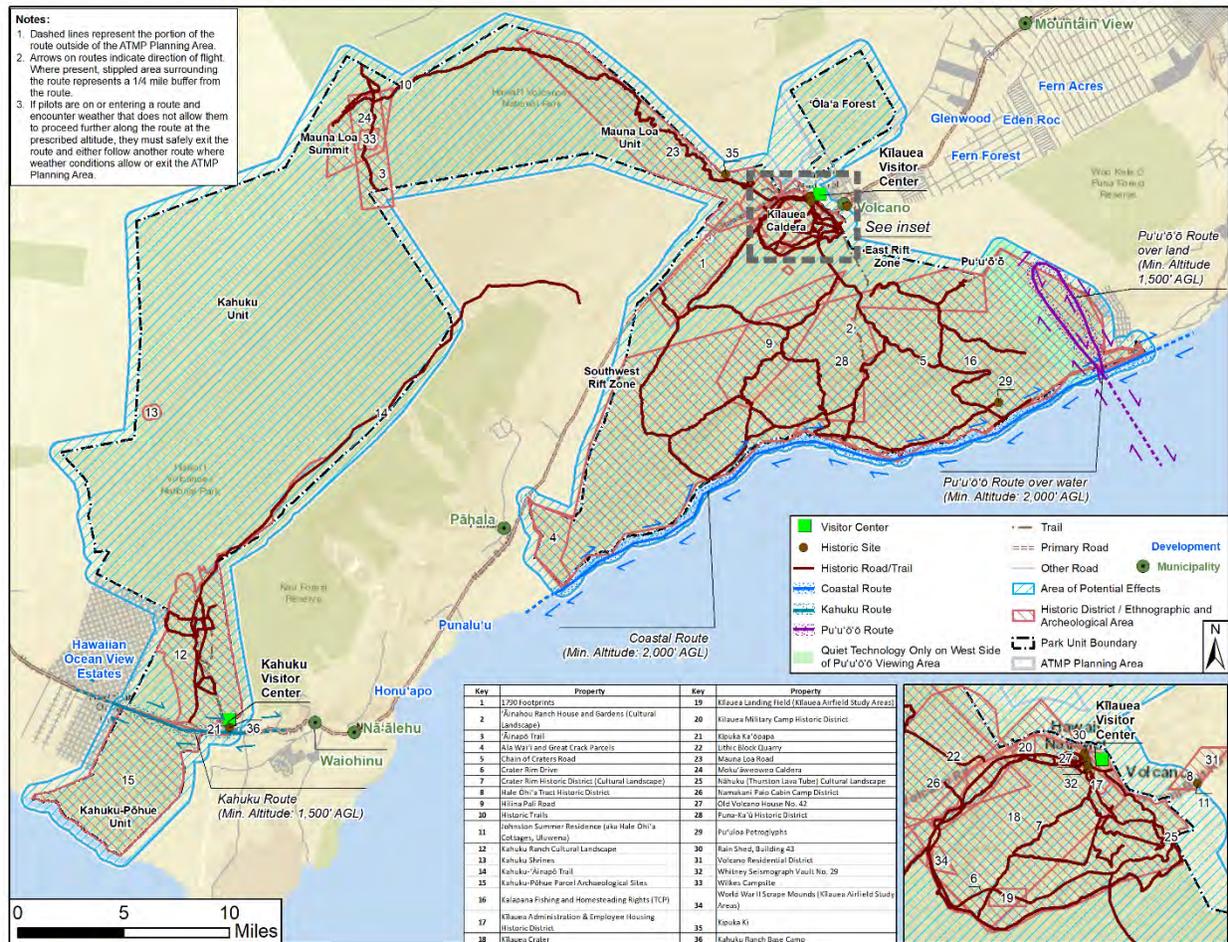


Figure 16. Cultural Resources Environmental Consequences for Alternative 3.

Indirect and Cumulative Effects

Indirect Effects: Indirect effects to cultural resources could occur as a result of noise and visual effects caused by air tours flying outside of the ATMP planning area, including those above 5,000 ft. AGL. As noted in 3.1.2, Indirect and Cumulative Effects for Noise and Noise-Compatible Land Use, indirect noise impacts would have the potential to occur under Alternatives 2 and 3 as these alternatives could result in the displacement of air tours outside the ATMP planning area. The No Action Alternative is not expected to result in indirect effects to cultural resources within the APE. Since Alternative 2 would prohibit flights within the ATMP planning area (whereas Alternative 3 would limit them to no more than 1,565 flights per year in addition to other operating parameters as specified in Section 2.6), Alternative 2 would likely result in more indirect impacts to cultural resources within the APE than Alternative 3.

It is difficult to predict with specificity if, where, and to what extent any displaced air tours under Alternatives 2 and 3 would result in impacts in different and/or new areas. The

preciseness of routes and altitudes for air tours flown on displaced routes are generally subject to Hawai'i Common Procedures Manual and may vary greatly. Under Alternatives 2 and 3, it is reasonably foreseeable that operators may choose to fly along existing flight paths but at or above 5,000 ft. AGL; however, the increase in altitude would likely decrease impacts on ground level resources as compared to current conditions. Helicopter flights above 5,000 ft. AGL in the higher elevations of Mauna Loa are unlikely due to the ground elevation in that area and safety requirements for unpressurized aircraft; however, fixed-wing flights with a pressurized cabin may still fly above 5,000 ft. AGL in these areas. Air tour operators may also choose to fly to points of interest on the island outside of the ATMP planning area, or along the perimeter of the ATMP planning area surrounding the volcanoes in order to view Kīlauea Crater or any active lava. Under Alternatives 2 and 3, some noise and visual impacts to cultural resources could occur at higher elevation areas of the Park to the north with views towards the ocean or near a small area to the southwest of the 'Ōla'a Forest tract in the APE where flights may be more likely to hover to view the Kīlauea Crater compared to existing operations. Any flights above or along the perimeter of the ATMP planning area would likely be reduced from the existing number of flights due to the ATMP restrictions and therefore result in a reduction of noise and visual impacts to cultural resources in the northern portion of the Park, including the Moku'āweoweo Caldera and several contributing resources to the Park TCP.

Cumulative Effects: Other ongoing sources of noise within the APE include Park maintenance and management actions such as administrative flights or the use of mechanized equipment for maintenance. Planned future projects at the Park include a disaster recovery project consisting of entrance road realignment that will adversely affect the Crater Rim Drive, demolition of damaged structures at Uēkahuna bluff including the historic Jaggar Museum (an adverse effect; a Programmatic Agreement is being implemented to mitigate the adverse effects from the disaster recovery project), replacement of waterline and fiber optic lines in the developed area, and construction of a replacement USGS field station on the western edge of the Kilauea Military Camp Historic District. This project will last one to two years, during which there will be some construction noise generated most days, but mitigation measures will be used to ensure that noise is minimized as much as possible. The NPS is also undertaking the development of a trail segment to connect the access road in the Kahuku-Pōhue parcel to an existing historic trail, as well as a project to rehabilitate water systems in the Kīlauea summit area. Ongoing visual impacts within the APE include general aviation flights, overflights by commercial airlines, military flights, and administrative flights such as those used for maintenance or search and rescue efforts, which would likely continue in the same frequency and manner under any of the alternatives, as they occur independently of air tours. These actions have the potential to introduce noise and visual impacts that may impact the feeling and setting of cultural resources. In some cases, these activities detract from the opportunity for traditional cultural practices because mechanized equipment is necessary for the activity.

However, these activities enhance the cultural and natural resources of the Park by protecting and potentially restoring habitat for Native Hawaiian plants and animals, which are significant to the Native Hawaiian people and traditional cultural practices.

The potential for cumulative noise and visual effects of these actions along with those from commercial air tours would be the greatest under the No Action Alternative. The cumulative effects would be fewer for Alternative 3, which limits the number of air tours that would occur as compared to the No Action Alternative, and the fewest under Alternative 2 as there would be no tours permitted within the ATMP planning area. As mentioned, changes in environmental conditions in the APE that may ensue from global climate change include increasing temperatures, decreasing precipitation, increasing storm intensities, and increasing variability in weather patterns (Thomas et al., 2004; Frazier and Giambelluca, 2017). These changes have the potential to affect cultural resources such as the availability of fresh water, which is crucial for traditional Native Hawaiian farming practices. Changes from climate change also threaten to impact archeological site integrity through erosion and increased risk of catastrophic flooding. Ongoing present and future Park management actions by the NPS would continue to occur under any of the alternatives.

3.5 Wilderness

While Wilderness is not an impact category the FAA traditionally examines, the NPS has agency wide (see NPS Management Policies (2006), Chapter 6, and Director's Order 41, 2013) and park-specific guidelines (NPS, 2015) for managing designated Wilderness areas within the National Park System. The Wilderness Act of 1964 is the primary federal legislation regulating the management of Wilderness areas. As a managing agency, the NPS is required to preserve Wilderness character. Pursuant to NPS Management Policies (2006), the NPS manages eligible, study, proposed, recommended, and potential Wilderness as designated Wilderness. NPS Management Policies (2006) Section 6.1. states:

The purpose of Wilderness in the national parks includes the preservation of Wilderness character and Wilderness resources in an unimpaired condition and, in accordance with the Wilderness Act, Wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.

The NPS manages the Wilderness for the following qualities of Wilderness character¹⁸:

- **Untrammeled:** Unhindered and free from the actions of modern human control or manipulation.
- **Natural:** Ecological systems are substantially free from the effects of modern

¹⁸ <https://www.nps.gov/subjects/wilderness/wilderness-character.htm>

civilization.

- **Undeveloped:** Retaining primeval character and influence without permanent improvements or modern human occupation.
- **Solitude or Primitive and Unconfined Recreation:** Ability to provide outstanding opportunities for solitude or primitive and unconfined type of recreation.
- **Other features of value:** Wilderness preserves other features of value that are of scientific, educational, scenic, or historical value.

Since commercial air tours do not land within the Park, the undeveloped quality of Wilderness is not discussed. Additionally, the authorization of commercial air tours is not an intentional manipulation of the environment and therefore the untrammelled quality of Wilderness is also not discussed. Other features of value within the Park's Wilderness including historical, scientific, educational, and scenic resources are discussed in other sections of this draft EA (cultural and ethnographic resources are discussed in Section 3.4, Cultural Resources; scientific and educational activities are discussed in Section 3.3, Biological Resources; and scenic resources are discussed in Section 3.8, Visual Effects) therefore, the other features of value have not been discussed in this section.

The study area for Wilderness includes the designated, eligible, and potential Wilderness areas within the ATMP planning area (collectively referred to as Wilderness) (refer to Figure 17).

3.5.1 Affected Environment

The Park's Wilderness is located on the most isolated land mass in the world and consists of some of the newest land in the world with lava flowing daily as a result of active volcanism (Burroughs, 2017). The Park has four distinct sections of the designated Wilderness that are informally considered units because they vary in characteristics such as vegetation, elevation, location, and climate. These four units, the Mauna Loa, Ka'ū Desert, East Rift, and 'Ōla'a, collectively span approximately 123,100 acres across the Park's 354,461 acres. Refer to Figure 17 for a depiction of the affected environment for Wilderness.

The NPS determined that approximately 121,015 acres of the Kahuku unit are eligible for inclusion under the National Wilderness Preservation System (NPS, 2014). Areas eligible for Wilderness designation include the upland portions of the Kahuku unit, the upslope of pastures, and 100 meters above and along the uppermost four-wheel drive roads (NPS, 2015).

The study area for Wilderness includes 7,500 acres of potential Wilderness per 1978 legislation.¹⁹ Approximately 1,951 acres of the potential Wilderness exist within the Park in an

¹⁹ An Act to authorize additional appropriations for the acquisition of lands and interests in lands within the Sawtooth National Recreation Area in Idaho. (92 Stat. 3467) (P.L. 95-625, Nov. 10, 1978).

area of outstanding geological resources called the Great Crack. The other area of potential Wilderness is located near Nāhuku in the East Rift forest and is owned by the State of Hawai'i. There are 19,201 acres of the Park that have not yet been evaluated for Wilderness eligibility.

Because natural sound is such an integral part of Wilderness character, the NPS considers noise above 35 dBA to negatively impact Wilderness character. As shown in Figure 2 of Appendix F, *Noise Technical Analysis*, the natural ambient conditions in the majority of Wilderness areas range from 25-35 dBA. As described in Section 3.1.1, Affected Environment for Noise and Noise-Compatible Land Use, human-generated noise sources within the study area for Wilderness include wheeled vehicles on roads, such as passenger vehicles and tour buses, and cyclists, and aircraft overflights consisting of high-altitude commercial jet aircraft, occasional NPS flights for management activities or other Park purposes, commercial air tour operations, and private general aviation aircraft.

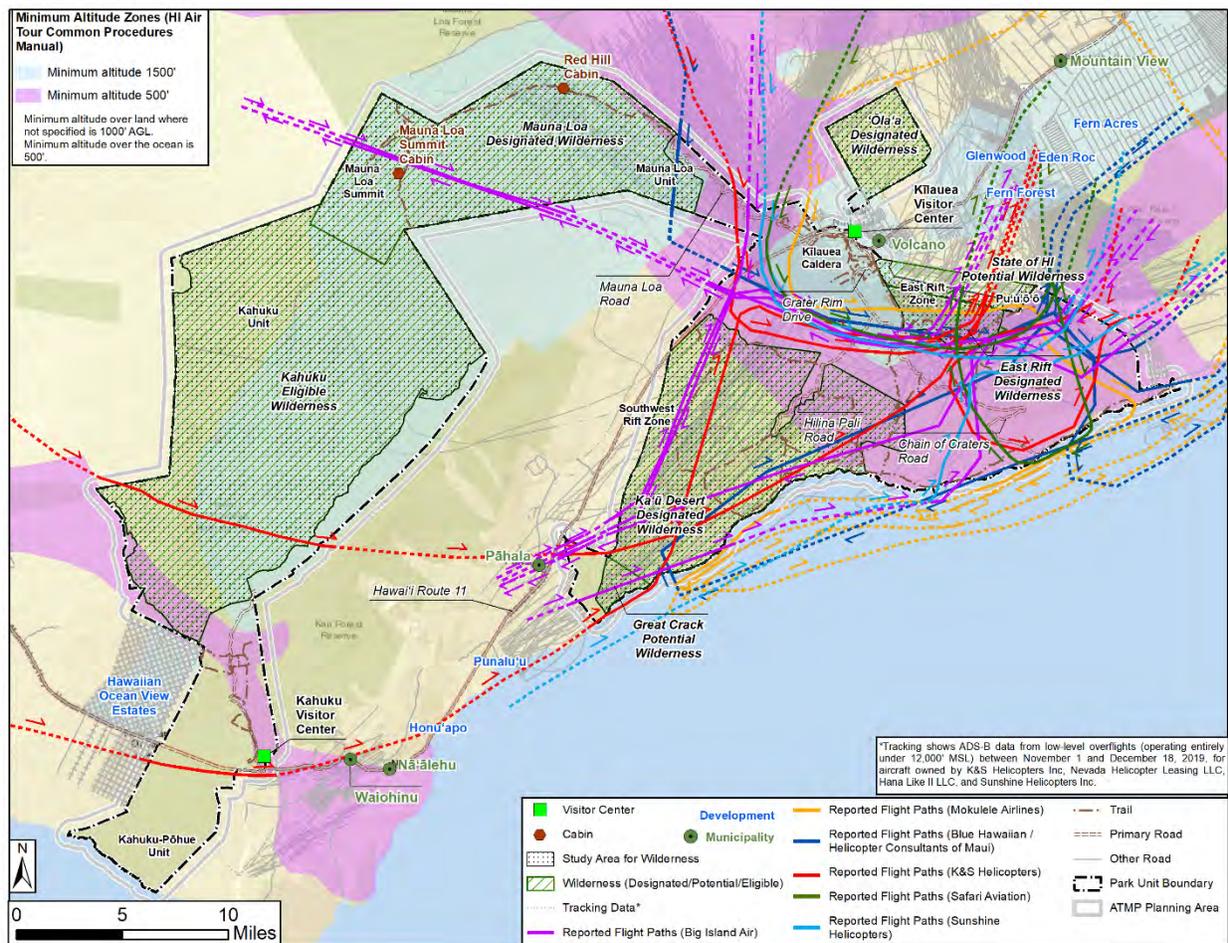


Figure 17. Affected Environment for Wilderness.

Natural

The Wilderness areas within the Park support a diverse community of plant species that allow the natural quality of Wilderness to be preserved. The Mauna Loa unit encompasses the summit of Mauna Loa and extends down the southeast face to just above the Mauna Loa Road. This unit of Wilderness is characterized by koa forest, isolated kīpuka (islands of plant and animal life surrounded by lava), subalpine and alpine shrublands, and extensive barren lava flows at higher elevations. The Ka'ū Desert unit spans the Ka'ū Desert and the coastal areas along the Southwest Rift of Kīlauea, and is characterized by 'ōhi'a woodlands, native shrublands, grasslands, and extensive lava flows. The 'Ōla'a unit is characterized by dense rainforest dominated by ferns. The East Rift unit is characterized by highly dynamic and relatively recent lava flows, pit craters, rainforest, as well as pioneer vegetation that is re-establishing on recent lava flows of the active upper east rift zone of Kīlauea. The Great Crack unit is characterized by its namesake crack that stretches up to 15 meters wide and 20 meters deep in places. It is a superb example of the geologic dynamism of Kīlauea and is just one of a series of cracks, fissures, and cones in the area. The Kahuku Wilderness unit stretches from 12,600 feet in elevation down to roughly 4,600 feet in elevation. The area is characterized by dramatic lava flows and volcanic features along the Mauna Loa Southwest Rift Zone and native montane 'ōhi'a and koa forests.

A natural Wilderness is one where ecological systems are substantially free from the effects of modern civilization. The natural quality is preserved when indigenous species and ecological processes are intact. When the effects of modern civilization impact Wilderness, the natural quality is degraded. The natural quality of Wilderness has been impacted by non-native ungulates that put endemic species at risk. Ungulates can alter vegetative communities through grazing or trampling, as well as disturbing nesting birds and their habitat. The Park has taken measures to prevent and mitigate damage to native species, such as installing fencing around sensitive areas to keep out ungulates.

Further, avian diseases such as avian malaria affect bird populations within the study area for Wilderness, negatively impacting the natural quality of Wilderness character in the Park.

Solitude

The ability to experience solitude is an integral component of Wilderness character. In preserving this Wilderness quality, the NPS places importance on considering the value of maintaining these places where present and future generations have the opportunity to feel free, at peace, and self-reliant, and observe landscapes without modern human effects. There are several opportunities for solitude and unconfined recreation within the Park's Wilderness. Wilderness use typically occurs on marked trails which provide the primary opportunities for visitors to experience solitude.

Within the Mauna Loa unit, trails lead to the summit caldera, the weather observatory off of Saddle Road, and the Kapāpala Forest Reserve. Visitors have access to two developed historic camps and water located at the Red Hill Cabin along the Mauna Loa Trail and the Mauna Loa Summit Cabin at the summit. Trails in the Ka'ū Desert unit provide paths to Kīlauea caldera, Highway 11, the end of Hilina Pali Road, and Chain of Craters Road, and several trails provide access to backcountry campgrounds with water and beaches within the Park. The East Rift unit, known for its scenic volcanic landscapes, receives higher amounts of visitation when there are active lava flows. As such, trails in this unit lead from the various craters and a campground in the East Rift Zone to Chain of Craters Road. There are no formal trails within the 'Ōla'a unit. Wilderness use beyond marked trails is inhibited by dense rainforests and geologic features but does occur in some areas. The Great Crack and Kahuku Wilderness units do not currently have formal trails or visitor facilities. Future planning efforts will consider if trails are needed and would utilize existing historic trail segments where feasible.

Solitude in all of the Wilderness units is disrupted by commercial air tours, and when permitted under a minimum requirement analysis, administrative flights and administrative use of motorized equipment, which audibly and visibly affect the primitive Wilderness experience.

3.5.2 Environmental Consequences

Section 2(a) of the Wilderness Act states that Wilderness areas “shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as Wilderness, and so as to provide for the protection of these areas, the preservation of their Wilderness character.” The NPS manages all categories of Wilderness to enhance Wilderness character consistent with the Wilderness Act and NPS Management Policies and generally manages for the natural, untrammled, undeveloped, solitude and unconfined recreation, and other features of value qualities of Wilderness character. Commercial air tours over the Park may impact the opportunity for solitude or the natural qualities of Wilderness character. Aircraft that land in Wilderness detract from the undeveloped quality of Wilderness. Because commercial air tours do not land in Wilderness or the Park, the undeveloped quality of Wilderness is not considered here.

Keeping it Wild 2, An Updated Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System, 2015 (Landres et al., 2015) notes that Wilderness has traditionally been associated with protecting ecological systems from human impacts (Sutter, 2004) (p.39). Therefore, “the natural quality is preserved when there are only indigenous species and natural ecological conditions and processes” taking place or by the restoration of those ecological conditions (p.11). “Natural quality is preserved when wilderness ecological systems are substantially free from the effects of modern civilization” (p.34). The natural quality of Wilderness may be impacted by actions both outside and inside Wilderness

(p.34). Effects on the natural quality are determined by determining the effects from human actions on ecological systems (p.34).

Solitude includes attributes such as “separation from people and civilization, inspiration (an awakening of the senses, connection with the beauty of nature and the larger community of life), and a sense of timelessness (allowing one to let go of day-to-day obligations, go at one’s own pace, and spend time reflecting). A review of research suggests that solitude encapsulates a range of experiences, including privacy, being away from civilization, inspiration, self-paced activities, and a sense of connection with times past (Borrie and Roggenbuck, 2001)” (p. 51).

Generally, solitude improves when sights and sounds of human activity are remote. Commercial air tours can represent both a sight and sound of human activity and therefore detract from this quality of Wilderness character. Visitors in backcountry and Wilderness areas often find commercial air tours more intrusive than visitors in developed and front-country areas where noise from commercial air tours may not be as audible (Rapoza et al., 2015; Anderson et al., 2011).

Alternative 1: No Action

Based on flight tracking data, the heaviest concentrations of air tours currently fly over the Mauna Loa, East Rift, Great Crack, and Ka’ū Desert Wilderness units. Operators have also reported flying tours over the Kahuku Wilderness unit, though flight tracking data shows very few tours being flown over this area. There is little to no air tour activity reported over the ‘Ōla’a Wilderness Unit, though flight tracking data shows heavy concentrations of air tours being flown near this area near the Kīlauea caldera. Under the No Action Alternative, the existing flight patterns, altitudes, number of tours per year, and other parameters described in Section 2.4, Alternative 1 (No Action Alternative), would continue to occur. The NPS has determined that persistent noise within the Park’s Wilderness areas under the No Action Alternative would continue to unreasonably interfere with the opportunity for solitude and would continue to detract from the natural qualities of Wilderness. The No Action Alternative would continue to adversely impact Wilderness character, as air tour noise within and near Wilderness detracts from the opportunity for solitude and natural quality of the Park’s Wilderness character as described below.

Natural Quality

Air tours at existing levels detract from the natural quality of Wilderness character, which would continue under the No Action Alternative. Specifically, air tour noise currently affects natural resources that are present within the Park’s Wilderness areas, including native forest birds, many of which are threatened and endangered. Noise may affect these species by making it more difficult to forage, mate, or avoid predation, (refer to Section 3.3.2, Environmental Consequences for Biological Resources for more information on noise impacts).

Ongoing air tour noise may result in temporal shifts in songbird vocalization (Gallardo Cruz et al., 2021). The *Noise Technical Analysis* (Appendix F, Section 6, Figure 10) shows that on days when air tours occur, noise above 35 dBA would occur for less than 90 minutes a day in the East Rift and Ka'ū Desert Wilderness units, and for less time in other Wilderness units. All Wilderness units would experience at least some noise above 35 dBA on days when air tours occurred. The potential for impacts to the Park's wildlife that would occur under the No Action Alternative would continue to greatly detract from the natural quality of the Park's Wilderness.

Opportunity for Solitude

The presence of noise and visual intrusion of commercial air tours is a human activity that detracts from the opportunity to experience solitude in Wilderness. Noise from commercial air tours disrupts Wilderness visitors seeking an opportunity for solitude within the Park's Wilderness areas and would continue to occur under the No Action Alternative. The *Noise Technical Analysis* (Appendix F, Section 6, Figure 9) provides context for the noise effects that would occur under the No Action Alternative and that would detract from the opportunity for solitude within the Park's Wilderness areas. This analysis shows that on days when air tours occur (an average of 345 days per year based on 2017-2019 reporting data), the maximum time that air tours could be audible within the Wilderness is less than 360 minutes a day (non-contiguous), which would occur in the East Rift Wilderness Unit. All Wilderness units would experience audible air tour noise in at least some areas, and only the Kahuku and Mauna Loa Wilderness units would have areas that would not experience audible air tour noise on days that air tours occurred. This noise would continue to detract from the opportunity for solitude in the Park's Wilderness areas as it introduces sounds of human activity and therefore detracts from this quality of Wilderness character. The NPS has received complaints from Wilderness users about commercial air tour noise within the East Rift, Mauna Loa, and Ka'ū Desert units, which would continue to occur under the No Action Alternative.

Alternative 2

Under Alternative 2, commercial air tour aircraft would not fly within the ATMP planning area, which would offer the greatest protection to Wilderness. Compared to current conditions, this would enhance Wilderness character by reducing the intensity of noise and number of noise events over Wilderness areas. There would be direct beneficial impacts to the natural quality of Wilderness and the opportunities for solitude under Alternative 2.

Alternative 3

Alternative 3 would not allow air tours to be conducted over any of the designated, eligible, or potential Wilderness within the ATMP planning area (see Figure 18). Compared to current conditions, this would enhance qualities of Wilderness character by reducing the intensity of

noise, the footprint of noise, and the number of noise events over Wilderness areas, although some noise would still be present as described below.

Natural Quality

Impacts to the natural quality of Wilderness character would be fewer than the No Action Alternative because the intensity and duration of air tour noise would be less, which would result in fewer disturbances to forest birds. There would be direct beneficial impacts to the natural quality of Wilderness and opportunities for solitude under Alternative 3. The *Noise Technical Analysis* (Appendix F, Section 6, Figure 13) shows that on days when air tours occur, noise above 35 dBA would occur for less than 15 minutes a day in the Great Crack, East Rift, and Ka'ū Desert Wilderness units. This would occur during both a standard day and quiet technology-only day, though the spatial footprint of noise above 35 dBA in Wilderness would be smaller during a quiet technology-only day. These impacts would detract from the natural quality of Wilderness, although it would represent an overall reduction in impacts compared to current conditions, and the majority of the Wilderness areas within the study area for Wilderness would not experience impacts to the natural quality of Wilderness, as noise above 35 dBA would not occur.

Opportunity for Solitude

Impacts to opportunities for solitude would be less than the No Action Alternative because the intensity and duration of air tour noise would be less, which would result in less of a detraction from this quality of Wilderness character. The *Noise Technical Analysis* (Appendix F, Section 6, Figure 12) shows that on standard days when air tours occur, the maximum time that air tours could be audible within Wilderness is less than 135 minutes a day (non-contiguous) in the East Rift Wilderness unit. Other Wilderness units would experience audible air tour noise for less time. The 'Ōla'a Wilderness unit would experience approximately 200 fewer minutes of audible air tour noise per day on a standard day under Alternative 3. Only portions of the Kahuku and Mauna Loa Wilderness units have portions of the Wilderness that would not experience audible air tour noise during a standard day. On quiet technology-only days, the maximum time that air tours could be audible within Wilderness is less than 120 minutes a day (non-contiguous). All Wilderness units except the Mauna Loa unit would experience at least some audible air tour noise, and the spatial footprint of audible air tour noise is smaller in the Kahuku, Ka'ū Desert, and 'Ōla'a units as compared to standard days, and approximately the same spatial footprint of audible air tour noise for the Great Crack unit. This noise detracts from the opportunity for solitude as it introduces sounds of human activity and therefore detracts from this quality of Wilderness character, although it would be substantially less than current conditions.

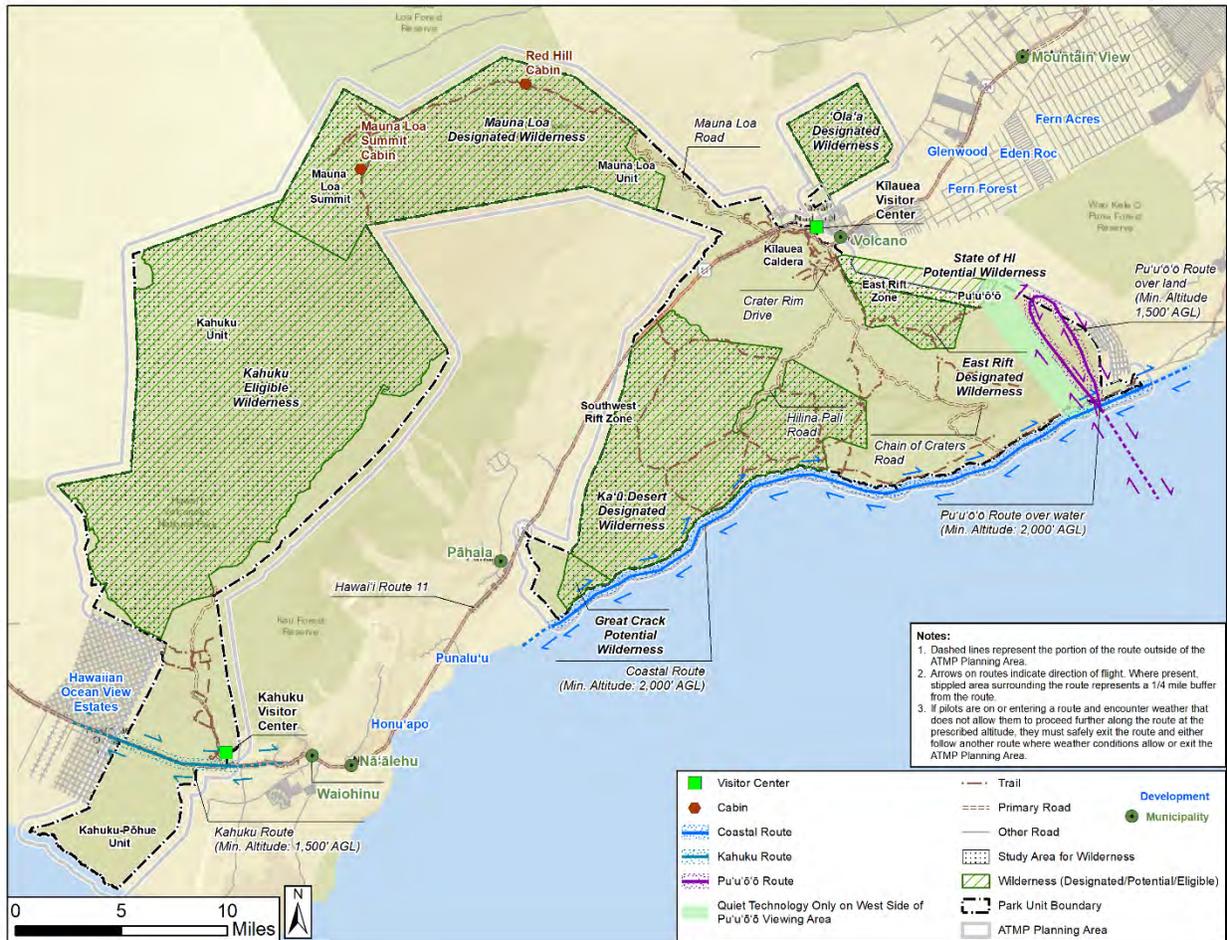


Figure 18. Wilderness Environmental Consequences for Alternative 3.

Indirect and Cumulative Effects

Indirect Effects: Under the No Action Alternative, commercial air tour operations within the ATMP planning area would generally remain consistent with existing conditions, thus there are no indirect impacts to Wilderness that would be expected to occur under this alternative.

Alternatives 2 and 3 would limit the number of flights per year as compared to existing conditions and would therefore have the potential to result in some displacement of air tours outside the ATMP planning area. Air tours occurring outside the ATMP planning area, if any, may result in noise that could affect qualities of Wilderness character to the extent that Wilderness is present in areas near where those air tours would be occurring. Operators may choose to fly along existing flight paths but at or above 5,000 ft. AGL; however, the increase in altitude would likely decrease impacts on ground level resources as compared to current conditions. Operators may also choose to fly just outside of the perimeter of the ATMP planning area surrounding the volcanoes in order to view Kīlauea Crater or any active lava. Air

tours outside the ATMP planning area may occur in the area southwest of the 'Ōla'a Forest tract due to the proximity to Kīlauea caldera and the potential to view any lava that may be present. Therefore, under Alternative 2, some indirect impacts to both the natural quality and opportunities for solitude could occur in the Wilderness as a result of noise from air tours flying just outside the ATMP planning area. Since Alternative 2 prohibits flights within the ATMP planning area whereas Alternative 3 limits them to no more than 1,565 flights per year in addition to other operating parameters as specified in Section 2.7, Summary Comparison of the ATMP Alternatives, Alternative 2 would likely result in more indirect impacts to Wilderness character than Alternative 3 as some tours would still be permitted within the ATMP planning area.

Cumulative Effects: Solitude in the study area for Wilderness is impacted by administrative flights and administrative use of motorized equipment for Park management actions, such as invasive plant removal and trail maintenance, and noise from commercial air tours which audibly and visually detract from the primitive Wilderness experience. Under the No Action Alternative these conditions would continue, resulting in limited opportunities to experience solitude in the Wilderness. Under Alternatives 2 and 3 administrative flights would continue, but noise would likely be less frequent since commercial air tours would be prohibited from flying directly over Wilderness areas below 5,000 ft. AGL. Therefore, the No Action Alternative would result in no cumulative change in the opportunity to experience solitude, while Alternatives 2 and 3 would likely result in a net beneficial effect to the opportunity for solitude. In some cases, management activities detract from the natural quality of Wilderness character because mechanized equipment is determined to be the minimum tool necessary under a minimum requirement analysis. However, these activities enhance the natural quality of Wilderness by protecting native species. The cumulative effects would be fewer for Alternative 3, which would limit the number of air tours that would occur as compared to the No Action Alternative, and the fewest under Alternative 2 as there would be no tours permitted within the ATMP planning area. Under all alternatives, the NPS would continue current management actions and respond to future needs and conditions to improve the natural quality of the Wilderness, while minimizing adverse impacts on the opportunity for solitude and the natural qualities of Wilderness character.

3.6 Visitor Use and Experience and Other Recreational Opportunities

While visitor experience is not an impact category the FAA traditionally examines, the NPS has agency wide (see 2006 NPS Management Policies, Section 8.2) and park-specific guidelines (NPS, 2015) for managing visitors within the National Park System. This section also examines impacts to air tour customers.

3.6.1 Affected Environment

Trends in Visitation and Visitor Demographics

From 2017-2019, the Park welcomed an average of 1.5 million visitors per year (NPS, 2022b). Due to the equable climate year-round, Park visitation is fairly evenly distributed throughout the year, with slightly higher visitation in July, August, and particularly December. However, visitation increases greatly at the time of volcanic activity. For example, a May 2002 eruption caused an increase in the number of visitors that hiked out to the lava-covered section of Chain of Craters Road to view the eruption site; the average of 650 visitors per day in that area increased to between 2,000 and 6,000 visitors per day during the eruption (USGS, 2002). Most Park visitation is for day-use, with visitors typically entering the Park between 10:00 AM and 2:00 PM and visiting just the Kīlauea caldera area. In 2007, most visitors to the Park (68.9-75.0%, depending on the location where visitors were surveyed) were first time visitors to the Park. Most Park visitors were residents of the United States (90.5-91.2%) and were typically between 25 and 54 years of age (Lawson et al., 2007).

Visitor Experience

The character and quality of the visitor experience influences perception of natural areas, providing a unique encounter with a place that differentiates it from other areas. Public enjoyment of resources is a fundamental purpose of all national parks (NPS, 2006). Park visitors have the opportunity to view some of the world's most active volcanoes, view dramatic landscapes, as well as learn about the geologic history of the Hawaiian Islands and learn about the Native Hawaiian culture. Viewing lava is a once in a lifetime opportunity for many of the Park's visitors. In addition to viewing volcanic eruptions and landscapes on scenic drives, visitors can also experience 63 miles of front-country hiking, over 92 miles of backcountry hiking, and utilize front-country campgrounds such as Nāmakanipaio and Kulanaokuaiki, or utilize backcountry campgrounds. The most popular trail in the Park is Kīlauea Iki Trail, located immediately to the east of the Kīlauea caldera. Visitors also have the opportunity to enjoy additional recreational activities such as biking on shared Park roadways, fishing in the Park's coastal Wilderness, bird watching, and viewing wildlife in the seven ecological zones of the Park. Figure 19 depicts various visitor facilities within the Park, including trails, campgrounds, visitor centers, points of interest, and other visitor destinations. Figure 19 also depicts the Park's four management zones (Park support zone, visitor services zone, transitional zone, wild/primitive zone). Of these four zones, the visitor services zone indicates the areas where the greatest concentrations of Park visitors would be expected, as this zone is managed primarily for a high level of visitor use and access.

The Park is open to visitors year-round, with the exception of the Kahuku unit, which is open Thursday through Sunday (except for federal holidays) from 8:00 AM to 4:00 PM. Kīlauea

Visitor Center is open from 9:00 AM to 8:00 PM. Most of the Park's interpretive programs are hosted at the Kīlauea Visitor Center.

A visitor use study conducted at the Park (Lawson et al., 2007) found that the most important reasons for visiting the Park included appreciating the natural scenery, seeing the active lava flows, seeing the summit caldera of Kīlauea volcano, and seeing the Nāhuku (Thurston Lava Tube). About half of all visitors at Steam Vents (43.2%) and Nāhuku (Thurston Lava Tube) (53.9%) reported that hearing the sounds of nature was a very important reason for visiting the Park, and about one-quarter of Steam Vents visitors (29.2%) and one-third of Thurston Lava Tube visitors (32.6%) reported that enjoying peace and quiet was a very important reason for visiting the Park. The same study examined the effects of natural and human caused sounds, including air tour sounds, on the visitor experience at the Park. Most visitors that reported hearing aircraft considered it either unacceptable or annoying and reported negative emotions or feelings associated with hearing aircraft sounds at the Park.

Other Recreational Opportunities

This category applies to persons recreating within the ATMP planning area through the experience of air tours. Air tour customers are able to experience the Park from another viewpoint. The air tour experience often varies depending on weather conditions and other factors such as length of flight and the Park features that are viewed. Commercial air tour companies offer various tours over the Park on helicopters and fixed-wing aircraft. In 2017, an estimated 82,600 people took commercial air tours of the Park, which equates to approximately 4% of the over two million visitors that same year.²⁰

Volcanic activity that results in surface lava flows and other geological features (lava trees, craters, earth cracks) are an attraction for air tours. Pu'u'ō'ō is a point of interest within the East Rift Zone. Lava flows that were visible near Pu'u'ō'ō and along the East Rift experienced 60-80 air tours daily (NPS, 2008). Another volcanic point of interest for commercial air tours includes Mauna Loa rift zones and Kīlauea caldera. Air tours transiting from the west side of the Island of Hawai'i routinely cross the Mauna Loa Road area and during periods of poor weather can dissect the lower part of Kīlauea at lower altitudes. The Park airspace is temporarily restricted by the FAA during hazardous volcanic events which may generate ash, volcanic tephra and hazardous gases. Other sites of interest for commercial air tours over the Park include craters along the East Rift Zone and the expansive views along the coastal areas.

²⁰ The estimated 82,600 people who took commercial air tours of the Park in 2017 is based on reported air tours in 2017 (16,520), multiplied by an estimated 5 passenger seats per aircraft. The number of air tours customers likely overestimates the actual number since it assumes every passenger seat is occupied.

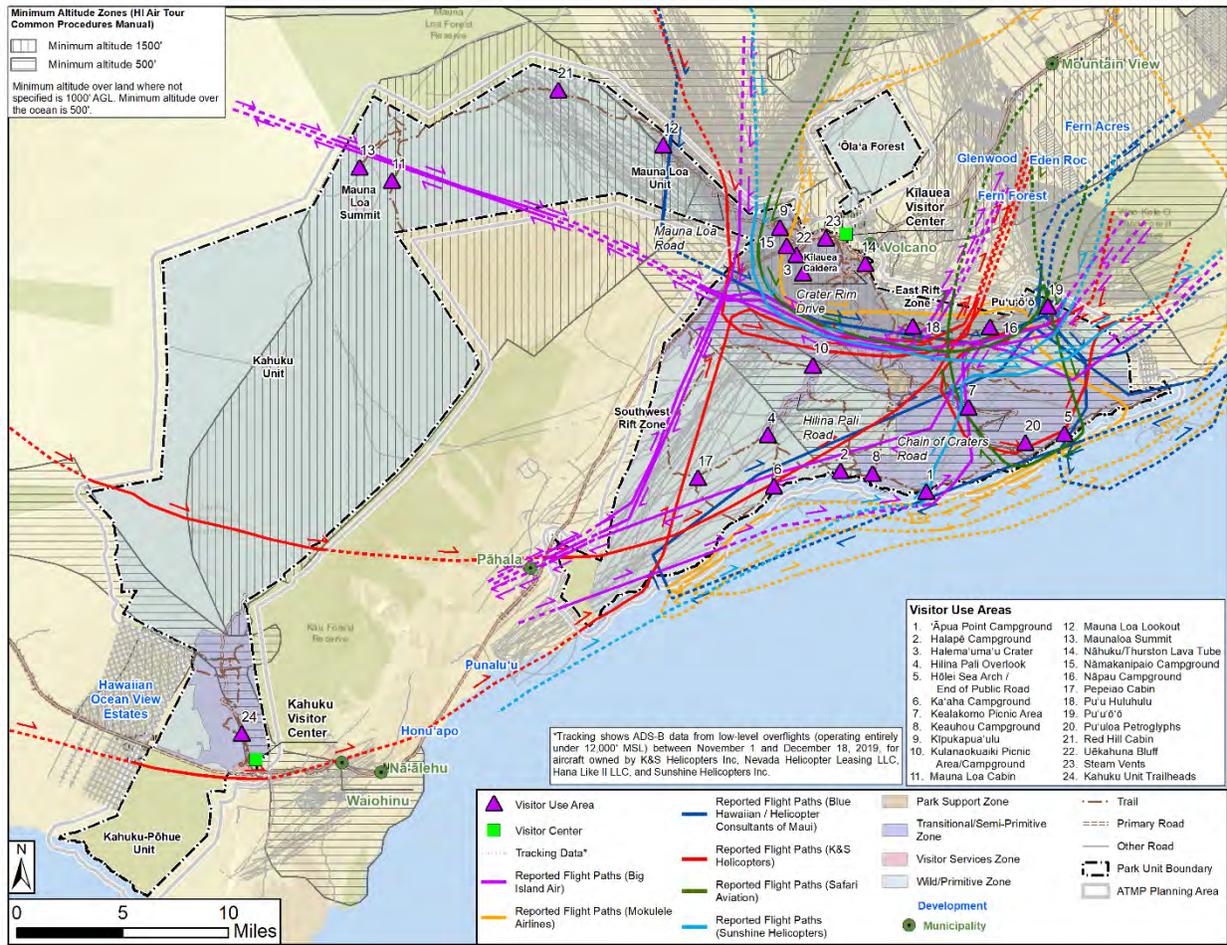


Figure 19. Affected Environment for Visitor Use and Experience.

3.6.2 Environmental Consequences

The NPS allows visitor uses that are appropriate to the purpose for which the park was established and can be sustained without causing unacceptable impacts to park resources or values. Unacceptable impacts are impacts that, individually or cumulatively, would unreasonably interfere with park programs or activities including interpretive programs, or the atmosphere of peace and tranquility, or the natural soundscape maintained in Wilderness and natural, historic, or commemorative locations within the park (NPS, 2006).

Effects of commercial air tours on Park visitor experience have been well documented over many years, one example is the *Report on the Effects of Aircraft Overflights on the National Park System* (NPS, 1995). The primary effect of commercial air tours is the introduction of noise into the acoustic environment of the Park. Numerous studies have identified the value and importance of soundscapes as one of the motivations for visiting parks (Haas and Wakefield, 1998; McDonald et al., 1995; Merchan et al., 2014; Miller et al., 2018), including in a cross-

cultural context (Miller et al., 2018). Other studies have focused specifically on the effects of aircraft on the visitor experience both in parks and protected areas, and a laboratory setting, indicating that aircraft noise negatively impacts the visitor experience (Anderson et al., 2011; Ferguson, 2018; Mace et al., 2013; Rapoza et al., 2015).

Some Park visitors may hear noise from commercial air tours, which may disrupt visitors or degrade the visitor experience at the Park by disturbing verbal communications and masking the sounds of nature. For example, noise from commercial air tours may disrupt visitors during interpretive and educational programs at the Park or while hiking, camping or participating in other activities. Visitors respond differently to noise from commercial air tour overflights – noise may be more acceptable to some visitors than others. Visitors in backcountry and Wilderness areas often find commercial air tours more intrusive than visitors in developed and frontcountry areas where noise from commercial air tours may not be as audible (Rapoza et al., 2015; Anderson et al., 2011). The NPS has established acoustic-based management standards for each of the Park’s visitor use zones (Park support zone, visitor services zone, transitional zone, wild/primitive zone), which are summarized in Table 11 (NPS, 2015):

Table 11. Management Standards for Visitor Use Zones at the Park

Zone	Standard
Park support zone	Permanent noise sources should not exceed sleep dBA thresholds (35 dBA) at the receptor site at nighttime.
Visitor services zone	If dBA levels which cause speech interference occur, management strategies will be triggered. L_{10} does not exceed 45 dBA. ²¹
Transitional zone	Mean difference between natural and ambient dBA (L_{50}) is not more than 1.5 dBA.
Wild/primitive zone	Mean difference between natural and ambient dBA (L_{50}) is not more than 1.0 dBA.

Source: NPS, 2015.

Alternative 1: No Action

Under existing conditions, air tours are concentrated near the Kīlauea caldera and the East Rift zone (see Figure 19), including visitor facilities and points of interest such as Halema’uma’u crater, Kīpukapua’ulu, Nāmakanipaio and Nāpau Campgrounds, Pu’uhuluhulu, Uēkahuna Bluff, Nāhuku (Thurston Lava Tube), and Pu’u’ō’ō, which would continue under the No Action Alternative.

As noted in Section 3.6.1, Affected Environment for Visitor Use and Experience, many ranger-led interpretive programs are offered near the Park’s Kīlauea Visitor Center. The visitor center

²¹ The L_{10} sound level (in decibels) is the sound level exceeded 10 percent of the day.

was one of the modeled location points selected by NPS for analysis in the *Noise Technical Analysis* (point #4, see Appendix F), which indicates that on days that air tours occur, noise above 52 dBA, which is the threshold for speech interference, is expected to occur for less than 0.1 minutes. Ranger-led interpretive programs also occur in the vicinity of Jaggar/HVO (point #37), and this location point was also modeled. The *Noise Technical Analysis* indicates that on days that air tours occur, noise above 52 dBA occurs for 0.2 minutes a day. Therefore, in these locations, the No Action Alternative could result in some impacts to visitor use and experience associated with speech interference during interpretive programs.

Natural quiet is a foundational resource for the Park and a primary reason for visitation, and air tours disrupt natural quiet throughout the Park which affects the visitor experience for activities such as hiking, camping, bird watching, nature viewing, and hearing the sounds of lava flows, all activities which value natural quiet. Air tours would continue to disrupt the natural quiet under the No Action Alternative. The time audible natural ambient metric provides context for the total time that aircraft noise levels would be audible to an attentive listener with normal hearing under natural ambient conditions. Based on the *Noise Technical Analysis* approximately half (48%) of the ATMP planning area would experience audible air tour noise for less than 30 minutes a day (non-contiguous) under this alternative, and 82% of the Park would experience audible air tour noise at some point during a day that commercial air tours occurred. Across the entire ATMP planning area, audible air tour noise would occur for up to 480 minutes a day in areas near Pu'u'ō'ō and the East Rift Zone. As noted in Section 3.6.1, Affected Environment for Visitor Use and Experience, a visitor use study (Lawson, 2007) indicated that peace and quiet is a very important reason for visitors to come to the Park and that the majority of visitors find air tour sounds unacceptable or annoying and reported negative emotions or feelings associated with that sound at the Park. Therefore, noise from commercial air tours under this alternative would negatively impact visitor experience at the Park. Table 12 presents a summary of the No Action Alternative's compliance with NPS acoustic-based visitor use and experience management standards for each of the Park's visitor use zones:

Table 12. Evaluation of Compliance with NPS Management Standards for Visitor Use Zones at the Park for the No Action Alternative.

Zone	Standard	Summary of Compliance
Park support zone	Permanent noise sources should not exceed sleep dBA thresholds (35 dBA) at the receptor site at nighttime.	Not applicable. Commercial air tours are transient, and the resultant noise is temporary. Commercial air tours also do not fly at night. The ATMP would not introduce permanent noise sources that would exceed nighttime management thresholds.

Zone	Standard	Summary of Compliance
Visitor services zone	If dBA levels which cause speech interference occur, management strategies will be triggered. L ₁₀ does not exceed 45 dBA.	<p>The <i>Noise Technical Analysis</i> shows that noise above 52 dBA, which generally corresponds with speech interference, would occur at two modeled location points in the visitor services zone under the No Action Alternative. This includes points #6 (Halema'uma'u Crater, 0.2 minutes) and #37 (Jaggar/HVO, 0.2 minutes).</p> <p>Time above 35 dBA would not exceed 10% of the day (72 minutes) at any of the modeled location points in the visitor services zone (points #4, 6, 24, 37, 38), therefore, neither would time above 45 dBA.</p>
Transitional zone	Mean difference between natural and ambient dBA (L ₅₀) is not more than 1.5 dBA. ²²	Under the No Action Alternative, the noise due to air tours at modeled location points #3, 5, 8, 11, 12, 15, 17, 18, and 20 within the transitional zone would increase the natural ambient by more than 1.5 dBA. The No Action Alternative would not be in compliance with the Park's soundscape management standards for visitor use and experience in these locations within the transitional zone.
Wild/primitive zone	Mean difference between natural and ambient dBA (L ₅₀) is not more than 1.0 dBA. ²²	Using the process described for the transitional zone, under the No Action Alternative, the noise due to air tours at modeled location points #9, 10, 16, 19, 27, and 41 within the wild/primitive zone would increase the natural ambient by more than 1.0 dBA. The No Action Alternative would not be in compliance with the Park's soundscape management standards for visitor use and experience in these locations within the wild/primitive zone.

²² The difference between the L₅₀ natural ambient and L₅₀ ambient sound level including air tours can be reasonably and conservatively assessed by evaluating the difference between the natural ambient L₅₀ (see *Noise Technical Analysis* Table 6) and the cumulative ambient including air tours. The cumulative ambient is the result of an energy summation of the measured natural ambient L₅₀ and modeled L_{eq12h} due to air tours.

In summary, noise from air tours under the No Action Alternative would not meet the NPS's acoustic-based visitor use standards for the visitor services, transitional, and wild/primitive zones in several of the modeled location points. The current level of air tours diminishes visitor opportunities to learn about and be inspired by Park resources and values and the NPS has determined that it unreasonably interferes with Park programs, activities, the atmosphere of peace and tranquility, and the natural soundscapes in Wilderness (NPS Management Policies, Section 1.4.7.1, 2006). Audibility of natural sounds or natural quiet is important to visitor experience at the Park since natural quiet is a fundamental resource of the Park (NPS, 2017). Because the natural ambient sound level of the Park is so low, the persistence of noise across the Park under current conditions interferes with visitor's ability to enjoy natural quiet almost daily (Rapoza et al., 2015). Most impacts to visitor experience under this alternative, which would continue to occur Park-wide with the exception of the Park's developed areas, are related to the intrusion of audible air tour noise where visitors would expect natural sounds to prevail during their visit to the Park.

In addition to interfering with natural soundscapes that allow visitors to hear the sounds of nature, including lava when present, the NPS has documented visitor complaints from ongoing low-level commercial air tours over backcountry areas, lava flow fields, and at various viewing locations around the Kīlauea summit. These effects would continue to occur under the No Action Alternative, as commercial air tours would be able to fly as low as 500 ft. AGL to 1,500 ft. AGL (depending on location) according to the Hawai'i Common Procedures Manual.

Commercial air tours offer a recreational experience for those who wish to view the Park from a different vantage point. Commercial air tour pilots may provide education to commercial air tour customers about the region, its history, and geology. Because the number of commercial air tours under the No Action Alternative would be consistent with the average number of flights from 2017-2019, there would be no or minimal changes anticipated to the availability of this recreational experience under this alternative.

Alternative 2

Under Alternative 2, commercial air tours would not fly within the ATMP planning area which would eliminate this source of noise from the ATMP planning area. Therefore, there would be a direct beneficial impact to Park visitor use and experience since the intensity and presence of noise from commercial air tours would be less than under the No Action Alternative.

Alternative 2 offers the greatest protection of visitor use and experience.

However, Alternative 2 would not allow commercial air tours within the ATMP planning area, so air tour customers who wished to would not be able to view the Park from an aerial vantage point within the ATMP planning area. This would be an adverse effect on those seeking that experience within the ATMP planning area.

Alternative 3

Alternative 3 would permit air tours to be conducted along designated routes and altitudes (see Figure 20). The authorized routes avoid flying directly over or close to areas of the Park that have the highest amount of visitor use, including those near the Kīlauea caldera, which would promote hearing the natural sounds, including of lava, by Park visitors. The designated routes avoid flying over the majority of the Park which would limit the noise effects of commercial air tours to Park visitors. Air tour routes would be limited to areas in the East Rift Zone near Pu'u'ō'ō, over Highway 11 near the Kahuku Visitor Contact Station, and along the coast. The designated Coastal Route would be flown offshore and would not occur directly over coastal visitor use areas such as campgrounds which would reduce potential impacts to visitor experience in these locations. In the area near the Kahuku Visitor Contact Station, the authorized Kahuku Route would be flown over Highway 11 where other anthropogenic noises such as roadway traffic noise is already present and may be more acceptable when audible to Park visitors. Alternative 3 would not be expected to result in impacts to visitor use and experience associated with speech interference during interpretive programs. The *Noise Technical Analysis* (Appendix F, Tables 8-9) shows that noise above 52 dBA would not occur during a standard day or quiet technology-only day at the Kīlauea Visitor Center (point #4) or Jaggar/HVO (point #37) where interpretive programs are typically held within the Park.

The time audible metric in the *Noise Technical Analysis* provides context for the effects of air tour noise on visitor experience where visitors would expect natural sounds and quiet soundscapes to prevail. The *Noise Technical Analysis* indicates that on a standard day under Alternative 3, air tour noise would be audible for up to 150 minutes a day (representing 2% of the Park). Approximately half the ATMP planning area (49%) would experience at least 15 minutes of audible air tour noise a day, and 84% of Park would experience some amount of audible air tour noise on days when air tours occurred. On a quiet technology-only day under Alternative 3, air tour noise would be audible for 135 minutes or more (representing 1% of the Park), and 50% of the Park would experience some amount of audible air tour noise, leaving 50% of the Park free from sounds caused by commercial air tours. Audible air tour noise would be concentrated in the lower elevations of the ATMP planning area and in the East Rift Zone. While this noise may detract from the visitor experience, particularly in areas where visitors would expect to hear natural sounds, the majority of time during the day would be free of air tour noise so visitors would not hear them. This would correspond to improved visitor experience conditions for activities such as camping and hiking, bird watching and wildlife viewing, and lava viewing since visitors would be able to hear natural sounds for the majority of their visit. The time-of-day restrictions included in Alternative 3 would provide further protection to visitor use and experience at the Park by creating times during the day when commercial air tours would not fly within the ATMP planning area so visitors would not experience noise from air tours in this area. In addition, Alternative 3 includes one day

(Sunday) when air tours would not be permitted within the ATMP planning area, so this would provide an entire day where Park visitors would not experience noise from air tours in this area.

When compared to current conditions, Alternative 3 would result in fewer negative impacts to visitor experience in most areas of the Park. Specifically, Alternative 3 would eliminate the 25% of the Park where time audible exceeds 150 minutes under the No Action Alternative, as it would no longer exceed this value. The largest reductions in the time audible metric between Alternative 3 and the No Action Alternative are at Pu'u'ō'ō (301 minutes) and the Mauna Loa Lookout (247 minutes). However, increases in time audible occur at 19 locations. Refer to Table 14 in the *Noise Technical Analysis* in Appendix F. Table 13 presents a summary of Alternative 3's compliance with NPS acoustic-based visitor use and experience management standards for each of the Park's visitor use zones:

Table 13. Evaluation of Compliance with NPS Management Standards for Visitor Use Zones at the Park for Alternative 3.

Zone	Standard	Summary of Compliance
Park support zone	Permanent noise sources should not exceed sleep dBA thresholds (35 dBA) at the receptor site at nighttime.	Not applicable. Commercial air tours are transient, and the resultant noise is temporary. Commercial air tours also do not fly at night. The ATMP would not introduce permanent noise sources that would exceed nighttime management thresholds.
Visitor services zone	If dBA levels which cause speech interference occur, management strategies will be triggered. L ₁₀ does not exceed 45 dBA.	The <i>Noise Technical Analysis</i> shows that noise above 52 dBA, which generally corresponds with speech interference, would not occur at any of the modeled location points that are in the visitor services zone under Alternative 3. Time above 35 dBA would not exceed 10% of the day (72 minutes) at any of the modeled location points in the visitor services zone (points #4, 6, 24, 37, 38), therefore, neither would time above 45 dBA.
Transitional zone	Mean difference between natural and ambient dBA (L ₅₀) is	During both a standard day and quiet technology-only day under Alternative 3, noise due to air tours at modeled location points #17 and 18 within the transitional

Zone	Standard	Summary of Compliance
	not more than 1.5 dBA. ²²	zone would increase the natural ambient by more than 1.5 dBA. Alternative 3 would not be in compliance with the Park's soundscape management standards for visitor use and experience in these locations within the transitional zone, but it would be in compliance in all other modeled location points.
Wild/primitive zone	Mean difference between natural and ambient dBA (L ₅₀) is not more than 1.0 dBA. ²²	During both a standard day and quiet technology-only day under Alternative 3, noise due to air tours at modeled location points #9, 10, and 41 within the wild/primitive zone would increase the natural ambient by more than 1.0 dBA. Alternative 3 would not be in compliance with the Park's soundscape management standards for visitor use and experience in these locations within the wild/primitive zone, but it would be in compliance in all other modeled location points.

In summary, noise from air tours under Alternative 3 would meet the Park's acoustic-based visitor use standards for the visitor services zone across all modeled location points. Alternative 3 would not meet the Park's visitor use standards for two modeled location points in the transitional zone and three points in the wild/primitive zone, but across all other modeled location points it would be in compliance, which represents an improvement compared to the No Action Alternative.

Alternative 3 would limit the availability of air tours for those who wish to view the Park from an aerial vantage point to no more than 1,565 tours per year.

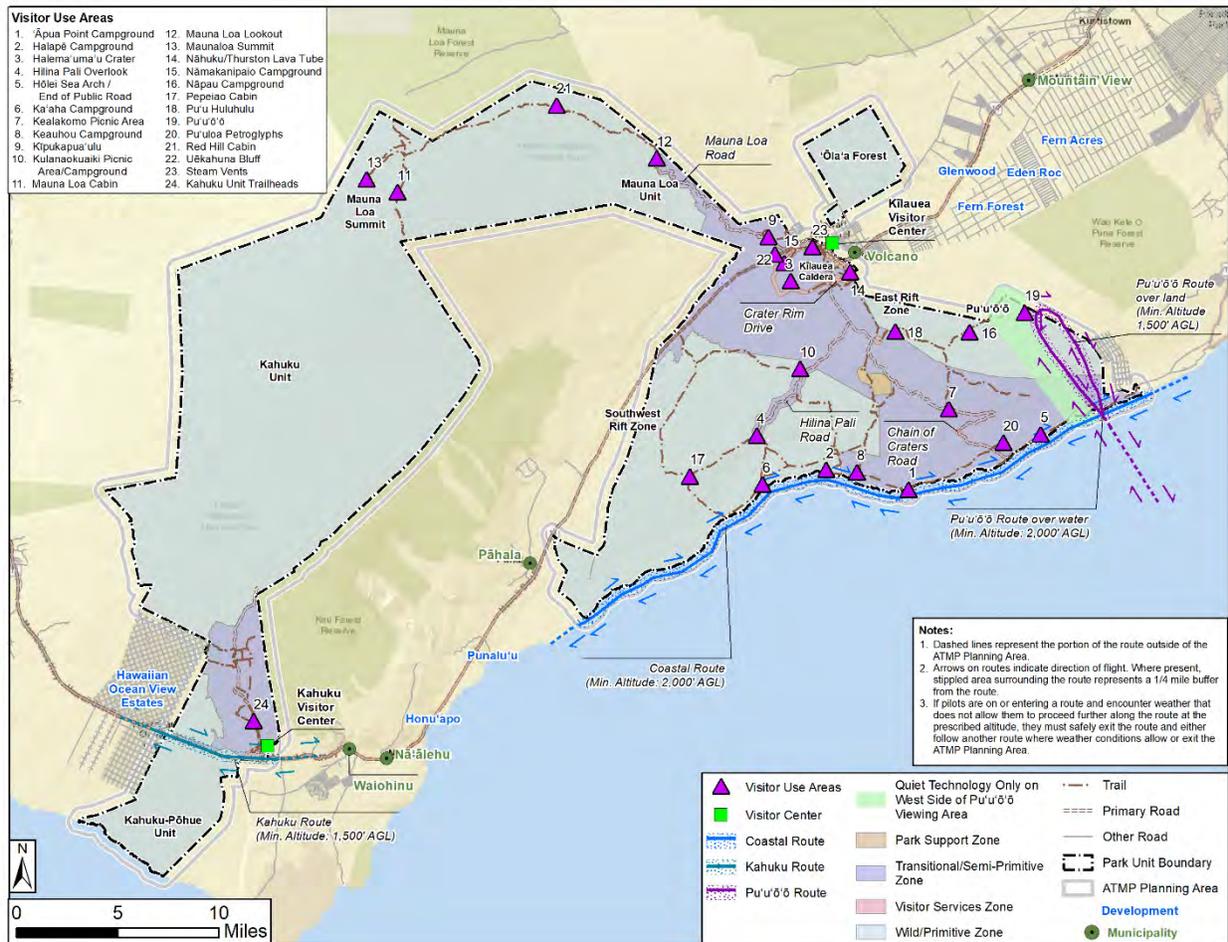


Figure 20. Visitor Use and Experience Environmental Consequences for Alternative 3.

Indirect and Cumulative Effects

Indirect Effects: Under the No Action Alternative, commercial air tour operations within the ATMP planning area would generally remain consistent with existing conditions, thus there are no indirect impacts that would be expected to occur under this alternative.

Alternatives 2 and 3 would limit the number of flights per year as compared to existing conditions and would therefore have the potential to result in some displacement of air tours outside the ATMP planning area. As described in 3.1.2, Indirect and Cumulative Effects for Noise and Noise-Compatible Land Use, air tours occurring outside the ATMP planning area, may result in noise that could affect visitor use and experience to the extent that those facilities and uses were present near where displaced air tours would be occurring. Operators may choose to fly along existing flight paths but at or above 5,000 ft. AGL; however, the increase in altitude would likely decrease impacts on ground level resources as compared to current conditions. Operators may also choose to fly just outside of the perimeter of the ATMP planning area

surrounding the volcanoes in order to view Kīlauea crater or any active lava. Air tours outside the ATMP planning area may occur in the area southwest of the 'Ōla'a Forest tract due to the proximity to Kīlauea caldera and the potential to view any lava that may be present. Therefore, under Alternatives 2 and 3, some indirect impacts to visitor experience and points of interest, likely in the Kīlauea caldera area, could occur if flights were displaced to outside the ATMP planning area. Since Alternative 2 prohibits flights within the ATMP planning area whereas Alternative 3 limits them to no more than 1,565 flights per year in addition to other operating parameters as specified in Section 2.6, Alternative 2 would likely result in more indirect impacts to visitor experience than Alternative 3.

Cumulative Effects: Under existing conditions, periodic helicopter flights are necessary to carry out Park management actions including maintenance, resource management, search and rescue and other operations. The noise from these administrative flights occasionally disrupts visitors. Because these flights generally occur throughout the Park and are not concentrated in any one area, they are not a source of consistent disruption on the visitor experience. These flights are anticipated to continue to facilitate resource stewardship projects and scientific research under any of the selected alternatives. Other noise from building and trail maintenance and construction activities occasionally disrupts visitors, but these activities are temporary and short-term in nature. Alternative 3 would result in less cumulative noise that could affect the visitor experience in the ATMP planning area than the No Action Alternative, given the reduced number of flights, designated routes, and other conditions that would be required by Alternative 3. However, it could allow for more cumulative noise impacting the visitor use and experience than Alternative 2, where flights would not be authorized in the ATMP planning area. Ongoing present and future Park management actions by the NPS would continue to occur under any of the alternatives.

3.7 Environmental Justice and Socioeconomics

As mandated by EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994), "each federal agency shall make achieving environmental justice part of its mission by identifying and addressing as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." In addition to EO 12898, DOT Order 5610.2c, Final Order to Address Environmental Justice in Low-Income and Minority Populations requires the FAA to incorporate environmental justice principles in project development and provide meaningful public involvement opportunities to minority and low-income populations, known as "EJ populations." For the purposes of this EJ analysis, the FAA uses the minority and low-income definitions provided in DOT Order 5610.2c.

Socioeconomics is an umbrella term used to describe aspects of a project that are either social or economic in nature, or a combination of the two. A socioeconomic analysis evaluates how

elements of the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s) (FAA, 2020). The CEQ regulations for implementing NEPA, 40 CFR 1500, direct economic analyses of federal actions that will affect local or regional economies. The policies and rationale associated with including an evaluation of socioeconomic impacts in the NEPA process are found in Section 1.4.7.1 of NPS Management Policies (2006). The factors of socioeconomics discussed in this draft EA include the tourism industry. U.S. Census Bureau data was used to evaluate social and economic factors of the study area.

The combination of all the other relevant impact categories represents the potential environmental justice impact, because environmental justice impacts may be realized in conjunction with impacts to any other impact category. Section 3.7.2 discusses the relevant resources that may have impacts considered in conjunction with EJ for this draft EA. Refer to each environmental impact category's respective section in this draft EA for a description of the study area limits and Figure 21 for a depiction of the study area used for the EJ and socioeconomic analyses. The analysis incorporates data presented at the county level and from census block groups that are within and adjacent to the study area. Data from the block group level is compared to county level data to determine populations of EJ concern.

3.7.1 Affected Environment

Environmental Justice

The most recent minority and low-income information was analyzed through 2020 U.S. Census Bureau data sets. U.S. Census Bureau data is collected in five descending groupings corresponding to geographic area. The groupings are as follows: state, county, tract, block group, and block. Block group is the smallest unit for which income and poverty level information is available. Block level data is the smallest unit for which race and minority information are available. The agencies used data from the American Community Survey (ACS) to determine socioeconomic and racial characteristics of the population. AEDT version 3e was used to screen for Potential Environmental Justice Populations. The analysis includes selecting a unit of analysis and comparing it to an appropriate reference community. If the percentage of minority or low-income populations in the unit of analysis exceed the reference community threshold, then those geographic units are populations of EJ concern. In this case, the agencies identified block level data within the study area (unit of analysis) and compared that data to the county (appropriate reference community). Data from the block group level was then compared to county level data to determine populations of EJ concern.

For this analysis, a minority census block group of EJ concern is a census block group (unit of analysis) with a minority population percentage greater than the average minority population percentage in the county (reference community). The average percentage of minority populations at the block group level residing within the study area is 68% (ACS 2016-2020).

Therefore, every census block group with a percentage of minority population greater than the average minority population of approximately 68% is designated a census block group of EJ concern. For this analysis, a low-income population census block group of EJ concern is a census block group with a greater percentage of low-income population than the average percentage of low-income population in the study area. The average percentage of low-income populations at the block group level residing in the study area was 14% (ACS 2016-2020). Therefore, every census block group with a low-income population greater than 14% is designated a census block group of EJ concern.

Figure 21 (ACS, 2016-2020) depicts locations of EJ concern by block group within the study area. Table 14 (ACS, 2016-2020) shows the minority and low-income data for Hawai'i County and block groups within the study area.

Table 14. Minority and Low-income Population Data within Hawai'i County and the Study Area

Area	Population	Minority	Low-Income
Hawai'i County	201,350	141,256	64,201
Block Groups within Study Area	22,510	15,086	3,826

Source: ACS, 2016-2020

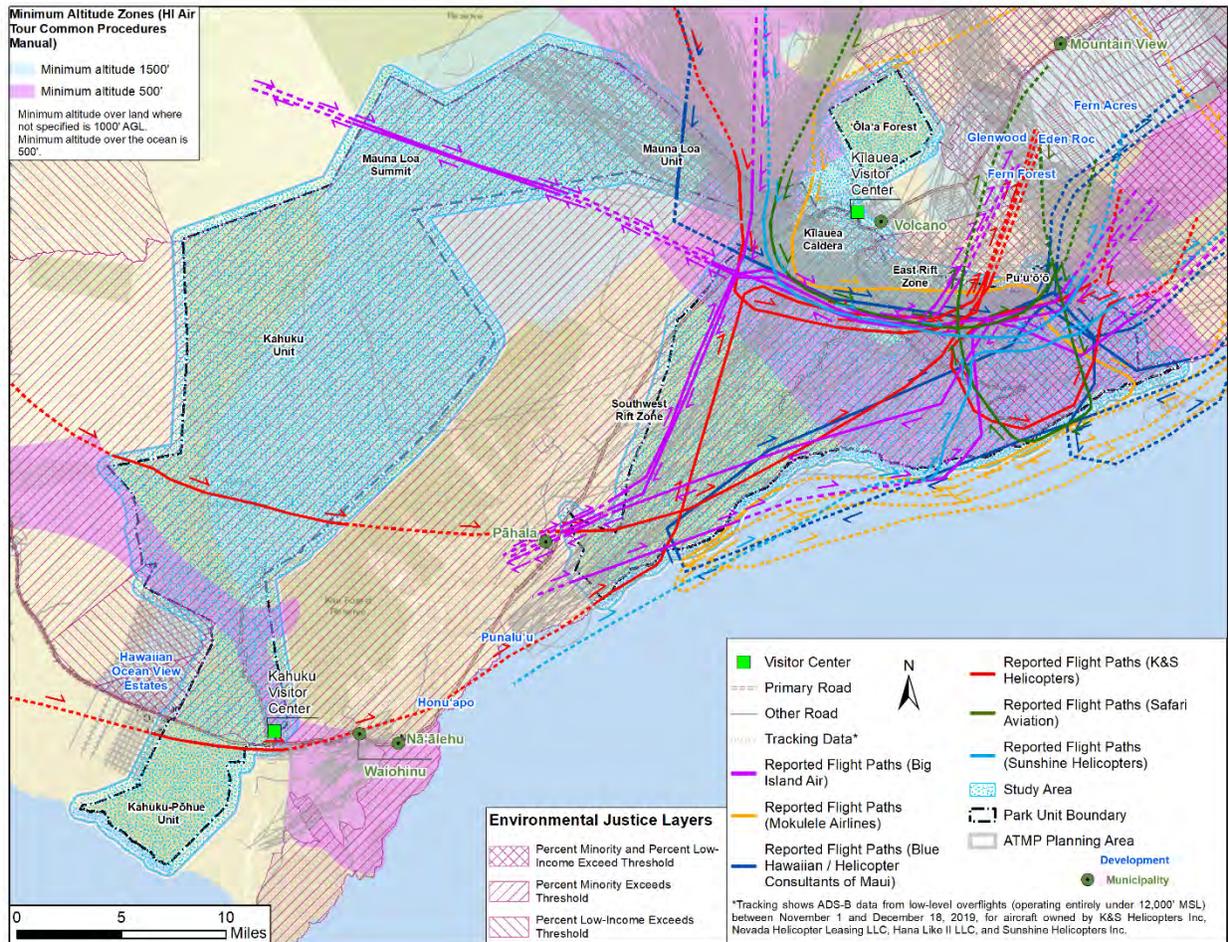


Figure 21. Affected Environment for Environmental Justice.

Socioeconomics

This section describes the socioeconomic conditions that may be affected by the alternatives. Socioeconomic impacts of the alternatives include the potential impacts commercial air tour operations have on two interest groups: 1) local residents living in close proximity to the Park, who may be affected by both the number of air tours and the manner in which they are conducted and 2) air tour operators in Hawai'i, specifically the ten air tour operators with IOA for the Park and their employees, and the associated tourism industry. The factors of socioeconomic discussed in this draft EA include population demographics, industry, employment and income.

Industry

Hawai'i County is the most rural county in Hawai'i and accounts for a majority of the farm employment in the state. The principle agricultural products on the Island of Hawai'i are fruits,

tree nuts, and berries (U.S. Department of Agriculture, 2017). The Kona district in the western part of Hawai'i County is the coffee belt of the United States and is also known for its beachfront resorts and offshore deep-sea fishing. Despite the importance of agriculture in the county and its national prominence, this industry accounts for only a small percentage of the total jobs in Hawai'i County, with the largest sources of employment being service-based jobs such as retail, health care, social assistance, and federal employment. In 2021, the air transportation industry represented 400 jobs in Hawai'i County,²³ or less than 1% of the county's overall employment (Hawai'i Department of Business, Economic Development and Tourism, 2021). Across the state, employment in manufacturing decreased by approximately 50% between 1990 and 2022, while employment in education and health services grew by approximately 80% during the same time period (Hawai'i Department of Business, Economic Development and Tourism, 2022).

The Park also plays an important role in the industry and employment of the area and is often the top visited site in the State of Hawai'i. The Park provides seasonal, term, permanent full-time, as well as part-time positions. In 2021, the Park employed 79 full-time employees and 1,262,747 visitors spent \$117 million in communities near the Park, and that spending supported 1,220 jobs in the local area (Hawai'i Volcanoes National Park Fact Sheet, 2022). In addition to these expenditures and benefits, the Park also supports the local economy when utilizing local vendors or awarding contracts to local businesses, for example, through wastewater management services or purchases of office supplies. From 2017-2019, the Park welcomed an average of 1.5 million visitors per year which does not include people who take air tours over the Park, who contribute to the local economy through tourism.

Commercial Air Tours

Commercial air tour operators currently fly an average of 11,376 flights per year (based on the average of reporting data from 2017-2019) over the Park. There is a \$25 fee for commercial air tours entering Park airspace. As per the Federal Lands Recreation Enhancement Act,²⁴ a majority of the revenues are used for facility improvement projects within the Park.

The price per person for each air tour varies by company and can range from \$350-\$650 per person (Blue Hawaiian Helicopters 2022; Safari Helicopters Hawai'i 2022). The air tour industry employs pilots, mechanics, office administrators, and other types of jobs to conduct business. In 2022, 400 individuals worked in the air transportation industry in Hawai'i County (which includes both the air tour industry plus commercial airlines and airport employees),

²³ The air transportation industry includes all forms of air transportation related employment, including but not limited to commercial air tourism.

²⁴ The Omnibus Budget Reconciliation Act of 1993.

representing approximately less than 1% of the county's total employment (Hawai'i Department of Business, Economic Development and Tourism, 2022). In addition to people directly employed by air tour operators, others are indirectly involved with the industry including hotels, tour booking agents, and advertising and marketing professionals. Employment supported by the air tour industry provides income to workers and indirectly provides revenue to local businesses as a result of employee and operator spending.

3.7.2 Environmental Consequences

In accordance with FAA Order 1050.1F the following factors were considered to determine if the action would have a disproportionately high and adverse impact to an EJ population, i.e., a low-income or minority population:

- significant impacts in other environmental impact categories; or
- impacts on the physical or natural environment that affect an EJ population in a way that the FAA determines are unique to the EJ population and significant to that population.

This assessment is provided for each alternative below. As shown in Figure 21, minority and low-income populations of EJ concern are present throughout nearly the entire study area. Specific impacts associated with each alternative are discussed in more detail below.

For socioeconomic impacts, FAA considers the following factors when evaluating the severity of impacts which include the potential to:

- induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing projects in an undeveloped area);
- disrupt or divide the physical arrangement of an established community;
- cause extensive relocation when sufficient replacement housing is unavailable;
- cause extensive relocation of community businesses that would cause severe economic hardship for affected communities;
- disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or
- produce a substantial change in the community tax base.

The analysis below reflects the results of the impact analysis for noise, visual, and air quality effects as they are the impact categories that would be reasonably expected to affect EJ

populations, though impact conclusions for other environmental impact categories are reflected in other sections of this draft EA.

Alternative 1: No Action

Under existing conditions, based on flight tracking data, the heaviest concentrations of commercial air tours within the study area fly over census block groups that contain populations of EJ concern or “EJ populations.” Reporting data from 2017-2019 indicates that residents in these areas have the potential, on average, for exposure to commercial air tour aircraft approximately 31 times per day, and the maximum number of air tours reported within the ATMP planning area during this time period was 90 tours in a single day. Based on reported data, the existing air tours occur between 6:00 AM and 4:00 PM. The altitudes vary between 500 – 1,500 ft. AGL.

Air tours are concentrated over the heart of the Park near Kīlauea and the East Rift zone. Block groups within these areas are comprised of low-income and minority EJ populations.²⁵ Therefore, EJ populations currently experience the noise, air quality, and visual effects associated with air tours under current conditions as described in more detail below.

The noise impacts analysis for the No Action Alternative (see Section 3.1, Noise and Noise-Compatible Land Use) indicates that the No Action Alternative would not result in noise impacts that would exceed 65 dB DNL. The DNL is expected to be below 50 dB under the No Action Alternative.

For air quality impacts (see Section 3.2, Air Quality and Climate Change), the No Action Alternative would not cause pollutant concentrations to exceed one or more of the NAAQS for any of the time periods analyzed, or increase the frequency or severity of any such existing violations. The total amount of annual GHG emissions resulting from commercial air tours over the Park is 1,851 MT CO₂.

Under the No Action Alternative, impacts to viewsheds would continue to primarily occur near Kīlauea summit, along the East Rift Zone, and over parts of Chain of Craters Road, and Crater Rim Drive. Impacts would continue to occur to visual resources under the No Action Alternative as air tours would affect the nature of the visual character of the area and would continue to contrast the scenic vistas and natural areas in the Park. The visual resources of the Park would still be viewable at times of the day when commercial air tours were not present within the

²⁵ Note that while residential use of the Park is limited to that provided by NPS temporary housing, the block groups encompassing the Park also encompass areas outside of the Park. Because block groups are the smallest unit of analysis for which data is available to identify EJ populations, these geographic areas inside and outside the Park have been lumped together as containing EJ populations, but the Park does not contain residential settlements other than temporary NPS housing.

study area (on average, air tours were conducted within the study area 31 times per day) (see Section 3.8, Visual Effects).

In summary, the No Action Alternative would not result in disproportionately high and adverse noise, air quality, or visual effects to EJ populations. Under the No Action Alternative, the number of commercial air tours conducted by operators would vary from year to year, but would likely be consistent with the number of tours reported in the timeframe from 2017-2019 (an average of 11,376 tours per year). Therefore, the amount of income generated for air tour operators and other ancillary businesses as well as employment would likely be consistent with income generated during that timeframe. The No Action Alternative would not induce substantial economic growth, disrupt or divide physicality of community, cause extensive relocation, disrupt traffic patterns, or produce a substantial change in the community tax base.

Alternative 2

Under Alternative 2, commercial air tours would not fly within the ATMP planning area. Therefore, there would be direct beneficial impacts on noise, air quality, and viewsheds within the study area as a result of the elimination of commercial air tours in the ATMP planning area (see Section 3.1, Noise and Noise-Compatible Land Use; 3.2, Air Quality and Climate Change; and 3.8, Visual Effects). Alternative 2 would result in a reduction in noise, air quality, and visual impacts compared to those currently occurring under existing conditions, therefore, this alternative may result in a benefit to EJ populations within the study area, and Alternative 2 would not result in disproportionately high and adverse noise, air quality, or visual impacts to EJ populations.

Because Alternative 2 would prohibit air tours from flying within the ATMP planning area, air tour operators and other ancillary businesses would not be able to generate income from conducting tours in this area. Additionally, the NPS would not collect a fee as no air tours would enter the Park's airspace. There could be some economic benefit under this alternative to businesses within the study area that benefit from quieter noise levels and/or the absence of human-caused sounds. This may include Park visitation, or it could include agricultural operations that occur in the study area that would experience less disturbance from human-caused sounds.

Alternative 2 would not induce substantial economic growth, disrupt or divide physicality of community, cause extensive relocation, or disrupt traffic patterns. Alternative 2 could result in some impacts to employment or the amount of income that air tour operators and other ancillary businesses could generate from conducting air tours within the ATMP planning area as would occur under the other alternatives. However, the air transportation industry represents less than 1% of the total employment in Hawai'i County, and the prohibition on air tours within the ATMP planning area would not preclude operators from making up this revenue generation

in other ways such as using their aircraft for other business ventures or conducting air tours elsewhere within the region (see below for a discussion of indirect socioeconomic effects). Therefore, it is unlikely that Alternative 2 would result in large socioeconomic impacts to the surrounding community, including those associated with changes to the community's tax base associated with loss of industry.

Alternative 3

Alternative 3 would permit air tours to be conducted along designated routes and altitudes (refer to Figure 22) within the ATMP planning area. The authorized routes for this alternative are located over Highway 11 in the Kahuku Unit, part of the East Rift zone, and offshore from the coastal boundary of the Park but within the ½ mile buffer. Compared to the No Action Alternative, Alternative 3 would result in fewer direct noise, air quality, and visual impacts as described for each impact category below.

In consideration of the noise impacts of Alternative 3, (Section 3.1, Noise and Noise-Compatible Land Use), the DNL analysis indicates that Alternative 3 would not result in noise in excess of 65 dB DNL. The resultant DNL for Alternative 3 is expected to be below 45 dB.

For air quality impacts (see Section 3.2, Air Quality and Climate Change), Alternative 3 would not cause pollutant concentrations to exceed one or more of the NAAQS for any of the time periods analyzed, or increase the frequency or severity of any such existing violations. The total change in annual GHG emissions for Alternative 3 as compared to the No Action Alternative is modeled to be a reduction of 1,388 MT CO₂ within the ATMP planning area.

For visual impacts, Alternative 3 would provide protection to Park viewsheds, including those overlooking Kīlauea, part of the East Rift Zone, and along Crater Rim Drive and the upper parts of Chain of Craters Road. Commercial air tours along the authorized route under Alternative 3 may be visible from the Park's coastal areas and lower Chain of Crater Road, parts of the East Rift zone, and over Highway 11 near Kahuku, but they would avoid most other scenic points of interest or overlooks within the ATMP planning area (see Section 3.8, Visual Effects). The limited duration and reduced number of air tours that would occur under Alternative 3 as compared to the No Action Alternative would result in fewer impacts to viewsheds than those under existing conditions, including those viewsheds that may be used by EJ populations within the study area. Alternative 3 would protect the visual character of the Park and its viewsheds, including the importance, uniqueness, and aesthetic value of the affected visual resources. Other than times of day when commercial air tours were present within the ATMP planning area, this alternative would not contrast with the visual resources and/or visual character in the study area or obstruct views of the visual resources.

In summary, Alternative 3 would not result in disproportionately high and adverse noise, air quality, or visual impacts to EJ populations. The same socioeconomic effects stated under

Alternative 2 would occur under Alternative 3, but those effects would be fewer (including the potential for impacts associated with changes to the community's tax base), as some air tours would still occur within the ATMP planning area. Alternative 3 would not induce substantial economic growth, disrupt or divide physicality of community, cause extensive relocation, or disrupt traffic patterns.

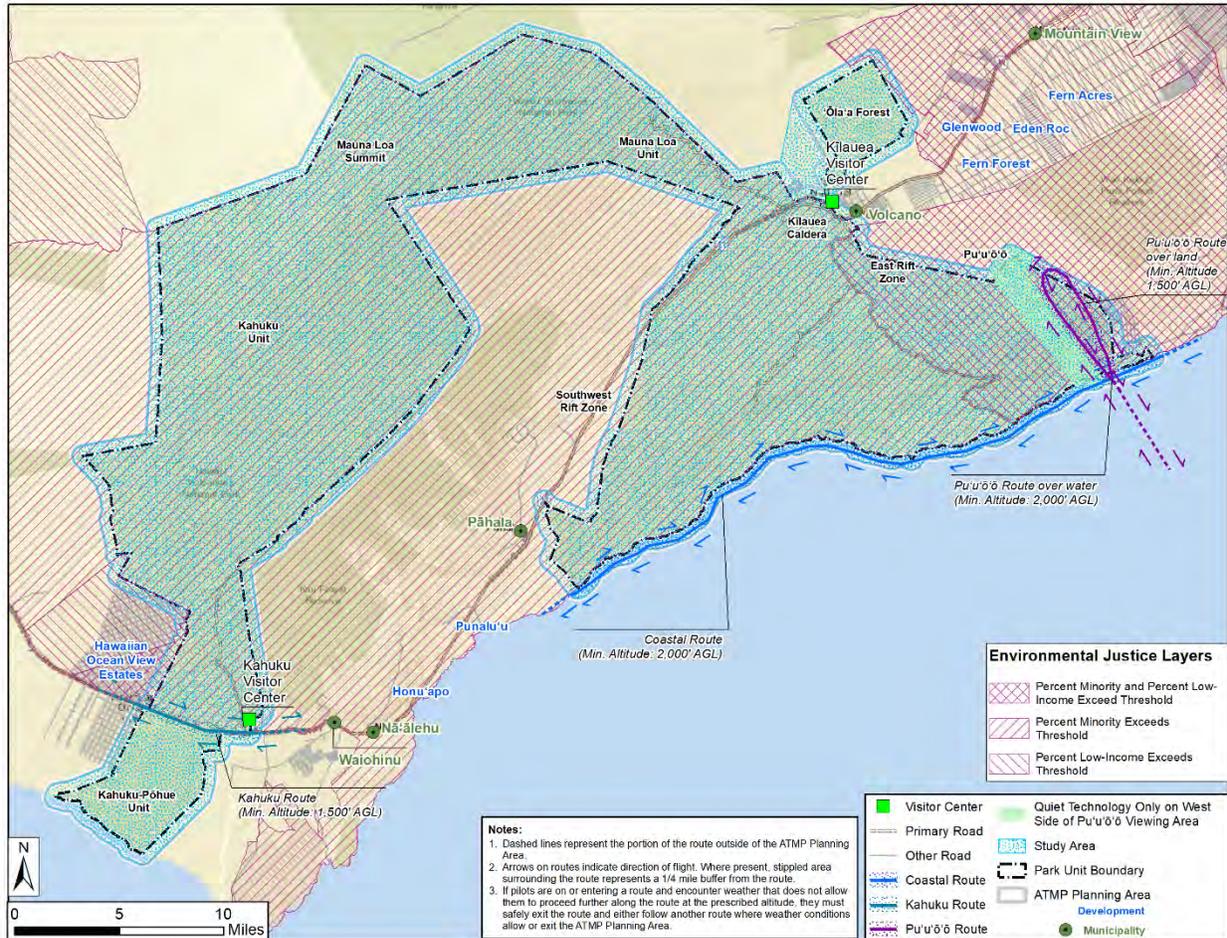


Figure 22. Environmental Justice Environmental Consequences for Alternative 3.

Indirect and Cumulative Effects

Indirect Effects: Under the No Action Alternative, commercial air tour operations within the ATMP planning area would remain consistent with existing conditions, thus there are no indirect impacts that would be expected to occur under this alternative. There are no indirect impacts to EJ populations that would be expected to occur under the No Action Alternative, nor would this alternative be expected to result in indirect socioeconomic impacts as there would be no change to existing conditions.

The prohibition of flights under Alternative 2 and the limited number of flights permitted by Alternative 3 could limit the potential future economic growth for commercial air tour operators and other ancillary businesses. Because of the capital investment air tour operators have in aircraft, facilities, and equipment, operators could seek to make up lost revenue from air tours within the ATMP planning area by conducting air tour operations outside of the ATMP planning area to the extent possible. Operators may also choose to retire, surrender their operating certificates, or use their aircraft for other businesses or operations such as search and rescue, fire protection, resource mapping and assessment, and flight for life operations. Therefore, although Alternatives 2 and 3 would limit the opportunities for air tour operators and ancillary businesses to generate revenue from tours conducted within the ATMP planning area, these alternatives would not preclude operators from making up this revenue generation in other ways such as using their aircraft for other business ventures or conducting air tours elsewhere within the region.

Under Alternatives 2 and 3, it is challenging to predict with specificity if, where, and to what extent any air tours that were displaced to outside the ATMP planning area would result in indirect noise, air quality, or visual impacts to EJ populations within the study area. Operations that may occur outside the ATMP planning area as a result of Alternative 2 and/or reduction in annual operations under Alternative 3, may shift where noise, air quality emissions, and visual effects occur, but the effects are not likely to change substantially as compared to current conditions. Therefore, adverse indirect impacts to EJ populations are not expected to occur. Therefore, disproportionately high or adverse indirect noise, air quality, or visual impacts to EJ populations are not expected to occur.

Cumulative Effects: The cumulative effects to EJ populations reflect those analyzed in other sections of this draft EA for noise, air quality, and visual effects. In summary, ongoing present and future Park management actions by the NPS within the ATMP planning area including administrative helicopter flights may contribute noise and air quality emissions that would continue to negatively affect the acoustic environment and air quality within the ATMP planning area. Those effects would be greatest under the No Action Alternative and fewest under Alternative 2 based on the number of flights authorized per year. Other sources of ongoing visual impacts that may affect EJ populations within the ATMP planning area include general aviation flights, overflights by commercial airlines, military flights, and administrative flights such as those used for management actions or search and rescue efforts. These flights would continue in the same frequency and manner under any of the alternatives, as they occur independently of air tours. The cumulative effects to viewsheds, including those experienced by EJ populations, would be greatest under the No Action Alternative and fewest under Alternative 2 based on the number of flights authorized per year. Ongoing present and future Park management actions by the NPS would continue to occur under any of the alternatives.

3.8 Visual Effects

Visual resources include buildings, sites, TCPs, and other natural or manmade landscape features that are visually important or have unique characteristics. In addition, visual resources can include the cohesive collection of various individual visual resources that can be viewed at once or in concert from the area surrounding the site of the alternatives. Visual character refers to the overall visual makeup of the existing environment where the alternatives would be located. For example, areas in close proximity to densely populated areas generally have a visual character that could be defined as urban, whereas less developed areas could have a visual character defined by the surrounding landscape features, such as open grass fields, forests, mountains, or deserts, etc. Visual effects generally describe the extent to which the proposed action or alternatives would either produce light emissions that create annoyance or interfere with activities; or contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Although there are no federal special purpose laws or requirements specific to light emissions and visual effects, there are special purpose laws and requirements that may be relevant, such as those relating to cultural resources or Section 4(f) resources. Additionally, NPS Management Policies (2006) Section 1.4.6 provides that scenic views and vistas are park resources that are subject to protection under the NPS Organic Act.

The study area for visual effects includes the ATMP planning area as well as areas within the cultural resources APE that are outside of the ATMP planning area. Refer to Figure 23 for a depiction of the visual effects study area.

3.8.1 Affected Environment

Within the Park, visual resources can be related to the Park's geologic features, including lava flows, craters, coastal areas, mountains, and other natural scenic areas, such as forests, coastal plains, and grasslands, and are often tied to visitor use and ethnographic resources. One such viewshed is the historic Crater Rim Drive, the most visited corridor in the Park that provides access to a number of unique volcanic, scenic, and cultural features such as Nāhuku lava tube, Uēkahuna, Kīlauea Visitor Center, and Steam Vents. Other notable viewpoints along Crater Rim Drive include Kīlauea Overlook, which provides views of Kīlauea caldera and Halema'uma'u crater; Kīlauea Iki Overlook and Pu'upua'i Overlook, which provide views into Kīlauea Iki crater and also into Kīlauea crater. Chain of Craters Road provides spectacular views along the drive and open vistas, and it also allows visitors to stop at several notable overlooks within the Park including Kealakomo Overlook, a scenic overlook above a vast lava plain with views toward the Pacific Ocean. As discussed in Section 3.6, Visitor Use and Experience, a major attraction for visiting the Park is to experience the natural scenery and landscape of the Park.

Other structures and sites that are tied to cultural resources are often present within these viewsheds and are discussed in greater detail in Section 3.4, Cultural Resources. Visual

character can also be defined by natural landscape features, particularly within the Park's Wilderness areas (refer to Section 3.5.1, Affected Environment for Wilderness). As approximately 123,100 acres of the Park are federally designated Wilderness, the natural areas and features provide an aesthetic and visual character unique to the Park that is free from visual evidence of human civilization. Figure 23 depicts scenic points of interest including overlooks throughout the ATMP planning area, viewpoints into the Kīlauea caldera, and visitor overlooks along Chain of Craters Road. Trails are also depicted to provide a sense of where visitors within backcountry of the Park would experience the Park's visual resources and aesthetics.

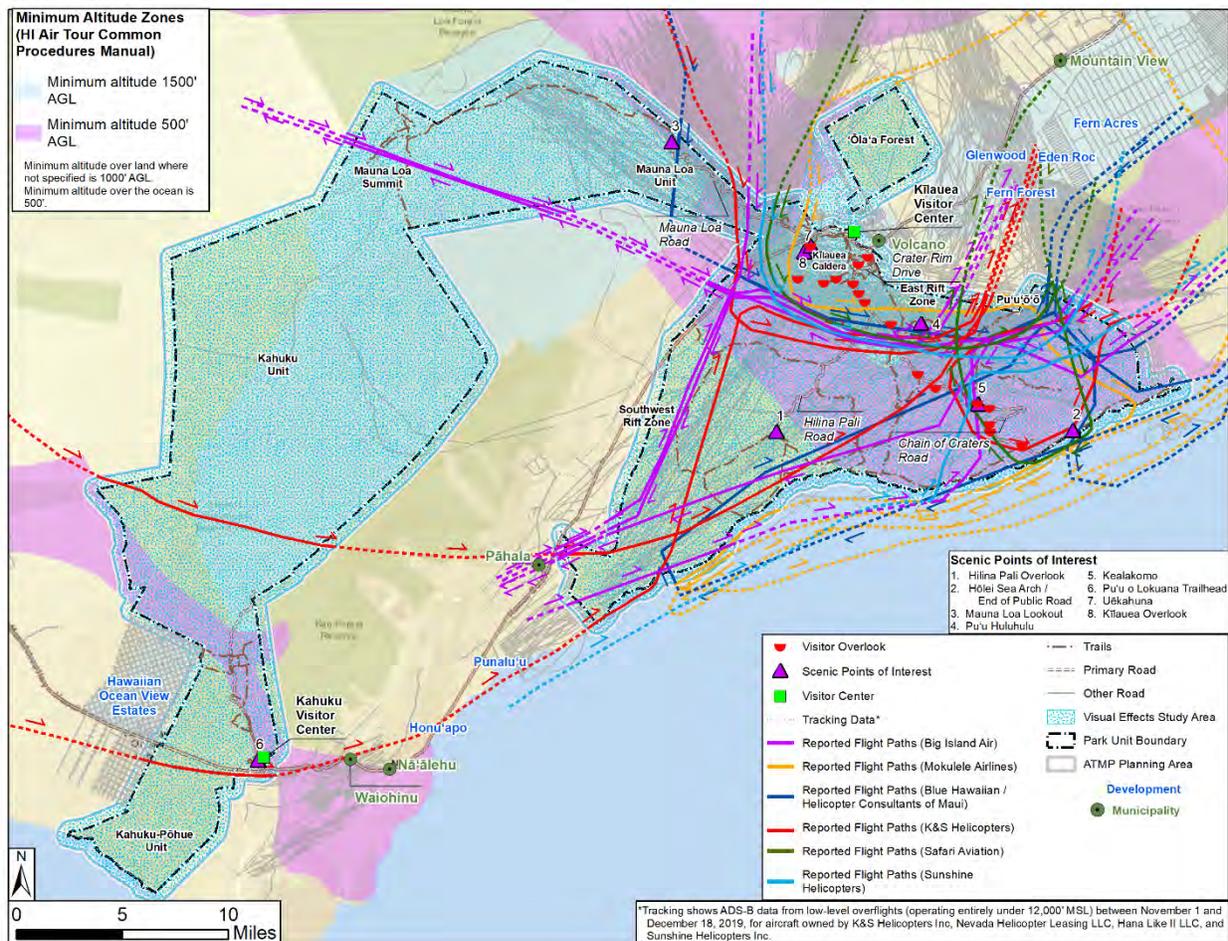


Figure 23. Affected Environment for Visual Effects.

3.8.2 Environmental Consequences

Studies indicate that aircraft noise in national parks can impact human perceptions of aesthetic quality of viewsheds (Weinzimmer et al., 2014; Benfield et al., 2018). Visitors may notice aircraft overflights because of the accompanying noise.

Impacts to visual resources and visual character relate to a decrease in the aesthetic quality of the Park resulting from air tours. FAA Order 1050.1F provides factors to consider in evaluating the severity of impacts, including the extent that the action would have the potential to:

- Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;
- Contrast with the visual resources and/or visual character in the study area; and
- Block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

Alternative 1: No Action

Reporting data from 2017-2019 indicates that visitors have the potential, on average, to see commercial air tour aircraft approximately 31 times per day, and the maximum number of tours reported over the Park during this time period was 90 tours a day. Based on reported data, the existing air tours occur between 6:00 AM and 4:00 PM. The altitudes reported near Park viewsheds are 500-1,500 ft. AGL. Refer to Figure 23 for a depiction of existing air tour conditions in the context of visual points of interest and viewsheds within the visual effects study area.

Based on current reported flight routes and flight tracking data, under existing conditions, overlooks and vistas across most of the visual effects study area have commercial air tour aircraft flying over or near them. Visitor overlook areas along Chain of Craters Road and Crater Rim Drive generally experience the heaviest concentrations of commercial air tours flying directly over these overlooks, which are also among the most heavily visited areas of the Park. Under this alternative, visitors in these areas would continue to experience visual impacts associated with commercial air tours. Commercial air tours may block visitors from seeing a viewshed or detract from natural or cultural scenery. Commercial air tours may be especially distracting when the visitor is at an overlook or other area where a specific visual experience is expected. Under the No Action Alternative, any of the viewsheds within the visual effects study area could be impacted by commercial air tours for up to 90 times a day. Since the Park consists primarily of a natural landscape, the encroachment of commercial air tour aircraft on these viewsheds would continue to detract from the visitor's opportunity to observe these scenic natural resources and would block the view of unique visual resources within the Park of scenic vistas and natural areas which contrast with commercial air tours when commercial air tours are present (on average approximately 31 times per day). However, the visual resources of the Park would still be viewable at times of the day when commercial air tours were not present within the ATMP planning area.

Alternative 2

Under Alternative 2, commercial air tour aircraft would not fly within the ATMP planning area so commercial air tours in this area would not detract from visual resources in the visual effects study area. Visual resources would experience direct beneficial impacts under Alternative 2 and visual character would improve compared to current conditions. Alternative 2 would provide the greatest protection to Park viewsheds across the three alternatives.

Alternative 3

Under Alternative 3, some Park viewsheds could experience temporary impacts when commercial air tours are flying within the visual effects study area, and those instances would be generally limited to viewsheds where aircraft could be seen along the designated routes and altitudes (refer to Figure 24) and would be limited to no more than 1,565 instances per year (an 86% reduction compared to the No Action Alternative). Commercial air tours along the authorized routes could be visible from the Park's coastal areas, the East Rift zone, and over Highway 11 near Kahuku, but they would avoid most other scenic points of interest or overlooks within the visual effects study area. The time-of-day restrictions included in Alternative 3 would provide further protection to the Park's viewsheds by creating times of day when commercial air tours would not fly within the ATMP planning area and viewsheds would not be impacted.

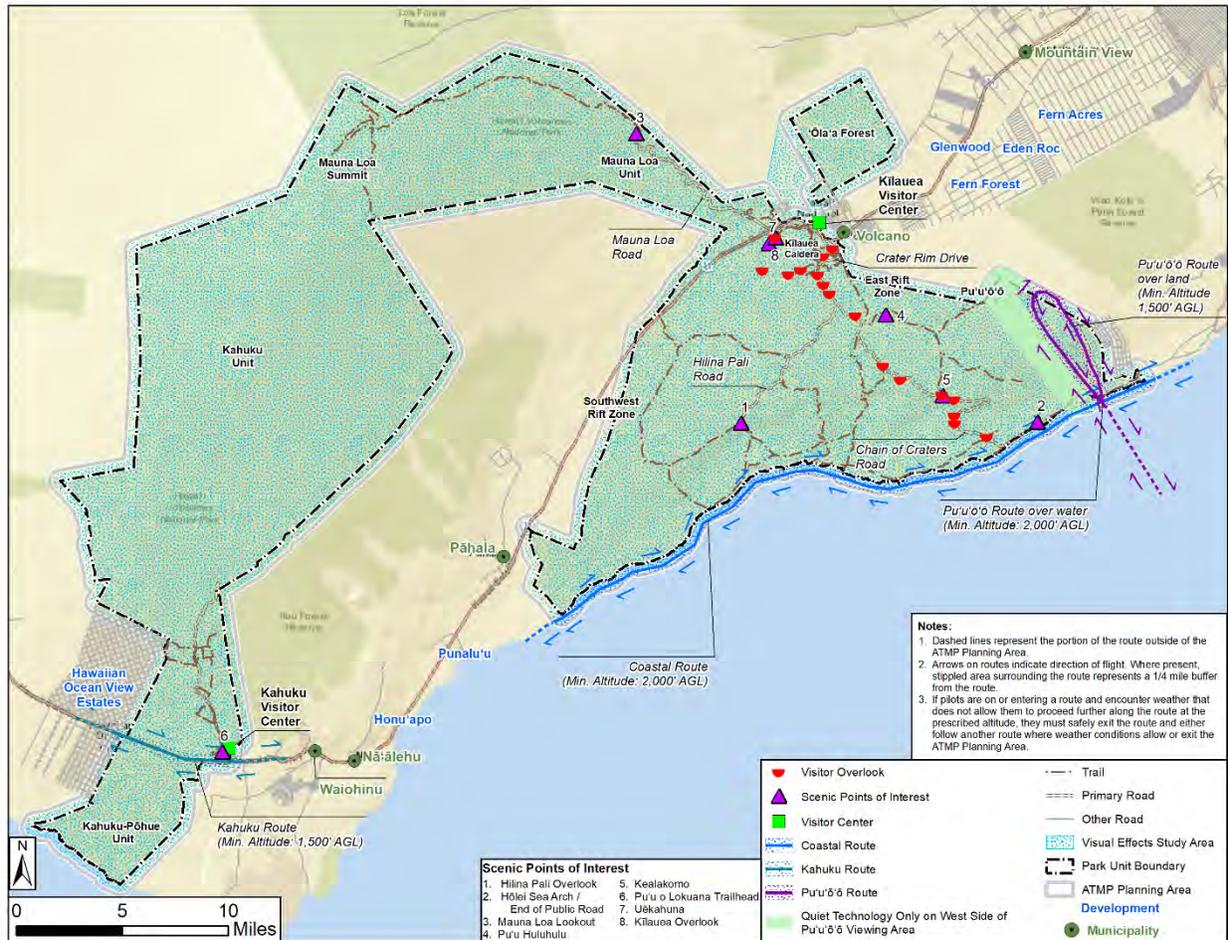


Figure 24. Visual Effects Environmental Consequences for Alternative 3.

Indirect and Cumulative Effects

Indirect Effects: Under the No Action Alternative, commercial air tour operations within the ATMP planning area would likely remain consistent with existing conditions, thus there are no indirect impacts that would be expected to occur under this alternative.

Under Alternatives 2 and 3, since commercial air tour operations would be limited or prohibited within the ATMP planning area, it could result in the displacement of tours outside of this area. Operators may choose to fly along existing flight paths but at or above 5,000 ft. AGL; however, the increase in altitude would likely decrease impacts on ground level resources as compared to current conditions. Operators may also choose to fly just outside of the perimeter of the ATMP planning area surrounding the volcanoes in order to view Kīlauea Crater or any active lava. Air tours outside the ATMP planning area may occur in the area southwest of the 'Ōla'a Forest tract due to the proximity to Kīlauea caldera and the potential for viewing any lava that may be present. Therefore, under Alternative 2, some indirect impacts to viewsheds near the 'Ōla'a

Forest tract and the areas near Kilauea could occur to the extent that they are present if flights were displaced to outside the visual effects study area. Since Alternative 2 prohibits flights within the ATMP planning area whereas Alternative 3 limits them to no more than 1,565 flights per year in addition to other operating parameters as specified in Section 2.6, Alternative 2 would likely result in more indirect impacts to viewsheds than Alternative 3.

Cumulative Effects: Other sources of ongoing visual impacts within the visual effects study area include general aviation flights, overflights by commercial airlines, military flights, and administrative flights such as those used for maintenance or search and rescue efforts, which would likely continue in the same frequency and manner under any of the alternatives, as they occur independently of air tours.

The cumulative visual effects of these ongoing flights along with those from commercial air tours under the No Action Alternative would have the greatest potential for impacts within the visual effects study area. The cumulative effects would be fewer for Alternative 3 which limits the number of air tours that would occur as compared to the No Action Alternative, and the fewest under Alternative 2 as there would be no tours permitted within the ATMP planning area. Ongoing present and future Park management actions by the NPS would continue to occur under any of the alternatives.

3.9 Coastal Resources

The Coastal Zone Management Act (CZMA) (16 U.S.C. §§ 1451-1466) provides for management of U.S. coastal resources to help coastal states balance conservation and restoration of natural resources with community development to develop their economies and support ecosystems. The CZMA provides a framework and technical assistance to address coastal issues including wetland management, public access, coastal hazards, and water quality. The CZMA includes requirements for ensuring that activities conducted or authorized by federal agencies are consistent with approved state coastal zone management programs. These consistency requirements, as interpreted in NOAA's implementing regulations (15 CFR part 930), apply to activities that would have reasonably foreseeable effects on land or water uses or natural resources in a coastal zone.

The State of Hawai'i administers a CZM program and has established objectives and their supporting policies (Hawai'i Revised Statutes § 205A-2) to help the Hawai'i CZM Program evaluate the consistency of proposed federal actions. As part of this compliance with CZMA, the agencies have prepared documentation describing the preferred alternative's consistency with each objective and policy of the Hawai'i CZM program (see Appendix K, *CZMA Compliance*). The agencies have requested a federal consistency review by the Hawai'i CZM Program Office simultaneous with the release of this draft EA for public review and comment.

The entire State of Hawai'i is considered a coastal zone under the Hawai'i CZM program. Therefore, the study area for coastal resources is the ATMP planning area.

3.9.1 Affected Environment

Because the entire State of Hawai'i is considered a coastal zone, the affected environment includes the entire ATMP planning area as discussed above.

3.9.2 Environmental Consequences

Impacts to coastal resources may occur in the form of physical effects associated with land use (such as construction), changes in water quality from pollutants or runoff, or effects to biological resources that utilize coastal resources. FAA Order 1050.1F provides factors to consider in evaluating the severity of impacts, including the extent that the action would have the potential to:

- Be inconsistent with the relevant state coastal zone management plan(s);
- Impact a coastal barrier resources system unit (and the degree to which the resource would be impacted);
- Pose an impact to coral reef ecosystems (and the degree to which the ecosystem would be affected);
- Cause an unacceptable risk to human safety or property; or
- Cause adverse impacts to the coastal environment that cannot be satisfactorily mitigated.

The agencies analyzed the potential for direct, indirect, and cumulative impacts on coastal resources in the relevant environmental impact categories for all three alternatives in this draft EA. This analysis can be found in Noise and Noise Compatible Land Use (Section 3.1), Biological Resources (Section 3.3), Cultural Resources (Section 3.4), Visitor Use and Experience and Other Recreational Opportunities (Section 3.6), Environmental Justice and Socioeconomics (Section 3.7), Visual Effects (Section 3.8), and DOT Act Section 4(f) Resources (Section 3.10).

The agencies only prepared a consistency determination for the preferred alternative (Alternative 3) and have evaluated Alternative 3's consistency with the enforceable policies of the Hawai'i CZM Program, including their objectives and supporting policies (Hawai'i Revised Statutes § 205A-2). The agencies' analysis is in Appendix K, *CZMA Compliance*, and the conclusions from that analysis are summarized below.

The agencies have evaluated Alternative 3 and have found that its implementation would not interfere with the Hawai'i CZM objective for:

- recreational resources, which is to provide coastal recreational opportunities accessible to the public;
- historic resources, which is to protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture;
- scenic and open space resources, which is to protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources;
- coastal ecosystems, which is to protect valuable coastal ecosystems, including reefs, beaches, and coastal dunes, from disruption and minimize adverse impacts on all coastal ecosystems;
- economic uses, which is to provide public or private facilities and improvements important to the state's economy in suitable locations;
- coastal hazards, which is to reduce hazard to life and property from coastal hazards;
- managing development, which is to improve the development review process, communication, and public participation in the management of coastal resources and hazards;
- public participation, which is to stimulate public awareness, education, and participation in coastal management.

Alternative 3 would be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of the Hawai'i CZM Program with respect to recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, and public participation. The policies for beach and coastal dune protection and marine and coastal resources are not applicable to the proposed action and have therefore not been evaluated as part of this assessment. Refer to Appendix K, *CZMA Compliance* for the agencies' analysis.

The agencies have provided the consistency determination in Appendix K, *CZMA Compliance* as well as a copy of this draft EA to the Hawai'i CZM Program Office concurrent with the release of this draft EA for public review and have requested their concurrence with this determination.

3.10 Department of Transportation (DOT) Act Section 4(f) Resources

Section 4(f) of the Department of Transportation Act of 1966, which was recodified and renumbered as Section 303(c) of 49 U.S.C., provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a

public park, recreational area, or wildlife and waterfowl refuge of national, state or local significance; or land from an historic site of national, state or local significance, as determined by the officials having jurisdiction over the land, unless i) there is no feasible and prudent alternative to the use of such land, and ii) such program or project includes all possible planning to minimize harm resulting from such use. Where federal lands are administered for multiple uses, the federal official having jurisdiction over the lands shall determine whether the subject lands are in fact being used for park, recreational, wildlife, waterfowl, or historical purposes. National Wilderness areas may serve similar purposes and shall be considered subject to Section 4(f) unless the controlling agency specifically determines that, for Section 4(f) purposes, the lands are not being used.

Appendix B of FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* describes the FAA's procedures for complying with Section 4(f). Federal Highway Administration/Federal Railroad Administration/Federal Transit Administration regulations and policy are not binding on the FAA; however, the FAA may use them as guidance to the extent relevant to aviation projects.²⁶ According to FAA Order 1050.1F, significance of impacts is determined based on if the action involves more than a minimal physical use of a Section 4(f) resource or constitutes a "constructive use" based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource.

The study area for considering Section 4(f) resources in this draft EA corresponds with the APE used for compliance with Section 106 of the NHPA. Refer to Figure 25 for a depiction of the Section 4(f) study area.

3.10.1 Affected Environment

Section 4(f) resources including parks, recreational areas, and wildlife and waterfowl refuges were identified using public datasets from federal, state, and local sources. Historic properties were identified as part of the Section 106 consultation process (refer to Section 3.4, Cultural Resources). Each resource that intersected the Section 4(f) study area (i.e., some portion of the property fell within the Section 4(f) study area) was included in the Section 4(f) analysis (see Appendix I).

Table 15 shows Section 4(f) parks and recreational areas identified in the study area, and Section 3.4.1, Affected Environment for Cultural Resources and Appendix G list historic resources that qualify under Section 4(f). Except in unusual circumstances, Section 4(f) protects

²⁶ See 1050.1F Desk Reference, Section 5-3.

only those historic sites that are listed in or eligible for listing in the National Register.²⁷ Figure 25 shows a map of the Section 4(f) resources analyzed in this chapter, within the Section 4(f) study area.

Table 15. Section 4(f) Resources

Property Name	Property Type
Hawai'i Volcanoes National Park	NPS Park Unit
Hakalau Forest National Wildlife Refuge	USFWS Wildlife Refuge
Keauhou Cooperative Nēnē Sanctuary	State Reserve
'Ōla'a Forest Reserve	State Forest Reserve
Ka'ū Forest Reserve	State Forest Reserve
Kapāpala Forest Reserve	State Forest Reserve
Mauna Loa Forest Reserve	State Forest Reserve
Kapāpala Cooperative Game Management Area	State Reserve
Kahauale'a Natural Area Reserve	State Reserve
Kipāhoehoe Natural Area Reserve	State Reserve
Manukā Natural Area Reserve	State Reserve
Pu'u Maka'ala Natural Area Reserve	State Reserve
Kīpuka 'Ainahou Nēnē Sanctuary	State Reserve
Kīlauea State Recreation Area	State Park
Pāpā/Honomalino Conservation Easements (Nature Conservancy of Hawai'i - Kona Hema Preserve)	Nature Preserve
Keaoi Islet Seabird Sanctuary	State Reserve
State Resource Management Area (SRMA)	SRMA

Sources: USGS Protected Areas Database of the United States, Hawai'i Division of State Parks, Hawai'i Department of Land and Natural Resources Office of Conservation and Coastal Lands, Hawai'i Division of Forestry and Wildlife.

²⁷ If a historic site is not National Register listed or eligible, a state or local official may formally provide information to FAA to indicate that a historic site is locally significant. The responsible FAA official may then determine it is appropriate to apply Section 4(f). See FAA Order 1050.1F for further detail.

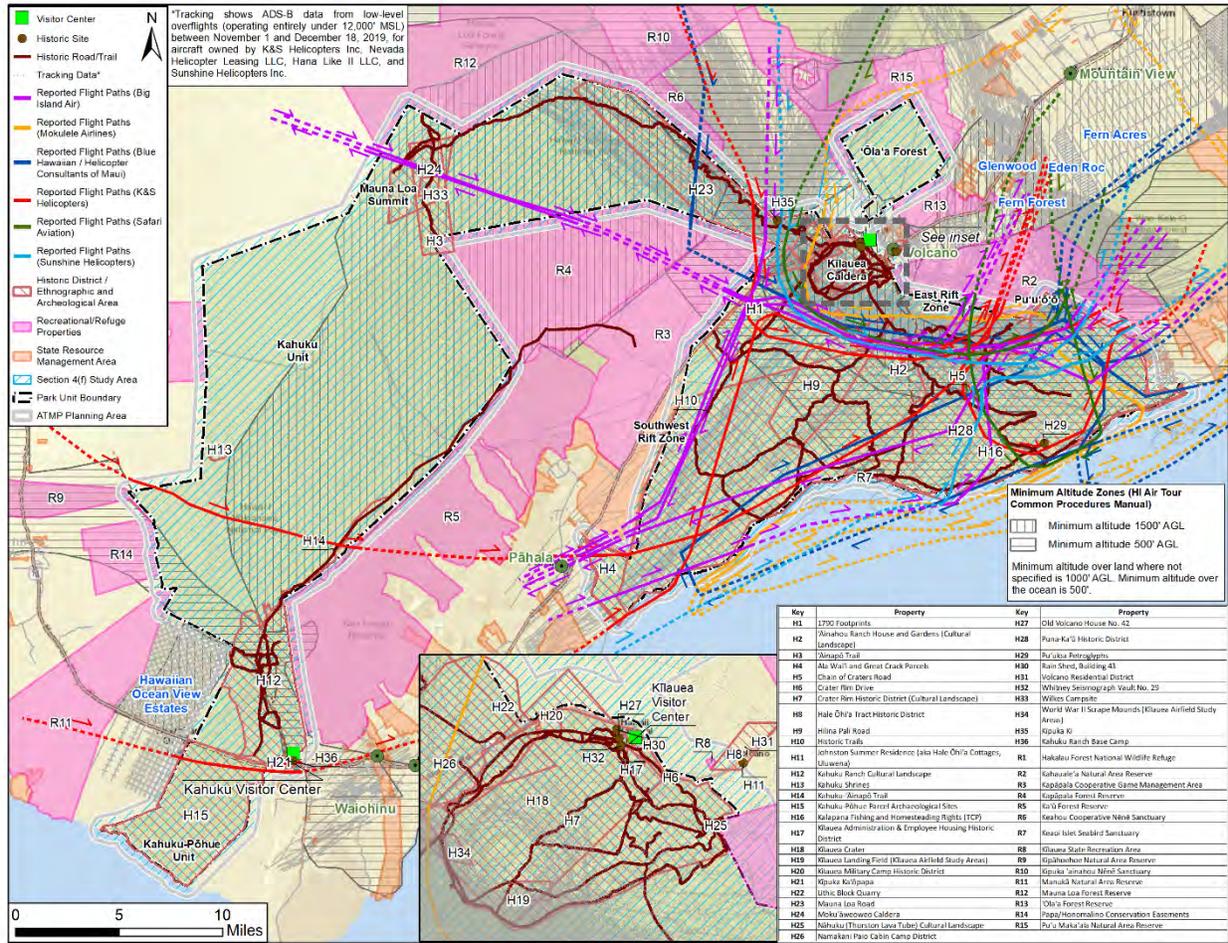


Figure 25. Affected Environment for Section 4(f) Properties.

3.10.2 Environmental Consequences

In the context of Section 4(f) resources, the term “use” refers to both physical constructive impacts to Section 4(f) resources. A physical use involves the physical occupation or alteration of a Section 4(f) resource, while constructive use occurs when a proposed action results in substantial impairment of a resource to the degree that the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished. In consideration of potential impacts that could result in substantial impairment to Section 4(f) resources in the Section 4(f) study area, the analysis is limited to identifying impacts that could result in a constructive use, as the alternatives would not have the potential to cause direct impacts to a Section 4(f) resource. Potential impacts to Section 4(f) resources from commercial air tours may include noise from aircraft within the acoustic environment, as well as visual impacts.

The FAA considered the potential for constructive use of Section 4(f) resources under all alternatives but focused the Section 4(f) analysis on the preferred alternative (Alternative 3). In accordance with FAA Order 1050.1F, the FAA determined through an initial assessment if the alternatives would result in use of any of the properties to which Section 4(f) applies. As noted in Section 2.4, Alternative 1 (No Action Alternative), the No Action Alternative provides a basis for comparison within this draft EA but is not a selectable alternative because it does not meet the purpose and need for the ATMP (refer to Section 1.4, Purpose and Need). Furthermore, the FAA consulted with the NPS on the potential for substantial impairment to Section 4(f) resources that would occur under the No Action Alternative, and the NPS determined that the No Action Alternative cannot be mitigated to avoid or prevent unacceptable impacts to Park resources including those that unreasonably interfere with ceremonies conducted by Native Hawaiian practitioners at cultural sites, Park programs, activities, the atmosphere of peace and tranquility, and the natural soundscapes in Park's Wilderness areas. The FAA did not advance the No Action Alternative for detailed Section 4(f) analysis as the NPS does not consider it a selectable alternative. Effects to Section 4(f) resources under Alternative 2 would be expected to be similar or less than those under Alternative 3 as there would be no air tours authorized in the ATMP planning area under this alternative. Therefore, the Section 4(f) analysis does not analyze the potential for constructive use of Section 4(f) resources in detail under Alternative 2. Detailed analysis of Section 4(f) resources is provided for Alternative 3 (preferred alternative).

In order to assess noise impacts to Section 4(f) resources, the land use compatibility guidelines in 14 CFR Part 150 assist with determining whether a proposed action would constructively use a Section 4(f) resource. These guidelines rely on the DNL, which is considered the best measure of impacts to the quality of the human environment from exposure to noise. The FAA acknowledges that the land use categories in 14 CFR Part 150 may not be sufficient to determine the noise compatibility of Section 4(f) properties (including, but not limited to, noise sensitive areas within national parks and wildlife refuges), where a quiet setting is a generally recognized purpose and attribute. The FAA has consulted with the NPS and included supplemental noise metrics in the Section 4(f) analysis for the alternatives (see Section 3.1.2, Environmental Consequences for Noise and Noise-Compatible Land Use). Visual impacts are assessed in accordance with the framework identified in Section 3.8, Visual Effects.

The FAA evaluated Alternative 3 for potential impacts to Section 4(f) resources. The noise analysis in Section 3.1.2, Environmental Consequences, indicates that the resultant DNL due to Alternative 3 is expected to be below DNL 45 dB and would eliminate or reduce noise in many noise sensitive regions of the Park compared to current conditions.

As indicated by the supplemental noise metrics, some points overlapping with or near Section 4(f) resources may experience an increase in noise intensity or duration as compared to existing conditions as routes include flights near these resources under Alternative 3. Refer to Section

3.4.2, Environmental Consequences of Alternative 3 for Cultural Resources for a discussion of these noise metrics in the context of historic resources that are Section 4(f) properties.

For parks and recreational sites that are Section 4(f) properties, at some points that are closest to the authorized routes under Alternative 3 (Points 9, 10, 14, 17, 18, 20, 24, 31, 39, 40, 41) time above 35 dBA or 52 dBA may be higher for quiet technology-only days compared to standard days because some quiet technology aircraft, while quieter overall, may be audible for a slightly longer period of time than standard aircraft based on the specific route location and type of aircraft modeled. Of the Section 4(f) parks and recreational sites that are within the Section 4(f) study area, this would be most likely to affect Kahauale'a Natural Area Reserve, Keaoi Islet Seabird Sanctuary, and State Resource Management Area which are located closest to these modeled location points and the routes for Alternative 3. See Figure 26.

Nine location points (14, 17, 18, 19, 20, 24, 39, 40, 41) are modeled to experience increases in noise under both standard and quiet technology-only days as indicated by the supplemental metrics (time audible natural ambient, time above 35 dBA, time above 52 dBA, and maximum sound level) as compared to current conditions. The FAA identified whether these points were near any parks and recreational Section 4(f) properties (refer to Appendix I, *Section 4(f) Analysis* for the location point analysis):

- Point 24 is within 1.10 miles of the Ka'ū Forest Reserve and within 0.77 miles of the State Resource Management Area;
- Point 39 is within 0.27 miles of the Keaoi Islet Seabird Sanctuary;
- Point 40 is within 1.47 miles of the Keaoi Islet Seabird Sanctuary.

The FAA then evaluated the supplemental noise metrics to determine changes in noise duration and intensity that would be experienced at those 4(f) properties under Alternative 3 compared to current conditions. Points 24 and 40 would experience increases in noise duration under all conditions but increases in noise intensity (as indicated by maximum sound level) would only occur on standard days on which air tours would be permitted. Increases in noise intensity either do not occur or are minimal (< 3 dBA) on quiet technology-only days. The increases in time above metrics are minimal (at point 24, time above 35 dBA would increase from 1.8 to 10.9 minutes; time above 52 dBA would increase from less than 0.1 minutes to 0.7 minutes; at point 40, time above 35 dBA would increase from 2.2 to 7.7 minutes; time above 52 dBA would increase from 0.2 to 0.8 minutes). The time audible for natural ambient would increase at these points but less on quiet technology-only days (at point 24, increase from 10.2 minutes to 46.6 minutes on a standard day and 37.7 minutes on a quiet technology-only day; at point 40, increase from 0 minutes to 88.6 minutes on a standard day and 51.5 minutes on a quiet

technology-only day). Note that in all cases, these durations are the summation of several non-contiguous events that would span across the operating day.

Point 39 represents a coastal point near the Keaoi Islet Seabird Sanctuary, and noise at Point 39 would increase for all modeled noise metrics. Specifically, the maximum sound level would increase by 2 dBA on quiet technology days and almost 8 dBA on standard days, with the highest level at 60.7 dBA. Time above 35 dBA and 52 dBA would slightly increase under Alternative 3 based on the modeling results, with time above 35 dBA experienced for a total of 7 minutes on a standard day and 10 minutes on a quiet technology-only day, and time above 52 dBA experienced for 1 minute on both a standard day and on a quiet technology-only day. At Point 39, air tours would be audible for 36 minutes on quiet technology-only days and about an hour (61 minutes) on standard days.

Because noise is modeled using conservative assumptions and implementing the ATMP under Alternative 3 would result in limiting the number of flights to 14% of the three-year average of flights flown from 2017-2019 using three consolidated routes and the same aircraft to fly at higher altitudes than existing conditions, noise impacts to Section 4(f) parks and recreational resources are expected to experience an overall reduction under Alternative 3. Air tours are currently occurring in these areas, and Alternative 3 would substantially reduce the number of air tours within the ATMP planning area, move the air tours away from most Section 4(f) resources in the Section 4(f) study area, and increase the altitude at which air tours must fly. Although Alternative 3 would shift authorized air tour operations to the three proposed flight paths and may expose some Section 4(f) resources to increased noise impacts, any increases in noise impacts would not result in substantial impairment of these Section 4(f) resources. The inclusion of no-fly days, time-of-day restrictions to avoid sunrise and sunset, quiet technology incentives, and limiting flights to certain days of the week minimizes impacts to Section 4(f) resources. Furthermore, air tours are transitory in nature, and any noise impacts would be temporary, infrequent, and in many cases less intrusive than current conditions in the Section 4(f) study area.

As a result, FAA concludes there would be no substantial impairment²⁸ on Section 4(f) resources in the Section 4(f) study area from noise-related effects under Alternative 3. This conclusion supports the FAA's determination that Alternative 3 would not constitute constructive use of Section 4(f) resources in the Section 4(f) study area. This Section 4(f) determination for historic properties is based on 14 CFR Part 150 Appendix A and is also consistent with the Section 106 no adverse effect determination at the Park (see Section 3.4, Cultural Resources).

²⁸ Substantial impairment would occur when impacts to section 4(f) lands are sufficiently serious that the value of the site in terms of its prior significance and enjoyment are substantially reduced or lost.

The FAA also considered the potential for vibrational impacts on Section 4(f) resources under Alternative 3. A review of the potential for vibrational impacts on sensitive structures such as historic buildings suggests that the potential for damage resulting from helicopter overflights is minimal, as the fundamental blade passage frequency is well above the natural frequency of these structures. Additionally, the vibration amplitude of these overflights at the altitudes prescribed in Alternative 3 would be well below recommended limits.^{29, 30} Vibrational impacts are not anticipated to affect surrounding parkland and State Forest areas given that aircraft overflights do not contain vibrational energy at levels which would affect outdoor areas or natural features and there is no substantial change from current conditions.

Recognizing that some types of Section 4(f) resources may be affected by visual effects of commercial air tours, the FAA and the NPS considered the potential for the introduction of visual elements that could substantially diminish the significance or enjoyment of Section 4(f) resources in the Section 4(f) study area. Alternative 3 would limit the number of commercial air tours per year to 1,565 flights and would limit those routes to three designated flight paths over the ATMP planning area, which would result in fewer areas of the Section 4(f) study area, and therefore, fewer Section 4(f) properties, from which a commercial air tour could be visible. Alternative 3 would not introduce visual elements or result in visual impacts that would substantially diminish the activities, features or attributes of a Section 4(f) resource. Therefore, there would be no constructive use from visual impacts of Section 4(f) resources.

²⁹ Hanson, C.E., King, K.W., et al., "Aircraft Noise Effects on Cultural Resources: Review of Technical Literature," NPOA Report No. 91-3 (HMMH Report No.290940.04-1), September 1991.

³⁰ Volpe National Transportation Systems Center, Department of Transportation, 2014. Literature Review: Vibration of Natural Structures and Ancient/Historical Dwellings, Internal Report for National Park Service, Natural Sounds and Night Skies Division, August 21, 2014.

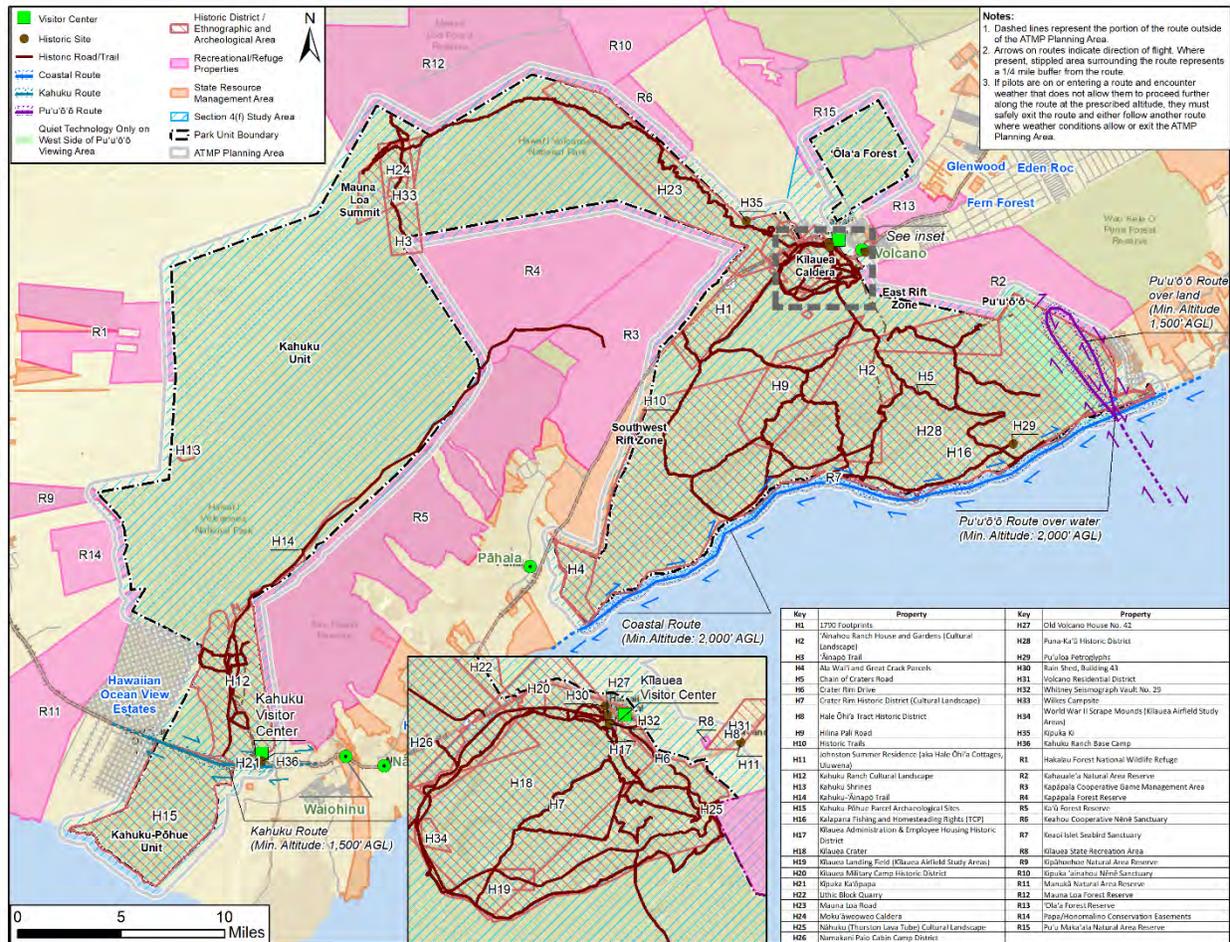


Figure 26. Section 4(f) Environmental Consequences for Alternative 3.

Indirect and Cumulative Effects

Indirect Effects: The indirect effects of Alternative 3 on Section 4(f) properties reflect those analyzed in the sections for noise and visual effects. Alternative 3 would limit the number of flights per year as compared to existing conditions and would have the potential to result in some displacement of air tours outside the ATMP planning area. Air tours occurring outside the ATMP planning area, if any, may result in noise or visual effects to Section 4(f) resources to the extent that they are present near the areas that those flights would occur.

The indirect effects analysis conducted for Noise and Noise-Compatible Land Use indicates that it is highly unlikely that the air tours that are displaced to outside the ATMP planning area under Alternative 3 would generate a noise exposure level at or above DNL 65 dB in a single location in accordance with FAA Order 1050.1F, including those that overlap with Section 4(f) properties. The indirect effects analysis for Visual Effects identifies that some indirect visual impacts could occur if flights were displaced to outside the ATMP planning area and would

likely be experienced in the areas within or surrounding the 'Ōla'a Forest and the Kīlauea caldera since lava and other volcanic features would still be visible from air tours conducted just outside the ATMP planning area in this location. Section 4(f) resources are present in these areas and could experience indirect visual effects if air tours were visible from those resources. However, the FAA and the NPS are unable to predict with specificity if, where, and to what extent any displaced air tours would result in visual impacts in different and/or new areas, including Section 4(f) resources.

Cumulative Effects: The cumulative effects to Section 4(f) properties reflect those analyzed in the sections for noise and visual effects. Ongoing present and future Park management actions by the NPS including administrative helicopter flights may contribute noise that would continue to negatively affect the acoustic environment of Section 4(f) properties within the Section 4(f) study area. Other sources of ongoing visual impacts that may affect Section 4(f) properties within the Section 4(f) study area include general aviation flights, overflights by commercial airlines, military flights, and administrative flights such as those used for management actions or search and rescue efforts, which would likely continue under Alternative 3, as they occur independently of air tours.

Section 4(f) Recommended Finding

In summary, the FAA has preliminarily determined that there would be no constructive use to Section 4(f) properties under Alternative 3 because noise, vibrational, and visual impacts from commercial air tours under this alternative would not constitute a substantial impairment of Section 4(f) resources in the Section 4(f) study area. As part of the draft ATMP and draft EA development, the FAA consulted with the NPS and through the release of the draft ATMP and draft EA, consulted with the NPS and other officials with jurisdiction over Section 4(f) resources in the Section 4(f) study area regarding FAA's preliminary finding of no substantial impairment, and hence, the FAA's proposed no constructive use determination. The FAA has sent letters to each Section 4(f) property's official with jurisdiction with this preliminary finding concurrent with the release of this draft EA for public review. Refer to Appendix I, *Section 4(f) Analysis*, for additional details on this coordination.

3.11 Summary of Environmental Consequences

Table 16 summarizes the environmental consequences described above for each of the alternatives considered across each environmental impact category.

Table 16. Summary of Environmental Consequences of the ATMP Alternatives

Environmental Impact Category	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
Noise and Noise-Compatible Land Use	<ul style="list-style-type: none"> • Air tours can occur any day of the year • 12-hr equivalent sound level: maximum <55 dBA; 35 to <50 dBA in 13% of the Park. • DNL: <50 dB • Time audible natural ambient: maximum 360-480 minutes a day in <1% of the Park; >120 minutes a day in 27% of the Park; audible air tour noise in 82% of the Park. • Time above 35 dBA: maximum >120 minutes a day in <1% of the Park; >30 minutes a day in 15% of the Park. • Maximum time above 52 dBA: 18.9 minutes; <1 minute in 85% of the Park. • Maximum sound level in ATMP planning area: 72.0 dBA at location #5. • Average of 345 days with air tours per year within the ATMP planning area. • No indirect effects expected. 	<ul style="list-style-type: none"> • 365 days per year without air tours within the ATMP planning area and would reduce noise in the most noise sensitive regions of the Park. • Indirect noise impacts may occur due to air tours displaced to outside the ATMP planning area. 	<ul style="list-style-type: none"> • 52 days per year without air tours within the ATMP planning area • 12-hr equivalent sound level: maximum <45 dBA; 35 to <40 dBA in 3% of the Park. • DNL: <45 dB • Time audible natural ambient: maximum <150 minutes a day in 2% of the Park; ≥60 minutes a day in 18% of the Park. • Time above 35 dBA: maximum 30-45 minutes a day in 1% of the Park; ≥0.1 minutes a day in 29% of the Park. • 83% of points modeled would not experience sound levels above 52 dBA on a standard day (i.e., time above 52 dBA is 0 minutes). • Maximum sound level in ATMP planning area: 63.7 dBA at location #17. • Indirect noise impacts may occur due to air tours being displaced to outside the ATMP planning area.
Air Quality and Climate Change	<ul style="list-style-type: none"> • Criteria pollutants: 0.845 TPY • GHG emissions: 1,851 MT of CO₂ per year • Would not cause NAAQS exceedance or increase the frequency or severity of any existing violations. • No indirect effects expected. 	<ul style="list-style-type: none"> • Reduction in criteria pollutants (from air tours in ATMP planning area): 0.845 TPY • Reduction of GHG emissions (from air tours in ATMP planning area): 1,851 MT of CO₂ per year • Would not cause NAAQS exceedance or increase the frequency or severity of any existing violations. • Indirect impacts may occur due to air tours outside the ATMP planning area if winds transport emissions to within 	<ul style="list-style-type: none"> • Reduction in criteria pollutants (from air tours in ATMP planning area): 0.676 TPY • Reduction in GHG emissions (from air tours in ATMP planning area): 1,388 MT CO₂ per year • Would not cause NAAQS exceedance or increase the frequency or severity of any existing violations. • Indirect impacts may occur due to air tours outside the ATMP planning area if winds transport emissions to within

Environmental Impact Category	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
		<p>the ATMP planning area, and some areas not currently exposed to emissions from air tours (outside the ATMP planning area) may be exposed to emissions.</p> <ul style="list-style-type: none"> Highly unlikely that air tours displaced to outside the ATMP planning area would result in air quality impacts under NEPA or change the current attainment status of the Park. 	<p>the ATMP planning area, and some areas not currently exposed to emissions from air tours (outside the ATMP planning area) may be exposed to emissions.</p> <ul style="list-style-type: none"> Highly unlikely that air tours displaced to outside the ATMP planning area would result in air quality impacts or change the current attainment status of the Park.
Biological Resources	<ul style="list-style-type: none"> Commercial air tour noise would continue to affect wildlife within the ATMP planning area and interfere with wildlife research activities in SEAs. Altitudes do not meet guidelines for protection of marine mammals. Time above 35 dBA: >120 minutes a day in portions of ATMP planning area. Not expected to result in indirect effects to wildlife. 	<ul style="list-style-type: none"> Direct beneficial effects to biological resources are expected. No direct impacts to biological resources within the ATMP planning area but could result in some indirect impacts due to air tour displacement outside the ATMP planning area. 	<ul style="list-style-type: none"> Annual (1,565) limit of air tour operations; time-of-day restrictions: 10:00 AM to 2:00 PM for non-quiet technology, 9:00 AM to 5:00 PM for quiet technology aircraft; and increased altitudes (1,500-2,000 ft. AGL.) to protect biological resources within the ATMP planning area. Time above 35 dBA: ≥45 minutes a day in portions of the ATMP planning area. Altitudes meet guidelines for protection of marine mammals. Could result in indirect effects to wildlife due to air tour displacement outside the ATMP planning area.
Cultural Resources	<ul style="list-style-type: none"> Cultural resources would continue to be impacted by air tours, as noise and visual effects would impact the feeling and setting of cultural resources. 12-hr equivalent sound level: 46.8 dBA at location #5. Time above 35 dBA: >120 minutes a day in 60% of the Park. Not expected to result in indirect effects to cultural resources within the APE. 	<ul style="list-style-type: none"> Would reduce the noise and remove visual intrusions from the setting of cultural resources within the APE. Could result in some indirect impacts to cultural resources within the APE, primarily in areas within and near the 'Ōla'a Forest tract and the Kīlauea caldera if flights were displaced to outside the ATMP planning area. 	<ul style="list-style-type: none"> Would reduce noise and visual impacts that could detract from the feeling and setting of cultural resources in most locations within the APE as compared to current conditions. Annual (1,565) limit of air tour operations; and time-of-day restrictions: 10:00 AM to 2:00 PM for non-quiet technology, 9:00 AM to 5:00 PM for quiet technology aircraft would reduce the likelihood that air

Environmental Impact Category	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
			<p>tours interrupt Native Hawaiian traditional practices such as ceremonies and the sanctity of the Kīlauea caldera.</p> <ul style="list-style-type: none"> • 12-hr equivalent sound level: 29.9 dBA on a quiet technology-only day, ≥30.1 dBA on a standard day at locations #12-#15; 32.3 dBA on a quiet technology-only day, 32.7 dBA on a standard day at location #4; 9.5 dBA on a quiet technology-only day, 9.6 dBA on a standard day at locations #16 and #28. • Time above 35 dBA: ≥45 minutes a day; ≥60 minutes a day on quiet technology-only day. • Could result in air tour displacement outside the ATMP planning area.
Wilderness	<ul style="list-style-type: none"> • Air tour noise within and near the Wilderness detracts from the natural quality and opportunity for solitude. • Time above 35 dBA: <90 minutes a day in the East Rift and Ka'ū Desert Wilderness units. • Time audible within Wilderness: <360 minutes a day in the East Rift Wilderness Unit. • No indirect effects expected. 	<ul style="list-style-type: none"> • Offers the greatest protection of Wilderness, since commercial air tours would not be able to fly over Wilderness. • Could result in indirect impacts to Wilderness areas associated with the sights and sounds of air tours if tours were displaced to outside the ATMP planning area. 	<ul style="list-style-type: none"> • Would diminish the natural quality of Wilderness in some discrete locations where air tour noise would reach native forest bird habitat, and also would detract from opportunities for solitude where air tour noise would be audible to Wilderness visitors. • Time above 35 dBA: <15 minutes a day in the Great Crack, East Rift, and Ka'ū Desert Wilderness units. • Time audible within Wilderness: <135 minutes a day in the East Rift Wilderness unit, <120 minutes a day on quiet technology-only days. • Could result in some indirect impacts to Wilderness areas if tours were displaced to outside the ATMP planning area and the sights and sounds of those tours

Environmental Impact Category	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
			affected Wilderness areas within the ATMP planning area.
Visitor Use and Experience and Other Recreational Opportunities	<ul style="list-style-type: none"> • Would not meet the Park's acoustic-based visitor use standards for the visitor services, transitional, and wild/primitive zones. Most impacts to visitor experience, which would occur Park-wide with the exception of the Park's developed areas, are related to the intrusion of audible air tour noise where visitors would expect natural sounds to prevail during their visit to the Park. • Maintains the current availability of air tours for those that wanted to view the Park from an aerial vantage point within the ATMP planning area. • 82% of the Park would experience audible air tour noise at some point of the day. • Audible air tour noise <30 minutes a day in 48% the Park. • Time above 52 dBA: <0.1 minutes a day at Kīlauea Visitor Center (location #4) and 0.2 minutes a day at Jaggar/HVO (location #37). • No indirect effects expected. 	<ul style="list-style-type: none"> • Offers the greatest protection of visitor use and experience but eliminates air tours within the ATMP planning area. • Air tours occurring outside the ATMP planning area may result in noise in other areas near those flights which could affect the visitor experience. • Indirect impacts to visitor experience and points of interest within or near the 'Ōla'a Forest tract and the Kīlauea caldera could occur if flights were displaced to outside the ATMP planning area. 	<ul style="list-style-type: none"> • Annual (1,565) limit of air tour operations; day-of-week restrictions: no air tours on Sundays; time-of-day restrictions: 10:00 AM to 2:00 PM for non-quiet technology, 9:00 AM to 5:00 PM for quiet technology aircraft; and increased altitudes (1,500-2,000 ft. AGL.) would reduce impacts to visitor experience. • 49% of the Park ≥15 minutes of audible air tour noise a day, 84% of the Park would experience audible air tour noise at some point in the day. • Audible air tour noise ≥150 minutes a day in 2% of the Park. • Time above 52 dBA: would not occur at Kīlauea Visitor Center (location #4) or Jaggar/HVO (location #37). • Indirect impacts to visitor experience and points of interest within or near the 'Ōla'a Forest tract and the Kīlauea caldera could occur if flights were displaced to outside the ATMP planning area.
Environmental Justice and Socioeconomics	<ul style="list-style-type: none"> • Would not result in disproportionately high or adverse noise, air quality, or visual effects to EJ populations. • Would not induce substantial economic growth, disrupt or divide physicality of community, cause extensive relocation, disrupt traffic patterns, or produce a 	<ul style="list-style-type: none"> • Would be direct beneficial impacts to EJ populations within the ATMP planning area for noise, air quality, and visual resources. • Would not induce substantial economic growth, disrupt or divide physicality of community, cause extensive relocation, or disrupt traffic patterns. 	<ul style="list-style-type: none"> • Annual (1,565) limit of air tour operations; time-of-day restrictions: 10:00 AM to 2:00 PM for non-quiet technology, 9:00 AM to 5:00 PM for quiet technology aircraft; and increased altitudes (1,500-2,000 ft. AGL.) would result in fewer impacts to EJ populations.

Environmental Impact Category	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
	<p>substantial change in the community tax base.</p> <ul style="list-style-type: none"> • DNL: <50 dB • 1,851 MT CO₂ • PMAD = 31 air tours 	<ul style="list-style-type: none"> • Unlikely would result in large socioeconomic impacts to the surrounding community, including those associated with changes to the community's tax base associated with loss of industry. 	<ul style="list-style-type: none"> • Would result in fewer direct noise, air quality, and visual effects to EJ populations. • Provides protection to Park viewsheds, including those overlooking Kilauea, part of the East Rift Zone, and along Crater Rim Drive and the upper parts of Chain of Craters Road. • DNL: <45 dB • 1,388 MT CO₂ • Could impact employment or the amount of income that air tour operators and other ancillary businesses generate from conducting air tours within the ATMP planning area.
Visual Effects	<ul style="list-style-type: none"> • Air tours would continue to impact visitor overlook areas primarily along Chain of Craters Road and Crater Rim Drive. • No indirect effects expected. • PMAD = 31 air tours 	<ul style="list-style-type: none"> • Would provide the greatest protection to Park viewsheds and would benefit visual resources and visual character within the Park. • Indirect impacts to viewsheds could occur if flights were displaced to outside the ATMP planning area. 	<ul style="list-style-type: none"> • Annual (1,565) limit of air tour operations; and time-of-day restrictions: 10:00 AM to 2:00 PM for non-quiet technology, 9:00 AM to 5:00 PM for quiet technology aircraft to protect the Park's viewsheds. • Commercial air tours along the authorized routes may be visible from the Park's coastal areas, parts of the East Rift zone, and over Highway 11 near Kahuku but air tours would be limited in the number of instances that would occur on an annual basis as compared to the No Action Alternative. • Indirect impacts to viewsheds could occur if flights were displaced to outside the ATMP planning area.
Coastal Resources	<ul style="list-style-type: none"> • N/A – the agencies have only prepared a consistency determination for the preferred alternative (Alternative 3). 	<ul style="list-style-type: none"> • N/A – the agencies have only prepared a consistency determination for the preferred alternative (Alternative 3). 	<ul style="list-style-type: none"> • Would not result in impacts to coastal resources. • Would be undertaken in a manner consistent to the maximum extent practicable

Environmental Impact Category	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)
			with the enforceable policies of the Hawai'i CZM Program.
DOT Act Section 4(f) Resources	<ul style="list-style-type: none"> • FAA consulted with NPS, who determined that the No Action Alternative would result in substantial impairment to Section 4(f) resources. 	<ul style="list-style-type: none"> • No substantial impairment of Section 4(f) resources in the Section 4(f) study area. • No "constructive use" to any Section 4(f) properties. 	<ul style="list-style-type: none"> • Annual (1,565) limit of air tour operations; time-of-day restrictions: 10:00 AM to 2:00 PM for non-quiet technology, 9:00 AM to 5:00 PM for quiet technology aircraft; and increased altitudes (1,500-2,000 ft. AGL.) result in beneficial impacts to the Section 4(f) resources. • No substantial impairment of Section 4(f) resources in the Section 4(f) study area. • No "constructive use" to any Section 4(f) properties. • DNL: <45 dB