Social Science Research to Inform Soundscape Management in Hawaii Volcanoes National Park

Final Report

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Chapter 1

Introduction

The National Park Service (NPS) defines natural soundscapes as those resources that "encompass all the natural sounds that occur in parks, including the physical capacity for transmitting those natural sounds and the interrelationships among park natural sounds of different frequencies and volumes" (NPS, 2006). Within the NPS Management Policies, the preservation and restoration of natural soundscape conditions are identified as important goals of the NPS:

> The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks…The Service will restore to the natural condition wherever possible those park soundscapes that have become degraded by unnatural sounds (noise), and will protect natural soundscapes from unacceptable impacts (NPS, 2006).

In recent years, the number of airplanes and helicopters flying over national park units has increased dramatically (NPS website, retrieved November 11, 2007, http://www.nature.nps.gov/naturalsounds/sources/). Thus, a significant source of unnatural sounds in national parks is from aviation activities over parks, which include general aviation, commercial passenger flights, park maintenance, and fire and emergency operations. Much of the increase in flights over the national parks can be attributed to the growth of the air tour industry. In the 1990s, Congress began to address the increasing number of sightseeing air tours by mandating the Federal Aviation Administration (FAA) and the NPS to manage air tours over the parks. The National Parks Air Tour Management Act of 2000 requires the development of Commercial Air Tour Management Plans (ATMP) for parks in which air tours are conducted.

The objective of the ATMP is to develop acceptable and effective measures to mitigate or prevent the significant adverse impacts, if any, of commercial air tour operations upon the natural and cultural resources of national parks and visitor experiences.

Currently, the NPS and FAA are in the process of developing an ATMP for Hawaii Volcanoes National Park. The purpose of this study is to examine the effects of natural and human-caused sounds, including air tour sounds, on visitors' experiences of Hawaii Volcanoes National Park's soundscape. The results of this study are designed to help inform the development of Hawaii Volcanoes National Park's ATMP.

The research presented in this report includes two components. The first component of the study uses a procedure referred to as attended listening, coupled with a visitor survey, and is designed to provide an empirical basis for understanding the sounds people hear while visiting the park, and their cognitive and affective responses to those sounds. The second component of the study uses a visitor survey, coupled with audio recordings of simulated park soundscapes, to assess visitor-based standards for: 1) the prominence of air tour sounds in Hawaii Volcanoes National Park; and 2) how often visitors hear helicopter air tour sounds while visiting selected areas of the park. Both the attended listening procedure and the audio recordings-based survey were administered to visitors at the Steam Vents near the overlook into Kīlauea Caldera and to visitors on the trail to Thurston Lava Tube. This report describes the methods used to conduct the attended listening exercises and audio recordings-based visitor surveys, presents results of the research, and summarizes major findings designed to help inform the development of Hawaii Volcanoes National Park's ATMP.

The report is organized as follows: Chapter 2 describes the survey instruments and sampling methods used to conduct the attended listening exercises and audio recordings-based

visitor surveys; Chapter 3 presents a summary of major findings and tabular results from the attended listening exercise administered at the Steam Vents; Chapter 4 presents a summary of major findings and tabular results from the attended listening exercise administered on the trail to Thurston Lava Tube; Chapter 5 presents a summary of major findings and tabular results from the audio recordings-based visitor survey administered at the Steam Vents and Thurston Lave Tube; and Chapter 6 presents a summary of the major findings from all components of the study. Appendices in the report include copies of the visitor survey instruments used in the study, verbatim responses to open-ended questions contained in the visitor surveys, comprehensive lists of zip codes of residence of all respondents to each of the visitor surveys, and codebooks for the electronic data files compiled from the visitor surveys. All electronic data files associated with this study are archived with Hawaii Volcanoes National Park and the NPS Natural Sounds Program Center.

Chapter 2

Methods

As stated above, the research presented in this report includes attended listening exercises and audio recordings-based visitor surveys administered in Hawaii Volcanoes National Park during June, 2007 to visitors at the Steam Vents near the overlook into Kīlauea Caldera and to visitors on the trail to Thurston Lava Tube. The visitor survey instruments used in this study were reviewed and approved by the Virginia Polytechnic Institute and State University Internal Review Board and the Office of Management and Budget, and are included in the Appendices of this report. It should be noted that the Chain of Craters Road was closed during the survey sampling period due to eruptive activity, consequently visitors were concentrated on Crater Rim Drive during the study period. The following subsections of this chapter describe the methods used to administer the attended listening exercises and audio recordings-based visitor surveys.

Attended Listening Exercise and Associated Visitor Survey

Attended listening exercises and associated visitor surveys were administered in Hawaii Volcanoes National Park during June, 2007 to visitors at the Steam Vents near the overlook into Kīlauea Caldera and to visitors on the trail to Thurston Lava Tube. Within the attended listening portion of the procedure, study participants were asked to sit quietly, close their eyes, and listen for several minutes to the sounds around them. Study participants were then administered a visitor survey questionnaire in which they were asked to identify, from a list of potential sounds, any sounds that they heard while engaged in the listening exercise. Respondents were also given the option to list and evaluate other sounds they heard that were not included in the list contained in the questionnaire. In addition, the questionnaire asked respondents to record any emotions or

feelings elicited by the sounds they heard, and to evaluate each sound they heard on an acceptability scale (-4 = "Very Unacceptable" to +4 = "Very Acceptable") and a personal evaluation scale (-4 = "Very Annoying" to +4 = Very Pleasing). A series of questions were included at the end of the questionnaire concerning visitors' group size, group type, number of previous visits to Hawaii Volcanoes National Park, gender, age, state or country of residence, level of formal education, race, ethnicity, and hearing ability. The attended listening survey questionnaires administered at the Steam Vents and trail to Thurston Lava Tube were identical, and a copy of the survey questionnaire is included in the report as Appendix A. The questionnaires were designed by researchers at Virginia Polytechnic Institute and State University, in consultation with Hawaii Volcanoes National Park, the NPS Natural Sounds Program Center, the NPS Denver Service Center, and researchers at Colorado State University and the University of Vermont.

The attended listening exercise and associated survey were administered on 9 randomly selected days in June, 2007 to visitors at the Steam Vents near the overlook into Kīlauea Caldera (Table 1). Survey administrators were stationed near the Kīlauea Caldera overlook, approximately 180 meters from Crater Rim Drive (Figure 1). On each sampling day, trained survey administrators approached randomly selected visitor groups as they were completing their visit to the overlook area of the Steam Vents and requested their participation in the survey. A randomly selected member of each visitor group who agreed to participate in the survey was given instructions about the attended listening exercise and administered a survey questionnaire after completing the attended listening. Respondents were asked to complete the questionnaire onsite. Individuals who were unwilling or unable to participate in the survey were thanked for their consideration. It should be noted that on three sampling days at the Steam Vents, the

attended listening exercise and associated survey were administered in conjunction with the audio-recordings based visitor survey. On those three days, while one member of a visitor group was completing the audio recordings-based visitor survey, a second member of the visitor group (if available) was asked to participate in the attended listening exercise and associated visitor survey. Thus, the response rate to the attended listening exercise is potentially inflated, as some of the participants may have refused to participate if they had not been waiting for another group member to complete the audio recordings-based visitor survey. The overall response rate for the attended listening visitor survey administered at the Steam Vents was 70.5%, while the response rate was 51.3% on days when the attended listening exercise was not administered in conjunction with the audio-recordings based visitor survey (Table 2).

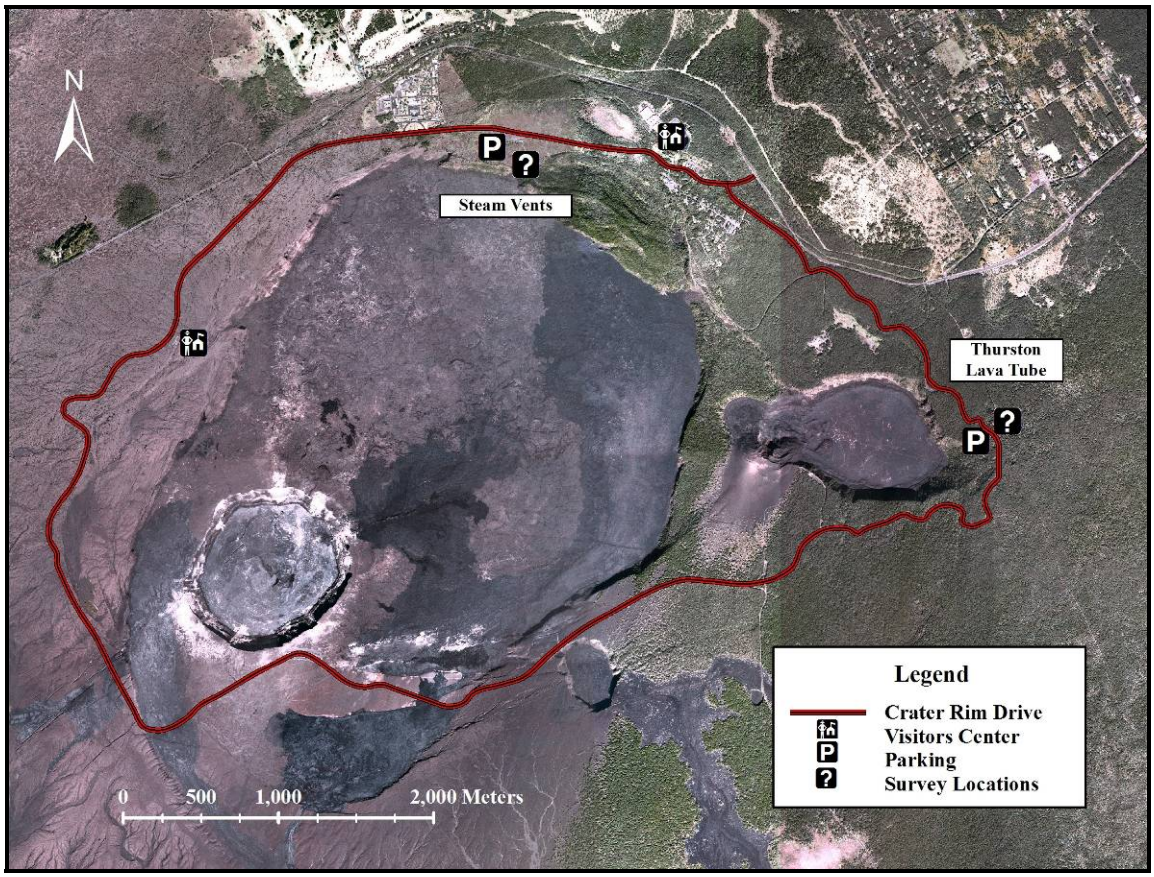

Figure 1. Steam Vents and Thurston Lava Tube visitor survey sampling locations.

The attended listening exercise and associated visitor survey were administered on the trail to Thurston Lava Tube on 8 randomly selected days in June, 2007 (Table 22). Survey administrators were stationed on the trail to Thurston Lava Tube, approximately 65 meters from Crater Rim Drive (Figure 1). On each sampling day, trained survey administrators approached randomly selected visitor groups as they were approaching the sampling area and requested their participation in the survey. A randomly selected member of each visitor group who agreed to participate in the survey was given instructions about the attended listening exercise and administered a survey after completing the attended listening. Respondents were instructed to complete the questionnaire onsite. Individuals who were unwilling or unable to participate in the survey were thanked for their consideration. It should be noted that on three sampling days on

the trail to Thurston Lave Tube, the attended listening exercise and associated survey were administered in conjunction with the audio-recordings based visitor survey. On those three days, while one member of a visitor group was completing the audio recordings-based visitor survey, a second member of the visitor group (if available) was asked to participate in the attended listening exercise and associated visitor survey. Thus, the response rate to the attended listening exercise is potentially inflated, as some of the participants may have refused to participate if they had not been waiting for another group member to complete the audio recordings-based visitor survey. Furthermore, due to a lack of consistency in how volunteer survey administrators recorded refusals, there were only two sampling days during which refusals were recorded consistently. Nonetheless, the overall response rate for the attended listening visitor survey administered on the trail to Thurston Lave Tube was 57.6%, while the response rate was 50.9% on the two days when refusals were recorded consistently (Table 23).

Audio Recordings-Based Visitor Survey

An audio recordings-based survey was administered to representative samples of visitors at the Steam Vents near the overlook into Kīlauea Caldera and on the trail to Thurston Lava Tube. At each location, the survey was administered on 8 randomly selected days in June, 2007 (Table 43). The audio recordings-based survey questionnaires administered at the Steam Vents and trail to Thurston Lava Tube were identical, and a copy of the survey questionnaire is included in the report as Appendix I. The survey questionnaire was designed by researchers at Virginia Polytechnic Institute and State University, in consultation with Hawaii National Park, the NPS Natural Sounds Program Center, the NPS Denver Service Center, and researchers at Colorado State University and the University of Vermont. The questionnaire has three major

sections. The first section of the questionnaire, entitled "Trip Description" includes questions concerning visitors' group size, group type, number of previous visits to Hawaii Volcanoes National Park, the importance of various motivations for visiting the park on the day they were contacted for the survey, and the locations in the park they had visited or planned to visit on the day they were contacted for the survey.

The second section of the questionnaire is entitled "The Park Soundscape" and includes questions designed to assess visitor-based standards for the prominence of air tour sounds in Hawaii Volcanoes National Park. In particular, visitors' evaluations of the acceptability of alternative park soundscape conditions were measured using a series of five audio recordings containing simulated park soundscapes. The first audio recording in the sequence contained only natural sounds that can be heard in the park. Each subsequent audio recording in the sequence contained the "base" natural sounds, mixed with increasing levels of helicopter sounds associated with scenic air tours of the park. Questions were included to correspond with each of the five audio recordings and asked respondents to rate the acceptability of the sounds contained in the corresponding audio recording. In addition, questions were included to ask visitors to identify sounds in the recordings they found pleasing and/or annoying, and to identify the recording that sounded most like what they heard while visiting the area of the park where they were contacted for the survey.

Questions were also included in the second section of the questionnaire to assess visitor-based standards for how often visitors hear helicopter air tour sounds while visiting the study location (i.e., Steam Vents or the trail to Thurston Lava Tube). In particular, visitors' evaluations of the acceptability of how often they hear helicopter air tour sounds during their visit to the area of the park where they were contacted were measured using narratively portrayed scenarios,

coupled with Recording 3 from the sequence of audio recordings described above. Each scenario described how often visitors would hear the helicopter sounds in Recording 3 while visiting the study location, with the scenarios ranging from never hearing the helicopter sounds to hearing them every 5 minutes. Questions were included to correspond with each of the scenarios and asked respondents to rate the acceptability of hearing helicopters as often as described in the corresponding scenario.

The second section of the questionnaire also contains questions concerning visitors' participation in scenic air tours over national parks, the extent to which visitors support or oppose potential air tour management strategies, and whether they heard aircraft while visiting the park on the day they were contacted for the survey.

The third section of the questionnaire, entitled "Background Information", includes questions concerning visitors' gender, age, state or country of residence, level of formal education, race, and ethnicity.

The audio recordings-based visitor survey was administered at the Steam Vents near the overlook into Kīlauea Caldera on 8 randomly selected days in June, 2007 (Table 43). Survey administrators were stationed near the Kīlauea Caldera overlook, approximately 180 meters from Crater Rim Drive (Figure 1). On each sampling day, trained survey administrators approached randomly selected visitor groups as they were completing their visit to the overlook area of the Steam Vents and requested their participation in the survey. A randomly selected member of each visitor group who agreed to participate in the survey was given a copy of the questionnaire and asked to complete it onsite. Individuals who were unwilling or unable to participate in the survey were thanked for their consideration. The overall response rate for the audio recordings-based survey administered at the Steam Vents was 53.8% and 54.8% after removing refusals due

to language barriers between the survey administrator and potential study participants. A substantial number of visitors who refused to participate in the survey did so because they were part of a commercial tour bus group and did not have sufficient time to complete the questionnaire. The response rate after eliminating refusals due language barriers and tour bus participant refusals was 55.8% (Table 44).

The audio recordings-based visitor survey was administered on the trail to Thurston Lava Tube on 8 randomly selected days in June, 2007 (Table 43). Survey administrators were stationed on the trail to Thurston Lava Tube, approximately 65 meters from Crater Rim Drive (Figure 1). On each sampling day, trained survey administrators approached randomly selected visitor groups as they were approaching the sampling area and requested their participation in the survey. A randomly selected member of each visitor group who agreed to participate in the survey was given a copy of the questionnaire and asked to complete it onsite. Individuals who were unwilling or unable to participate in the survey were thanked for their consideration. The overall response rate for the audio recordings-based survey administered on the trail to Thurston Lava Tube was 50.0% and 51.1% after removing refusals due to language barriers between the survey administrator and potential study participants. A substantial number of visitors who refused to participate in the survey did so because they were part of a commercial tour bus group and did not have sufficient time to complete the questionnaire. The response rate after eliminating refusals due language barriers and tour bus participant refusals was 68.3% (Table 44).

Chapter 3

Results – Steam Vents Area Attended Listening Visitor Survey

This chapter of the report presents the results of the Steam Vents Area Attended Listening Visitor Survey. The chapter begins with a summary of major findings from the survey, organized according to the sections of the survey questionnaire. The chapter then reports information about sampling effort and survey response rate, and concludes with tables and figures reporting the quantitative results of the survey. The attended listening survey questionnaires administered at the Steam Vents and trail to Thurston Lava Tube were identical, and a copy of the survey questionnaire is included in the report as Appendix A.

Summary of Major Findings

Trip Description

- A substantial majority (85.9%) of visitor groups in the Steam Vents area consist of 4 or fewer people, with just under half (44.4%) consisting of 2 people and about one-third (36.3%) consisting of 3 to 4 people (Table 3).
- Most (97.8%) visitors to the Steam Vents are not part of a commercial tour (Table 4).
- Nearly three-quarters (70.6%) of visitors to the Steam Vents are visiting Hawaii Volcanoes National Park for the first time. Of those visitors who have previously visited the park, 40% have visited once previously, 40% have visited 2 to 4 times previously, and one-fifth (20.0%) have visited the park 5 or more times previously (Tables 5 and 6).

Listening Portion of the Steam Vents Area Attended Listening Visitor Survey

Within the listening portion of the Steam Vents Area Attended Listening Visitor Survey, study participants were asked to sit quietly near the overlook into Kīlauea Caldera, close their eyes, and listen for several minutes to the sounds around them. Respondents were then asked to identify, from a list of potential sounds, any sounds that they heard while engaged in the listening exercise. Respondents were also given the option to list and evaluate other sounds they heard that were not included in the list contained in the questionnaire. Respondents were also asked to record any emotions or feelings elicited by the sounds they heard, and to evaluate each sound they heard on an acceptability scale (-4 = "Very Unacceptable" to +4 = "Very Acceptable") and a personal evaluation scale (-4 = "Very Annoying" to +4 = Very Pleasing). The detailed instructions used to administer the survey to park visitors are on the cover of the survey questionnaire, which is included in this report as Appendix A. For the purposes of analysis, the individual sounds listed in the questionnaire were grouped into sound categories representing general types of sounds. For example, the questionnaire items "Automobile" and "Motorcycle" were grouped into a sound category labeled "Vehicle Sounds". The results of the listening portion of the survey are summarized below and include results for both the individual sounds listed in the questionnaire and the sound categories derived from grouping the individual sound items.

- The types of sounds that visitors most commonly reported hearing during the listening exercise in the Steam Vents area include nature sounds (97.7%); the sounds of other visitors, such as walking sounds (74.1%) and talking (89.8%); and automobiles (79.3%). Furthermore, nearly half (44.9%) of all visitors reported hearing bird song and over one-third (37.2%) reported hearing "technology sounds", such as cameras (31.4%) and cell

phones (11.7%). About one-quarter (23.7%) of all visitors reported hearing aircraft during the listening exercise in the Steam Vents area, while just over one-quarter (27.7%) of visitors reported hearing loud voices and/or yelling. Among the nature sounds visitors reported hearing, wind was by far the most commonly heard (97.1%), and more than half (59.3%) of all visitors reported hearing leaves rustling. Of the aircraft sounds visitors reported hearing, the most commonly heard was helicopter sounds (14.1%; Tables 7 and 8; Figures 2 and 3). Survey administrators noted if aircraft sounds were present while each respondent was completing a survey; 50.0% of the respondents reported hearing an aircraft if one was indeed present during the time he or she took the survey.

- On average, visitors who reported hearing animal sounds such as bird song rated these as very acceptable to hear in the Steam Vents area (mean = 3.5). Similarly, those visitors who heard nature sounds generally rated them as acceptable to hear in the Steam Vents area of the park (mean = 2.9), particularly favoring the sounds of leaves rustling (mean = 3.8), shifting rocks and sand (mean = 3.4), and rainfall (mean = 3.1). Sounds generated by other visitors in the study area, such as walking sounds and talking sounds, were also generally considered to be acceptable sounds to hear (mean acceptability ratings of 2.1 and 1.4, respectively). However, the sounds of loud voices and/or yelling were generally considered to be unacceptable (mean = -1.6). Furthermore, visitors, on average, rated the sounds of personal electronic devices such as cell phones (mean = -1.8) and radio headsets/IPODS (mean = -1.4) to be unacceptable sounds to hear in the Steam Vents area. On average, visitors considered aircraft sounds to be unacceptable sounds to hear in the Steam Vents area (mean = -1.5), while they were generally neutral about the acceptability of hearing vehicle sounds (mean = -0.1), with greater sensitivity to the sounds of

motorcycles (mean = -1.5) than automobiles (mean = 0.0; Tables 9 and 10; Figures 4 and 5).

- On average, the sounds visitors rated most pleasing to hear in the Steam Vents area include bird song (mean = 3.9) and the sound of leaves rustling (mean = 3.4). More generally, visitors rated animal sounds and nature sounds to be pleasing sounds to hear in the Steam Vents area (mean personal interpretation ratings of 3.4 and 2.5, respectively). While the sounds of other visitors walking and talking in the Steam Vents area were generally considered to be somewhat pleasing sounds to hear, the sounds of other visitors' personal electronic devices, such as radio headsets and cell phones, were perceived to be very annoying. In fact, radio headsets and cell phones were rated, on average, as the most annoying sounds to hear in the Steam Vents area. Similarly, loud voices and/or yelling were generally considered to be annoying sounds to hear in the Steam Vents area (mean = -2.0). These findings, coupled with the results of the acceptability ratings for loud voices and/or yelling and the sounds of personal electronic devices, suggest that there may be social norms concerning appropriate visitor behavior and corresponding sounds in the Steam Vents area. Thus, it would be advisable to inform visitors about these issues prior to visiting the Steam Vents and other similar areas of the park. On average, visitors rated mechanical sounds, such as aircraft sounds (mean = -1.7) and vehicle sounds (mean = -1.1), as annoying to hear in the Steam Vents area (Tables 11 and 12; Figures 7 and 8).
- Figures 6 and 9 display information about the sounds visitors heard during the listening exercise in the Steam Vents area in an "importance-performance" framework. Figure 6 plots visitors' mean *acceptability* ratings for the sounds included in the questionnaire

(Table 9), by the percentage of visitors who reported hearing each sound (Table 7), while Figure 9 plots visitors' mean *personal interpretation* ratings for the sounds (Table 11), by the percentage of visitors who reported hearing each sound (Table 7). The two figures are designed to help prioritize soundscape management actions. For example, sounds in the upper left quadrant of Figures 6 and 9 would be considered high priority for management consideration as they are sounds that were rated, on average, as unacceptable and/or annoying, and were heard frequently by visitors. In this case, automobile sounds appear in the upper left quadrant of Figure 9 and on the border of the upper left quadrant of Figure 6, with automobile sounds being heard by more than three-quarters (79.3%) of all visitors, and receiving a mean personal interpretation rating of -1.1 and a mean acceptability rating of 0.0. The only other sounds to appear in the upper left quadrant of either figure are the sounds of a group(s) talking, with the sounds of a group(s) talking heard by about two-thirds (65.0%) of visitors, and receiving a mean personal interpretation rating of -0.1. However, while it is common for visitors to hear other groups talking in the Steam Vents area, and visitors, on average, consider the sounds of other groups talking to be slightly annoying, they generally consider it to be acceptable (mean = 1.4) to hear the sounds of groups talking in the Steam Vents area. No other sounds are contained within the upper left quadrant of Figure 6 or 9. Sounds in the lower left quadrant of Figures 6 and 9 would be considered a priority for management as well, as they are sounds that were rated, on average, as unacceptable and/or annoying sounds to hear in the Steam Vents area, though they are sounds that were heard by less than half of all visitors. In this case, just over one-quarter (27.7%) of visitors reported hearing loud voices and/or yelling during the listening exercise, and on average, visitors rated these

sounds as unacceptable (mean = -1.6) and annoying (mean = -2.0) to hear in the Steam Vents area. Similarly, about one-quarter (23.7%) of visitors reported hearing aircraft sounds, and these sounds were generally considered to be unacceptable (mean = -1.5) and annoying (mean = -1.7) to hear in the Steam Vents area. Other sounds that appear in the lower left quadrant of Figures 6 and/or 9 include the sounds of personal electronic devices (e.g., cell phones, radio headsets/IPod's) and motorcycles. However, each of these sounds was heard by less than one-quarter of visitors during the listening exercise. Nonetheless, while these sounds may not present a significant management problem currently, they should be monitored and managed to ensure that they not become more common elements of the ambient sound conditions in the Steam Vents area and similar areas of the park. The sounds in the upper right quadrant of Figures 6 and 9 are those sounds that visitors generally perceive to be acceptable and/or pleasing to hear in the Steam Vents area and are heard frequently. The most commonly heard sounds in this quadrant include the sound of wind and the sounds of other visitors walking and talking, while sounds that received the highest acceptability and personal interpretation ratings in the upper right quadrant of Figures 6 and 9 include the sounds of wind and leaves rustling. Efforts should be made to preserve opportunities to hear the sounds contained in the upper right quadrant of Figures 6 and 9, particularly those sounds that are perceived to be the most acceptable and pleasing to hear. Sounds in the bottom right quadrant of Figures 6 and 9 are those that visitors generally consider to be acceptable and/or pleasing to hear in the Steam Vents area, but are heard less frequently than those in the upper right quadrant of the figures. Within this quadrant, the sounds of bird song had the highest mean acceptability and personal interpretation ratings, and were heard by nearly half

(44.9%) of all visitors. The sounds of rainfall and shifting rocks and sand were also among the sounds that received the highest acceptability and personal interpretation ratings in the lower right quadrant of the figures, though each was heard by less than one-quarter of visitors. Efforts to maintain and improve opportunities for visitors to hear the sounds found in the lower right quadrant of Figures 6 and 9 are recommended.

- As stated earlier, visitors were asked to describe any emotions or feelings they associated with the sounds they heard during the attended listening exercise in the Steam Vents area. Of the 105 visitors who reported emotions and/or feelings associated with nature sounds they heard, a substantial majority (81.0%) reported positive emotions or feelings, such as feelings of calm, peacefulness, and pleasure. While relatively few (21) visitors reported emotions and/or feelings associated with hearing bird song, all of them reported positive emotions or feelings. The sounds of other visitors walking in the Steam Vents area also elicited positive emotions from more than two-thirds (68.6%) of the visitors who reported an emotion or feeling associated with hearing this sound. For example, visitors associated feelings of camaraderie, enjoyment, safety, and pleasantness with hearing the sounds of other visitors walking in the Steam Vents area of the park. In contrast, more than two-thirds (69.6%) of the visitors who reported an emotion or feeling associated with hearing loud voices and/or yelling described negative emotions or feelings, such as annoyance and irritation. Similarly, nearly three-quarters (73.7%) of the visitors who reported an emotion or feeling associated with aircraft, reported negative emotions or feelings, while almost two-thirds (65.3%) of visitors who reported an emotion or feeling associated with hearing vehicle sounds provided negative responses. These data suggest that aircraft sounds, vehicle sounds, and loud, disruptive behavior of other visitors may inhibit

visitors' ability to have a restorative experience of natural sounds and quiet in the Steam Vents area (Table 14).

Background Information

- A small majority (52.6%) of visitors to the Steam Vents area of the park are female, while a more substantial majority of visitors are residents of the United States (91.2%); have completed college/business/trade school or more formal education (84.6%); do not consider themselves to be Hispanic or Latino (95.5%); and identify themselves as White (88.8%). Furthermore, just under three-quarters (71.4%) of visitors in the Steam Vents area are between the ages of 25 and 54 years of age (Tables 15-20).
- Most (94.1%) visitors who participated in the study described their hearing as normal, while very few rated their hearing as somewhat impaired (5.9%), and no study participants rated their hearing as very impaired (Table 21).

Survey Sampling Effort and Response Rates

This section of the chapter reports information about sampling effort and survey response associated with the Steam Vents Area Attended Listening Visitor Survey.

Table 1. Steam Vents area attended listening survey sampling dates.

Date	Day of Week	Time of Day	Solicitations	Accept	Refuse	Unusable [a]	LB Refuse [b]	Tour Refuse [c]
6/19/2007	Tuesday	0915-1150	28	17	11	0	0	3
6/20/2007	Wednesday	0900-1200	26	8	14	4	3	0
6/21/2007	Thursday	0900-1150	17	13	4	0	1	0
6/22/2007[d]	Friday	0830-1150	14	12	1	1	0	N/A
6/23/2007	Saturday	0830-1150	16	9	5	2	1	0
6/24/2007	Sunday	0845-1420	26	11	9	6	0	1
6/26/2007 [e]	Tuesday	0855-1610	28	27	0	1	0	0
6/27/2007 [e]	Wednesday	0845-1140	17	17	0	0	0	0
6/29/2007 [e]	Friday	0845-1500	28	27	0	1	0	0
Total	**-**	**-**	**200**	**141**	**44**	**15**	**5**	**4**

[a] Denotes surveys that were administered to respondents but contained no useable data.
[b] LB Refuse were refusals due to a language barrier with the potential respondent.
[c] Tour Refuse were refusals due to time constraints from being a member of a commercial tour.
[d] Survey administrator did not solicit tour group members.
[e] Attended listening exercise administered to group members of audio recordings-based survey participants.

Table 2. Steam Vents area attended listening survey response rates.		
	Only Attended Listening [a,b] %	**Overall [a,c]** %
Acceptance Rate	51.3	70.5
Refusal Rate	48.7	29.5

[a] "Unusable" surveys treated as refusals.
[b] Only includes days when the attended listening survey was the only instrument administered, and excludes 6/22/2007 because tour group members were not solicited on that day.
[c] Overall response rate with all days and survey solicitation methods included.

Quantitative Results

This section of the chapter includes tables and figures reporting the quantitative results of the Steam Vents Area Attended Listening Visitor Survey, organized according to the sections of the survey questionnaire.

Trip Description

Table 3. How many people are in your personal group (family/friends) today?		
	(n= 135)	
Group Size	*Count*	*Percent*
1 person	7	5.2
2 people	60	44.4
3 to 4 people	49	36.3
5 or more people	19	14.1
Mean [a]	3.0	

[a] Extreme outliers were removed before calculating the mean.

Table 4. Is your personal group part of commercial tour in the park today?		
	(n= 137)	
	Count	*Percent*
Yes	3	2.2
No	134	97.8

Table 5. Have you visited Hawaii Volcanoes National Park before?		
	(n= 136)	
	Count	*Percent*
Yes	40	29.4
No	96	70.6

Table 6. Approximately how many times have you visited Hawaii Volcanoes National Park before today?		
	(n= 40)	
Number of Previous Visits	*Count*	*Percent*
1 visit	16	40.0
2 to 4 visits	16	40.0
5 or more	8	20.0
Mean [a]	2.6	

[a] Extreme outliers were removed before calculating the mean.

Table 7. Number and percentage of visitors who reported hearing sounds during attended listening in the Steam Vents area.

		Heard Sound	
Sound Category	**Sound**	*Count*	*Percent*
Aircraft Sounds	Aircraft, Jet	5	3.7
	Aircraft, Propeller	7	5.2
	Aircraft, Helicopter	19	14.1
	Aircraft, Unknown	10	7.4
Vehicle Sounds	Automobile	107	79.3
	Motorcycle	8	5.9
Trail Work / Maintenance Sounds	Trail Work / Maintenance	12	8.9
Technology Sounds	Cell Phones	16	11.7
	Radio Headset or IPOD	5	3.6
	Technology Sounds, Unknown	4	2.9
	Camera	43	31.4
Walking Sounds	Walking Sounds	100	74.1
	Walking Sticks	7	5.2
Talking	Group, Talking	89	65.0
	Adult(s), Talking	110	80.3
	Child/children, Talking	53	38.7
Loud Voices / Yelling	Group, Loud or Yelling	20	14.6
	Adult(s), Loud or Yelling	17	12.4
	Child/children, Loud or Yelling	25	18.2
	Child/children, Crying	10	7.3
Nature Sounds	Leaves Rustling	80	59.3
	Wind	132	97.1
	Thunder	4	2.9
	Rainfall	28	20.6
	Shifting Rocks & Sand	19	14.0
Animal Sounds	Bird Song	61	44.9
	Insect(s)	19	14.0
	Horses	3	2.2
	Animal, Unknown	3	2.2

Note: Sounds visitors reported hearing other than those listed in the questionnaire are presented in Appendix B.

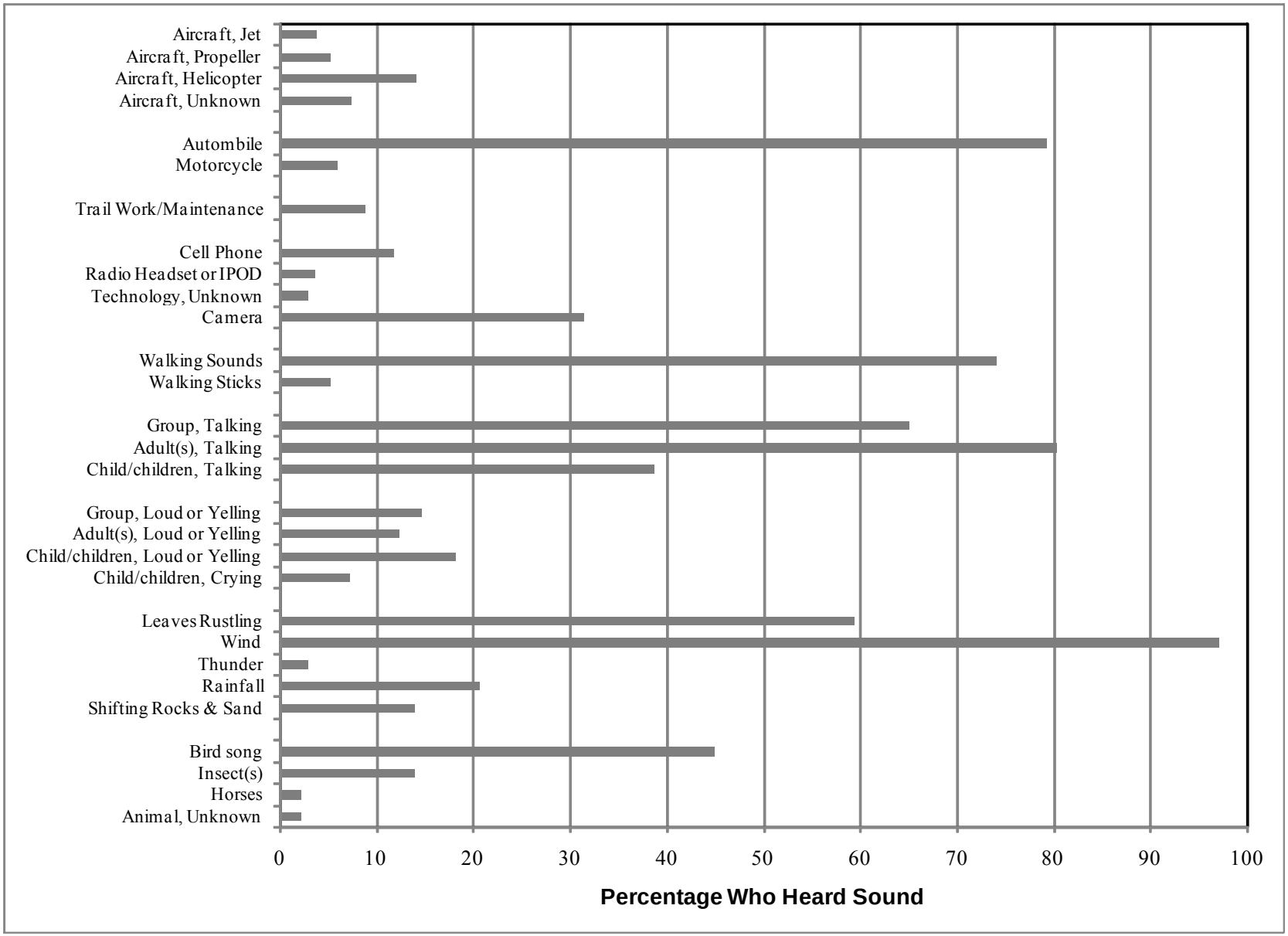

Figure 2. Percentage of visitors who reported hearing sounds during attended listening in the Steam Vents area.

Table 8. Number and percentage of visitors who reported hearing sounds during attended listening in the Steam Vents area, by sound category.

Sound Category	Heard Sound	
	Count	*Percent*
Aircraft Sounds	32	23.7
Vehicle Sounds	107	79.3
Trail Work / Maintenance Sounds	12	8.9
Technology Sounds	51	37.2
Walking Sounds	100	74.1
Talking	123	89.8
Loud Voices / Yelling	38	27.7
Nature Sounds	127	97.7
Animal Sounds	62	45.6

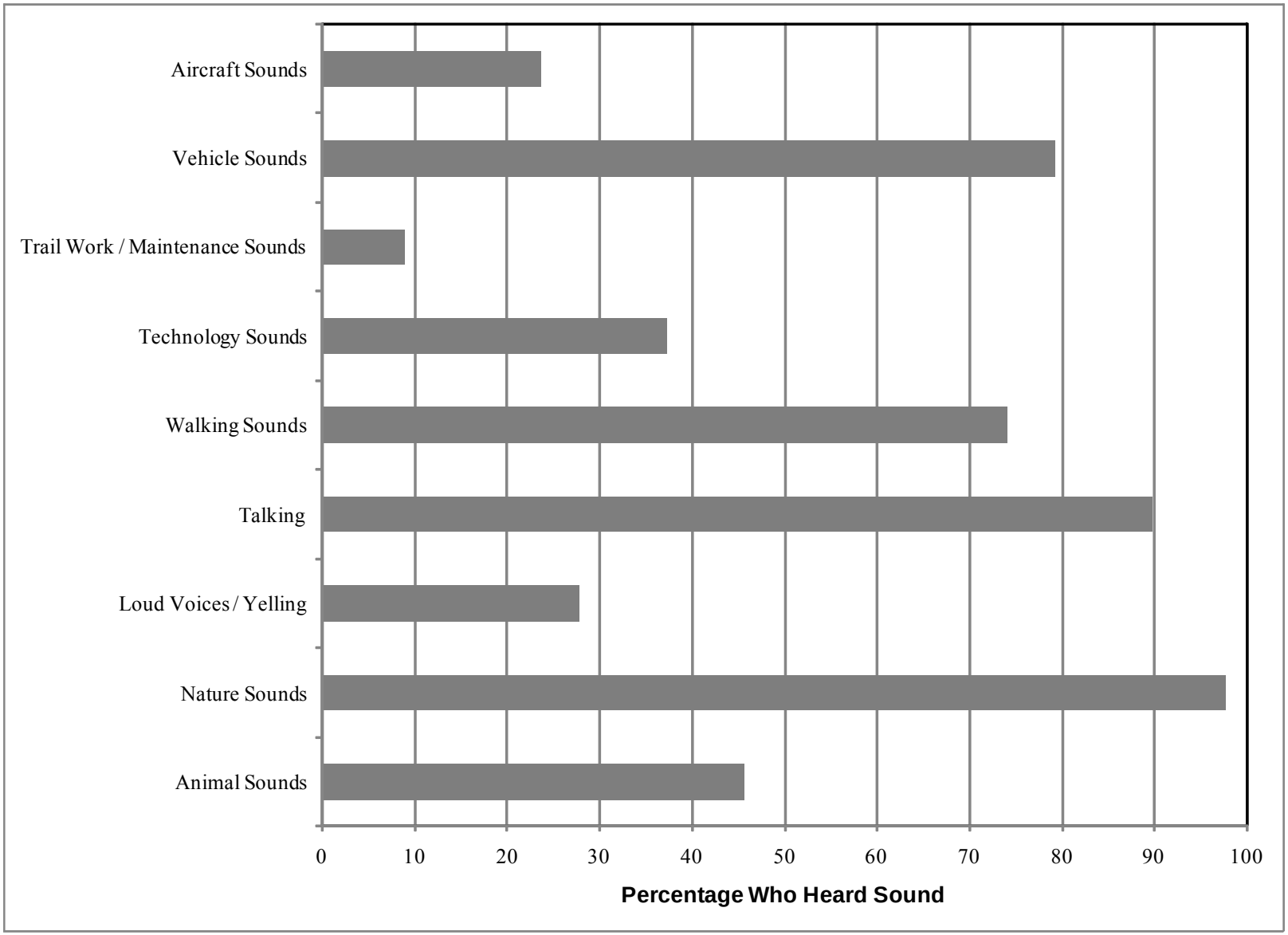

Figure 3. Percentage of visitors who reported hearing sounds during attended listening in the Steam Vents area, by sound category.

Table 9. Visitors' acceptability ratings of sounds heard during attended listening in the Steam Vents area.

Sound	Percentage who Rated Sound as... [a]				Mean
	n	*Acceptable*	*Neutral*	*Unacceptable*	
Aircraft, Jet	5	0.0	20.0	80.0	-1.8
Aircraft, Propeller	7	0.0	42.9	57.1	-1.6
Aircraft, Helicopter	17	11.8	11.8	76.5	-1.8
Aircraft, Unknown	8	25.0	12.5	62.5	-0.5
Automobile	106	31.1	29.2	39.6	0.0
Motorcycle	8	25.0	0.0	75.0	-1.5
Trail Work / Maintenance	12	41.7	33.3	25.0	0.8
Cell Phones	16	12.5	25.0	62.5	-1.8
Radio Headset or IPOD	5	20.0	0.0	80.0	-1.4
Technology Sounds, Unknown	4	0.0	50.0	50.0	-0.8
Camera	42	54.8	40.5	4.8	1.8
Walking Sounds	97	66.0	25.8	8.2	2.1
Walking Sticks	7	71.4	28.6	0.0	2.0
Group, Talking	85	55.3	32.9	11.8	1.4
Adult(s), Talking	105	55.2	36.2	8.6	1.4
Child/children, Talking	51	60.8	27.5	11.8	1.5
Group, Loud or Yelling	19	10.5	15.8	73.7	-1.9
Adult(s), Loud or Yelling	15	6.7	6.7	86.7	-2.5
Child/children, Loud or Yelling	24	20.8	12.5	66.7	-1.1
Child/children, Crying	10	10.0	20.0	70.0	-1.2
Leaves Rustling	77	94.8	1.3	3.9	3.5
Wind	129	83.7	9.3	7.0	2.9
Thunder	4	75.0	25.0	0.0	2.8
Rainfall	28	92.9	0.0	7.1	3.1
Shifting Rocks & Sand	18	100.0	0.0	0.0	3.4
Bird Song	61	98.4	0.0	1.6	3.8
Insect(s)	19	89.5	5.3	5.3	3.2
Horses	3	33.3	33.3	33.3	-0.3
Animal, Unknown	3	100.0	0.0	0.0	3.7

[a] Response scale ranged from -4 = "Very Unacceptable" to +4 = "Very Acceptable." See Appendix B for detailed frequency distributions of acceptability ratings.

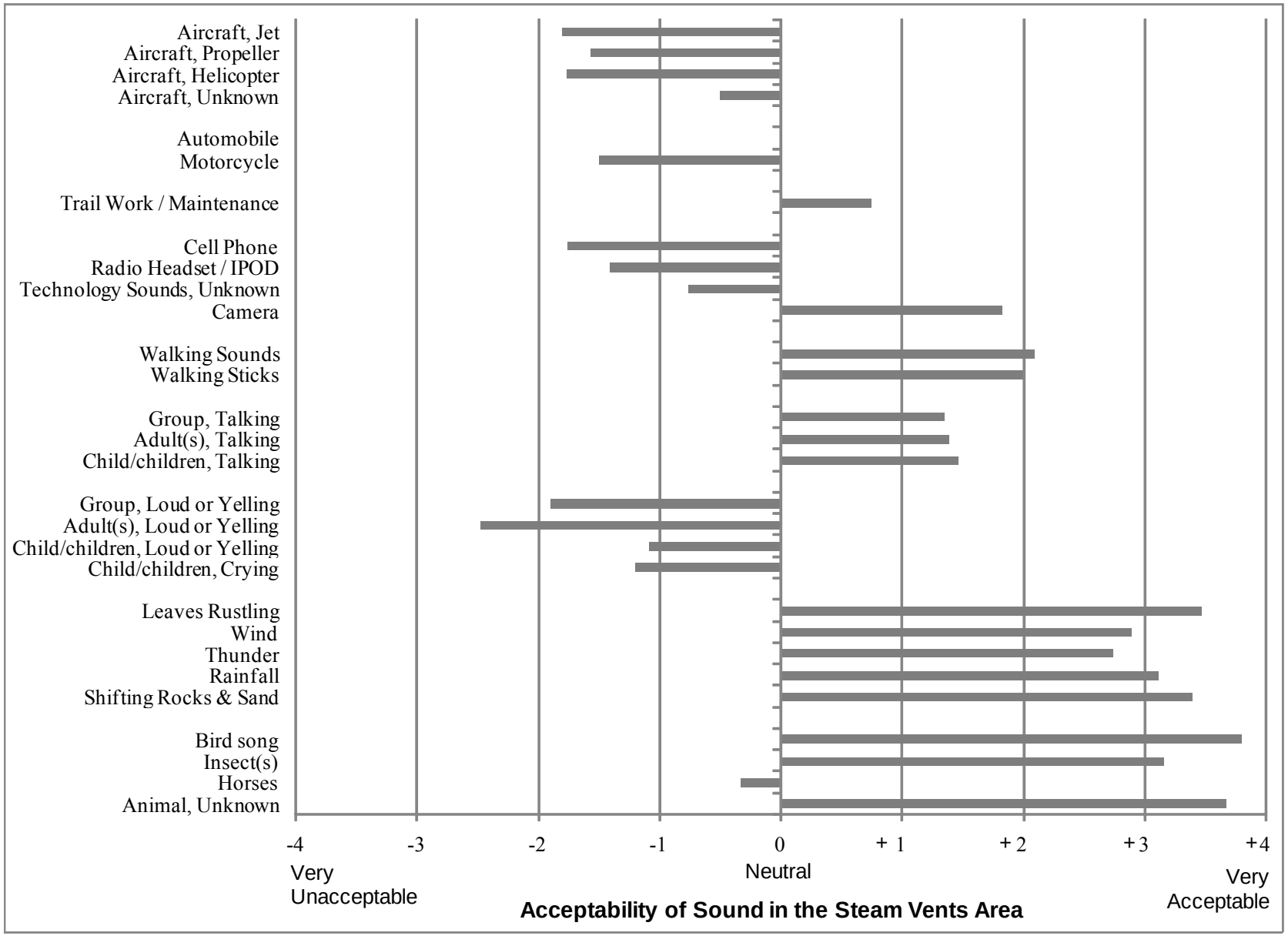

Figure 4. Visitors' mean acceptability ratings of sounds heard during attended listening in the Steam Vents area.

Table 10. Visitors' acceptability ratings of sounds heard during attended listening in the Steam Vents area, by sound category.

Sound Category	Percentage who Rated Sound as... [a]				Mean
	n	*Acceptable*	*Neutral*	*Unacceptable*	
Aircraft Sounds	37	10.8	18.9	70.3	-1.5
Vehicle Sounds	114	30.7	27.2	42.1	-0.1
Trail Work / Maintenance Sounds	12	41.7	33.3	25.0	0.8
Technology Sounds	67	38.8	34.3	26.9	0.6
Walking Sounds	104	66.3	26.0	7.7	2.1
Talking	241	56.4	33.2	10.4	1.4
Loud Voices / Yelling	68	13.2	13.2	73.5	-1.6
Nature Sounds	256	89.0	5.5	5.5	2.9
Animal Sounds	86	94.2	2.3	3.5	3.5

[a] Response scale ranged from -4 = "Very Unacceptable" to +4 = "Very Acceptable". See Appendix B for detailed frequency distributions of acceptability ratings.

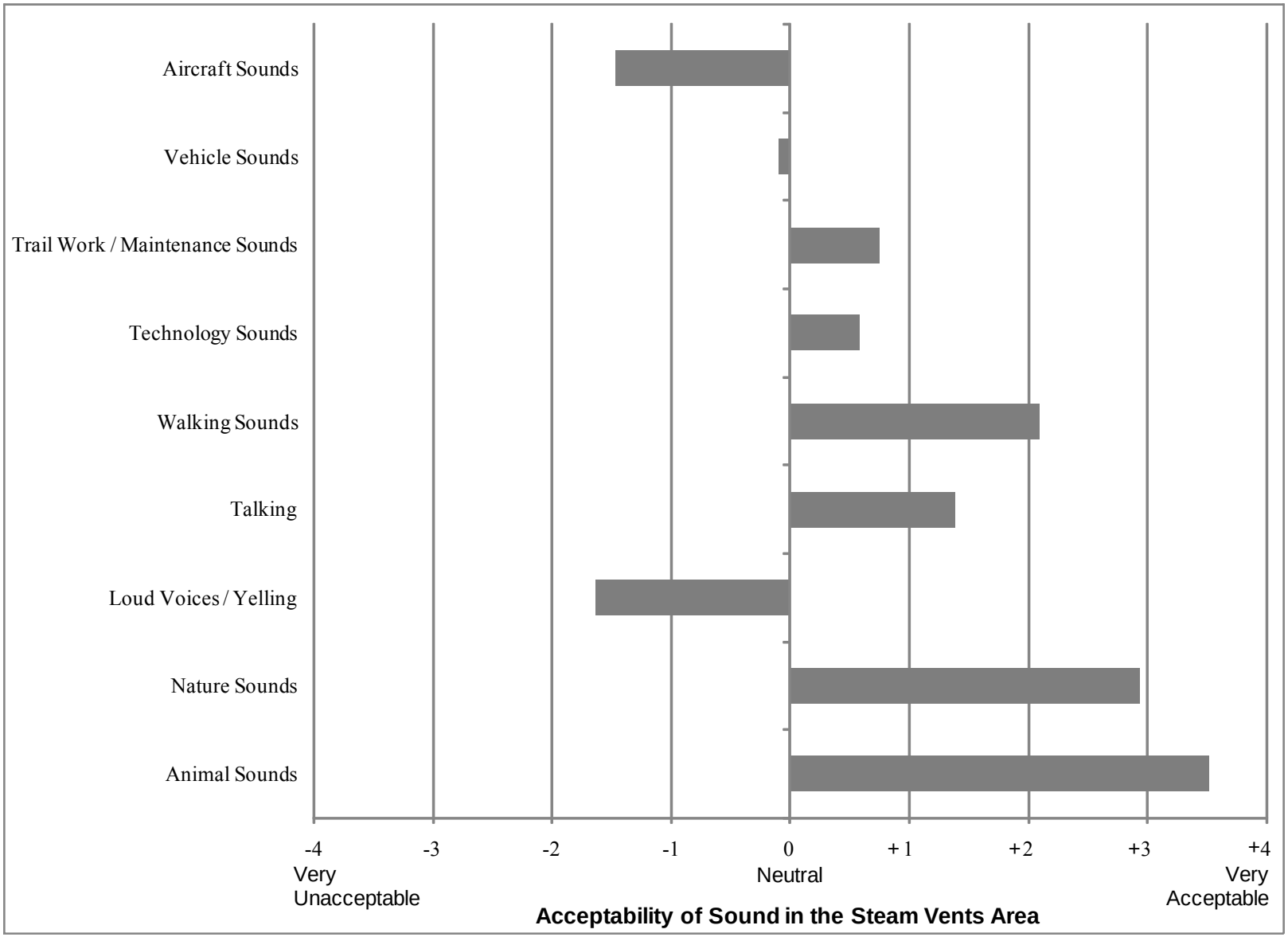

Figure 5. Visitors' mean acceptability ratings of sounds heard during attended listening in the Steam Vents area, by sound category.

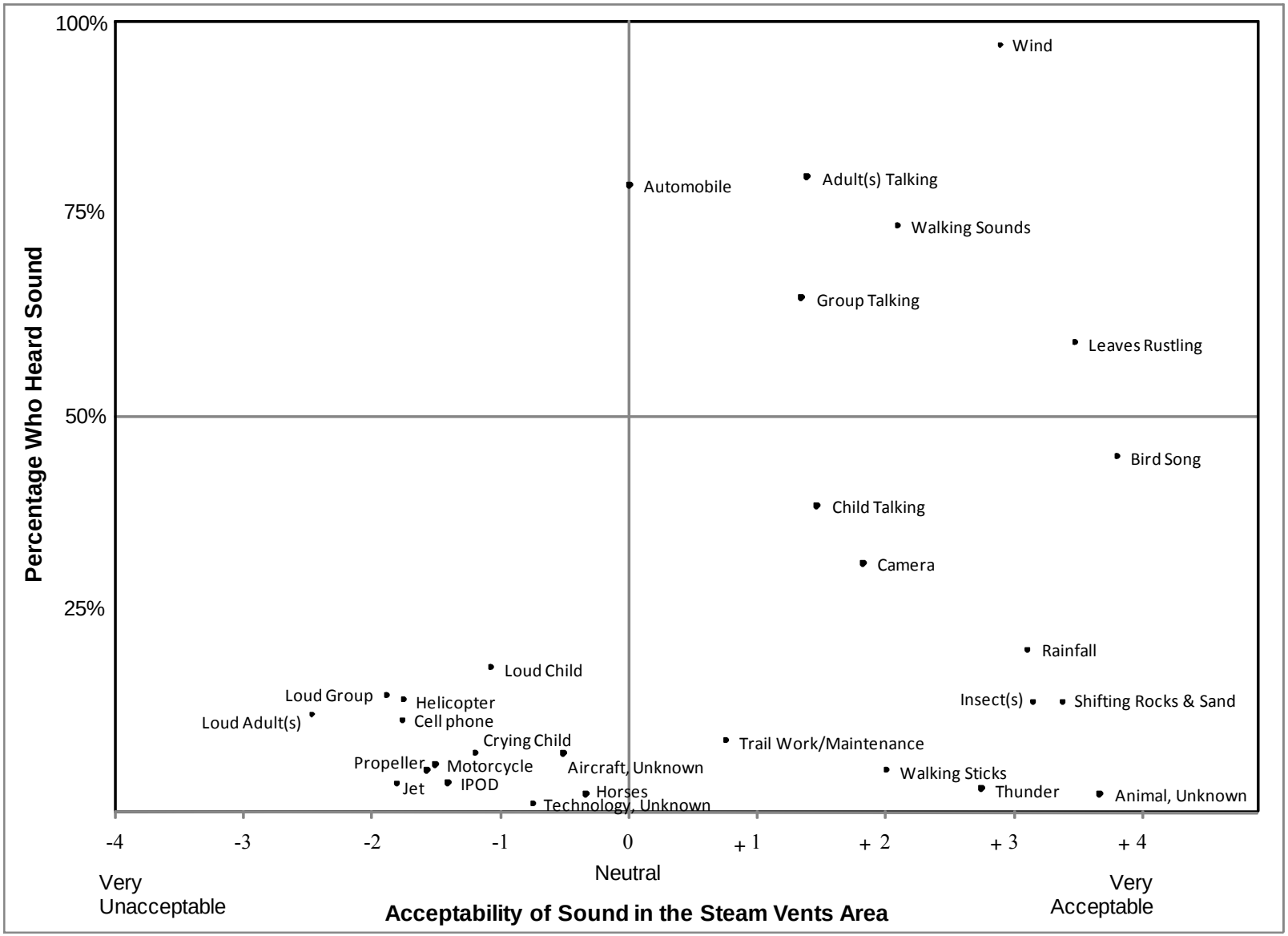

Figure 6. Visitors' mean acceptability ratings of sounds heard during attended listening in the Steam Vents area, by percentage of visitors who heard each sound.

Table 11. Visitors' personal interpretation ratings of sounds heard during attended listening in the Steam Vents area.

Sound		Percentage who Rated Sound as... [a]			Mean
	n	*Pleasing*	*Neutral*	*Annoying*	
Aircraft, Jet	5	0.0	40.0	60.0	-1.6
Aircraft, Propeller	6	0.0	16.7	83.3	-2.0
Aircraft, Helicopter	18	11.1	16.7	72.2	-1.8
Aircraft, Unknown	8	12.5	25.0	62.5	-1.3
Automobile	101	3.0	38.6	58.4	-1.1
Motorcycle	7	0.0	0.0	100.0	-1.9
Trail Work / Maintenance	10	10.0	50.0	40.0	-1.1
Cell Phones	14	0.0	7.1	92.9	-2.3
Radio Headset or IPOD	4	0.0	25.0	75.0	-2.8
Technology Sounds, Unknown	4	0.0	25.0	75.0	-2.0
Camera	39	25.6	53.8	20.5	0.5
Walking Sounds	89	48.3	38.2	13.5	1.0
Walking Sticks	5	60.0	40.0	0.0	1.2
Group, Talking	83	16.9	51.8	31.3	-0.1
Adult(s), Talking	101	20.8	62.4	16.8	0.2
Child/children, Talking	49	34.7	46.9	18.4	0.6
Group, Loud or Yelling	17	5.9	11.8	82.4	-2.3
Adult(s), Loud or Yelling	14	14.3	7.1	78.6	-2.1
Child/children, Loud or Yelling	20	5.0	10.0	85.0	-1.8
Child/children, Crying	9	11.1	11.1	77.8	-1.6
Leaves Rustling	73	97.3	2.7	0.0	3.4
Wind	123	80.5	9.8	9.8	2.5
Thunder	4	75.0	0.0	25.0	1.8
Rainfall	27	77.8	11.1	11.1	2.3
Shifting Rocks & Sand	18	94.4	5.6	0.0	3.1
Bird Song	57	98.2	1.8	0.0	3.9
Insect(s)	19	84.2	5.3	10.5	2.6
Horses	2	50.0	50.0	0.0	0.5
Animal, Unknown	3	66.7	33.3	0.0	2.0

[a] Response scale ranged from -4 = "Very Annoying" to +4 = "Very Pleasing". See Appendix B for detailed frequency distributions of personal interpretation ratings.

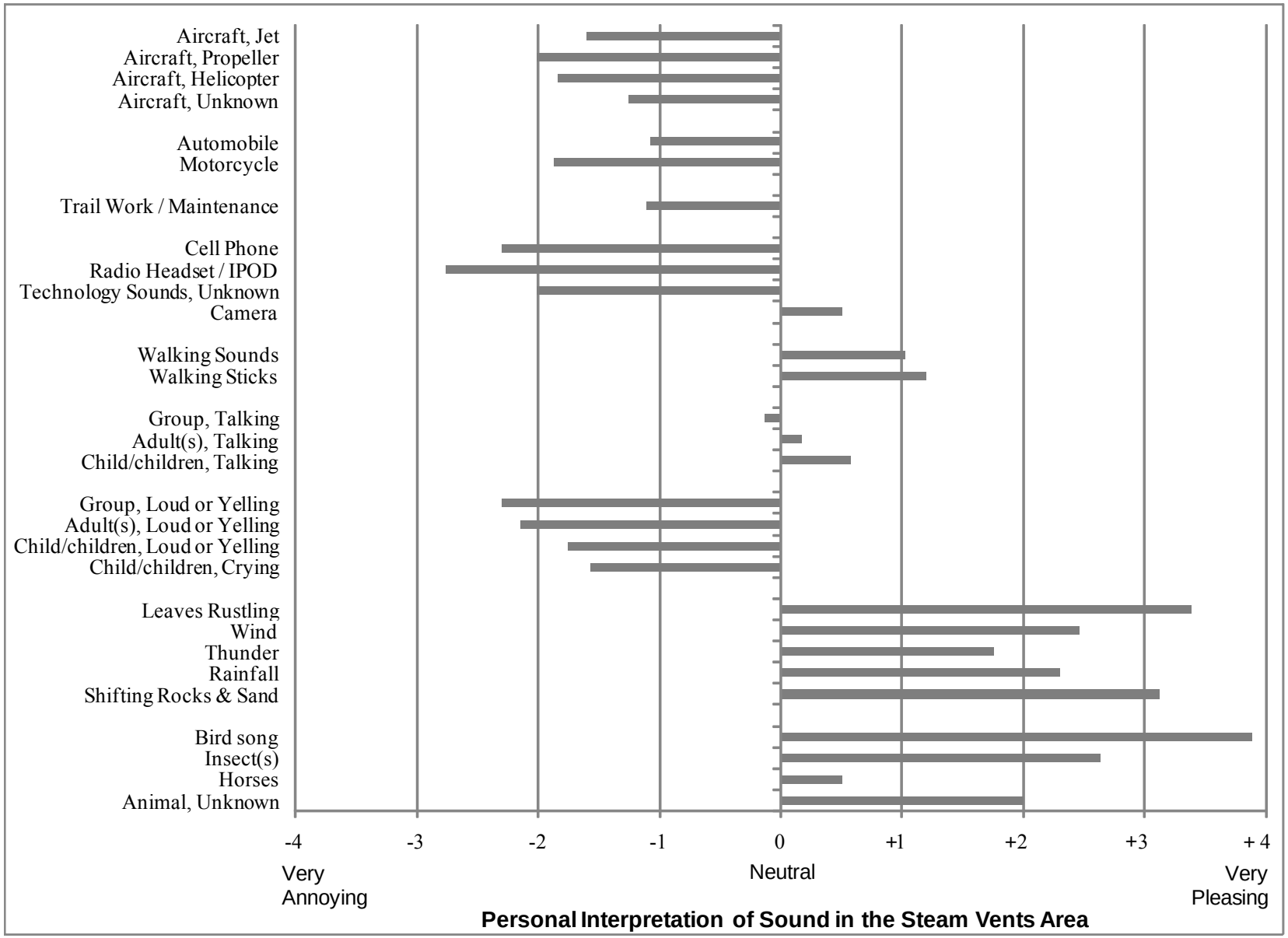

Figure 7. Visitors' mean personal interpretation ratings of sounds heard during attended listening in the Steam Vents area.

Table 12. Visitors' personal interpretation ratings of sounds heard during attended listening in the Steam Vents area, by sound category.

Sound Category	Percentage who Rated Sound as... [a]				Mean
	n	*Pleasing*	*Neutral*	*Annoying*	
Aircraft Sounds	37	8.1	21.6	70.3	-1.7
Vehicle Sounds	108	2.8	36.1	61.1	-1.1
Trail Work / Maintenance Sounds	12	10.0	50.0	40.0	-1.1
Technology Sounds	61	16.4	39.3	44.3	-0.5
Walking Sounds	94	48.9	38.3	12.8	1.0
Talking	233	22.3	55.4	22.3	0.1
Loud Voice / Yelling	60	8.3	10.0	81.7	-2.0
Nature Sounds	245	86.1	7.3	6.5	2.5
Animal Sounds	81	92.6	4.9	2.5	3.4

[a] Response scale ranged from -4 = "Very Annoying" to +4 = "Very Pleasing". See Appendix B for detailed frequency distributions of personal interpretation ratings.

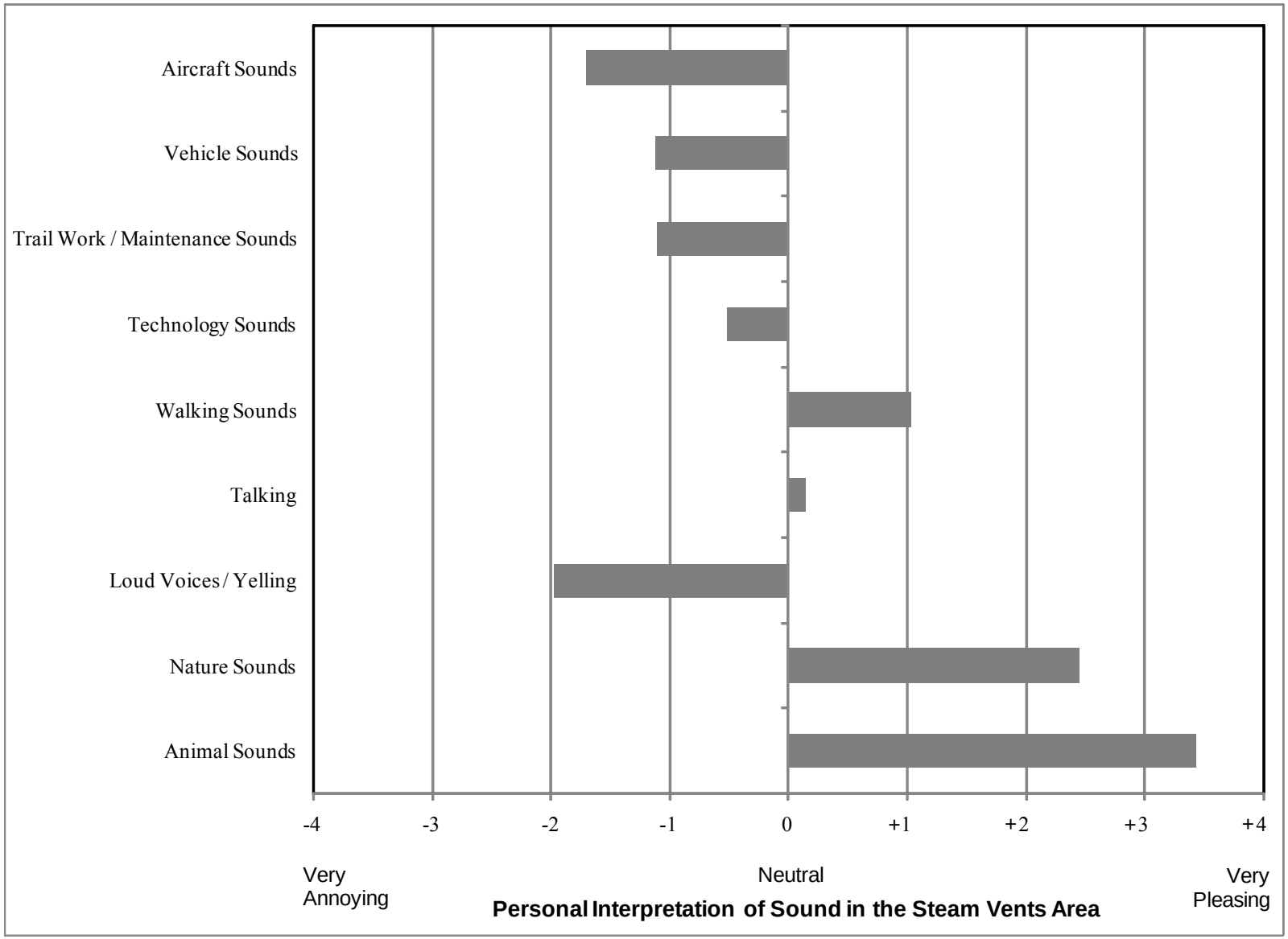

Figure 8. Visitors' mean personal interpretation ratings of sounds heard during attended listening in the Steam Vents area, by sound category.

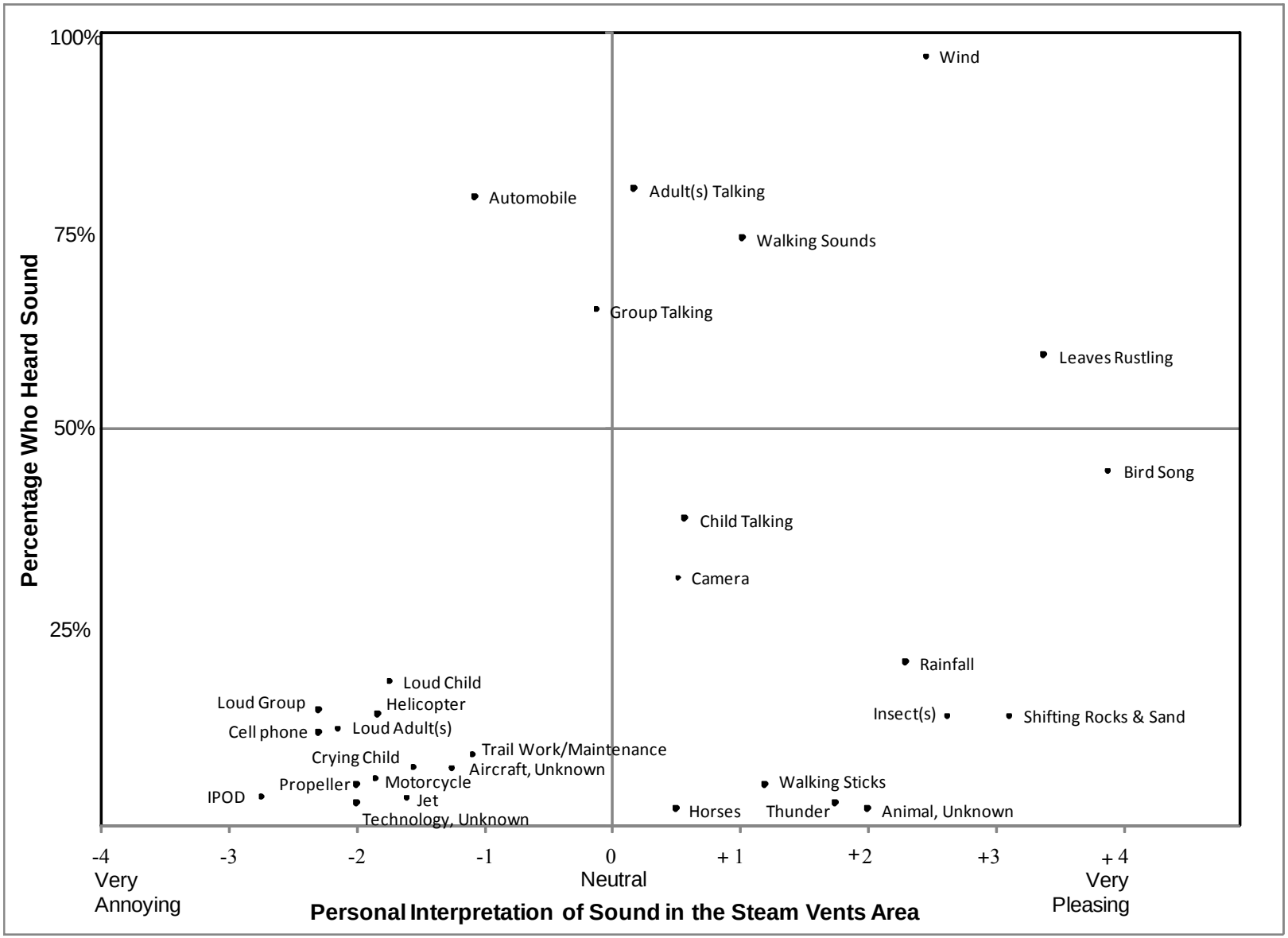

Figure 9. Visitors' mean personal interpretation ratings of sounds heard during attended listening in the Steam Vents area, by percentage of visitors who heard each sound.

Table 13. Visitor-reported emotions/feelings associated with sounds heard during attended listening in the Steam Vents area.

Sound	Reported Emotions/Feelings Associated with Sound [a] --------Percent-------				None Reported [b]
	n	*Positive*	*Ambiguous*	*Negative*	*n*
Aircraft, Jet	1	0.0	0.0	100.0	4
Aircraft, Propeller	2	0.0	0.0	100.0	5
Aircraft, Helicopter	12	0.0	25.0	75.0	7
Aircraft, Unknown	4	0.0	50.0	50.0	6
Automobile	45	0.0	37.8	62.2	62
Motorcycle	4	0.0	0.0	100.0	3
Trail Work / Maintenance	6	0.0	83.3	16.7	6
Cell Phones	7	0.0	28.6	71.4	9
Radio Headset or IPOD	1	0.0	0.0	100.0	4
Technology Sounds, Unknown	1	0.0	100.0	0.0	3
Camera	9	55.6	11.1	33.3	34
Walking Sounds	34	70.6	29.4	0.0	66
Walking Sticks	1	0.0	100.0	0.0	6
Group, Talking	20	30.0	50.0	20.0	69
Adult(s), Talking	22	36.4	36.4	27.3	88
Child/children, Talking	15	66.7	26.7	6.7	38
Group, Loud or Yelling	7	0.0	42.9	57.1	13
Adult(s), Loud or Yelling	6	0.0	16.7	83.3	11
Child/children, Loud or Yelling	7	14.3	14.3	71.4	18
Child/children, Crying	3	0.0	33.3	66.7	7
Leaves Rustling	38	97.4	2.6	0.0	42
Wind	55	70.9	7.3	21.8	77
Thunder	0	N/A	N/A	N/A	4
Rainfall	6	83.3	0.0	16.7	22
Shifting Rocks & Sand	6	66.7	33.3	0.0	13
Bird Song	21	100.0	0.0	0.0	40
Insect(s)	7	71.4	14.3	14.3	12
Horses	0	N/A	N/A	N/A	3
Animal, Unknown	0	N/A	N/A	N/A	3

[a] Open-ended responses were categorized as "positive," "negative," or "ambiguous" emotions/feelings. See Appendix C for a verbatim list of responses.

[b] Number of respondents who heard the sound but did not report an emotion or feeling.

Table 14. Visitor-reported emotions/feelings associated with sounds heard during attended listening in the Steam Vents area, by sound category.

	Reported Emotions/Feelings Associated with Sound [a]				None Reported [b]
		--------Percent-------			
Sound Category	*n*	*Positive*	*Ambiguous*	*Negative*	*n*
Aircraft Sounds	19	0.0	26.3	73.7	22
Vehicle Sounds	49	0.0	34.7	65.3	66
Trail Work / Maintenance Sounds	6	0.0	83.3	16.7	6
Technology Sounds	18	27.8	22.2	50.0	50
Walking Sounds	35	68.6	31.4	0.0	72
Talking	57	42.1	38.6	19.3	195
Loud Voices / Yelling	23	4.3	26.1	69.6	49
Nature Sounds	105	81.0	6.7	12.4	158
Animal Sounds	28	92.9	3.6	3.6	58

[a] Open-ended responses were categorized as "positive," "negative," or "ambiguous" emotions/feelings. See Appendix C for a verbatim list of responses.

[b] Includes respondents who heard the sound but did not report an emotion or feeling.

Background Information

Table 15. What is your gender?		
	(n= 135)	
Gender	*Count*	*Percent*
Male	64	47.4
Female	71	52.6

Table 16. In what year were you born? (Converted to age in years.)		
	(n= 136)	
Age Group	*Count*	*Percent*
18 to 24 years old	12	8.8
25 to 34 years old	33	24.3
35 to 44 years old	31	22.8
45 to 54 years old	33	24.3
55 to 64 years old	20	14.7
65 years old and older	7	5.1
Mean Age	42.4	

Table 17.1. Do you live in the United States?		
	(n= 137)	
	Counts	*Percent*
Yes	125	91.2
No	12	8.8

Table 17.2. What is your zip code (if you live in the United States)?	
	(n= 115)
Most Frequently Reported Zip Codes	*Count*
47906 (West Lafayette, IN)	3
43201 (Columbus, OH)	2
32606 (Gainesville, FL)	2
96734 (Kailua, HI)	2
96749 (Keaau, HI)	2
96818 (Honolulu, HI)	2

See Appendix D for a frequency distribution of respondents, organized by state.

Table 17.3. What country do you live in (if not the United States)?	
	(n= 12)
Country	*Count*
Canada	3
Australia	2
New Zealand	2
United Kingdom	2
Italy	1
Netherlands	1
Thailand	1

Table 18. What is the highest level of formal education you have completed?		
	(n= 136)	
Education Level	*Count*	*Percent*
Some high school	1	0.7
High school graduate or GED	2	1.5
Some college, business or trade school	18	13.2
College, business or trade school graduate	44	32.4
Some graduate school	17	12.5
Master's, doctoral or professional degree	54	39.7

Table 19. Are you Hispanic or Latino?		
	(n= 134)	
	Counts	*Percent*
Yes	6	4.5
No	128	95.5

Table 20. What is your race?		
	(n= 134)	
Race	*Count*	*Percent*
American Indian or Alaskan Native	3	2.2
Asian	10	7.5
Black or African American	0	0.0
Native Hawaiian	2	1.5
Pacific Islander other than Native Hawaiian	0	0.0
White	119	88.8
Reported 2 races	0	0.0

Table 21. How would you describe your hearing?		
	(n= 136)	
	Count	*Percent*
My hearing is normal	128	94.1
I am somewhat hearing impaired	8	5.9
I am very hearing impaired	0	0.0
I don't know about my hearing capacity	0	0.0

Chapter 4

Results – Thurston Lava Tube Area Attended Listening Visitor Survey

This chapter of the report presents the results of the Thurston Lava Tube Area Attended Listening Visitor Survey. The chapter begins with a summary of major findings from the survey, organized according to the sections of the survey questionnaire. The chapter then reports information about sampling effort and survey response rate, and concludes with tables and figures reporting the quantitative results of the survey. The attended listening survey questionnaires administered at the Steam Vents and trail to Thurston Lava Tube were identical, and a copy of the survey questionnaire is included in the report as Appendix A.

Summary of Major Findings

Trip Description

- A substantial majority (79.4%) of visitor groups to the Thurston Lava Tube area consist of 4 or fewer people, with just under half (42.5%) consisting of 2 people and one-third (33.3%) consisting of 3 to 4 people (Table 24).
- Very few (8.9%) participants in the Thurston Lava Tube area attended listening exercise were part of a commercial tour (Table 25). However, it should be noted that nearly half (48.1%) of the visitors who declined to participate in the survey were members of tour groups. Thus, it is likely the survey data under-represent the proportion of visitors who come to the Thurston Lava Tube area of the park as part of a commercial tour (Table 22).
- Three-quarters (75.0%) of visitors to the Thurston Lava Tube are visiting Hawaii Volcanoes National Park for the first time. Of those visitors who have previously visited the park, about one-quarter (23.8%) have visited once previously, nearly two-thirds

(61.9%) have visited 2 to 4 times previously, and less than one-fifth (14.3%) have visited the park 5 or more times previously (Tables 26 and 27).

Listening Portion of the Thurston Lava Tube Area Attended Listening Visitor Survey

Within the listening portion of the Thurston Lava Tube Area Attended Listening Visitor Survey, study participants were asked to sit quietly on the side of the trail to the Thurston Lava Tube, close their eyes, and listen for several minutes to the sounds around them. Respondents were then asked to identify, from a list of potential sounds, any sounds that they heard while engaged in the listening exercise. Respondents were also given the option to list and evaluate other sounds they heard that were not included in the list contained in the questionnaire. Respondents were also asked to record any emotions or feelings elicited by the sounds they heard, and to evaluate each sound they heard on an acceptability scale (-4 = "Very Unacceptable" to +4 = "Very Acceptable") and a personal evaluation scale (-4 = "Very Annoying" to +4 = Very Pleasing). The detailed instructions used to administer the survey to park visitors are on the cover of the survey questionnaire, which is included in this report as Appendix A. For the purposes of analysis, the individual sounds listed in the questionnaire were grouped into sound categories representing general types of sounds. For example, the questionnaire items "Automobile" and "Motorcycle" were grouped into a sound category labeled "Vehicle Sounds". The results of the listening portion of the survey are summarized below and include results for both the individual sounds listed in the questionnaire and the sound categories derived from grouping the individual sound items.

- The types of sounds that visitors most commonly reported hearing during the listening exercise in the Thurston Lava Tube area include bird song (97.2%); the sounds of wind

(90.5%) and leaves rustling (83.7%); and the sounds of other visitors, such as walking sounds (86.0%) and talking (98.4%). Furthermore, about half of all visitors reported hearing vehicle sounds (55.8%); "technology sounds" (50.5%), such as cameras and cell phones; and loud voices and/or yelling (45.1%). More than one-quarter (29.7%) of all visitors reported hearing aircraft during the listening exercise in the Thurston Lava Tube area, with helicopter sounds (19.8%) being the most commonly heard type of aircraft sound (Tables 28 and 29; Figures 10 and 11). Survey administrators noted if aircraft sounds were present while each respondent was completing a survey; 72.4% of respondents reported hearing an aircraft if one was indeed present during the time he or she took the survey.

- On average, visitors who reported hearing animal sounds such as bird song rated these as very acceptable to hear in the Thurston Lava Tube area (mean = 3.6). Similarly, those visitors who heard nature sounds generally rated them as acceptable to hear in the Thurston Lava Tube area of the park (mean = 3.3). Sounds generated by other visitors in the study area, such as walking sounds and talking sounds, were also generally considered to be acceptable sounds to hear (mean acceptability ratings of 2.0 and 0.6, respectively). However, the sounds of loud voices and/or yelling were generally considered to be unacceptable (mean = -1.8), with the lowest mean acceptability rating of any sound heard by visitors being given to loud or yelling adults (mean = -2.4). Furthermore, visitors, on average, rated the sounds of personal electronic devices such as cell phones (mean = -2.3) and radio headsets/Ipod's (mean = -1.0) to be unacceptable sounds to hear in the Thurston Lava Tube area. On average, visitors considered aircraft sounds to be unacceptable sounds to hear in the Thurston Lava Tube area (mean = -1.1),

and they generally considered hearing vehicle sounds to be slightly unacceptable (mean = -0.5), with greater sensitivity to the sounds of motorcycles (mean = -1.8) than automobiles (mean = -0.5; Tables 30 and 31; Figures 12 and 13).

- On average, the sounds visitors rated most pleasing to hear in the Thurston Lava Tube area of the park include bird song (mean = 3.9); wind (mean = 3.5); rainfall (mean = 3.4); and leaves rustling (mean = 3.3). More generally, visitors rated animal sounds and nature sounds to be pleasing sounds to hear in the Thurston Lava Tube area (mean personal interpretation ratings of 3.6 and 3.2, respectively). While the sounds of other visitors walking and talking in the Thurston Lava Tube area were generally considered to be somewhat pleasing sounds to hear, the sounds of other visitors' personal electronic devices, such as radio headsets and cell phones, were perceived to be annoying. In fact, the sounds of cell phones were rated, on average, as the most annoying sounds to hear in the Thurston Lava Tube area. Similarly, loud voices and/or yelling were generally considered to be annoying sounds to hear in the Thurston Lava Tube area (mean = -2.2). These findings, coupled with the results of the acceptability ratings for loud voices and/or yelling and the sounds of personal electronic devices, suggest that there may be social norms concerning appropriate visitor behavior and corresponding sounds in the Thurston Lava Tube area. Thus, it would be advisable to inform visitors about these issues prior to visiting the Thurston Lava Tube and other similar areas of the park. On average, visitors rated mechanical sounds, such as vehicle sounds (mean = -1.5) and aircraft sounds (mean = -1.4), as annoying to hear in the Thurston Lava Tube area (Tables 32 and 33; Figures 15 and 16).

- Figures 14 and 17 display information about the sounds visitors heard during the listening exercise in the Thurston Lava Tube area in an "importance-performance" framework. Figure 14 plots visitors' mean *acceptability* ratings for the sounds included in the questionnaire (Table 30), by the percentage of visitors who reported hearing each sound (Table 28), while Figure 17 plots visitors' mean *personal interpretation* ratings for the sounds (Table 32), by the percentage of visitors who reported hearing each sound (Table 28). The two figures are designed to help prioritize soundscape management actions. For example, sounds in the upper left quadrant of Figures 14 and 17 would be considered high priority for management consideration as they are sounds that were rated, on average, as unacceptable and/or annoying, and were heard frequently by visitors. In this case, automobile sounds appear in the upper left quadrant of Figures 14 and 17, with automobile sounds being heard by more than half (55.8%) of all visitors, and receiving a mean acceptability rating of -0.5 and a mean personal interpretation rating of -1.5. The only other sounds to appear in the upper left quadrant of either figure are the sounds of other visitors talking, with the sounds of other visitors talking heard by a substantial majority (98.4%) of visitors, and receiving a mean personal interpretation rating of -0.3. However, while it is common for visitors to hear other groups talking in the Thurston Lava Tube area, and visitors, on average, consider the sounds of other groups talking to be slightly annoying, they generally consider it to be acceptable (mean = 0.6) to hear the sounds of groups talking in the Thurston Lava Tube area. No other sounds are contained within the upper left quadrant of Figure 14 or 17. Sounds in the lower left quadrant of Figures 14 and 17 would be considered a priority for management as well, as they are sounds that were rated, on average, as unacceptable and/or annoying sounds to hear in the

Thurston Lava Tube area, though they are sounds that were heard by less than half of all visitors. In this case, about one-quarter of visitors reported hearing a loud group (25.5%), loud adult(s) (23.9%), and/or loud child/children, and on average, visitors rated the sounds of loud voices and/or yelling as unacceptable (mean = -1.8) and annoying (mean = -2.2) to hear in the Thurston Lava Tube area. Similarly, about one-fifth (19.8%) of visitors reported hearing helicopter sounds, and these sounds were generally considered to be unacceptable (mean = -1.4) and annoying (mean = -2.1) to hear in the Thurston Lava Tube area. Other sounds that appear in the lower left quadrant of Figures 14 and/or 17 include the sounds of personal electronic devices (e.g., cell phones, radio headsets/IPod's) and motorcycles. However, each of these sounds was heard by less than one-quarter of visitors during the listening exercise. Nonetheless, while these sounds may not present a significant management problem currently, they should be monitored and managed to ensure that they not become more common elements of the ambient sound conditions in the Thurston Lava Tube area and similar areas of the park. The sounds in the upper right quadrant of Figures 14 and 17 are those sounds that visitors generally perceive to be acceptable and/or pleasing to hear in the Thurston Lava Tube area and are heard frequently. The most commonly heard sounds in this quadrant include bird song, wind, and the sounds of other visitors walking and talking, while sounds that received the highest acceptability and personal interpretation ratings in the upper right quadrant of Figures 14 and 17 include bird song and the sounds of wind and leaves rustling. Efforts should be made to preserve opportunities to hear the sounds contained in the upper right quadrant of Figures 14 and 17, particularly those sounds that are perceived to be the most acceptable and pleasing to hear. Sounds in the bottom right quadrant of Figures 14 and 17

are those that visitors generally consider to be acceptable and/or pleasing to hear in the Thurston Lava Tube area, but are heard less frequently than those in the upper right quadrant of the figures. Within this quadrant, the sounds of rainfall and insects were among the sounds that received the highest mean acceptability and personal interpretation ratings, and both were heard by more than 40% of visitors. The sounds of animals that visitors were unable to identify (listed in the survey questionnaire as "animal, unknown") were also among the sounds that received the highest acceptability and personal interpretation ratings in the lower right quadrant of the figures, though these sounds were heard by relatively few (7.3%) visitors. Efforts to maintain and improve opportunities for visitors to hear the sounds found in the lower right quadrant of Figures 14 and 17 are recommended.

- As stated earlier, visitors were asked to describe any emotions or feelings they associated with the sounds they heard during the attended listening exercise in the Thurston Lava Tube area. Of the more than 150 visitors who reported emotions and/or feelings associated with nature sounds they heard, a substantial majority (91.7%) reported positive emotions or feelings, such as feelings of calm, peacefulness, and pleasure. Similarly, nearly 100 visitors reported emotions and/or feelings associated with animal sounds they heard during the attended listening exercise, and the vast majority (90.9%) of them reported positive emotions or feelings. The sounds of other visitors walking in the Thurston Lava Tube area also elicited positive emotions from nearly half (47.5%) of the visitors who reported an emotion or feeling associated with hearing this sound. For example, visitors associated feelings of camaraderie, enjoyment, safety, and pleasantness with hearing the sounds of other visitors walking in the Thurston Lava Tube area of the

park. In contrast, a substantial majority (80.4%) of the visitors who reported an emotion or feeling associated with hearing loud voices and/or yelling described negative emotions or feelings, such as annoyance and irritation. Similarly, nearly two-thirds (63.3%) of the visitors who reported an emotion or feeling associated with aircraft, reported negative emotions or feelings, and about two-thirds (65.3%) of visitors who reported an emotion or feeling associated with hearing vehicle sounds provided negative responses. These data suggest that aircraft sounds, vehicle sounds, and loud, disruptive behavior of other visitors may inhibit visitors' ability to have a restorative experience of natural sounds and quiet in the Thurston Lava Tube area and similar areas of the park (Table 35).

Background Information

- A majority (58.6%) of visitors to the Thurston Lava Tube area of the park are female, while a more substantial majority of visitors are residents of the United States (90.5%); have completed college/business/trade school or more formal education (78.1%); do not consider themselves to be Hispanic or Latino (98.3%); and identify themselves as White (88.6%). Furthermore, about two-thirds (67.2%) of visitors in the Thurston Lava Tube area are between the ages of 25 and 54 years of age, with about one-quarter (26.0%) between the ages of 45 and 54 years, and one-fifth each between the ages of 25 and 34 years (20.9%) and 35 and 44 years of age (20.3%; Tables 36-41).
- Most (93.3%) visitors who participated in the study described their hearing as normal, while very few rated their hearing as somewhat impaired (4.4%), and no study participants rated their hearing as very impaired. A few respondents (2.2%) responded that they didn't know about their hearing capability (Table 42).

Survey Sampling Effort and Response Rates

This section of the chapter reports information about sampling effort and survey response associated with the Thurston Lava Tube Area Attended Listening Visitor Survey.

Table 22. Thurston Lava Tube area attended listening survey sampling dates.

Date	Day of Week	Time of Day	Solicitations	Accept	Refuse	Unusable [a]	LB Refuse [b]	Tour Refuse [c]
6/19/2007	Tuesday	1300-1555	74	31	41	2	0	23
6/20/2007 [d]	Wednesday	1315-1530	30	8	19	3	N/A	N/A
6/21/2007	Thursday	1325-1615	38	26	11	1	0	2
6/22/2007 [e]	Friday	1330-1545	26	21	2	3	N/A	N/A
6/23/2007 [d]	Saturday	1330-1645	74	24	41	9	13	N/A
6/27/2007 [f]	Wednesday	1355-1545	17	17	0	0	0	0
6/28/2007 [f]	Thursday	1355-1630	30	29	0	1	0	0
6/30/2007 [f]	Saturday	0915-1200	32	29	2	1	0	0
Total	**-**	**-**	**321**	**185**	**116**	**20**	**13**	**25**

[a] Denotes surveys that were administered to respondents but contained no useable data.
[b] LB Refuse were refusals due to a language barrier with the potential respondent.
[c] Tour Refuse were refusals due to time constraints from being a member of a commercial tour.
[d] Survey administrator did not note tour group and/or language barrier refusals.
[e] Survey administrator did not solicit tour group members.
[f] Attended listening exercise administered to group members of audio recordings-based survey participants.

Table 23. Thurston Lava Tube area attended listening survey response rates.		
	Only Attended Listening [a,b] %	**Overall [a,c]** %
Acceptance Rate	50.9	57.6
Refusal Rate	49.1	42.4

[a] "Unusable" surveys treated as refusals.
[b] Only includes 6/19/2007 and 6/21/2007 when the attended listening survey was the only instrument administered, all potential respondents were solicited, and reason for refusal was recorded.
[c] Overall response rate with all days and survey solicitation methods included.

Quantitative Results

This section of the chapter includes tables and figures reporting the quantitative results of the Thurston Lava Tube Area Attended Listening Visitor Survey, organized according to the sections of the survey questionnaire.

Trip Description

Table 24. How many people are in your personal group (family/friends) today?		
	(n= 179)	
Group Size	*Count*	*Percent*
1 person	7	3.9
2 people	76	42.5
3 to 4 people	59	33.0
5 or more people	37	20.7
Mean [a]	3.3	

[a] Extreme outliers were removed before calculating the mean.

Table 25. Is your personal group part of commercial tour in the park today?		
	(n= 180)	
	Count	*Percent*
Yes	16	8.9
No	164	91.1

Table 26. Have you visited Hawaii Volcanoes National Park before?		
	(n= 180)	
	Count	*Percent*
Yes	45	25.0
No	135	75.0

Table 27. Approximately how many times have you visited Hawaii Volcanoes National Park before today?		
	(n= 42)	
Number of Previous Visits	*Count*	*Percent*
1 visit	10	23.8
2 to 4 visits	26	61.9
5 or more	6	14.3
Mean [a]	2.3	

[a] Extreme outliers were removed before calculating the mean.

Table 28. Number and percentage of visitors who reported hearing sounds during attended listening in the Thurston Lava Tube area.

		Heard Sound	
Sound Category	**Sound**	*Count*	*Percent*
Aircraft Sounds	Aircraft, Jet	7	4.1
	Aircraft, Propeller	14	8.1
	Aircraft, Helicopter	34	19.8
	Aircraft, Unknown	14	8.1
Vehicle Sounds	Automobile	96	55.8
	Motorcycle	5	2.9
Trail Work / Maintenance Sounds	Trail Work / Maintenance	4	2.3
Technology Sounds	Cell Phones	34	18.5
	Radio Headset or IPOD	5	2.7
	Technology Sounds, Unknown	7	3.8
	Camera	82	44.6
Walking Sounds	Walking Sounds	147	85.5
	Walking Sticks	18	10.5
Talking	Group, Talking	156	84.8
	Adult(s), Talking	164	89.1
	Child/children, Talking	119	64.7
Loud Voices / Yelling	Group, Loud or Yelling	47	25.5
	Adult(s), Loud or Yelling	44	23.9
	Child/children, Loud or Yelling	45	24.5
	Child/children, Crying	21	11.4
Nature Sounds	Leaves Rustling	144	83.7
	Wind	162	90.5
	Thunder	1	0.6
	Rainfall	72	40.2
	Shifting Rocks & Sand	23	12.8
Animal Sounds	Bird Song	174	97.2
	Insect(s)	79	44.1
	Horses	0	0.0
	Animal, Unknown	13	7.3

Note: Sounds visitors reported hearing other than those listed in the questionnaire are presented in Appendix F.

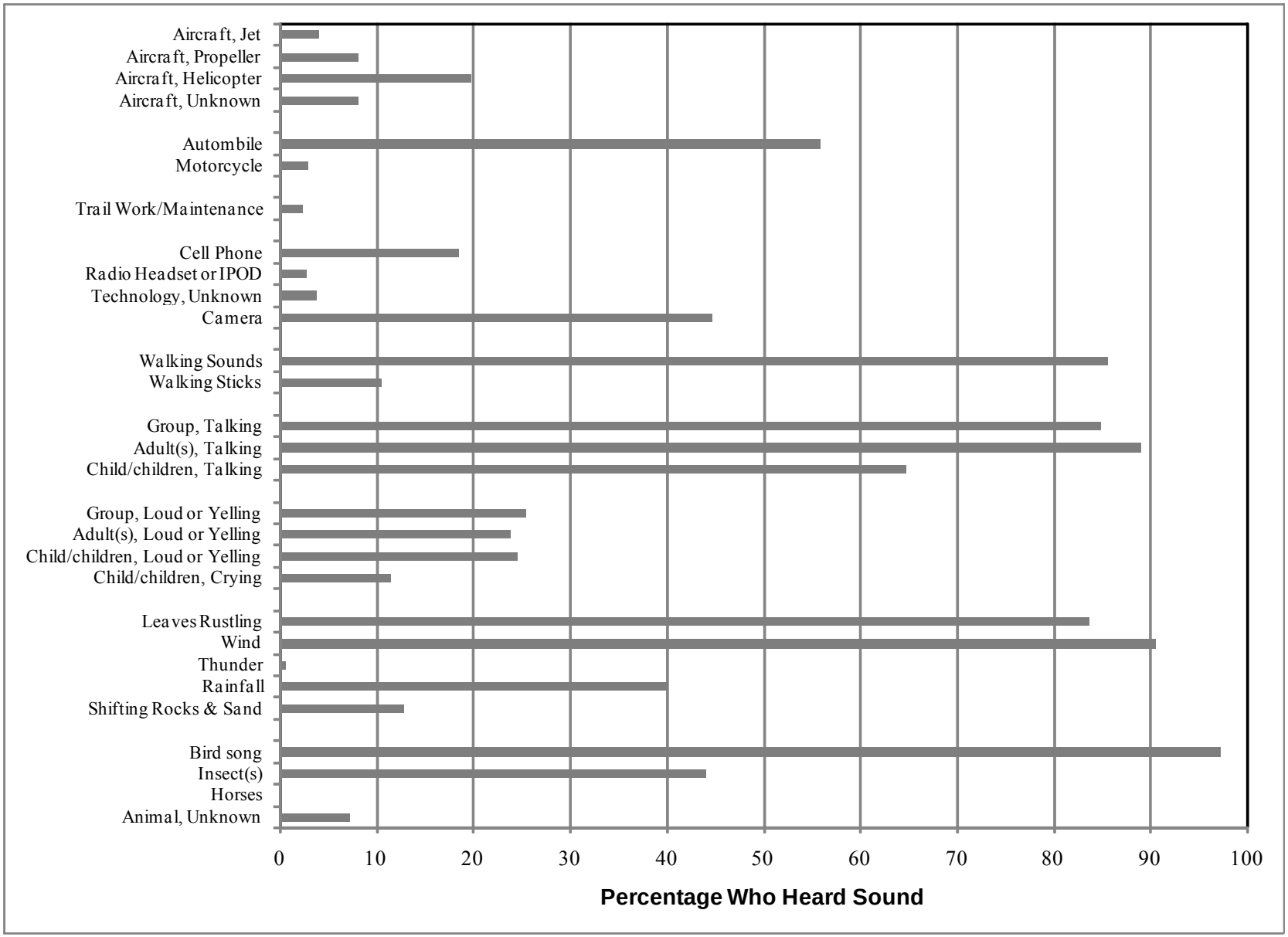

Figure 10. Percentage of visitors who reported hearing sounds during attended listening in the Thurston Lava Tube area.

Table 29. Number and percentage of visitors who reported hearing sounds during attended listening in the Thurston Lava Tube area, by sound category.

	Heard Sound	
Sound Category	*Count*	*Percent*
Aircraft Sounds	51	29.7
Vehicle Sounds	96	55.8
Trail Work / Maintenance Sounds	4	2.3
Technology Sounds	93	50.5
Walking Sounds	148	86.0
Talking	181	98.4
Loud Voices / Yelling	83	45.1
Nature Sounds	164	97.6
Animal Sounds	174	97.2

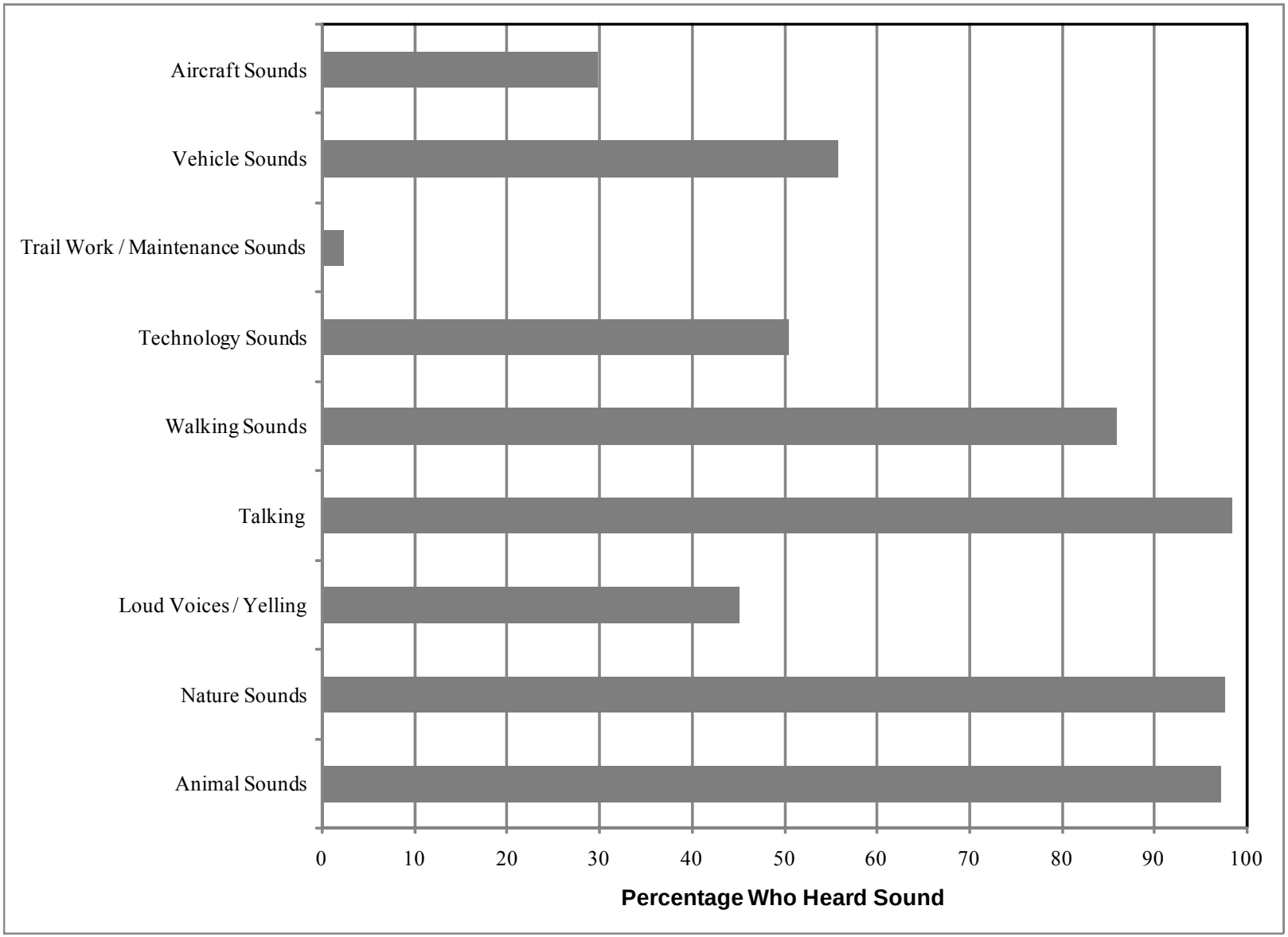

Figure 11. Percentage of visitors who reported hearing sounds during attended listening in the Thurston Lava Tube area, by sound category.

Table 30. Visitors' acceptability ratings of sounds heard during attended listening in the Thurston Lava Tube area.

Sound	Percentage who Rated Sound as... [a]				Mean
	n	*Acceptable*	*Neutral*	*Unacceptable*	
Aircraft, Jet	7	14.3	14.3	71.4	-1.9
Aircraft, Propeller	13	38.5	23.1	38.5	0.1
Aircraft, Helicopter	33	18.2	9.1	72.7	-1.4
Aircraft, Unknown	13	15.4	23.1	61.5	-1.0
Automobile	96	20.8	33.3	45.8	-0.5
Motorcycle	4	0.0	25.0	75.0	-1.8
Trail Work / Maintenance	4	50.0	25.0	25.0	1.3
Cell Phones	33	9.1	9.1	81.8	-2.3
Radio Headset or IPOD	5	0.0	60.0	40.0	-1.0
Technology Sounds, Unknown	7	14.3	28.6	57.1	-1.7
Camera	81	51.9	40.7	7.4	1.5
Walking Sounds	142	70.4	21.8	7.7	2.1
Walking Sticks	18	61.1	33.3	5.6	1.6
Group, Talking	156	39.7	26.9	33.3	0.4
Adult(s), Talking	159	43.4	34.6	22.0	0.8
Child/children, Talking	115	43.5	35.7	20.9	0.8
Group, Loud or Yelling	47	6.4	8.5	85.1	-1.9
Adult(s), Loud or Yelling	43	2.3	14.0	83.7	-2.4
Child/children, Loud or Yelling	44	11.4	20.5	68.2	-1.5
Child/children, Crying	21	14.3	23.8	61.9	-1.2
Leaves Rustling	141	94.3	1.4	4.3	3.5
Wind	158	94.3	3.2	2.5	3.5
Thunder	1	100.0	0.0	0.0	4.0
Rainfall	68	92.6	4.4	2.9	3.4
Shifting Rocks & Sand	22	81.8	13.6	4.5	2.8
Bird Song	170	97.6	1.2	1.2	3.8
Insect(s)	75	89.3	5.3	5.3	3.3
Horses	0	N/A	N/A	N/A	N/A
Animal, Unknown	13	92.3	7.7	0.0	3.54

[a] Response scale ranged from -4 = "Very Unacceptable" to +4 = "Very Acceptable." See Appendix F for detailed frequency distributions of acceptability ratings.

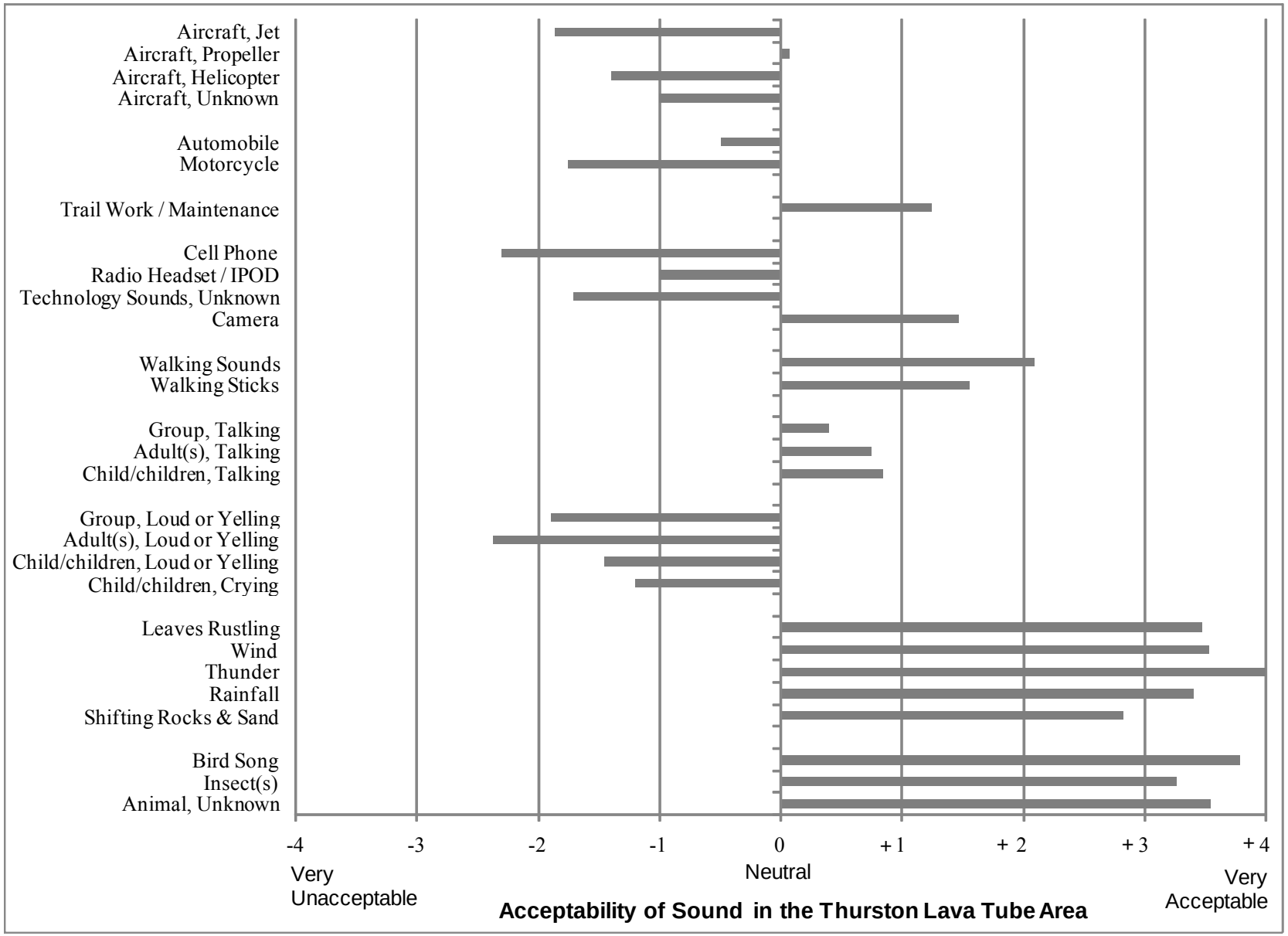

Figure 12. Visitors' mean acceptability ratings of sounds heard during attended listening in the Thurston Lava Tube area.

Table 31. Visitors' acceptability ratings of sounds heard during attended listening in the Thurston Lava Tube area, by sound category.

Sound Category	Percentage who Rated Sound as... [a]				Mean
	n	*Acceptable*	*Neutral*	*Unacceptable*	
Aircraft Sounds	66	21.2	15.1	63.6	-1.1
Vehicle Sounds	100	20.0	33.0	47.0	-0.5
Trail Work / Maintenance Sounds	4	50.0	25.0	25.0	1.3
Technology Sounds	126	36.5	32.5	31.0	0.2
Walking Sounds	160	69.4	23.1	7.5	2.0
Talking	430	42.1	32.1	25.8	0.6
Loud Voices / Yelling	155	7.7	15.5	76.8	-1.8
Nature Sounds	390	93.3	3.3	3.3	3.3
Animal Sounds	258	95.0	2.7	2.3	3.6

[a] Response scale ranged from -4 = "Very Unacceptable" to +4 = "Very Acceptable". See Appendix F for detailed frequency distributions of acceptability ratings.

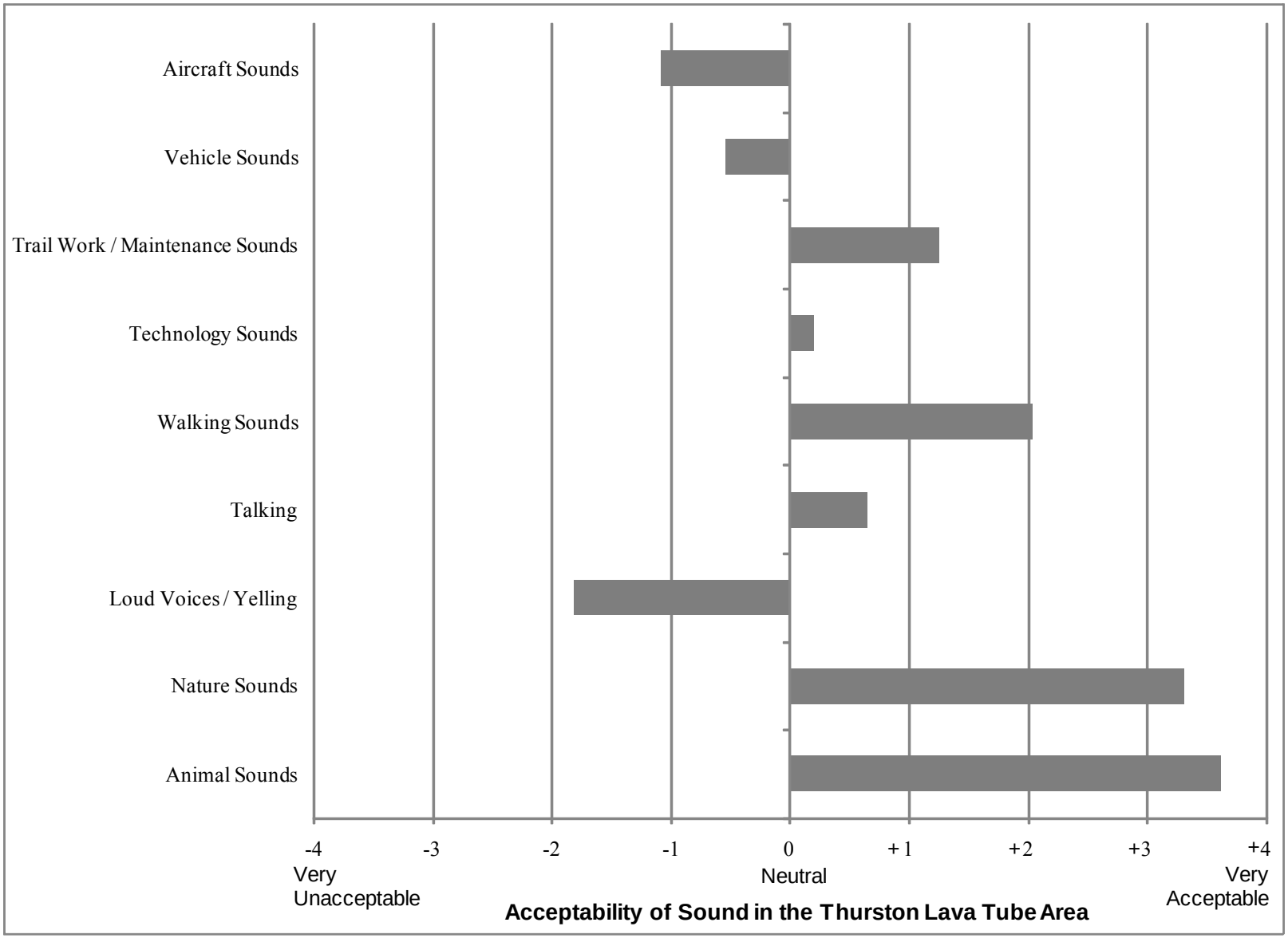

Figure 13. Visitors' mean acceptability ratings of sounds heard during attended listening in the Thurston Lava Tube area, by sound category.

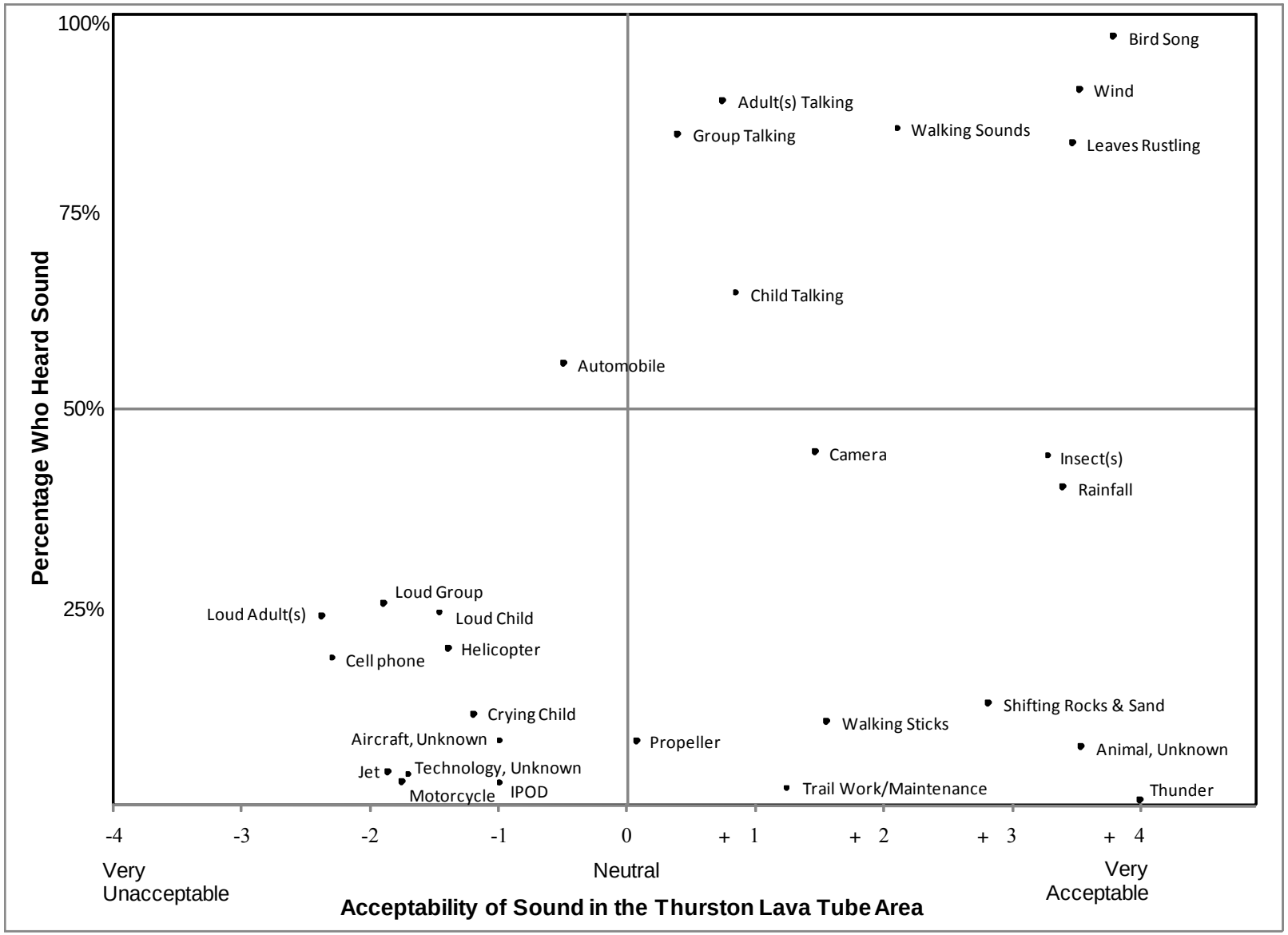

Figure 14. Visitors' mean acceptability ratings of sounds heard during attended listening in the Thurston Lava Tube area, by percentage of visitors who heard each sound.

Table 32. Visitors' personal interpretation ratings of sounds heard during attended listening in the Thurston Lava Tube area.

Sound	Percentage who Rated Sound as... [a]				Mean
	n	*Pleasing*	*Neutral*	*Annoying*	
Aircraft, Jet	7	14.3	28.6	57.1	-1.3
Aircraft, Propeller	14	7.1	42.9	50.0	-0.8
Aircraft, Helicopter	30	3.3	13.3	83.3	-2.1
Aircraft, Unknown	13	23.1	15.4	61.5	-0.6
Automobile	90	2.2	30.0	67.8	-1.5
Motorcycle	5	0.0	0.0	100.0	-2.0
Trail Work / Maintenance	3	33.3	33.3	33.3	0.7
Cell Phones	33	3.0	12.1	84.8	-2.7
Radio Headset or IPOD	4	25.0	25.0	50.0	-0.3
Technology Sounds, Unknown	7	14.3	14.3	71.4	-2.0
Camera	77	20.8	64.9	14.3	0.4
Walking Sounds	132	43.9	47.7	8.3	1.1
Walking Sticks	16	50.0	50.0	0.0	1.4
Group, Talking	143	13.3	41.3	45.5	-0.5
Adult(s), Talking	148	15.5	48.0	36.5	-0.2
Child/children, Talking	108	18.5	47.2	34.3	-0.1
Group, Loud or Yelling	42	4.8	7.1	88.1	-2.5
Adult(s), Loud or Yelling	39	2.6	12.8	84.6	-2.4
Child/children, Loud or Yelling	42	7.1	7.1	85.7	-2.0
Child/children, Crying	20	5.0	30.0	65.0	-1.5
Leaves Rustling	134	92.5	6.7	0.7	3.3
Wind	155	94.2	4.5	1.3	3.5
Thunder	1	100.0	0.0	0.0	4.0
Rainfall	67	91.0	7.5	1.5	3.4
Shifting Rocks & Sand	22	63.6	36.4	0.0	2.3
Bird Song	162	99.4	0.6	0.0	3.9
Insect(s)	75	88.0	4.0	8.0	3.0
Horses	0	N/A	N/A	N/A	N/A
Animal, Unknown	12	83.3	16.7	0.0	3.2

[a] Response scale ranged from -4 = "Very Annoying" to +4 = "Very Pleasing". See Appendix F for detailed frequency distributions of personal interpretation ratings.

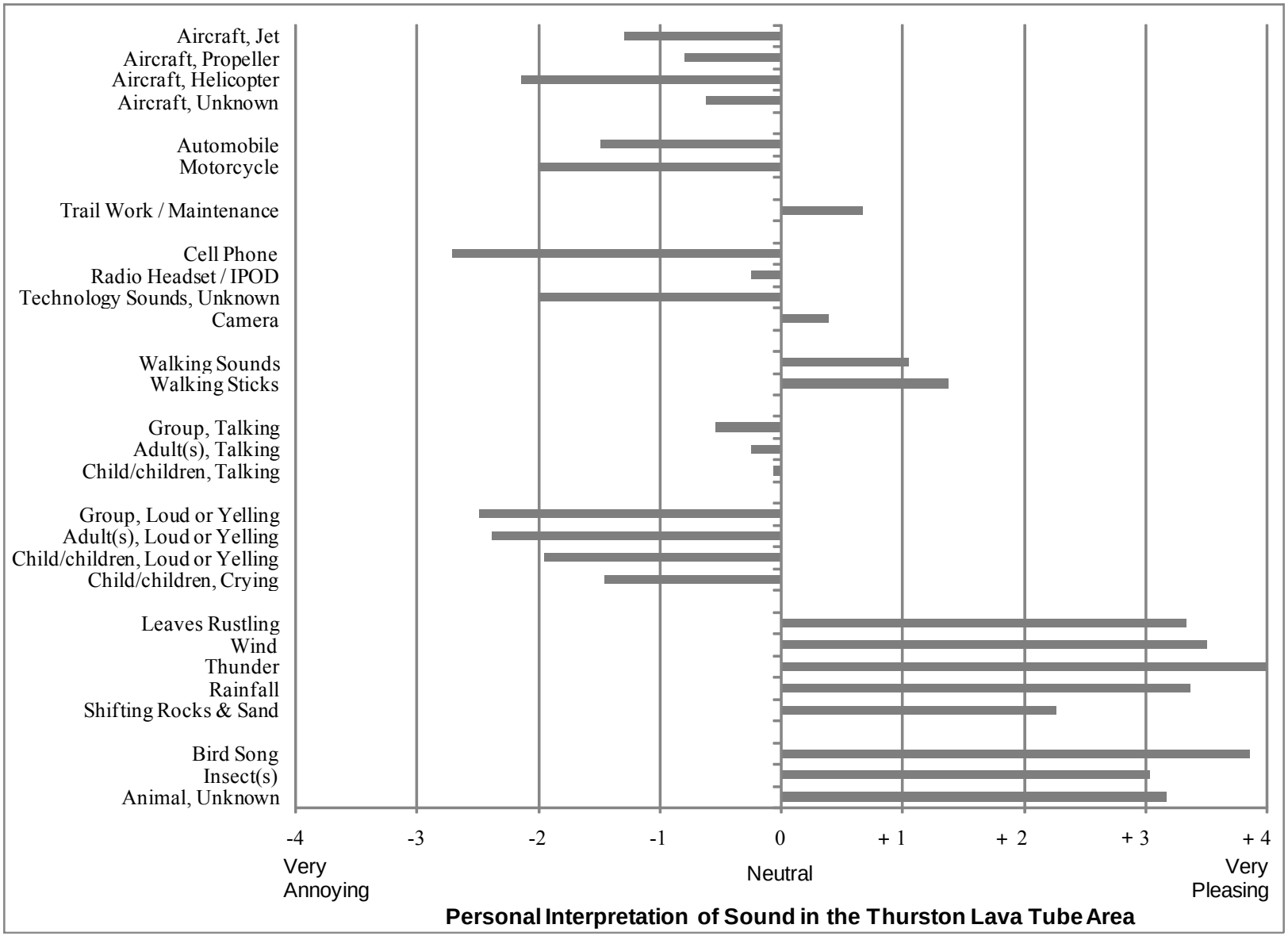

Figure 15. Visitors' mean personal interpretation ratings of sounds heard during attended listening in the Thurston Lava Tube area.

Table 33. Visitors' personal interpretation ratings of sounds heard during attended listening in the Thurston Lava Tube area, by sound category.

Sound Category	Percentage who Rated Sound as... [a]				Mean
	n	*Pleasing*	*Neutral*	*Annoying*	
Aircraft Sounds	64	9.4	21.9	68.7	-1.4
Vehicle Sounds	95	2.1	28.4	69.5	-1.5
Trail Work / Maintenance Sounds	3	33.3	33.3	33.3	0.7
Technology Sounds	121	15.7	46.3	38.0	-0.6
Walking Sounds	148	44.6	48.0	7.4	1.1
Talking	399	15.5	45.3	39.1	-0.3
Loud Voice / Yelling	143	4.9	11.9	83.2	-2.2
Nature Sounds	379	91.3	7.7	1.1	3.2
Animal Sounds	249	95.2	2.4	2.4	3.6

[a] Response scale ranged from -4 = "Very Annoying" to +4 = "Very Pleasing". See Appendix F for detailed frequency distributions of personal interpretation ratings.

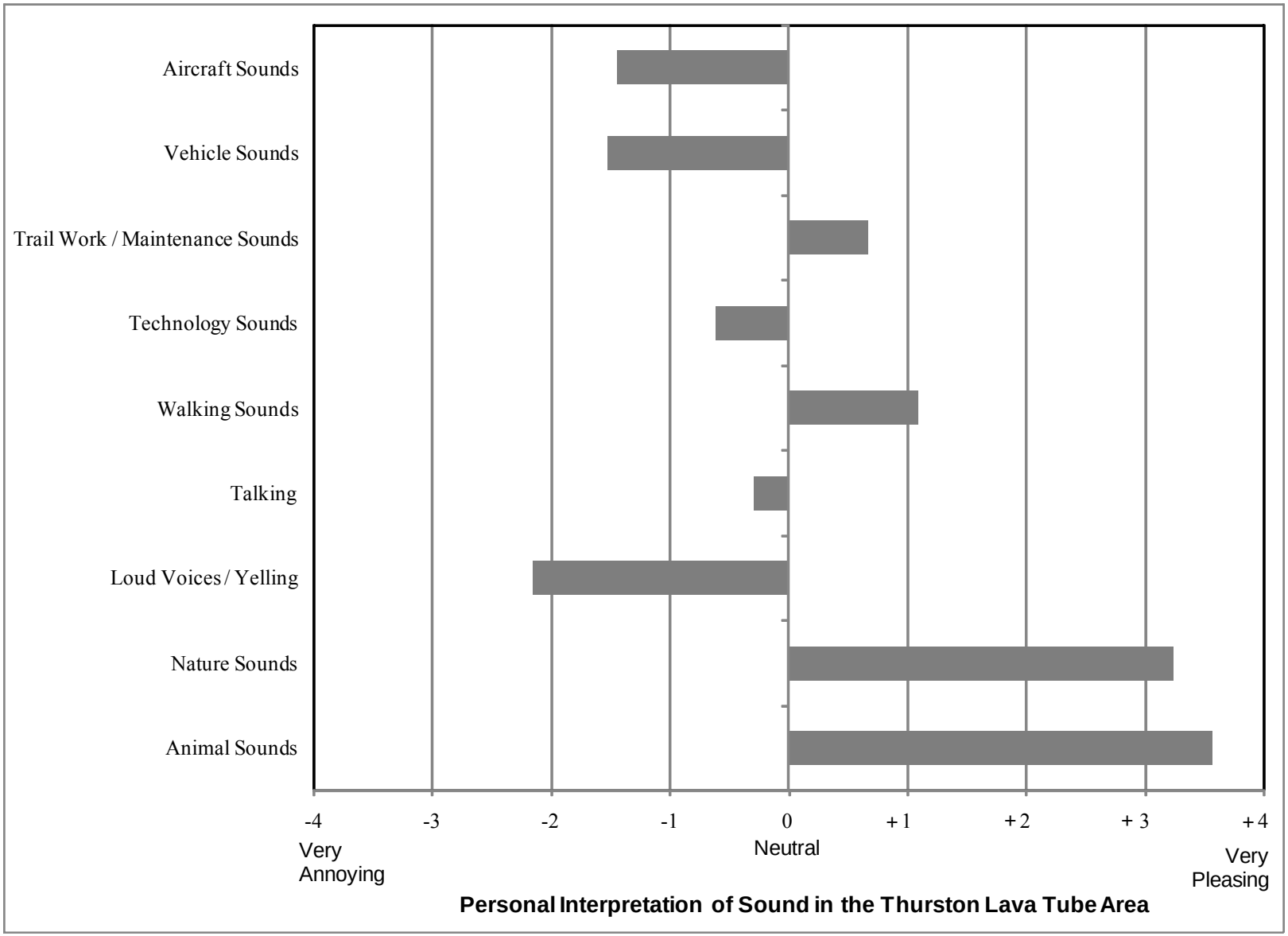

Figure 16. Visitors' mean personal interpretation ratings of sounds heard during attended listening in the Thurston Lava Tube area, by sound category.

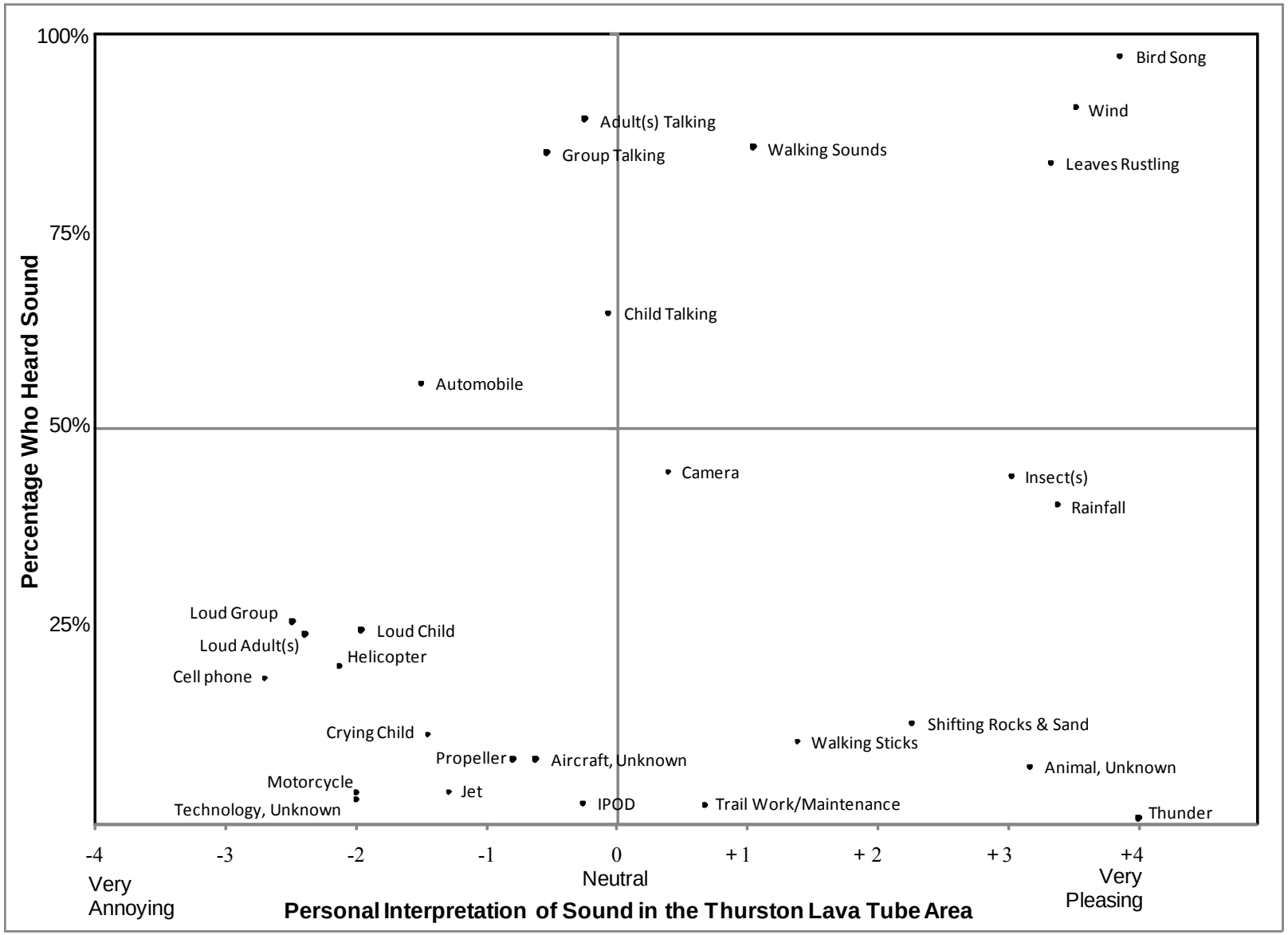

Figure 17. Visitors' mean personal interpretation ratings of sounds heard during attended listening in the Thurston Lava Tube area, by percentage of visitors who heard each sound.

Table 34. Visitor-reported emotions/feelings associated with sounds heard during attended listening in the Thurston Lava Tube area.

Sound	Reported Emotions/Feelings Associated with Sound [a] --------Percent-------				None Reported [b]
	n	*Positive*	*Ambiguous*	*Negative*	*n*
Aircraft, Jet	4	0.0	50.0	50.0	3
Aircraft, Propeller	6	33.3	33.3	33.3	8
Aircraft, Helicopter	16	6.3	18.8	75.0	18
Aircraft, Unknown	4	25.0	0.0	75.0	10
Automobile	34	2.9	38.2	58.8	62
Motorcycle	1	0.0	0.0	100.0	4
Trail Work / Maintenance	1	100.0	0.0	0.0	3
Cell Phones	14	0.0	14.3	85.7	20
Radio Headset or IPOD	2	0.0	50.0	50.0	3
Technology Sounds, Unknown	4	25.0	25.0	50.0	3
Camera	21	28.6	61.9	9.5	61
Walking Sounds	37	51.4	43.2	5.4	110
Walking Sticks	3	0.0	66.7	33.3	15
Group, Talking	40	25.0	30.0	45.0	116
Adult(s), Talking	41	24.4	36.6	39.0	123
Child/children, Talking	25	44.0	28.0	28.0	94
Group, Loud or Yelling	17	11.8	11.8	76.5	30
Adult(s), Loud or Yelling	13	7.7	7.7	84.6	31
Child/children, Loud or Yelling	13	7.7	7.7	84.6	32
Child/children, Crying	8	25.0	0.0	75.0	13
Leaves Rustling	56	89.3	8.9	1.8	88
Wind	65	98.5	1.5	0.0	97
Thunder	0	N/A	N/A	N/A	1
Rainfall	28	89.3	10.7	0.0	44
Shifting Rocks & Sand	8	62.5	25.0	12.5	15
Bird Song	67	98.5	1.5	0.0	107
Insect(s)	24	87.5	8.3	4.2	55
Horses	0	N/A	N/A	N/A	N/A
Animal, Unknown	8	37.5	62.5	0.0	5

[a] Open-ended responses were categorized as "positive," "negative," or "ambiguous" emotions/feelings. See Appendix G for a verbatim list of responses.

[b] Number of respondents who heard the sound but did not report an emotion or feeling.

Table 35. Visitor-reported emotions/feelings associated with sounds heard during attended listening in the Thurston Lava Tube area, by sound category.

Sound Category	Reported Emotions/Feelings Associated with Sound [a]				None Reported [b]
		--------Percent-------			
	n	*Positive*	*Ambiguous*	*Negative*	*n*
Aircraft Sounds	30	13.3	23.3	63.3	39
Vehicle Sounds	35	2.9	37.1	60.0	66
Trail Work / Maintenance Sounds	1	100.0	0.0	0.0	3
Technology Sounds	41	17.1	41.5	41.5	87
Walking Sounds	40	47.5	45.0	7.5	125
Talking	106	29.2	32.1	38.7	333
Loud Voices / Yelling	51	11.8	7.8	80.4	106
Nature Sounds	157	91.7	7.0	1.3	245
Animal Sounds	99	90.9	8.1	1.0	167

[a] Open-ended responses were categorized as "positive," "negative," or "ambiguous" emotions/feelings. See Appendix G for a verbatim list of responses.

[b] Includes respondents who heard the sound but did not report an emotion or feeling.

Background Information

Table 36. What is your gender?		
	(n= 172)	
Gender	*Count*	*Percent*
Male	71	41.3
Female	101	58.7

Table 37. In what year were you born? (Converted to age in years.)		
	(n= 177)	
Age Group	*Count*	*Percent*
18 to 24 years old	18	10.2
25 to 34 years old	37	20.9
35 to 44 years old	36	20.3
45 to 54 years old	46	26.0
55 to 64 years old	28	15.8
65 years old and older	12	6.8
Mean Age	43.1	

Table 38.1. Do you live in the United States?		
	(n= 179)	
	Counts	*Percent*
Yes	162	90.5
No	17	9.5

Table 38.2. What is your zip code (if you live in the United States)?	
	(n= 143)
Most Frequently Reported Zip Codes	*Count*
96797 (Waipahu, HI)	3
96734 (Kailua, HI)	2
96701 (Aiea, HI)	2
76053 (Hurst, TX)	2
60563 (Naperville, IL)	2
12180 (Troy, NY)	2

See Appendix H for a frequency distribution of respondents, organized by state.

Table 38.3. What country do you live in (if not the United States)?	
	(n= 14)
Country	*Count*
Australia	3
United Kingdom	3
Canada	2
Germany	1
Hong Kong	1
Indonesia	1
Ireland	1
Mexico	1
Taiwan	1

Table 39. What is the highest level of formal education you have completed?		
	(n= 178)	
Education Level	*Count*	*Percent*
Some high school	1	0.6
High school graduate or GED	7	3.9
Some college, business or trade school	31	17.4
College, business or trade school graduate	39	21.9
Some graduate school	21	11.8
Master's, doctoral or professional degree	79	44.4

Table 40. Are you Hispanic or Latino?		
	(n= 178)	
	Counts	*Percent*
Yes	3	1.7
No	175	98.3

Table 41. What is your race?		
	(n= 176)	
Race	*Count*	*Percent*
American Indian or Alaskan Native	1	0.6
Asian	17	9.7
Black or African American	4	2.3
Native Hawaiian	0	0.0
Pacific Islander other than Native Hawaiian	2	1.1
White	156	88.6
Reported 2 races	5	2.8

Note: One respondent indicated he or she belonged to an "other" race, but did not specify.

Table 42. How would you describe your hearing?		
	(n= 180)	
	Count	*Percent*
My hearing is normal	168	93.3
I am somewhat hearing impaired	8	4.4
I am very hearing impaired	0	0.0
I don't know about my hearing capacity	4	2.2

Chapter 5

Results – Steam Vents and Thurston Lava Tube Audio Recording Visitor Surveys

This chapter of the report presents the results of the Steam Vents and Thurston Lava Tube Audio Recording Visitor Surveys. The chapter begins with a summary of major findings from the surveys, organized according to the sections of the survey questionnaires. The chapter then reports information about sampling effort and survey response, and concludes with tables and figures reporting the quantitative results of the surveys. The audio recordings-based survey questionnaires administered at the Steam Vents and trail to Thurston Lava Tube were identical, and a copy of the survey questionnaire is included in the report as Appendix I.

Summary of Major Findings

Trip Description

- About half (46.4%) of all visitors to the Steam Vents area of the park are in groups of 2 people, while about one-third (31.5%) are in groups of 3 to 4 people, and a little less than one-fifth (16.6%) are in groups of 5 or more people. The size of visitor groups in the Thurston Lava Tube area of the park tend to be somewhat bigger than those in the Steam Vents area, with the average group size consisting of about 4 people. About one-third of visitors to the Thurston Lava Tube area visit in groups of 2 people (38.0%) or 3 to 4 people (31.3%), while just over one-quarter (28.6%) visit in groups of 5 or more people (Table 45).
- It is more common for visitors in the Thurston Lava Tube area of the park (13.0%) to be part of a commercial tour group than it is for visitors to the Steam Vents (1.6%; Table 46). It is likely the true difference is even more pronounced than the survey data suggest

as nearly half (48.1%) of the visitors who declined to participate in the survey at the Thurston Lava Tube were members of tour groups (Table 43).

- More than two-thirds (61.3%) of visitors to the Steam Vents (69.8%) and Thurston Lava Tube (71.9%) are visiting Hawaii Volcanoes National Park for the first time (Table 47). Of those who have previously visited the park, about half of both Steam Vents visitors (48.1%) and Thurston Lava Tube visitors (47.2%) have visited once previously, about one third of each have visited 2 to 5 times previously, and just under one-fifth of each have visited the park 6 or more times previously (Table 48).
- The most important reasons to visitors at both the Steam Vents and Thurston Lava Tube for visiting Hawaii Volcanoes National Park include appreciating the natural scenery; seeing the active lava flows on the Chain of Craters Road; seeing the summit caldera of Kīlauea volcano; and seeing the Thurston Lava Tube. About half of all visitors at Steam Vents (43.2%) and 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. Of the reasons for visiting the park included in the questionnaire, the least important to visitors included experiencing solitude, getting exercise, and hiking on Wilderness trails, although a majority of visitors at both study locations reported these as somewhat or very important reasons for visiting the park (Table 49).

The Visitor Experience

- At each of the two study locations, visitors' evaluations of the acceptability of alternative park soundscape conditions were measured using a series of five audio recordings containing simulated park soundscapes. The first audio recording in the sequence contained only natural sounds that can be heard in Hawaii Volcanoes National Park. Each subsequent audio recording in the sequence contained the "base" natural sounds, mixed with increasing levels of helicopter sounds associated with scenic air tours of the park. The electronic audio playback files (i.e., recordings) are archived with Hawaii Volcanoes National Park and the National Park Service Natural Sounds Program Center. The amplitude and slope of the curves derived from plotting visitors' mean acceptability ratings of the recordings suggest that exposure to helicopter sounds while hiking is a salient issue for visitors at both study locations. Furthermore, Steam Vents visitors' mean ratings of the audio recordings suggest that, on average, they consider the sounds in Recordings 1, 2, and 3 to be acceptable, while the soundscape conditions contained in Recordings 4 and 5 are unacceptable. Furthermore, the distributions of Steam Vents visitors' acceptability ratings suggest there is a relatively high degree of consensus among them about the acceptability of the recordings (Tables 51.1 and 51.2; Figure 18). Thurston Lava Tube visitors' mean ratings of the audio recordings also suggest that, on average, they consider the sounds in Recordings 1, 2, and 3 to be acceptable, while the soundscape conditions contained in Recordings 4 and 5 are unacceptable. However, there is somewhat less consensus among Thurston Lava Tube visitors about what constitutes minimally acceptable soundscape conditions, as presented in the audio recordings. In particular, the acceptability ratings within one standard deviation of the mean for

Recording 3 span the unacceptable and acceptable ranges of the scale. Nonetheless, almost two-thirds (61.1%) of Thurston Lava Tube visitors consider Recording 3 to be acceptable. Furthermore, greater than 75% of them consider the sounds in Recordings 1 and 2 to be acceptable, and the sounds in Recordings 4 and 5 to be unacceptable (Tables 51.3 and 51.4; Figure 18).

- The vast majority of visitors at both study locations reported one or more pleasing sounds they heard in the first 4 audio recordings within the sequence of recordings described above, while a majority of visitors at Steam Vents (63.0%) and Thurston Lava Tube (61.1%) indicated that they did not find any sounds pleasing in Recording 5 (the audio recording containing the highest level of helicopter sounds). Of those visitors who described sounds in the recordings they found pleasing, the most commonly reported sounds included birds; insects/crickets; and wind. A small number of visitors described aircraft sounds as pleasing sounds contained within Recordings 3, 4, and 5 (Tables 52.1 and 52.2) .
- A substantial majority of visitors at both study locations indicated that they did not find any sounds annoying in Recordings 1 and 2 within the sequence of recordings described above, while over half (58.4%) of Steam Vents visitors and more than three-quarters (84.7%) of Thurston Lava Tube visitors reported one or more annoying sounds associated with Recording 3. Furthermore, most visitors at Steam Vents and Thurston Lava Tube reported one or more annoying sounds associated with Recordings 4 (86.7% and 97.4%, respectively) and 5 (94.4% and 98.9%, respectively). Of those visitors who described sounds in Recordings 1 and 2 they found annoying, the most commonly reported sounds included birds, crickets, and/or frogs; wind; and high pitched sounds. Of those visitors

who described sounds in Recordings 3, 4, and/or 5 they found annoying, by far the most commonly reported sounds were those of aircraft, while a smaller percentage of responses cited vehicle traffic sounds (Tables 53.1 and 53.2).

- Approximately two-thirds of visitors at Steam Vents (64.2%) and Thurston Lava Tube (67.2%) reported that Recording 1 sounded most like what they heard while they were visiting the area of the park where they were contacted for the survey. About one-quarter of Steam Vents visitors (21.8%) and Thurston Lava Tube visitors (24.2%) indicated that Recording 2 sounded most like what they heard, and under one-fifth of visitors at either location considered Recording 3 to sound most like what they heard on the trail. Very few visitors reported Recordings 4 or 5 as sounding most like what they heard while they were visiting the area of the park where they were contacted for the survey (Table 54).
- At each of the two study locations, visitors' evaluations of the acceptability of how often they hear helicopter air tour sounds while visiting the park were measured using narratively portrayed scenarios, coupled with Recording 3 from the sequence of audio recordings described above. Each scenario described how often visitors would hear the helicopter sounds in Recording 3 while visiting the park, with the scenarios ranging from never hearing the helicopter sounds to hearing them every 5 minutes. The amplitude and slope of the curves derived from plotting visitors' mean acceptability ratings of the scenarios suggest that the frequency with which visitors hear helicopters while visiting the park is a salient issue for visitors at both the Steam Vents and Thurston Lava Tube. Furthermore, Steam Vents visitors' mean ratings of the scenarios suggest that, by far, their most preferred scenario is to never hear helicopter sounds while they are visiting that area of the park, and that hearing helicopter sounds more often than once an hour is

unacceptable. However, values within 1 standard deviation of the mean acceptability ratings for all of the scenarios except "never hear helicopter sounds" span the acceptable and unacceptable ranges of the scale. Nonetheless, nearly two-thirds (63.6%) of Steam Vents visitors indicated that hearing helicopters once every 60 minutes is acceptable, while a majority (51.7%) are either neutral about hearing helicopters every 30 minutes or consider it to be unacceptable. Furthermore, the majority of Steam Vents visitors consider hearing helicopter sounds every 15 minutes or more often to be unacceptable (Tables 55.1 and 55.2; Figure 19). Thurston Lava Tube visitors' mean ratings of the scenarios also suggest that their most preferred scenario, by far, is to never hear helicopter sounds while visiting that area of the park, and that hearing helicopter sounds more often than once an hour is unacceptable. As with Steam Vents visitors, the acceptability ratings of all but the "never hear helicopters" scenario are somewhat dispersed across the unacceptable and acceptable ranges of the scale. For example, while about half (52.2%) of Thurston Lava Tube visitors consider hearing helicopter sounds once every 60 minutes to be acceptable, more than one-third (37.0%) consider this to be unacceptable. Similarly, just over half (58.2%) of Thurston Lava Tube visitors consider hearing helicopter sounds every 30 minutes to be unacceptable, while about one-third (31.0%) consider this to be acceptable. However, a substantial majority of Thurston Lava Tube visitors consider hearing helicopters every 15 minutes or more often to be unacceptable (Tables 55.3 and 55.4; Figure 19).

- It was more common for visitors to report hearing aircraft at Thurston Lava Tube (29.4%) than at the Steam Vents (15.3%; Table 56). Of those visitors who heard aircraft during their visit to the Steam Vents or Thurston Lava Tube, nearly half indicated that

they found the sounds neither pleasing nor annoying (i.e., they were indifferent about the aircraft sounds). However, more than half (54.6%) of Thurston Lave Tube visitors and just under half (44.4%) of Steam Vents visitors indicated that the sounds of aircraft were somewhat or very annoying (Table 57).

- A substantial majority of visitors at Steam Vents (87.9%) and Thurston Lava Tube (88.0%) have never taken a scenic air tour over Hawaii Volcanoes National Park or any other national park (Table 58). When asked if they would take a scenic air tour over Hawaii Volcanoes National Park, even if park visitors could hear the aircraft during their visit, respondents at both study location were about evenly split in their answers. In particular, about one-third of respondents at both locations said they would take a scenic air tour, about one-third said they would not, and about one-third said they did not know whether they would take a scenic air tour over the park (Table 59.1).
- Visitors at the two study locations who had taken a scenic air tour over a national park previously were *less likely* than those who had not previously taken a scenic air tour to support: 1) reducing the number of scenic air tours allowed to fly over Hawaii Volcanoes National Park (46.5% and 65.1%, respectively); and 2) prohibiting scenic air tours from flying over the park (7.3% and 27.2%, respectively). Furthermore, visitors who had taken a scenic air tour over a national park previously were *more likely* than those who had not previously taken a scenic air tour to support maintaining the current number of scenic air tours allowed to fly over the park. However, the majority of visitors at the two study locations, whether they had taken a scenic air tour over a national park previously or not, would: 1) *support* requiring scenic air tours to be flown over the park only during designated dates and times (64.1% and 64.3%, respectively); 2) *support* requiring scenic

air tours to use designated flight paths over limited areas of the park (69.5% and 66.8%, respectively); and 3) *oppose* increasing the number of scenic air tours allowed to fly over the park (65.9% and 75.6%, respectively; Table 60).

Background Information

- A small majority (51.4%) of Steam Vents visitors are male, while a small majority (54.5%) of visitors to Thurston Lava Tube are female. A substantial majority of visitors at both Steam Vents and Thurston Lava Tube are residents of the United States (88.4% and 88.2%, respectively); have completed college/business/trade school or more formal education (84.3% and 83.3%, respectively); do not consider themselves to be Hispanic or Latino (97.2% and 94.6%, respectively); and identify themselves as White (91.4% and 88.9%, respectively). Furthermore, about two-thirds of visitors at Steam Vents (62.7%) and Thurston Lava Tube (68.5%) are between the ages of 25 and 54 years of age, while about one-third (30.0%) of Steam Vents visitors and one-quarter (23.0%) of Thurston Lava Tube visitors are 55 years of age or older (Tables 61-66).

Survey Sampling Effort and Response Rates

This section of the chapter reports information about sampling effort and survey response associated with the Steam Vents and Thurston Lave Tube Audio Recording Visitor Surveys.

Table 43. Hawaii Volcanoes audio recording survey sampling dates.

Steam Vents	Day of Week	Time of Day	Solicitations	Accept	Refuse	Unusable [a]	LB Refuse [b]	Tour Refuse [c]
6/20/2007	Wednesday	0930-1200	48	16	32	0	0	6
6/21/2007	Thursday	0900-1200	33	18	15	0	1	0
6/22/2007	Friday	0835-1200	28	19	9	0	1	0
6/23/2007	Saturday	0845-1030	8	5	3	0	0	0
6/24/2007	Sunday	0915-1405	44	19	25	0	0	0
6/26/2007	Tuesday	0855-1610	80	43	37	0	2	0
6/27/2007	Wednesday	0845-1145	32	24	8	0	2	0
6/29/2007	Friday	0845-1400	65	38	23	4	0	0
Total	**-**	**-**	**338**	**182**	**152**	**4**	**6**	**6**
Lava Tube	**Day of Week**	**Time of Day**	**Solicitations**	**Accept**	**Refuse**	**Unusable [a]**	**LB Refuse [b]**	**Tour Refuse [c]**
6/19/2007	Tuesday	1330-1615	56	19	37	0	0	23
6/20/2007	Wednesday	1310-1515	52	18	34	0	3	24
6/21/2007	Thursday	1330-1600	54	29	25	0	2	6
6/22/2007	Friday	1335-1540	61	18	42	1	0	21
6/23/2007	Saturday	1325-1620	49	34	14	1	1	1
6/27/2007	Wednesday	1355-1540	44	21	23	0	1	17
6/28/2007	Thursday	1355-1630	41	31	10	0	0	3
6/30/2007	Saturday	0915-1130	27	22	5	0	1	0
Total	**-**	**-**	**384**	**192**	**190**	**2**	**8**	**95**
Overall Total	**-**	**-**	**722**	**374**	**342**	**6**	**14**	**101**

[a] Denotes surveys that were administered to respondents but contained no usable data.
[b] LB Refuse were refusals due to a language barrier with the potential respondent.
[b] Tour Refuse were refusals due to time constraints from being a member of a commercial tour.

Table 44. Hawaii Volcanoes audio recording survey response rates.				
All Days	**Overall [a]**	**Minus LB [b]**	**Minus Tour [c]**	**Minus LB and Tour [b,c]**
Acceptance Rate	51.8%	52.8%	60.2%	61.6%
Refusal Rate	48.2%	47.2%	39.8%	38.4%
Steam Vents	**Overall [a]**	**Minus LB [b]**	**Minus Tour [c]**	**Minus LB and Tour [b,c]**
Acceptance Rate	53.8%	54.8%	54.8%	55.8%
Refusal Rate	46.2%	45.2%	45.2%	44.2%
Lava Tube	**Overall [a]**	**Minus LB [b]**	**Minus Tour [b]**	**Minus LB and Tour [b,c]**
Acceptance Rate	50.0%	51.1%	66.4%	68.3%
Refusal Rate	50.0%	48.9%	33.6%	31.7%

[a] "Unusable" surveys treated as refusals.

[b] LB Refuse were refusals due to a language barrier with the potential respondent.

[c] Tour Refuse were refusals due to time constraints from being a member of a commercial tour.

Quantitative Results

This section of the chapter includes tables and figures reporting the quantitative results of the Steam Vents and Thurston Lava Tube Audio Recording Visitor Surveys, organized according to the sections of the survey questionnaires.

Trip Description

Table 45. Including yourself, how many people are in your personal group (family/friends) today?

Group Size	**Steam Vents** (n=181)		**Lava Tube** (n=192)	
	Count [a]	*Percent*	*Count* [a]	*Percent*
1 person	10	5.5	4	2.1
2 people	84	46.4	73	38.0
3 to 4 people	57	31.5	60	31.3
5 or more people	30	16.6	55	28.6
Mean [b, c]	2.9		3.8	

[a] ($\chi^2 = 10.457$, $p = 0.015$)
[b] ($t = -4.395$, $p < 0.001$)
[c] Extreme outliers removed.

Table 46. Is your personal group part of a commercial tour in the park today?

	Steam Vents (n=182)		**Lava Tube** (n=192)	
	Count [a]	*Percent*	*Count* [a]	*Percent*
Yes	3	1.6	25	13.0
No	179	98.4	167	87.0

[a] ($\chi^2 = 17.447$, $p < 0.001$)

Table 47. Have you visited Hawaii Volcanoes National Park before?

	Steam Vents (n=182)		**Lava Tube** (n=192)	
	Count [a]	*Percent*	*Count* [a]	*Percent*
Yes	55	30.2	54	28.1
No	127	69.8	138	71.9

[a]($\chi^2 = 0.199$, $p = 0.656$)

Table 48. Approximately how many times have you visited Hawaii Volcanoes National Park before today?

	Steam Vents (n=52)		**Lava Tube** (n=53)	
Number of Previous Visits	*Count*	*Percent*	*Count*	*Percent*
1 visit	25	48.1	25	47.2
2 to 5 visits	18	34.6	18	34.0
6 or more visits	9	17.3	10	18.9
Mean [a, b]	1.8		2.3	

[a]($t = -1.372$, $p = 0.0865$)
[b] Extreme outliers removed.

Table 49. Please rate the importance of each of the following reasons for your visit to Hawaii Volcanoes National Park today (Check one box for each item.)

		Steam Vents		Lava Tube		*Significance Tests*
		Count	*Percent*	*Count*	*Percent*	
Seeing the active lava flows on the Chain of Crater Roads	*Not at all important*	4	2.2	13	6.8	$\chi^2 = 6.106$, $p = 0.047$
	Somewhat important	54	30.3	44	23.0	
	Very important	120	67.4	134	70.2	
	Mean [a]	2.7		2.6		$t = 0.307$, $p = 0.759$
	Median [a]	3.0		3.0		
Seeing the summit caldera of Kīlauea volcano	*Not at all important*	5	2.8	7	3.7	$\chi^2 = 4.028$, $p = 0.133$
	Somewhat important	75	42.4	61	32.3	
	Very important	97	54.8	121	64.0	
	Mean [a]	2.5		2.6		$t = -1.428$, $p = 0.154$
	Median [a]	3.0		3.0		
Enjoying peace and quiet	*Not at all important*	47	26.4	37	19.5	$\chi^2 = 2.526$, $p = 0.283$
	Somewhat important	79	44.4	91	47.9	
	Very important	52	29.2	62	32.6	
	Mean [a]	2.0		2.1		$t = -1.361$, $p = 0.174$
	Median [a]	2.0		2.0		

[a] Response scale ranged from 1 = "not at all important," 2 = "somewhat important," to 3 = "very important."

Table 49 (continued). Please rate the importance of each of the following reasons for your visit to Hawaii Volcanoes National Park today (Check <u>one</u> box for each item.)

		Steam Vents		Lava Tube		*Significance Tests*
		Count	*Percent*	*Count*	*Percent*	
Being with family/friends	*Not at all important*	22	12.5	22	11.8	$\chi^2 = 0.889$, $p = 0.641$
	Somewhat important	57	32.4	53	28.3	
	Very important	97	55.1	112	59.9	
	Mean [a]	2.4		2.5		$t = -0.748$, $p = 0.455$
	Median [a]	3.0		3.0		
Learning about nature	*Not at all important*	11	6.2	8	4.2	$\chi^2 = 1.969$, $p = 0.374$
	Somewhat important	82	46.1	78	41.3	
	Very important	85	47.8	103	54.5	
	Mean [a]	2.4		2.5		$t = -1.403$, $p = 0.162$
	Median [a]	2.0		3.0		
Learning about Hawaiian culture and history	*Not at all important*	10	5.5	12	6.3	$\chi^2 = 0.184$, $p = 0.912$
	Somewhat important	93	52.0	95	50.0	
	Very important	76	42.5	83	43.7	
	Mean [a]	2.4		2.4		$t = -0.080$, $p = 0.936$
	Median [a]	2.0		2.0		

[a] Response scale ranged from 1 = "not at all important," 2 = "somewhat important," to 3 = "very important."

Table 49 (continued). Please rate the importance of each of the following reasons for your visit to Hawaii Volcanoes National Park today (Check <u>one</u> box for each item.)

		Steam Vents		Lava Tube		*Significance Tests*
		Count	*Percent*	*Count*	*Percent*	
Experiencing solitude	*Not at all important*	72	40.4	75	39.5	$\chi^2 = 0.732$, $p = 0.693$
	Somewhat important	72	40.4	84	44.2	
	Very important	34	19.2	31	16.3	
	Mean [a]	1.8		1.8		$t = 0.238$, $p = 0.812$
	Median [a]	2.0		2.0		
Appreciating the natural scenery	*Not at all important*	5	2.8	2	1.0	$\chi^2 = 3.360$, $p = 0.186$
	Somewhat important	47	26.4	40	21.0	
	Very important	126	70.8	149	78.0	
	Mean [a]	2.7		2.8		$t = -1.765$, $p = 0.078$
	Median [a]	3.0		3.0		
Hearing the sounds of nature	*Not at all important*	16	9.0	14	7.3	$\chi^2 = 4.197$, $p = 0.123$
	Somewhat important	85	47.8	74	38.7	
	Very important	77	43.2	103	53.9	
	Mean [a]	2.3		2.5		$t = -1.866$, $p = 0.063$
	Median [a]	2.0		3.0		

[a] Response scale ranged from 1 = "not at all important," 2 = "somewhat important," to 3 = "very important."

Table 49 (continued). Please rate the importance of each of the following reasons for your visit to Hawaii Volcanoes National Park today (Check <u>one</u> box for each item.)

		Steam Vents		Lava Tube		*Significance Tests*
		Count	*Percent*	*Count*	*Percent*	
Getting exercise	*Not at all important*	36	20.0	40	20.9	$\chi^2 = 1.101$, $p = 0.577$
	Somewhat important	96	53.3	92	48.2	
	Very important	48	26.7	59	30.9	
	Mean [a]	2.1		2.1		$t = -0.452$, $p = 0.652$
	Median [a]	2.0		2.0		
Hiking on Wilderness trails	*Not at all important*	40	22.2	39	20.4	$\chi^2 = 2.115$, $p = 0.347$
	Somewhat important	85	47.2	80	41.9	
	Very important	55	30.6	72	37.7	
	Mean [a]	2.1		2.2		$t = -1.172$, $p = 0.242$
	Median [a]	2.0		2.0		
Seeing the Thurston Lava Tube	*Not at all important*	10	5.6	4	2.1	$\chi^2 = 7.196$, $p = 0.027$
	Somewhat important	75	42.4	64	33.7	
	Very important	92	52.0	122	64.2	
	Mean [a]	2.5		2.6		$t = -2.658$, $p = 0.008$
	Median [a]	3.0		3.0		

[a] Response scale ranged from 1 = "not at all important," 2 = "somewhat important," to 3 = "very important."

Table 50. Which of the following places in the park have you visited or plan to visit today? (Check <u>all</u> that apply.) [a]

	Steam Vents (n=181)		Lava Tube (n=192)	
	Have visited	*Plan to visit*	*Have visited*	*Plan to visit*
Kīlauea Visitor Center	79.6	18.8	85.9	11.5
Jaggar Museum	19.9	56.4	57.8	22.9
Kīlauea Caldera/Halema'uma'u	31.5	51.9	72.4	14.6
Chain of Craters Road [a]	11.6	39.2	13.5	26.6
Active Lava Surface Flow [a]	6.6	44.2	8.9	29.2
Thurston Lava Tube	16.0	69.6	93.2	6.3
Other (Please specify.)	6.1	2.7	13.5	2.0
Kīlauea Iki Crater	1.7	1.1	2.1	0.5
Mauna Loa	1.7	0.5	0.0	0.0
Crater Rim Drive/Trail	1.7	0.0	1.0	0.5
Art Gallery	0.5	0.0	0.5	0.0
Devastation Trail	0.0	0.0	2.6	0.5
Volcano House	0.0	0.0	2.1	0.0
Steam Vents	N/A	N/A	2.1	0.0
Miscellaneous	0.5	1.1	3.1	0.5

[a] Chain of Craters Road was closed during most of the survey sampling period, and the Active Lava Surface Flow was closed during all of the survey sampling period.

Table 51.1. We would like you to listen to several short recordings of sounds from this part of Hawaii Volcanoes National Park. Please rate each recording by indicating how acceptable you would find the sounds heard in the audio clip during a hike in this area of the park. (Circle one number for each recording.)

	Steam Vents												
	----------*Percent*----------												
	Very Unacceptable				**Neutral**				**Very Acceptable**				
	-4	**-3**	**-2**	**-1**	**0**	**+1**	**+2**	**+3**	**+4**	**Median**	**25th Percentile**	**75th Percentile**	**n**
Recording 1	0.6	1.7	1.1	2.8	1.7	2.8	14.4	26.6	48.6	3.0	2.5	4.0	181
Recording 2	0.6	1.1	1.1	3.4	3.9	3.4	14.5	26.9	45.3	3.0	2.0	4.0	179
Recording 3	3.3	2.8	5.5	7.2	6.6	9.9	24.3	18.3	22.1	2.0	0.0	3.0	181
Recording 4	24.3	11.6	14.4	8.3	8.8	12.2	8.8	6.1	5.5	-2.0	-3.0	1.0	181
Recording 5	61.7	13.9	7.8	1.7	1.7	6.1	2.2	2.8	1.7	-4.0	-4.0	-3.0	180

Note: The recordings are archived with Hawaii Volcanoes National Park and the NPS Natural Sounds Program Center.

Table 51.2. We would like you to listen to several short recordings of sounds from this part of Hawaii Volcanoes National Park. Please rate each recording by indicating how acceptable you would find the sounds heard in the audio clip during a hike in this area of the park.

	Steam Vents		
	Mean	**Standard Deviation**	**n**
Recording 1	2.9	1.6	181
Recording 2	2.8	1.6	179
Recording 3	1.6	2.2	181
Recording 4	-1.0	2.6	181
Recording 5	-2.8	2.1	180

Table 51.3. We would like you to listen to several short recordings of sounds from this part of Hawaii Volcanoes National Park. Please rate each recording by indicating how acceptable you would find the sounds heard in the audio clip during a hike in this area of the park. (Circle <u>one</u> number for each recording.)

Lava Tube													
	----------*Percent*----------												
	Very Unacceptable				**Neutral**				**Very Acceptable**				
	-4	**-3**	**-2**	**-1**	**0**	**+1**	**+2**	**+3**	**+4**	**Median**	**25th Percentile**	**75th Percentile**	**n**
Recording 1	0.0	0.0	0.0	0.5	0.0	1.1	8.4	23.7	66.3	4.0	3.0	4.0	190
Recording 2	0.0	0.0	0.0	0.5	1.1	3.2	16.0	31.0	48.1	3.0	3.0	4.0	187
Recording 3	6.9	4.8	9.6	9.6	7.4	20.2	20.2	12.2	8.5	1.0	-1.0	2.0	188
Recording 4	35.7	14.1	16.2	13.0	7.6	7.0	3.2	1.6	1.6	-2.0	-4.0	-1.0	185
Recording 5	82.2	8.6	3.2	1.1	2.2	1.6	0.0	0.5	0.5	-4.0	-4.0	-4.0	185

Note: The recordings are archived with Hawaii Volcanoes National Park and the NPS Natural Sounds Program Center.

Table 51.4. We would like you to listen to several short recordings of sounds from this part of Hawaii Volcanoes National Park. Please rate each recording by indicating how acceptable you would find the sounds heard in the audio clip during a hike in this area of the park.

Lava Tube			
	Mean	**Standard Deviation**	**n**
Recording 1	3.5	0.8	190
Recording 2	3.2	1.0	187
Recording 3	0.6	2.3	188
Recording 4	-2.1	2.0	185
Recording 5	-3.6	1.2	185

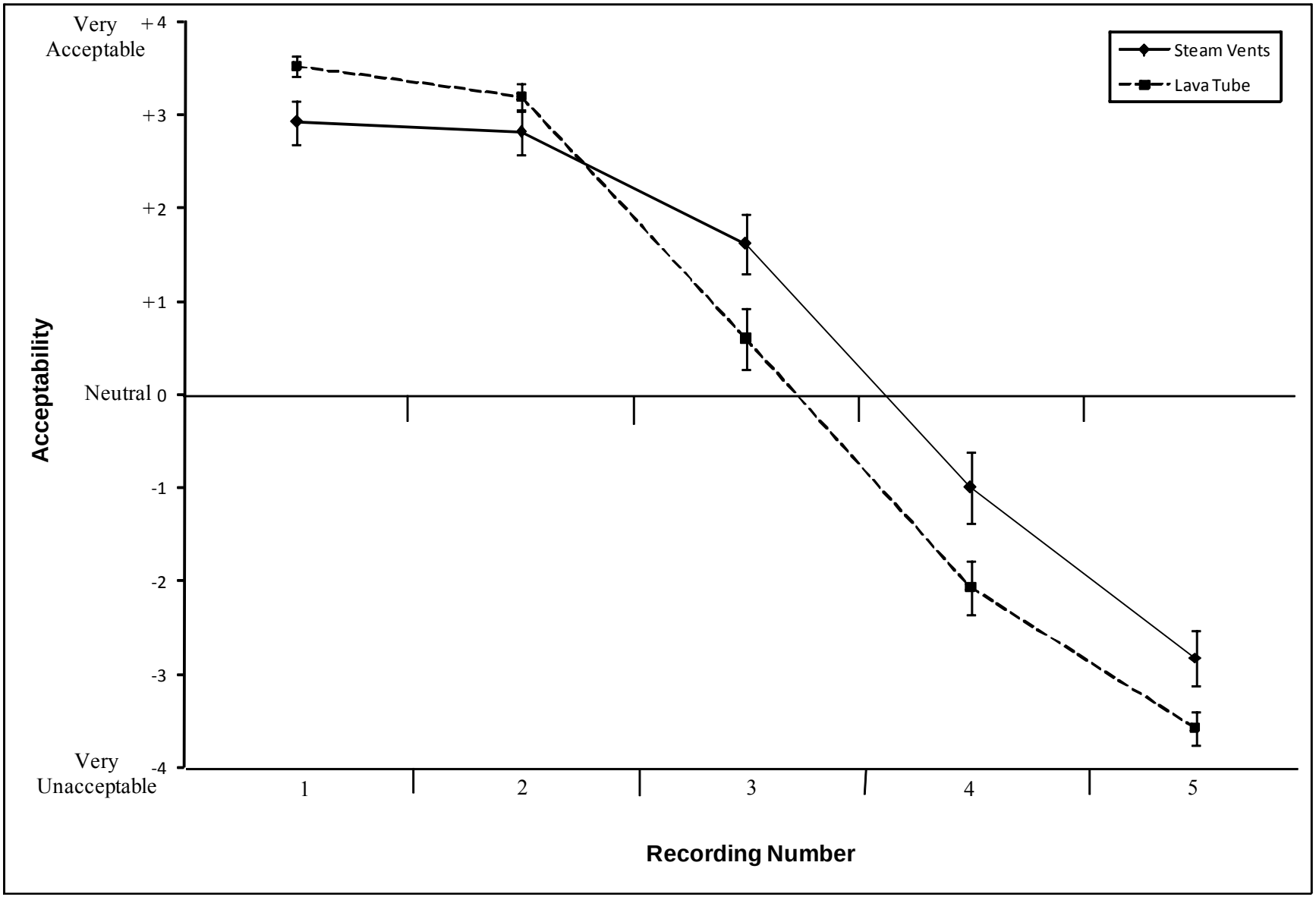

Figure 18: Respondents' mean acceptability rating of each recording. Note: Error bars represent 95% confidence intervals.

Table 51.5. We would like you to listen to several short recordings of sounds from this part of Hawaii Volcanoes National Park. Please rate each recording by indicating how acceptable you would find the sounds heard in the audio clip during a hike in this area of the park.

	Steam Vents Mean [a]	**Lava Tube Mean [a]**	***t-test, p-value* [b]**
Recording 1	2.9	3.5	$t = -4.650$, $p < 0.001$
Recording 2	2.8	3.2	$t = -2.717$, $p = 0.006$
Recording 3	1.6	0.6	$t = 4.351$, $p < 0.001$
Recording 4	-1.0	-2.1	$t = 4.396$, $p < 0.001$
Recording 5	-2.8	-3.6	$t = 4.275$, $p < 0.001$

Note: The recordings are archived with Hawaii Volcanoes National Park and the NPS Natural Sounds Program Center.

[a] Response scale ranged from -4 = "Very Unacceptable," 0 = "Neutral," to +4 = "Very Acceptable."

[b] The Bonferroni correction for multiple comparisons results in a critical p-value of 0.01.

Table 52.1. Briefly describe any sounds in the recording you found pleasing.				
		Reported a pleasing sound	**Did not find any sounds pleasing**	**Chi-square**
		Percent	*Percent*	
Recording 1	Steam Vents (n=180)	96.1	3.9	$\chi^2 = 1.876$, $p = 0.171$
	Lava Tube (n=190)	98.4	1.6	
Recording 2	Steam Vents (n=178)	93.8	6.2	$\chi^2 = 6.726$, $p = 0.010$
	Lava Tube (n=183)	98.9	1.1	
Recording 3	Steam Vents (n=169)	94.1	5.9	$\chi^2 = 0.191$, $p = 0.662$
	Lava Tube (n=184)	92.9	7.1	
Recording 4	Steam Vents (n=163)	81.0	19.0	$\chi^2 = 0.874$, $p = 0.350$
	Lava Tube (n=177)	76.8	23.2	
Recording 5	Steam Vents (n=154)	37.0	63.0	$\chi^2 = 0.112$, $p = 0.738$
	Lava Tube (n=157)	38.9	61.1	

Note: The recordings are archived with Hawaii Volcanoes National Park and the NPS Natural Sounds Program Center.

Table 52.2. Briefly describe any sounds in the recording you found pleasing. (For those who reported a sound.)

Pleasing Sounds [b]		Recording 1 (n=170, 187[a])		Recording 2 (n=166, 186[a])		Recording 3 (n=159, 170[a])		Recording 4 (n=131, 135[a])		Recording 5 (n=57, 60[a])	
		Count	*Percent*	*Count*	*Percent*	*Count*	*Percent*	*Count*	*Percent*	*Count*	*Percent*
Birds	Steam Vents	143	84.1	136	81.9	134	84.3	107	81.7	42	73.7
	Lava Tube	161	86.1	151	81.2	140	82.4	111	82.2	46	76.7
Bugs, insects, crickets	Steam Vents	20	11.8	20	12.0	17	10.7	15	11.5	2	3.5
	Lava Tube	33	17.6	34	18.3	22	12.9	20	14.8	7	11.7
Sounds like nature	Steam Vents	9	5.3	8	4.3	10	6.3	10	7.6	6	10.5
	Lava Tube	7	3.7	6	3.2	18	10.6	15	11.1	6	10.0
Wind, breeze	Steam Vents	8	4.7	12	7.2	8	5.0	6	4.6	1	1.8
	Lava Tube	21	11.2	32	17.1	15	8.8	8	5.9	3	5.0
Quiet, serene, peaceful, etc.	Steam Vents	8	4.7	5	2.7	4	2.5	1	0.8	0	0.0
	Lava Tube	8	4.3	9	4.8	3	1.8	1	0.7	0	0.0
Wildlife (other than birds/insects)	Steam Vents	8	4.7	5	2.7	5	3.1	5	3.8	4	7.0
	Lava Tube	7	3.7	7	3.8	10	5.9	7	5.2	4	6.7
Rainforest, forest sounds, etc.	Steam Vents	7	4.1	5	2.7	2	1.3	2	1.5	2	3.5
	Lava Tube	4	2.1	3	1.6	3	1.8	3	2.2	1	1.7
All, everything	Steam Vents	5	2.9	9	4.8	9	5.7	3	2.3	0	0.0
	Lava Tube	11	5.9	9	4.8	3	1.8	2	1.5	0	0.0
Water, stream, waterfall, etc.	Steam Vents	4	2.4	15	9.0	4	2.5	7	5.3	3	5.3
	Lava Tube	41	21.9	46	24.6	20	11.8	13	9.6	7	11.7
Other	Steam Vents	3	1.8	8	4.3	6	3.8	6	4.6	5	8.8
	Lava Tube	3	1.6	6	3.2	4	2.4	4	3.0	1	1.7
Aircraft noises, vehicles, etc.	Steam Vents	0	0.0	1	0.6	2	1.3	4	3.1	2	3.5
	Lava Tube	0	0.0	0	0.0	5	2.9	4	3.0	0	0.0

[a] Sample size equals the number of respondents who wrote in a response to this question – Steam Vents sample size first, Thurston Lava Tube second. Some respondents wrote in more than one response, therefore, percentages may sum to greater than 100.

[b] See Appendix J for a verbatim list of responses, organized by recording and category.

Table 53.1. Briefly describe any sounds in the recording you found annoying.				
		Reported an annoying sound	**Did not find any sounds annoying**	**Chi-square**
		Percent	*Percent*	
Recording 1	Steam Vents (n=180)	15.6	84.4	$\chi^2 = 4.335$, $p = 0.037$
	Lava Tube (n=188)	8.5	91.5	
Recording 2	Steam Vents (n=176)	17.6	82.4	$\chi^2 = 1.618$, $p = 0.203$
	Lava Tube (n=187)	23.0	77.0	
Recording 3	Steam Vents (n=178)	58.4	41.6	$\chi^2 = 31.237$, $p < 0.001$
	Lava Tube (n=189)	84.7	15.3	
Recording 4	Steam Vents (n=181)	86.7	23.3	$\chi^2 = 14.420$, $p < 0.001$
	Lava Tube (n=189)	97.4	2.6	
Recording 5	Steam Vents (n=180)	94.4	5.6	$\chi^2 = 8.003$, $p = 0.005$
	Lava Tube (n=189)	98.9	1.1	

Note: The recordings are archived with Hawaii Volcanoes National Park and the NPS Natural Sounds Program Center.

Table 53.2. Briefly describe any sounds in the recording you found annoying. (For those who reported a sound.)

Pleasing Sounds [b]		Recording 1 (n=28, 17[a])		Recording 2 (n=31, 46[a])		Recording 3 (n=103, 160[a])		Recording 4 (n=156, 183[a])		Recording 5 (n=169, 186[a])	
		Count	*Percent*	*Count*	*Percent*	*Count*	*Percent*	*Count*	*Percent*	*Count*	*Percent*
Aircraft, Helicopters, etc.	Steam Vents	0	0.0	0	0.0	68	66.0	138	88.5	142	84.0
	Lava Tube	0	0.0	2	4.3	135	84.4	160	87.4	146	78.5
Loud, annoying, noisy, etc.	Steam Vents	0	0.0	1	3.2	1	1.0	11	7.1	22	13.0
	Lava Tube	0	0.0	0	0.0	3	1.9	14	7.7	35	18.8
Cars, traffic, parking lot, etc.	Steam Vents	0	0.0	0	0.0	6	5.8	18	11.5	18	10.7
	Lava Tube	2	11.8	10	21.7	22	13.8	33	18.0	25	13.4
Motor sounds	Steam Vents	0	0.0	0	0.0	4	3.9	4	2.6	9	5.3
	Lava Tube	0	0.0	2	4.3	3	1.9	6	3.3	11	5.9
Other	Steam Vents	9	32.1	7	22.6	6	5.8	7	4.5	6	3.6
	Lava Tube	1	5.9	3	6.5	3	1.9	3	1.6	2	1.1
All, everything	Steam Vents	0	0.0	0	0.0	0	0.0	1	0.6	5	3.0
	Lava Tube	0	0.0	0	0.0	0	0.0	2	1.1	20	10.8
Background noise	Steam Vents	0	0.0	1	3.2	6	5.8	6	3.8	3	1.8
	Lava Tube	1	5.9	7	15.2	6	3.8	5	2.7	4	2.2
People	Steam Vents	0	0.0	0	0.0	1	1.0	0	0.0	2	1.2
	Lava Tube	5	29.4	2	4.3	1	0.6	0	0.0	1	0.5
Birds, crickets, frogs	Steam Vents	10	35.7	16	51.6	15	14.6	5	3.2	2	1.2
	Lava Tube	5	29.4	11	23.9	6	3.8	1	0.5	0	0.0
Water, wind	Steam Vents	1	3.6	0	0.0	1	1.0	1	0.6	1	0.6
	Lava Tube	2	11.8	7	15.2	0	0.0	0	0.0	1	0.5
High pitch, screech	Steam Vents	8	28.8	6	19.4	9	8.7	2	1.3	1	0.6
	Lava Tube	1	5.9	2	4.3	2	1.3	0	0.0	0	0.0

[a] Sample size equals the number of respondents who wrote in a response to this question – Steam Vents sample size first, Thurston Lava Tube second. Some respondents wrote in more than one response, therefore, percentages may sum to greater than 100.

[b] See Appendix K for a verbatim list of responses, organized by recording and category.

Table 54. Which of the five recordings you just heard sounds most like what you heard while visiting this area of the park today?

	Steam Vents		Lava Tube	
	Count	*Percent*	*Count*	*Percent*
Recording 1	106	64.2	125	67.2
Recording 2	36	21.8	45	24.2
Recording 3	15	9.1	15	8.1
Recording 4	6	3.6	1	0.5
Recording 5	2	1.2	0	0.0

Note: The recordings are archived with Hawaii Volcanoes National Park and the NPS Natural Sounds Program Center.

Table 55.1. We would like to know how often you think it would be acceptable to hear a helicopter air tour during your visit to this area of the park. To help judge this, please listen to a short recording of a helicopter air tour and then rate the acceptability of each of the following scenarios based on how frequently you would hear the sounds in the recording. (Circle one number for each scenario.)

Steam Vents													
	----------*Percent*----------												
Hear the helicopter sounds…	**Very Unacceptable**				**Neutral**				**Very Acceptable**	**Median**	**25th Percentile**	**75th Percentile**	**n**
	-4	**-3**	**-2**	**-1**	**0**	**+1**	**+2**	**+3**	**+4**				
Never during visit	1.7	1.7	0.0	0.6	6.3	0.6	2.9	9.2	77.0	4.0	4.0	4.0	174
Once every 60 minutes	15.3	1.7	5.7	5.1	8.5	5.7	15.3	17.0	25.6	2.0	-1.0	4.0	176
Once every 30 minutes	21.9	8.4	6.2	5.1	10.1	11.2	9.0	12.9	15.2	0.0	-3.0	3.0	178
Once every 15 minutes	32.6	10.7	9.0	9.0	8.4	5.1	10.1	6.7	8.4	-2.0	-4.0	2.0	178
Once every 5 minutes	52.5	9.5	6.1	2.8	6.7	6.7	6.7	3.9	5.0	-4.0	-4.0	0.0	179

Table 55.2. We would like to know how often you think it would be acceptable to hear a helicopter air tour during your visit to this area of the park. To help judge this, please listen to a short recording of a helicopter air tour and then rate the acceptability of each of the following scenarios based on how frequently you would hear the sounds in the recording. (Circle one number for each scenario.)

Steam Vents			
	Mean	**Standard Deviation**	**n**
Never during visit	3.3	1.7	174
Once every 60 minutes	1.1	2.8	176
Once every 30 minutes	0.0	2.9	178
Once every 15 minutes	-1.1	2.8	178
Once every 5 minutes	-2.0	2.6	179

Table 55.3. We would like to know how often you think it would be acceptable to hear a helicopter air tour during your visit to this area of the park. To help judge this, please listen to a short recording of a helicopter air tour and then rate the acceptability of each of the following scenarios based on how frequently you would hear the sounds in the recording. (Circle one number for each scenario.)

Lava Tube													
	----------*Percent*----------												
Hear the helicopter sounds…	**Very Unacceptable**				**Neutral**				**Very Acceptable**	**Median**	**25th Percentile**	**75th Percentile**	**n**
	-4	**-3**	**-2**	**-1**	**0**	**+1**	**+2**	**+3**	**+4**				
Never during visit	1.7	0.0	0.6	0.6	5.0	1.7	1.7	3.3	85.6	4.0	4.0	4.0	180
Once every 60 minutes	12.5	8.7	7.6	8.2	10.9	11.4	9.8	15.2	15.8	1.0	-2.0	3.0	184
Once every 30 minutes	26.1	12.5	9.8	9.8	10.9	8.2	8.7	5.4	8.7	-1.0	-4.0	1.0	184
Once every 15 minutes	40.0	15.7	11.4	8.1	5.9	7.6	2.7	4.3	4.3	-3.0	-4.0	-0.5	185
Once every 5 minutes	63.0	10.3	7.1	1.6	6.0	4.9	3.8	1.6	1.6	-4.0	-4.0	-2.0	184

Table 55.4. We would like to know how often you think it would be acceptable to hear a helicopter air tour during your visit to this area of the park. To help judge this, please listen to a short recording of a helicopter air tour and then rate the acceptability of each of the following scenarios based on how frequently you would hear the sounds in the recording. (Circle one number for each scenario.)

Lava Tube			
	Mean	**Standard Deviation**	**n**
Never during visit	3.5	1.5	180
Once every 60 minutes	0.4	2.7	184
Once every 30 minutes	-1.0	2.7	184
Once every 15 minutes	-2.0	2.4	185
Once every 5 minutes	-2.8	2.1	184

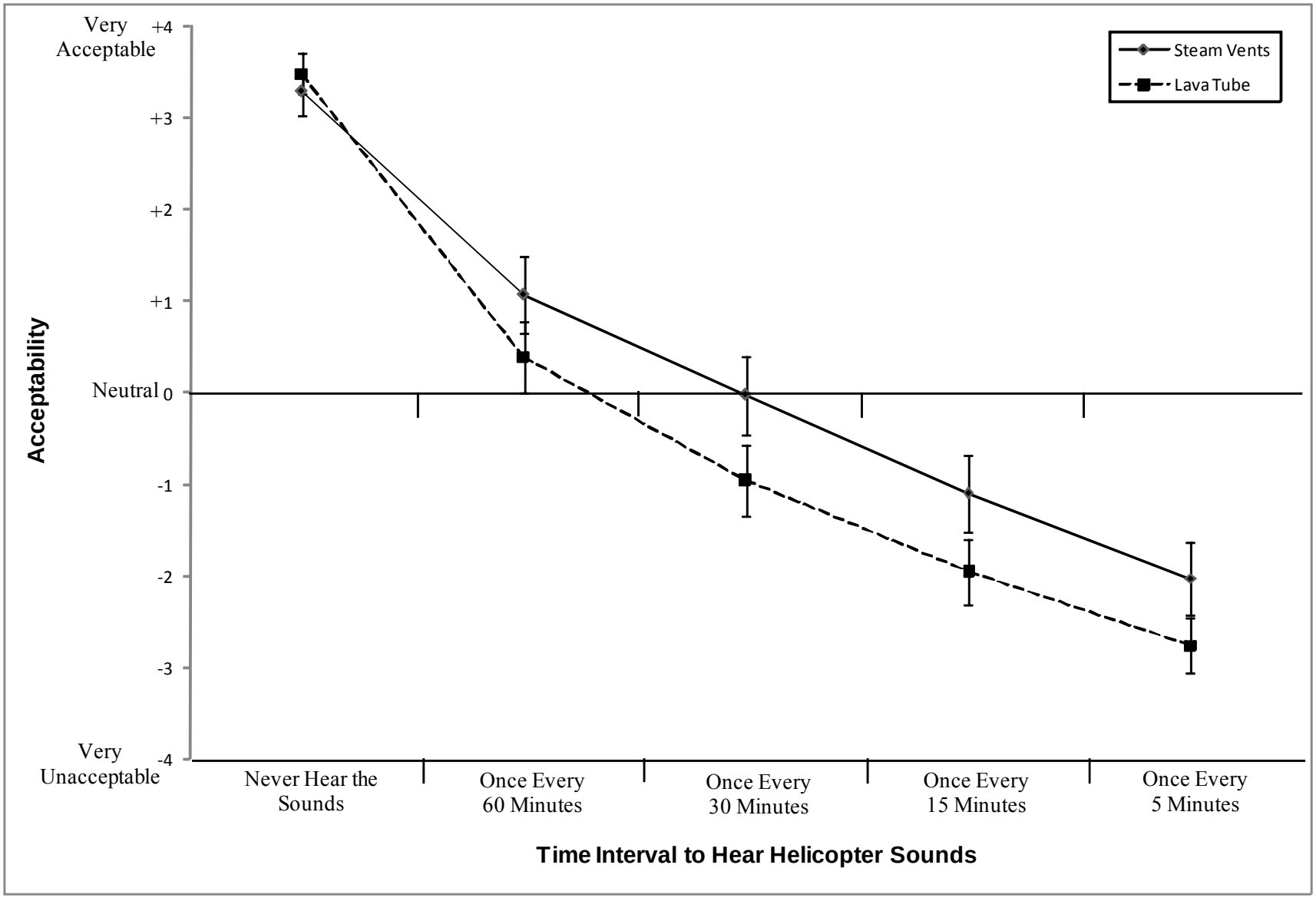

Figure 19: Respondents' mean acceptability rating of the time interval to hear helicopter sounds. Note: Error bars represent 95% confidence intervals.

Table 55.5. We would like to know how often you think it would be acceptable to hear a helicopter air tour during your visit to this area of the park. To help judge this, please listen to a short recording of a helicopter air tour and then rate the acceptability of each of the following scenarios based on how frequently you would hear the sounds in the recording. (Circle <u>one</u> number for each scenario.)

	Steam Vents Mean [a]	**Lava Tube Mean** [a]	***t-test, p-value*** [b]
Recording 1	3.3	3.5	$t = 2.923$, $p = 0.004$
Recording 2	1.1	0.4	$t = 3.068$, $p = 0.002$
Recording 3	0.0	-1.0	$t = 3.134$, $p = 0.002$
Recording 4	-1.1	-2.0	$t = 2.268$, $p = 0.024$
Recording 5	-2.0	-2.8	$t = -1.156$, $p = 0.248$

[a] Response scale ranged from -4 = "Very Unacceptable," 0 = "Neutral," to +4 = "Very Acceptable."

[b] The Bonferroni correction for multiple comparisons results in a critical p-value of 0.01.

Table 56. Did you hear any aircraft while you were in this area of the park today?

	Steam Vents (n=176)		**Lava Tube** (n=187)	
	Count [a]	*Percent*	*Count* [a]	*Percent*
Yes	27	15.3	55	29.4
No	149	84.7	132	70.4

[a]($\chi^2 = 10.266$, $p = 0.001$)

Table 57. Please indicate how pleasing or annoying you found the sounds of aircraft you heard while you were in this area of the park today. (Check one.)

Response	**Steam Vents** (n=27)		**Lava Tube** (n=55)	
	Count	*Percent*	*Count*	*Percent*
Very Pleasing	3	11.1	1	1.8
Somewhat Pleasing	1	3.7	0	0.0
Neutral	11	40.7	24	43.6
Somewhat Annoying	6	22.2	25	45.5
Very Annoying	6	22.2	5	9.1

Table 58. Have you ever taken a scenic air tour over Hawaii Volcanoes National Park or any other national park? (Check all that apply.)

Response	**Steam Vents** (n=173)		**Lava Tube** (n=184)	
	Count [a]	*Percent*	*Count* [a]	*Percent*
Yes, I have taken a scenic air tour over Hawaii Volcanoes National Park	10	5.8	13	7.1
Yes, I have taken a scenic air tour over another national park	12	6.9	11	6.0
No, I have never taken a scenic air tour over a national park	152	87.9	162	88.0

[a] ($\chi^2 = 0.285$, $p = 0.867$)

Table 59.1. If given the opportunity to take a scenic air tour over Hawaii Volcanoes National Park, would you do so even if park visitors could hear the aircraft during their visit? (Check one.)

Response	**Steam Vents** (n=175)		**Lava Tube** (n=187)	
	Count [a]	*Percent*	*Count* [a]	*Percent*
Yes	60	34.3	69	36.9
No	61	34.9	57	30.5
Don't Know/Not Sure	54	30.9	61	32.6

[a]($\chi^2 = 0.793$, $p = 0.673$)

Table 59.2. Comparison of those that have taken an air tour with those that haven't to whether or not they would take an air tour of Hawaii Volcanoes National Park, even if visitors in the park could hear the aircraft while hiking.

	Would take air tour		**Would not take air tour**		**Don't know**		
	Count	*Percent*	*Count*	*Percent*	*Count*	*Percent*	**n**
Have taken a scenic air tour over Hawaii Volcanoes National Park	13	56.5	4	17.4	6	26.1	23
Have taken a scenic air tour over another national park	5	21.7	11	47.8	7	30.4	23
Have not taken a scenic air tour over a national park	118	37.6	95	30.3	113	36.0	314

Table 60. Comparison of the level of support or opposition for each of the potential management actions at Hawaii Volcanoes National Park between those who have taken an air tour in Hawaii Volcanoes National Park or in another National Park and those who have never taken an air tour in a park.

	Level of Support [a]	Have Taken Air Tour		Have Never Taken Air Tour		*Chi-Square* [a], *p-value*	*T-test, p-value*
		Count	*Percent*	*Count*	*Percent*		
Reduce the number of scenic air tours allowed to fly over the park	*Support*	20	46.5	192	65.1	$\chi^2 = 8.988$, $p = 0.011$	
	Neutral	15	34.9	83	28.1		
	Oppose	8	18.6	20	6.8		
	Mean [b]	0.4 (n=43)		1.0 (n=295)			$t = 3.181$, $p = 0.002$
	Median [b]	0.0		1.0			
Maintain the number of scenic air tours allowed to fly over park at the current level	*Support*	19	51.4	70	27.6	$\chi^2 = 9.268$, $p = 0.010$	
	Neutral	14	37.8	123	48.4		
	Oppose	4	10.8	61	24.0		
	Mean [b]	0.5 (n=37)		0.0 (n=254)			$t = -2.659$, $p = 0.008$
	Median [b]	1.0		0.0			
Increase the number of scenic air tours allowed to fly over the park	*Support*	2	4.9	14	4.8	$\chi^2 = 2.080$, $p = 0.353$	
	Neutral	12	29.3	57	19.6		
	Oppose	27	65.9	220	75.6		
	Mean [b]	-0.8 (n=41)		-1.1 (n=291)			$t = -2.073$, $p = 0.039$
	Median [b]	-1.0		-1.0			

[a] In order to conduct a Chi-square test, strongly support and support were combined, strongly oppose and oppose were combined, and those responding "don't know/not sure" were removed from the analysis.

[b] Scale ranged from -2 = "Strongly Oppose," -1 = "Oppose," 0 = "Neutral," 1 = "Support," to 2 = "Strongly Support."

Table 60 (Continued). Comparison of the level of support or opposition for each of the potential management actions at Hawaii Volcanoes National Park between those who have taken an air tour in Hawaii Volcanoes National Park or in another National Park and those who have never taken an air tour in a park.

	Level of Support [a]	Have Taken Air Tour		Have Never Taken Air Tour		*Chi-Square* [a], *p-value*	*T-test, p-value*
		Count	*Percent*	*Count*	*Percent*		
Require scenic air tours to be flown over the park only during designated dates and times	*Support*	25	64.1	191	64.3	$\chi^2 = 3.145$, $p = 0.208$	
	Neutral	6	15.4	71	23.9		
	Oppose	8	20.5	35	11.8		
	Mean [b]	0.6 (n=39)		0.7 (n=297)			$t = 0.806$, $p = 0.421$
	Median [b]	1.0		1.0			
Require scenic air tours to use designated flight paths over limited areas of the park	*Support*	31	72.1	217	71.9	$\chi^2 = 0.432$, $p = 0.806$	
	Neutral	6	14.0	51	16.9		
	Oppose	6	14.0	34	11.2		
	Mean [b]	0.8 (n=43)		0.8 (n=302)			$t = 0.180$, $p = 0.857$
	Median [b]	1.0		1.0			
Prohibit scenic air tours from flying over the park	*Support*	3	7.3	81	27.2	$\chi^2 = 10.357$, $p = 0.006$	
	Neutral	10	24.4	85	28.5		
	Oppose	28	68.3	132	44.3		
	Mean [b]	-1.0 (n=41)		-0.2 (n=298)			$t = 3.773$, $p < 0.001$
	Median [b]	-1.0		0.0			

[a] In order to conduct a Chi-square test, strongly support and support were combined, strongly oppose and oppose were combined, and those responding "don't know/not sure" were removed from the analysis.

[b] Scale ranged from -2 = "Strongly Oppose," -1 = "Oppose," 0 = "Neutral," 1 = "Support," to 2 = "Strongly Support."

Background Information

Table 61. What is your gender?				
	Steam Vents (n=181)		**Lava Tube** (n=187)	
Gender	*Count* [a]	*Percent*	*Count* [a]	*Percent*
Male	93	51.4	85	45.5
Female	88	48.6	102	54.5

[a]($\chi^2 = 1.294$, $p = 0.255$)

Table 62. In what year were you born? (Converted to age in years.)				
	Steam Vents (n=180)		**Lava Tube** (n=187)	
Age Group	*Count* [a]	*Percent*	*Count* [a]	*Percent*
18 to 24	13	7.2	16	8.6
25 to 34	44	24.4	32	17.1
35 to 44	34	18.9	37	19.8
45 to 54	35	19.4	59	31.6
55 to 64	39	21.7	29	15.5
65 and older	15	8.3	14	7.5
Mean [b]	44.6		44.7	

[a]($\chi^2 = 9.835$, $p = 0.080$)
[b]($t = -0.098$, $p = 0.922$)

Table 63.1. Do you live in the United States?				
	Steam Vents (n=180)		**Lava Tube** (n=187)	
	Count [a]	*Percent*	*Count* [a]	*Percent*
Yes	160	88.4	165	88.2
No	21	11.6	22	11.8

[a]($\chi^2 = 0.002$, $p = 0.961$)

Table 63.2. What is your zip code (if you live in the United States)?		
Most Frequently Reported Zip Codes	**Steam Vents** (n=160) *Count*	**Lava Tube** (n=165) *Count*
Dover, NH (03820)	2	0
Pflugerville, TX (78660)	2	0
Fort Collins, CO (80525)	2	0
Simi Valley, CA(93063)	2	0
San Francisco, CA(94109)	2	0
Honolulu, HI (96818)	2	0
Bend, OR (97701)	2	0
Schaumburg, IL (60194)	1	1
Colorado Springs, CO (80960)	1	1
West Hills, CA (91307)	1	1
Murietta, CA (92563)	1	1
Fresno, CA (93711)	1	1
Hilo, HI (96720)	1	1
Kailua, HI (96734)	1	1
Longmeadow, MA (01106)	0	2
Palo Alto, CA (94306)	0	2
Kapolei, HI (96707)	0	2
Renton, WA (98059)	0	2

See Appendix L for a frequency distribution of respondents, organized by state.

Table 63.3. What country do you live in (if not the United States)?				
	Steam Vents (n=21)		**Lava Tube** (n=22)	
Country	*Count*	*Percent*	*Count*	*Percent*
Canada	4	19.0	3	13.6
England	2	9.5	3	13.6
Germany	2	9.5	2	9.1
United Kingdom	2	9.5	1	4.5
France	2	9.5	0	0.0
New Zealand	2	9.5	0	0.0
Australia	1	4.8	6	27.3
Japan	1	4.8	2	9.1
Ireland	1	4.8	2	9.1
Switzerland	1	4.8	0	0.0
Italy	1	4.8	0	0.0
Indonesia	1	4.8	0	0.0
Mexico	1	4.8	0	0.0
India	0	0.0	1	4.5
Croatia	0	0.0	1	4.5
Manica, PI?	0	0.0	1	4.5

Table 64. What is the highest level of formal education you have completed?				
	Steam Vents (n=179)		**Lava Tube** (n=186)	
Education Level	*Count* [a]	*Percent*	*Count* [a]	*Percent*
Some high school	0	0.0	0	0.0
High school graduate or GED	5	2.8	4	2.2
Some college, business or trade school	23	12.8	27	14.5
College, business or trade school graduate	61	34.1	59	31.7
Some graduate school	21	11.7	16	8.6
Master's, doctoral or professional degree	69	38.5	80	43.0

[a]($\chi^2 = 1.819$, $p = 0.769$) Note: Chi-square was calculated after grouping "Some high school" and "High school graduate or GED" into one group.

Table 65. Are you Hispanic or Latino?				
	Steam Vents (n=179)		**Lava Tube** (n=185)	
	Count [a]	*Percent*	*Count* [a]	*Percent*
Yes	5	2.8	10	5.4
No	174	97.2	175	94.6

[a]($\chi^2 = 1.571$, $p = 0.210$)

Table 66. What is your race?				
Race	**Steam Vents** (n=175)		**Lava Tube** (n=180)	
	Count	*Percent*	*Count*	*Percent*
American Indian or Alaskan Native	3	1.7	4	2.2
Asian	10	5.7	13	7.2
Black or African American	2	1.1	3	1.7
Native Hawaiian	0	0.0	1	0.6
Pacific Islander other than Native Hawaiian	3	1.7	0	0.0
White	160	91.4	160	88.9
Reported 2 races	3	1.7	1	0.6

Chapter 6

Summary of Major Study Findings

This chapter of the report summarizes major findings from each of the components of the study, including the Steam Vents Area Attended Listening Visitor Survey, the Thurston Lava Tube Area Attended Listening Visitor Survey, and the Steam Vents and Thurston Lava Tube Audio Recording Visitor Surveys.

Summary of Major Findings - Steam Vents Area Attended Listening Visitor Survey

Trip Description

- A substantial majority (85.9%) of visitor groups in the Steam Vents area consist of 4 or fewer people, with just under half (44.4%) consisting of 2 people and about one-third (36.3%) consisting of 3 to 4 people (Table 3).
- Most (97.8%) visitors to the Steam Vents are not part of a commercial tour (Table 4).
- Nearly three-quarters (70.6%) of visitors to the Steam Vents are visiting Hawaii Volcanoes National Park for the first time. Of those visitors who have previously visited the park, 40% have visited once previously, 40% have visited 2 to 4 times previously, and one-fifth (20.0%) have visited the park 5 or more times previously (Tables 5 and 6).

Listening Portion of the Steam Vents Area Attended Listening Visitor Survey

Within the listening portion of the Steam Vents Area Attended Listening Visitor Survey, study participants were asked to sit quietly near the overlook into Kīlauea Caldera, close their eyes, and listen for several minutes to the sounds around them. Respondents were then asked to identify, from a list of potential sounds, any sounds that they heard while engaged in the

listening exercise. Respondents were also given the option to list and evaluate other sounds they heard that were not included in the list contained in the questionnaire. Respondents were also asked to record any emotions or feelings elicited by the sounds they heard, and to evaluate each sound they heard on an acceptability scale (-4 = "Very Unacceptable" to +4 = "Very Acceptable") and a personal evaluation scale (-4 = "Very Annoying" to +4 = Very Pleasing). The detailed instructions used to administer the survey to park visitors are on the cover of the survey questionnaire, which is included in this report as Appendix A. For the purposes of analysis, the individual sounds listed in the questionnaire were grouped into sound categories representing general types of sounds. For example, the questionnaire items "Automobile" and "Motorcycle" were grouped into a sound category labeled "Vehicle Sounds". The results of the listening portion of the survey are summarized below and include results for both the individual sounds listed in the questionnaire and the sound categories derived from grouping the individual sound items.

- The types of sounds that visitors most commonly reported hearing during the listening exercise in the Steam Vents area include nature sounds (97.7%); the sounds of other visitors, such as walking sounds (74.1%) and talking (89.8%); and automobiles (79.3%). Furthermore, nearly half (44.9%) of all visitors reported hearing bird song and over one-third (37.2%) reported hearing "technology sounds", such as cameras (31.4%) and cell phones (11.7%). About one-quarter (23.7%) of all visitors reported hearing aircraft during the listening exercise in the Steam Vents area, while just over one-quarter (27.7%) of visitors reported hearing loud voices and/or yelling. Among the nature sounds visitors reported hearing, wind was by far the most commonly heard (97.1%), and more than half (59.3%) of all visitors reported hearing leaves rustling. Of the aircraft sounds visitors

reported hearing, the most commonly heard was helicopter sounds (14.1%; Tables 7 and 8; Figures 2 and 3). Survey administrators noted if aircraft sounds were present while each respondent was completing the survey; 50.0% of the respondents reported hearing an aircraft if one was indeed present during the time he or she took the survey.

- On average, visitors who reported hearing animal sounds such as bird song rated these as very acceptable to hear in the Steam Vents area (mean = 3.5). Similarly, those visitors who heard nature sounds generally rated them as acceptable to hear in the Steam Vents area of the park (mean = 2.9), particularly favoring the sounds of leaves rustling (mean = 3.8), shifting rocks and sand (mean = 3.4), and rainfall (mean = 3.1). Sounds generated by other visitors in the study area, such as walking sounds and talking sounds, were also generally considered to be acceptable sounds to hear (mean acceptability ratings of 2.1 and 1.4, respectively). However, the sounds of loud voices and/or yelling were generally considered to be unacceptable (mean = -1.6). Furthermore, visitors, on average, rated the sounds of personal electronic devices such as cell phones (mean = -1.8) and radio headsets/IPODS (mean = -1.4) to be unacceptable sounds to hear in the Steam Vents area. On average, visitors considered aircraft sounds to be unacceptable sounds to hear in the Steam Vents area (mean = -1.5), while they were generally neutral about the acceptability of hearing vehicle sounds (mean = -0.1), with greater sensitivity to the sounds of motorcycles (mean = -1.5) than automobiles (mean = 0.0; Tables 9 and 10; Figures 4 and 5).
- On average, the sounds visitors rated most pleasing to hear in the Steam Vents area include bird song (mean = 3.9) and the sound of leaves rustling (mean = 3.4). More generally, visitors rated animal sounds and nature sounds to be pleasing sounds to hear in

the Steam Vents area (mean personal interpretation ratings of 3.4 and 2.5, respectively). While the sounds of other visitors walking and talking in the Steam Vents area were generally considered to be somewhat pleasing sounds to hear, the sounds of other visitors' personal electronic devices, such as radio headsets and cell phones, were perceived to be very annoying. In fact, radio headsets and cell phones were rated, on average, as the most annoying sounds to hear in the Steam Vents area. Similarly, loud voices and/or yelling were generally considered to be annoying sounds to hear in the Steam Vents area (mean = -2.0). These findings, coupled with the results of the acceptability ratings for loud voices and/or yelling and the sounds of personal electronic devices, suggest that there may be social norms concerning appropriate visitor behavior and corresponding sounds in the Steam Vents area. Thus, it would be advisable to inform visitors about these issues prior to visiting the Steam Vents and other similar areas of the park. On average, visitors rated mechanical sounds, such as aircraft sounds (mean = -1.7) and vehicle sounds (mean = -1.1), as annoying to hear in the Steam Vents area (Tables 11 and 12; Figures 7 and 8).

- Figures 6 and 9 display information about the sounds visitors heard during the listening exercise in the Steam Vents area in an "importance-performance" framework. Figure 6 plots visitors' mean *acceptability* ratings for the sounds included in the questionnaire (Table 9), by the percentage of visitors who reported hearing each sound (Table 7), while Figure 9 plots visitors' mean *personal interpretation* ratings for the sounds (Table 11), by the percentage of visitors who reported hearing each sound (Table 7). The two figures are designed to help prioritize soundscape management actions. For example, sounds in the upper left quadrant of Figures 6 and 9 would be considered high priority for management

consideration as they are sounds that were rated, on average, as unacceptable and/or annoying, and were heard frequently by visitors. In this case, automobile sounds appear in the upper left quadrant of Figure 9 and on the border of the upper left quadrant of Figure 6, with automobile sounds being heard by more than three-quarters (79.3%) of all visitors, and receiving a mean personal interpretation rating of -1.1 and a mean acceptability rating of 0.0. The only other sounds to appear in the upper left quadrant of either figure are the sounds of a group(s) talking, with the sounds of a group(s) talking heard by about two-thirds (65.0%) of visitors, and receiving a mean personal interpretation rating of -0.1. However, while it is common for visitors to hear other groups talking in the Steam Vents area, and visitors, on average, consider the sounds of other groups talking to be slightly annoying, they generally consider it to be acceptable (mean = 1.4) to hear the sounds of groups talking in the Steam Vents area. No other sounds are contained within the upper left quadrant of Figure 6 or 9. Sounds in the lower left quadrant of Figures 6 and 9 would be considered a priority for management as well, as they are sounds that were rated, on average, as unacceptable and/or annoying sounds to hear in the Steam Vents area, though they are sounds that were heard by less than half of all visitors. In this case, just over one-quarter (27.7%) of visitors reported hearing loud voices and/or yelling during the listening exercise, and on average, visitors rated these sounds as unacceptable (mean = -1.6) and annoying (mean = -2.0) to hear in the Steam Vents area. Similarly, about one-quarter (23.7%) of visitors reported hearing aircraft sounds, and these sounds were generally considered to be unacceptable (mean = -1.5) and annoying (mean = -1.7) to hear in the Steam Vents area. Other sounds that appear in the lower left quadrant of Figures 6 and/or 9 include the sounds of personal electronic

devices (e.g., cell phones, radio headsets/IPod's) and motorcycles. However, each of these sounds was heard by less than one-quarter of visitors during the listening exercise. Nonetheless, while these sounds may not present a significant management problem currently, they should be monitored and managed to ensure that they not become more common elements of the ambient sound conditions in the Steam Vents area and similar areas of the park. The sounds in the upper right quadrant of Figures 6 and 9 are those sounds that visitors generally perceive to be acceptable and/or pleasing to hear in the Steam Vents area and are heard frequently. The most commonly heard sounds in this quadrant include the sound of wind and the sounds of other visitors walking and talking, while sounds that received the highest acceptability and personal interpretation ratings in the upper right quadrant of Figures 6 and 9 include the sounds of wind and leaves rustling. Efforts should be made to preserve opportunities to hear the sounds contained in the upper right quadrant of Figures 6 and 9, particularly those sounds that are perceived to be the most acceptable and pleasing to hear. Sounds in the bottom right quadrant of Figures 6 and 9 are those that visitors generally consider to be acceptable and/or pleasing to hear in the Steam Vents area, but are heard less frequently than those in the upper right quadrant of the figures. Within this quadrant, the sounds of bird song had the highest mean acceptability and personal interpretation ratings, and were heard by nearly half (44.9%) of all visitors. The sounds of rainfall and shifting rocks and sand were also among the sounds that received the highest acceptability and personal interpretation ratings in the lower right quadrant of the figures, though each was heard by less than one-quarter of visitors. Efforts to maintain and improve opportunities for visitors to hear the sounds found in the lower right quadrant of Figures 6 and 9 are recommended.

- As stated earlier, visitors were asked to describe any emotions or feelings they associated with the sounds they heard during the attended listening exercise in the Steam Vents area. Of the 105 visitors who reported emotions and/or feelings associated with nature sounds they heard, a substantial majority (81.0%) reported positive emotions or feelings, such as feelings of calm, peacefulness, and pleasure. While relatively few (21) visitors reported emotions and/or feelings associated with hearing bird song, all of them reported positive emotions or feelings. The sounds of other visitors walking in the Steam Vents area also elicited positive emotions from more than two-thirds (68.6%) of the visitors who reported an emotion or feeling associated with hearing this sound. For example, visitors associated feelings of camaraderie, enjoyment, safety, and pleasantness with hearing the sounds of other visitors walking in the Steam Vents area of the park. In contrast, more than two-thirds (69.6%) of the visitors who reported an emotion or feeling associated with hearing loud voices and/or yelling described negative emotions or feelings, such as annoyance and irritation. Similarly, nearly three-quarters (73.7%) of the visitors who reported an emotion or feeling associated with aircraft, reported negative emotions or feelings, while almost two-thirds (65.3%) of visitors who reported an emotion or feeling associated with hearing vehicle sounds provided negative responses. These data suggest that aircraft sounds, vehicle sounds, and loud, disruptive behavior of other visitors may inhibit visitors' ability to have a restorative experience of natural sounds and quiet in the Steam Vents area (Table 14).

Background Information

- A small majority (52.6%) of visitors to the Steam Vents area of the park are female, while a more substantial majority of visitors are residents of the United States (91.2%); have completed college/business/trade school or more formal education (84.6%); do not consider themselves to be Hispanic or Latino (95.5%); and identify themselves as White (88.8%). Furthermore, just under three-quarters (71.4%) of visitors in the Steam Vents area are between the ages of 25 and 54 years of age (Tables 15-20).
- Most (94.1%) visitors who participated in the study described their hearing as normal, while very few rated their hearing as somewhat impaired (5.9%), and no study participants rated their hearing as very impaired (Table 21).

Summary of Major Findings - Thurston Lava Tube Area Attended Listening Visitor Survey

Trip Description

- A substantial majority (79.4%) of visitor groups to the Thurston Lava Tube area consist of 4 or fewer people, with just under half (42.5%) consisting of 2 people and one-third (33.3%) consisting of 3 to 4 people (Table 24).
- Very few (8.9%) participants in the Thurston Lava Tube area attended listening exercise were part of a commercial tour (Table 25). However, it should be noted that nearly half (48.1%) of the visitors who declined to participate in the survey were members of tour groups. Thus, it is likely the survey data under-represent the proportion of visitors who come to the Thurston Lava Tube area of the park as part of a commercial tour (Table 22).
- Three-quarters (75.0%) of visitors to the Thurston Lava Tube are visiting Hawaii Volcanoes National Park for the first time. Of those visitors who have previously visited

the park, about one-quarter (23.8%) have visited once previously, nearly two-thirds (61.9%) have visited 2 to 4 times previously, and less than one-fifth (14.3%) have visited the park 5 or more times previously (Tables 26 and 27).

Listening Portion of the Thurston Lava Tube Area Attended Listening Visitor Survey

Within the listening portion of the Thurston Lava Tube Area Attended Listening Visitor Survey, study participants were asked to sit quietly on the side of the trail to the Thurston Lava Tube, close their eyes, and listen for several minutes to the sounds around them. Respondents were then asked to identify, from a list of potential sounds, any sounds that they heard while engaged in the listening exercise. Respondents were also given the option to list and evaluate other sounds they heard that were not included in the list contained in the questionnaire. Respondents were also asked to record any emotions or feelings elicited by the sounds they heard, and to evaluate each sound they heard on an acceptability scale (-4 = "Very Unacceptable" to +4 = "Very Acceptable") and a personal evaluation scale (-4 = "Very Annoying" to +4 = Very Pleasing). The detailed instructions used to administer the survey to park visitors are on the cover of the survey questionnaire, which is included in this report as Appendix A. For the purposes of analysis, the individual sounds listed in the questionnaire were grouped into sound categories representing general types of sounds. For example, the questionnaire items "Automobile" and "Motorcycle" were grouped into a sound category labeled "Vehicle Sounds". The results of the listening portion of the survey are summarized below and include results for both the individual sounds listed in the questionnaire and the sound categories derived from grouping the individual sound items.

- The types of sounds that visitors most commonly reported hearing during the listening exercise in the Thurston Lava Tube area include bird song (97.2%); the sounds of wind (90.5%) and leaves rustling (83.7%); and the sounds of other visitors, such as walking sounds (86.0%) and talking (98.4%). Furthermore, about half of all visitors reported hearing vehicle sounds (55.8%); "technology sounds" (50.5%), such as cameras and cell phones; and loud voices and/or yelling (45.1%). More than one-quarter (29.7%) of all visitors reported hearing aircraft during the listening exercise in the Thurston Lava Tube area, with helicopter sounds (19.8%) being the most commonly heard type of aircraft sound (Tables 28 and 29; Figures 10 and 11). Survey administrators noted if aircraft sounds were present while each respondent was completing a survey; 72.4% of respondents reported hearing an aircraft if one was indeed present during the time he or she took the survey.
- On average, visitors who reported hearing animal sounds such as bird song rated these as very acceptable to hear in the Thurston Lava Tube area (mean = 3.6). Similarly, those visitors who heard nature sounds generally rated them as acceptable to hear in the Thurston Lava Tube area of the park (mean = 3.3). Sounds generated by other visitors in the study area, such as walking sounds and talking sounds, were also generally considered to be acceptable sounds to hear (mean acceptability ratings of 2.0 and 0.6, respectively). However, the sounds of loud voices and/or yelling were generally considered to be unacceptable (mean = -1.8), with the lowest mean acceptability rating of any sound heard by visitors being given to loud or yelling adults (mean = -2.4). Furthermore, visitors, on average, rated the sounds of personal electronic devices such as cell phones (mean = -2.3) and radio headsets/Ipod's (mean = -1.0) to be unacceptable

sounds to hear in the Thurston Lava Tube area. On average, visitors considered aircraft sounds to be unacceptable sounds to hear in the Thurston Lava Tube area (mean = -1.1), and they generally considered hearing vehicle sounds to be slightly unacceptable (mean = -0.5), with greater sensitivity to the sounds of motorcycles (mean = -1.8) than automobiles (mean = -0.5; Tables 30 and 31; Figures 12 and 13).

- On average, the sounds visitors rated most pleasing to hear in the Thurston Lava Tube area of the park include bird song (mean = 3.9); wind (mean = 3.5); rainfall (mean = 3.4); and leaves rustling (mean = 3.3). More generally, visitors rated animal sounds and nature sounds to be pleasing sounds to hear in the Thurston Lava Tube area (mean personal interpretation ratings of 3.6 and 3.2, respectively). While the sounds of other visitors walking and talking in the Thurston Lava Tube area were generally considered to be somewhat pleasing sounds to hear, the sounds of other visitors' personal electronic devices, such as radio headsets and cell phones, were perceived to be annoying. In fact, the sounds of cell phones were rated, on average, as the most annoying sounds to hear in the Thurston Lava Tube area. Similarly, loud voices and/or yelling were generally considered to be annoying sounds to hear in the Thurston Lava Tube area (mean = -2.2). These findings, coupled with the results of the acceptability ratings for loud voices and/or yelling and the sounds of personal electronic devices, suggest that there may be social norms concerning appropriate visitor behavior and corresponding sounds in the Thurston Lava Tube area. Thus, it would be advisable to inform visitors about these issues prior to visiting the Thurston Lava Tube and other similar areas of the park. On average, visitors rated mechanical sounds, such as vehicle sounds (mean = -1.5) and aircraft sounds (mean

= -1.4), as annoying to hear in the Thurston Lava Tube area (Tables 32 and 33; Figures 15 and 16).

- Figures 14 and 17 display information about the sounds visitors heard during the listening exercise in the Thurston Lava Tube area in an "importance-performance" framework. Figure 14 plots visitors' mean *acceptability* ratings for the sounds included in the questionnaire (Table 30), by the percentage of visitors who reported hearing each sound (Table 28), while Figure 17 plots visitors' mean *personal interpretation* ratings for the sounds (Table 32), by the percentage of visitors who reported hearing each sound (Table 30). The two figures are designed to help prioritize soundscape management actions. For example, sounds in the upper left quadrant of Figures 14 and 17 would be considered high priority for management consideration as they are sounds that were rated, on average, as unacceptable and/or annoying, and were heard frequently by visitors. In this case, automobile sounds appear in the upper left quadrant of Figures 14 and 17, with automobile sounds being heard by more than half (55.8%) of all visitors, and receiving a mean acceptability rating of -0.5 and a mean personal interpretation rating of -1.5. The only other sounds to appear in the upper left quadrant of either figure are the sounds of other visitors talking, with the sounds of other visitors talking heard by a substantial majority (98.4%) of visitors, and receiving a mean personal interpretation rating of -0.3. However, while it is common for visitors to hear other groups talking in the Thurston Lava Tube area, and visitors, on average, consider the sounds of other groups talking to be slightly annoying, they generally consider it to be acceptable (mean = 0.6) to hear the sounds of groups talking in the Thurston Lava Tube area. No other sounds are contained within the upper left quadrant of Figure 14 or 17. Sounds in the lower left quadrant of

Figures 14 and 17 would be considered a priority for management as well, as they are sounds that were rated, on average, as unacceptable and/or annoying sounds to hear in the Thurston Lava Tube area, though they are sounds that were heard by less than half of all visitors. In this case, about one-quarter of visitors reported hearing a loud group (25.5%), loud adult(s) (23.9%), and/or loud child/children, and on average, visitors rated the sounds of loud voices and/or yelling as unacceptable (mean = -1.8) and annoying (mean = -2.2) to hear in the Thurston Lava Tube area. Similarly, about one-fifth (19.8%) of visitors reported hearing helicopter sounds, and these sounds were generally considered to be unacceptable (mean = -1.4) and annoying (mean = -2.1) to hear in the Thurston Lava Tube area. Other sounds that appear in the lower left quadrant of Figures 14 and/or 17 include the sounds of personal electronic devices (e.g., cell phones, radio headsets/IPod's) and motorcycles. However, each of these sounds was heard by less than one-quarter of visitors during the listening exercise. Nonetheless, while these sounds may not present a significant management problem currently, they should be monitored and managed to ensure that they not become more common elements of the ambient sound conditions in the Thurston Lava Tube area and similar areas of the park. The sounds in the upper right quadrant of Figures 14 and 17 are those sounds that visitors generally perceive to be acceptable and/or pleasing to hear in the Thurston Lava Tube area and are heard frequently. The most commonly heard sounds in this quadrant include bird song, wind, and the sounds of other visitors walking and talking, while sounds that received the highest acceptability and personal interpretation ratings in the upper right quadrant of Figures 14 and 17 include bird song and the sounds of wind and leaves rustling. Efforts should be made to preserve opportunities to hear the sounds contained in the upper right

quadrant of Figures 14 and 17, particularly those sounds that are perceived to be the most acceptable and pleasing to hear. Sounds in the bottom right quadrant of Figures 14 and 17 are those that visitors generally consider to be acceptable and/or pleasing to hear in the Thurston Lava Tube area, but are heard less frequently than those in the upper right quadrant of the figures. Within this quadrant, the sounds of rainfall and insects were among the sounds that received the highest mean acceptability and personal interpretation ratings, and both were heard by more than 40% of visitors. The sounds of animals that visitors were unable to identify (listed in the survey questionnaire as "animal, unknown") were also among the sounds that received the highest acceptability and personal interpretation ratings in the lower right quadrant of the figures, though these sounds were heard by relatively few (7.3%) visitors. Efforts to maintain and improve opportunities for visitors to hear the sounds found in the lower right quadrant of Figures 14 and 17 are recommended.

- As stated earlier, visitors were asked to describe any emotions or feelings they associated with the sounds they heard during the attended listening exercise in the Thurston Lava Tube area. Of the more than 150 visitors who reported emotions and/or feelings associated with nature sounds they heard, a substantial majority (91.7%) reported positive emotions or feelings, such as feelings of calm, peacefulness, and pleasure. Similarly, nearly 100 visitors reported emotions and/or feelings associated with animal sounds they heard during the attended listening exercise, and the vast majority (90.9%) of them reported positive emotions or feelings. The sounds of other visitors walking in the Thurston Lava Tube area also elicited positive emotions from nearly half (47.5%) of the visitors who reported an emotion or feeling associated with hearing this sound. For

example, visitors associated feelings of camaraderie, enjoyment, safety, and pleasantness with hearing the sounds of other visitors walking in the Thurston Lava Tube area of the park. In contrast, a substantial majority (80.4%) of the visitors who reported an emotion or feeling associated with hearing loud voices and/or yelling described negative emotions or feelings, such as annoyance and irritation. Similarly, nearly two-thirds (63.3%) of the visitors who reported an emotion or feeling associated with aircraft, reported negative emotions or feelings, and about two-thirds (65.3%) of visitors who reported an emotion or feeling associated with hearing vehicle sounds provided negative responses. These data suggest that aircraft sounds, vehicle sounds, and loud, disruptive behavior of other visitors may inhibit visitors' ability to have a restorative experience of natural sounds and quiet in the Thurston Lava Tube area and similar areas of the park (Table 35).

Background Information

- A majority (58.6%) of visitors to the Thurston Lava Tube area of the park are female, while a more substantial majority of visitors are residents of the United States (90.5%); have completed college/business/trade school or more formal education (78.1%); do not consider themselves to be Hispanic or Latino (98.3%); and identify themselves as White (88.6%). Furthermore, about two-thirds (67.2%) of visitors in the Thurston Lava Tube area are between the ages of 25 and 54 years of age, with about one-quarter (26.0%) between the ages of 45 and 54 years, and one-fifth each between the ages of 25 and 34 years (20.9%) and 35 and 44 years of age (20.3%; Tables 36-41).
- Most (93.3%) visitors who participated in the study described their hearing as normal, while very few rated their hearing as somewhat impaired (4.4%), and no study

participants rated their hearing as very impaired. A few respondents (2.2%) responded that they didn't know about their hearing capability (Table 42).

Summary of Major Findings - Steam Vents and Thurston Lava Tube Audio Recording Visitor Surveys

Trip Description

- About half (46.4%) of all visitors to the Steam Vents area of the park are in groups of 2 people, while about one-third (31.5%) are in groups of 3 to 4 people, and a little less than one-fifth (16.6%) are in groups of 5 or more people. The size of visitor groups in the Thurston Lava Tube area of the park tend to be somewhat bigger than those in the Steam Vents area, with the average group size consisting of about 4 people. About one-third of visitors to the Thurston Lava Tube area visit in groups of 2 people (38.0%) or 3 to 4 people (31.3%), while just over one-quarter (28.6%) visit in groups of 5 or more people (Table 45).
- It is more common for visitors in the Thurston Lava Tube area of the park (13.0%) to be part of a commercial tour group than it is for visitors to the Steam Vents (1.6%; Table 46)). It is likely the true difference is even more pronounced than the survey data suggest as nearly half (48.1%) of the visitors who declined to participate in the survey at the Thurston Lava Tube were members of tour groups (Table 43).
- More than two-thirds (61.3%) of visitors to the Steam Vents (69.8%) and Thurston Lava Tube (71.9%) are visiting Hawaii Volcanoes National Park for the first time (Table 47). Of those who have previously visited the park, about half of both Steam Vents visitors (48.1%) and Thurston Lava Tube visitors (47.2%) have visited once previously, about

one third of each have visited 2 to 5 times previously, and just under one-fifth of each have visited the park 6 or more times previously (Table 48).

- The most important reasons to visitors at both the Steam Vents and Thurston Lava Tube for visiting Hawaii Volcanoes National Park include appreciating the natural scenery; seeing the active lava flows on the Chain of Craters Road; seeing the summit caldera of Kīlauea volcano; and seeing the Thurston Lava Tube. About half of all visitors at Steam Vents (43.2%) and 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. Of the reasons for visiting the park included in the questionnaire, the least important to visitors included experiencing solitude, getting exercise, and hiking on Wilderness trails, although a majority of visitors at both study locations reported these as somewhat or very important reasons for visiting the park (Table 49).

The Visitor Experience

- At each of the two study locations, visitors' evaluations of the acceptability of alternative park soundscape conditions were measured using a series of five audio recordings containing simulated park soundscapes. The first audio recording in the sequence contained only natural sounds that can be heard in Hawaii Volcanoes National Park. Each subsequent audio recording in the sequence contained the "base" natural sounds, mixed with increasing levels of helicopter sounds associated with scenic air tours of the park. The electronic audio playback files (i.e., recordings) are archived with Hawaii Volcanoes

National Park and the National Park Service Natural Sounds Program Center. The amplitude and slope of the curves derived from plotting visitors' mean acceptability ratings of the recordings suggest that exposure to helicopter sounds while hiking is a salient issue for visitors at both study locations. Furthermore, Steam Vents visitors' mean ratings of the audio recordings suggest that, on average, they consider the sounds in Recordings 1, 2, and 3 to be acceptable, while the soundscape conditions contained in Recordings 4 and 5 are unacceptable. Furthermore, the distributions of Steam Vents visitors' acceptability ratings suggest there is a relatively high degree of consensus among them about the acceptability of the recordings (Tables 51.1 and 51.2; Figure 18). Thurston Lava Tube visitors' mean ratings of the audio recordings also suggest that, on average, they consider the sounds in Recordings 1, 2, and 3 to be acceptable, while the soundscape conditions contained in Recordings 4 and 5 are unacceptable. However, there is somewhat less consensus among Thurston Lava Tube visitors about what constitutes minimally acceptable soundscape conditions, as presented in the audio recordings. In particular, the acceptability ratings within one standard deviation of the mean for Recording 3 span the unacceptable and acceptable ranges of the scale. Nonetheless, almost two-thirds (61.1%) of Thurston Lava Tube visitors consider Recording 3 to be acceptable. Furthermore, greater than 75% of them consider the sounds in Recordings 1 and 2 to be acceptable, and the sounds in Recordings 4 and 5 to be unacceptable (Tables 51.3 and 51.4; Figure 18).

- The vast majority of visitors at both study locations reported one or more pleasing sounds they heard in the first 4 audio recordings within the sequence of recordings described above, while a majority of visitors at Steam Vents (63.0%) and Thurston Lava Tube

(61.1%) indicated that they did not find any sounds pleasing in Recording 5 (the audio recording containing the highest level of helicopter sounds). Of those visitors who described sounds in the recordings they found pleasing, the most commonly reported sounds included birds; insects/crickets; and wind. A small number of visitors described aircraft sounds as pleasing sounds contained within Recordings 3, 4, and 5 (Tables 51.2 and 52.2).

- A substantial majority of visitors at both study locations indicated that they did not find any sounds annoying in Recordings 1 and 2 within the sequence of recordings described above, while over half (58.4%) of Steam Vents visitors and more than three-quarters (84.7%) of Thurston Lava Tube visitors reported one or more annoying sounds associated with Recording 3. Furthermore, most visitors at Steam Vents and Thurston Lava Tube reported one or more annoying sounds associated with Recordings 4 (86.7% and 97.4%, respectively) and 5 (94.4% and 98.9%, respectively). Of those visitors who described sounds in Recordings 1 and 2 they found annoying, the most commonly reported sounds included birds, crickets, and/or frogs; wind; and high pitched sounds. Of those visitors who described sounds in Recordings 3, 4, and/or 5 they found annoying, by far the most commonly reported sounds were those of aircraft, while a smaller percentage of responses cited vehicle traffic sounds (Tables 53.1 and 53.2).
- Approximately two-thirds of visitors at Steam Vents (64.2%) and Thurston Lava Tube (67.2%) reported that Recording 1 sounded most like what they heard while they were visiting the area of the park where they were contacted for the survey. About one-quarter of Steam Vents visitors (21.8%) and Thurston Lava Tube visitors (24.2%) indicated that Recording 2 sounded most like what they heard, and under one-fifth of visitors at either

location considered Recording 3 to sound most like what they heard on the trail. Very few visitors reported Recordings 4 or 5 as sounding most like what they heard while they were visiting the area of the park where they were contacted for the survey (Table 54).

- At each of the two study locations, visitors' evaluations of the acceptability of how often they hear helicopter air tour sounds while visiting the park were measured using narratively portrayed scenarios, coupled with Recording 3 from the sequence of audio recordings described above. Each scenario described how often visitors would hear the helicopter sounds in Recording 3 while visiting the park, with the scenarios ranging from never hearing the helicopter sounds to hearing them every 5 minutes. The amplitude and slope of the curves derived from plotting visitors' mean acceptability ratings of the scenarios suggest that the frequency with which visitors hear helicopters while visiting the park is a salient issue for visitors at both the Steam Vents and Thurston Lava Tube. Furthermore, Steam Vents visitors' mean ratings of the scenarios suggest that, by far, their most preferred scenario is to never hear helicopter sounds while they are visiting that area of the park, and that hearing helicopter sounds more often than once an hour is unacceptable. However, values within 1 standard deviation of the mean acceptability ratings for all of the scenarios except "never hear helicopter sounds" span the acceptable and unacceptable ranges of the scale. Nonetheless, nearly two-thirds (63.6%) of Steam Vents visitors indicated that hearing helicopters once every 60 minutes is acceptable, while a majority (51.7%) are either neutral about hearing helicopters every 30 minutes or consider it to be unacceptable. Furthermore, the majority of Steam Vents visitors consider hearing helicopter sounds every 15 minutes or more often to be unacceptable (Tables 55.1 and 55.2; Figure 19). Thurston Lava Tube visitors' mean ratings of the scenarios

also suggest that their most preferred scenario, by far, is to never hear helicopter sounds while visiting that area of the park, and that hearing helicopter sounds more often than once an hour is unacceptable. As with Steam Vents visitors, the acceptability ratings of all but the "never hear helicopters" scenario are somewhat dispersed across the unacceptable and acceptable ranges of the scale. For example, while about half (52.2%) of Thurston Lava Tube visitors consider hearing helicopter sounds once every 60 minutes to be acceptable, more than one-third (37.0%) consider this to be unacceptable. Similarly, just over half (58.2%) of Thurston Lava Tube visitors consider hearing helicopter sounds every 30 minutes to be unacceptable, while about one-third (31.0%) consider this to be acceptable. However, a substantial majority of Thurston Lava Tube visitors consider hearing helicopters every 15 minutes or more often to be unacceptable (Tables 55.3 and 55.4; Figure 19).

- It was more common for visitors to report hearing aircraft at Thurston Lava Tube (29.4%) than at the Steam Vents (15.3%; Table 56). Of those visitors who heard aircraft during their visit to the Steam Vents or Thurston Lava Tube, nearly half indicated that they found the sounds neither pleasing nor annoying (i.e., they were indifferent about the aircraft sounds). However, more than half (54.6%) of Thurston Lave Tube visitors and just under half (44.4%) of Steam Vents visitors indicated that the sounds of aircraft were somewhat or very annoying (Table 57).
- A substantial majority of visitors at Steam Vents (87.9%) and Thurston Lava Tube (88.0%) have never taken a scenic air tour over Hawaii Volcanoes National Park or any other national park (Table 58). When asked if they would take a scenic air tour over Hawaii Volcanoes National Park, even if park visitors could hear the aircraft during their

visit, respondents at both study location were about evenly split in their answers. In particular, about one-third of respondents at both locations said they would take a scenic air tour, about one-third said they would not, and about one-third said they did not know whether they would take a scenic air tour over the park (Table 59.1).

- Visitors at the two study locations who had taken a scenic air tour over a national park previously were *less likely* than those who had not previously taken a scenic air tour to support: 1) reducing the number of scenic air tours allowed to fly over Hawaii Volcanoes National Park (46.5% and 65.1%, respectively); and 2) prohibiting scenic air tours from flying over the park (7.3% and 27.2%, respectively). Furthermore, visitors who had taken a scenic air tour over a national park previously were *more likely* than those who had not previously taken a scenic air tour to support maintaining the current number of scenic air tours allowed to fly over the park. However, the majority of visitors at the two study locations, whether they had taken a scenic air tour over a national park previously or not, would: 1) *support* requiring scenic air tours to be flown over the park only during designated dates and times (64.1% and 64.3%, respectively); 2) *support* requiring scenic air tours to use designated flight paths over limited areas of the park (69.5% and 66.8%, respectively); and 3) *oppose* increasing the number of scenic air tours allowed to fly over the park (65.9% and 75.6%, respectively; Table 60).

Background Information

- A small majority (51.4%) of Steam Vents visitors are male, while a small majority (54.5%) of visitors to Thurston Lava Tube are female. A substantial majority of visitors at both Steam Vents and Thurston Lava Tube are residents of the United States (88.4%

and 88.2%, respectively); have completed college/business/trade school or more formal education (84.3% and 83.3%, respectively); do not consider themselves to be Hispanic or Latino (97.2% and 94.6%, respectively); and identify themselves as White (91.4% and 88.9%, respectively). Furthermore, about two-thirds of visitors at Steam Vents (62.7%) and Thurston Lava Tube (68.5%) are between the ages of 25 and 54 years of age, while about one-third (30.0%) of Steam Vents visitors and one-quarter (23.0%) of Thurston Lava Tube visitors are 55 years of age or older (Table 61-66).

Appendix A

Hawaii Volcanoes National Park Attended Listening Survey Questionnaire

Hawaii Volcanoes: Attended Listening

Today we are conducting a visitor survey that includes a listening portion which directs your attention to the sounds of the park. If you are interested in participating, you will be asked to fill out a checklist to identify sounds you heard today. This survey will be used to help management understand the effects of natural and human sounds in the park. This exercise is voluntary and anonymous. It will take approximately 5-10 minutes to complete.

Step 1: The listening portion of this survey will be led by an NPS volunteer. Remember that all sounds are included, both human and natural.

Step 2: Close your eyes and relax, and keep track of each individual sound that you hear. Listen until you are told by the leader to stop.

Step 3: While holding your concentration, focus on the sounds you have heard. Now, please take a moment to fill out the attached worksheets before speaking with other participants about what you have heard. This exercise begins on the next page.

Step 4: Please put a √ check mark next to each sound that you heard during the exercise. If the sounds are not listed, please write the sound(s) in the blank spaces provided at the bottom of the **SOUNDS** column on page 4.

Step 5: Under the **FEELINGS OR EMOTIONS ASSOCIATED WITH SOUNDS** column, please list any feelings or emotions that you associated with each of the sounds you checked√.

Examples: I felt *relaxed* because the stream was soothing to me.
I felt *annoyed* because the bird was beeping like an alarm clock.
I felt *frustrated* because the dog was barking when I wanted peace and quiet.

Step 6: Under the **ACCEPTABILITY OF SOUNDS AT THIS LOCATION** column, please circle one number which best describes how unacceptable or acceptable the sound was for this location in the park: The scale is on a continuum from: - 4 as very unacceptable, - 2 as slightly unacceptable, 0 as neutral, +2 as slightly acceptable, and + 4 as very acceptable.

Step 7: Under the **PERSONAL INTERPRETATION** column, please circle one number which best describes how pleasing or annoying the sound was to you: The scale is on a continuum from: -4 as very annoying, - 2 as slightly annoying, 0 as neutral, +2 as slightly pleasing, and + 4 as very pleasing.

Step 8: Please answer a few questions about yourself and your group on page 5.

Thank you for your participation

OMB # 1024-0224 (NPS #07-014)
Expiration Date: 01/30/2008

SOUNDS	√	FEELINGS OR EMOTIONS ASSOCIATED WITH SOUND	ACCEPTABILITY OF SOUND AT THIS LOCATION									PERSONAL INTERPRETATION OF SOUND								
			Very unacceptable		Slightly unacceptable		Neutral		Slightly acceptable		Very acceptable	Very annoying		Slightly annoying		Neutral		Slightly pleasing		Very pleasing
Aircraft, Jet			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Aircraft, Propeller			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Aircraft, Helicopter			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Aircraft, Unknown			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Automobile (cars, vans, trucks & buses)			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Motorcycle			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Trail Work/Maintenance			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Walking sounds			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Walking sticks			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Leaves Rustling			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4

SOUNDS	√	FEELINGS OR EMOTIONS ASSOCIATED WITH SOUND	ACCEPTABILITY OF SOUND AT THIS LOCATION									PERSONAL INTERPRETATION OF SOUND									
			Very unacceptable		Slightly unacceptable		Neutral		Slightly acceptable		Very acceptable	Very annoying		Slightly annoying		Neutral		Slightly pleasing		Very pleasing	
Group, talking			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Group, loud or yelling			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Adult(s), talking			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Adult(s), loud or yelling			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Child/children, talking			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Child/children, loud or yelling			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Child/children, crying			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Technology, cell phone			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Technology, radio headset or IPOD			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Technology Sounds, Unknown			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	
Camera			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4	

SOUNDS	√	FEELINGS OR EMOTIONS ASSOCIATED WITH SOUND	ACCEPTABILITY OF SOUND AT THIS LOCATION									PERSONAL INTERPRETATION OF SOUND								
			Very unacceptable		Slightly unacceptable		Neutral		Slightly acceptable		Very acceptable	Very annoying		Slightly annoying		Neutral		Slightly pleasing		Very pleasing
Wind			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Thunder			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Rainfall			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Shifting Rocks & Sand			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Bird song			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Insect (s)			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Horses			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Animal, unknown			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Other (Please specify):			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Other (Please specify):			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Other (Please specify):			-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4

1. **Have you visited Hawaii Volcanoes National Park before? (Check <u>one</u>.)**

   ❑ Yes (CONTINUE TO QUESTION 2)
   ❑ No (SKIP TO QUESTION 3.)

2. **Approximately how many times have you visited Hawaii Volcanoes National Park before today?**

   Approximate number of visits: _____ **<u>OR</u>** Don't know/Not sure

3. **How many people are in your personal group (family/friends) today?**

   Number of people in group: _____

4. **Is your personal group part of a commercial tour in the park today? (Check <u>one</u>.)**

   ❑ Yes
   ❑ No

5. **What is your gender? (Check <u>one</u>.)**

   ❑ Male
   ❑ Female

6. **In what year were you born?**

   Year born: ____

7. **Do you live in the United States? (Check <u>one</u>.)**

   ❑ Yes (What is your zip code? _____)
   ❑ No (What country do you live in? _____)

8. **What is the highest level of formal education you have completed? (Check <u>one</u>.)**

   ❑ Some high school
   ❑ High school graduate or GED
   ❑ Some college, business or trade school
   ❑ College, business or trade school
   ❑ Some graduate school
   ❑ Master's, doctoral or professional degree

9. **Are you Hispanic or Latino? (Check <u>one</u>.)**

   ❑ Yes
   ❑ No

10. **What is your race? (Check <u>all</u> that apply.)**

    ❑ American Indian or Alaska Native
    ❑ Asian
    ❑ Black or African American
    ❑ Native Hawaiian
    ❑ Pacific Islander other than Native Hawaiian
    ❑ White

11. **How would you describe your hearing? (Check <u>one</u>.)**

    ❑ My hearing is normal.
    ❑ I am somewhat hearing impaired.
    ❑ I am very hearing impaired.
    ❑ I don't know about my hearing capacity.

Thank you for your participation.

PRIVACY ACT and PAPERWORK REDUCTION ACT statement: 16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. The permanent data will be anonymous. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. BURDEN ESTIMATE statement: Public reporting burden for this form is estimated to average 15 minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to:

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Eric_Anderson@nps.gov

Appendix B

Frequency Distributions of Acceptability and Personal Interpretation Ratings of Sounds Heard During Steam Vents Area Attended Listening

Table B.1. Detailed ratings of the acceptability of aircraft sounds in the Steam Vents area and personal interpretations of aircraft sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Aircraft, Jet	Count	1	0	2	1	1	0	0	0	0	1	0	2	0	2	0	0	0	0
	Percent	20.0	0.0	40.0	20.0	20.0	0.0	0.0	0.0	0.0	20.0	0.0	40.0	0.0	40.0	0.0	0.0	0.0	0.0
Aircraft, Propeller	Count	1	1	2	0	3	0.0	0.0	0.0	0.0	1	1	2	1	1	0	0	0	0
	Percent	14.3	14.3	28.6	0.0	42.9	0.0	0.0	0.0	0.0	16.7	16.7	33.3	16.7	16.7	0.0	0.0	0.0	0.0
Aircraft, Helicopter	Count	5	1	4	3	2	0	2	0	0	4	3	4	2	3	2	0	0	0
	Percent	29.4	5.9	23.5	17.6	11.8	0.0	11.8	0.0	0.0	22.2	16.7	22.2	11.1	16.7	11.1	0.0	0.0	0.0
Aircraft, Unknown	Count	2	0	1	2	1	0	0	0	2	1	1	1	2	2	1	0	0	0
	Percent	25.0	0.0	12.5	25.0	12.5	0.0	0.0	0.0	25.0	12.5	12.5	12.5	25.0	25.0	12.5	0.0	0.0	0.0

Table B.2. Detailed ratings of the acceptability of vehicle sounds in the Steam Vents area and personal interpretations of vehicle sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Automobile	Count	1	7	23	11	31	9	7	8	9	4	5	30	20	39	3	0	0	0
	Percent	0.9	6.6	21.7	10.4	29.2	8.5	6.6	7.5	8.5	4.0	5.0	29.7	19.8	38.6	3.0	0.0	0.0	0.0
Motorcycle	Count	1	2	3	0	0	0	2	0	0	1	0	3	3	0	0	0	0	0
	Percent	12.5	25.0	37.5	0.0	0.0	0.0	25.0	0.0	0.0	14.3	0.0	42.9	42.9	0.0	0.0	0.0	0.0	0.0

Table B.3. Detailed ratings of the acceptability of trail work / maintenance sounds in the Steam Vents area and personal interpretations of trail work / maintenance sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Trail Work/ Maintenance	Count	0	2	0	1	4	0	1	2	2	2	1	0	1	5	1	0	0	0
	Percent	0.0	16.7	0.0	8.3	33.3	0.0	8.3	16.7	16.7	20.0	10.0	0.0	10.0	50.0	10.0	0.0	0.0	0.0

Table B.4. Detailed ratings of the acceptability of technology sounds in the Steam Vents area and personal interpretations of technology sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Technology, Cell Phones	Count	4	3	3	0	4	1	1	0	0	4	2	3	4	1	0	0	0	0
	Percent	25.0	18.8	18.8	0.0	25.0	6.3	6.3	0.0	0.0	28.6	14.3	21.4	28.6	7.1	0.0	0.0	0.0	0.0
Technology, Radio Headset or IPOD	Count	1	1	1	1	0	0	0	1	0	2	1	0	0	1	0	0	0	0
	Percent	20.0	20.0	20.0	20.0	0.0	0.0	0.0	20.0	0.0	50.0	25.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0
Technology Sounds, Unknown	Count	0	0	1	1	2	0	0	0	0	0	2	1	0	1	0	0	0	0
	Percent	0.0	0.0	25.0	25.0	50.0	0.0	0.0	0.0	0.0	0.0	50.0	25.0	0.0	25.0	0.0	0.0	0.0	0.0
Camera	Count	0	0	1	1	17	1	2	5	15	0	0	2	6	21	1	2	3	4
	Percent	0.0	0.0	2.4	2.4	40.5	2.4	4.8	11.9	35.7	0.0	0.0	5.1	15.4	53.8	2.6	5.1	7.7	10.3

Table B.5. Detailed ratings of the acceptability of walking sounds in the Steam Vents area and personal interpretations of walking sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Walking Sounds	Count	4	0	1	3	25	2	5	16	41	0	1	4	7	34	10	12	9	12
	Percent	4.1	0.0	1.0	3.1	25.8	2.1	5.2	16.5	42.3	0.0	1.1	4.5	7.9	38.2	11.2	13.5	10.1	13.5
Walking Sticks	Count	0	0	0	0	2	1	1	1	2	0	0	0	0	2	1	1	1	0
	Percent	0.0	0.0	0.0	0.0	28.6	14.3	14.3	14.3	28.6	0.0	0.0	0.0	0.0	40.0	20.0	20.0	20.0	0.0

Table B.6. Detailed ratings of the acceptability of talking sounds in the Steam Vents area and personal interpretations of talking sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Group Talking	Count	1	0	4	5	28	9	7	15	16	1	0	11	14	43	6	2	5	1
	Percent	1.2	0.0	4.7	5.9	32.9	10.6	8.2	17.6	18.8	1.2	0.0	13.3	16.9	51.8	7.2	2.4	6.0	1.2
Adult(s) Talking	Count	2	0	4	3	38	13	6	16	23	2	0	5	10	63	8	4	7	2
	Percent	1.9	0.0	3.8	2.9	36.2	12.4	5.7	15.2	21.9	2.0	0.0	5.0	9.9	62.4	7.9	4.0	6.9	2.0
Child/children Talking	Count	2	1	0	3	14	5	5	10	11	1	1	2	5	23	2	5	8	2
	Percent	3.9	2.0	0.0	5.9	27.5	9.8	9.8	19.6	21.6	2.0	2.0	4.1	10.2	46.9	4.1	10.2	16.3	4.1

Table B.7. Detailed ratings of the acceptability of loud voices / yelling in the Steam Vents area and personal interpretations of loud voices / yelling.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Group, Loud or Yelling	Count	5	4	3	2	3	1	0	1	0	5	5	3	1	2	0	0	1	0
	Percent	26.3	21.1	15.8	10.5	15.8	5.3	0.0	5.3	0.0	29.4	29.4	17.6	5.9	11.8	0.0	0.0	5.9	0.0
Adult(s), Loud or Yelling	Count	5	4	2	2	1	1	0	0	0	6	2	3	0	1	0	0	2	0
	Percent	33.3	26.7	13.3	13.3	6.7	6.7	0.0	0.0	0.0	42.9	14.3	21.4	0.0	7.1	0.0	0.0	14.3	0.0
Child/children, Loud or Yelling	Count	3	4	4	5	3	1	2	2	0	2	5	5	5	2	0	0	1	0
	Percent	12.5	16.7	16.7	20.8	12.5	4.2	8.3	8.3	0.0	10.0	25.0	25.0	25.0	10.0	0.0	0.0	5.0	0.0
Child/children Crying	Count	1	2	1	3	2	0	0	1	0	2	1	2	2	1	0	0	1	0
	Percent	10.0	20.0	10.0	30.0	20.0	0.0	0.0	10.0	0.0	22.2	11.1	22.2	22.2	11.1	0.0	0.0	11.1	0.0

Table B.8. Detailed ratings of the acceptability of nature sounds in the Steam Vents area and personal interpretations of nature sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Leaves Rustling	Count	3	0	0	0	1	0	0	13	60	0	0	0	0	2	2	7	17	45
	Percent	3.9	0.0	0.0	0.0	1.3	0.0	0.0	16.9	77.9	0.0	0.0	0.0	0.0	2.7	2.7	9.6	23.3	61.6
Wind	Count	4	0	4	1	12	1	8	15	84	1	2	7	2	12	3	23	12	61
	Percent	3.1	0.0	3.1	0.8	9.3	0.8	6.2	11.6	65.1	0.8	1.6	5.7	1.6	9.8	2.4	18.7	9.8	49.6
Thunder	Count	0	0	0	0	1	0	0	1	2	0	0	1	0	0	1	0	0	2
	Percent	0.0	0.0	0.0	0.0	25.0	0.0	0.0	25.0	50.0	0.0	0.0	25.0	0.0	0.0	25.0	0.0	0.0	50.0
Rainfall	Count	1	0	1	0	0	0	3	5	18	1	0	0	2	3	2	3	4	12
	Percent	3.6	0.0	3.6	0.0	0.0	0.0	10.7	17.9	64.3	3.7	0.0	0.0	7.4	11.1	7.4	11.1	14.8	44.4
Shifting Rocks & Sand	Count	0	0	0	0	0	1	2	4	11	0	0	0	0	1	1	2	5	9
	Percent	0.0	0.0	0.0	0.0	0.0	5.6	11.1	22.2	61.1	0.0	0.0	0.0	0.0	5.6	5.6	11.1	27.8	50.0

Table B.9. Detailed ratings of the acceptability of animal sounds in the Steam Vents area and personal interpretations of animal sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Bird Song	Count	1	0	0	0	0	0	0	4	56	0	0	0	0	1	0	0	3	53
	Percent	1.6	0.0	0.0	0.0	0.0	0.0	0.0	6.6	91.8	0.0	0.0	0.0	0.0	1.8	0.0	0.0	5.3	93.0
Insect(s)	Count	0	1	0	0	1	0	2	1	14	1	0	1	0	1	1	1	3	11
	Percent	0.0	5.3	0.0	0.0	5.3	0.0	10.5	5.3	73.7	5.3	0.0	5.3	0.0	5.3	5.3	5.3	15.8	57.9
Horses	Count	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0
	Percent	0.0	0.0	33.3	0.0	33.3	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0
Animals, Unknown	Count	0	0	0	0	0	0	0	1	2	0	0	0	0	1	0	0	2	0
	Percent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	66.7	0.0	0.0	0.0	0.0	33.3	0.0	0.0	66.7	0.0

Table B.10. Respondents were given the opportunity to report additional sounds heard that were not listed in the survey. The table below presents the "other" sounds heard during attended listening in the Steam Vents area, the emotions associated with those sounds, acceptability of hearing the sounds in the Steam Vents area, and the personal interpretation of the sounds.

Other Sounds Reported	Feelings Associated With Sound	Acceptability of Sound At this Location [a]	Personal Interpretation Of Sound [b]
car alarm	annoyed	-4	-4
children laughing		3	4
people talking	annoying some, like nature sounds	0	-2
jacket flap		-4	-4
bottle opening	nice	4	4
paper rustling		-2	-3
paper rustling		0	-1
steam	mystery	4	4
lava floor cracking		3	3
plants		4	4
grass rustling		4	4
grass rustling in the wind		4	4
frog	cool	4	2

[a] Scale ranged from -4 = "Very Unacceptable" to +4 = "Very Acceptable"
[b] Scale ranged from -4 = "Very Annoying" to +4 = "Very Pleasing"

Appendix C

Verbatim Feelings and Emotions Associated with Sounds Heard During Steam Vents Area Attended Listening, Organized by Sound

Appendix C: Verbatim Feelings and Emotions – Steam Vents Area Attended Listening (Note: Number in parentheses indicates number of times response was mentioned.)

Aircraft, Jet		
Positive	*Ambiguous*	*Negative*
		• I didn't wish to hear this.

Aircraft, Propeller		
Positive	*Ambiguous*	*Negative*
		• annoying • annoyed

Aircraft, Helicopter		
Positive	*Ambiguous*	*Negative*
	• holiday/rescue • none • probably sightseeing	• annoyance filled w/ understanding of why someone would take a helicopter ride • annoyed • annoying (2) • didn't care for it • disturbing the peace • intrusive • slightly annoyed • the rich taking advantage of "access argument

Aircraft, Unknown		
Positive	*Ambiguous*	*Negative*
	• none • not common, so OK	• unhappy with commercial aircraft but curious about Park Service aircraft • unnatural

Appendix C (continued). Verbatim Feelings and Emotions – Steam Vents Area Attended Listening

Automobile		
Positive	*Ambiguous*	*Negative*
	• a necessary evil • bus-neutral • car alarm • commonly heard at home • everyday sounds • faint, unnoticable mostly • familiar, expected • neutral • none (3) • normal • normal noise • quiet enough to not be a problem • to be expected (no unmuffled noises) • understand, need access • understandable	• annoyed • annoyed with the break in silence • annoying • annoying buses • anxiety • boo • buses need better noise supression equipment • busy • continuous low level bother • crowded (bus) • disappointment • discouraged • disruption • distracting • frustrated • loud/smelly • mildly invasive but accepted as necessary • negative • sad, annoyed • slight distraction (2) • slightly annoyed • slightly annoying • slightly disorienting, out of place • too long, never stops, very annoying • too many buses • traffic/people • ugh, sad

Motorcycle		
Positive	*Ambiguous*	*Negative*
		• annoyed • annoying buses • grr • loud

Appendix C (continued). Verbatim Feelings and Emotions – Steam Vents Area Attended Listening

Trail Work/Maintenance		
Positive	*Ambiguous*	*Negative*
	• acceptable, necessary • distant beeping like vehicle back-up warning • ok (not very loud) • understanding • vehicle back up sounds	• distracting

Technology, Cell Phone		
Positive	*Ambiguous*	*Negative*
	• for society • normal	• annoyance • annoyed • hate their interruption of my nature experience • take a break • unfortunate

Technology, radio headset or IPOD		
Positive	*Ambiguous*	*Negative*
		• turn it off

Technology Sounds, unknown		
Positive	*Ambiguous*	*Negative*
	• siren	

Camera		
Positive	*Ambiguous*	*Negative*
• exciting • good • happy • satisfaction • vacation/fun	• acceptable	• annoyed • disruptive • the click sound is annoying

Appendix C (continued). Verbatim Feelings and Emotions – Steam Vents Area Attended Listening

Walking Sounds		
Positive	*Ambiguous*	*Negative*
• anticipation • comerodity • comfort, well-being • energy • enjoyment • expected, comforting • exploration-good • getting places • happy • happy, other people enjoying • laughter, noisy sounds from large groups • natural and relaxing • nice (2) • peaceful • peaceful, normal day • pleasant (2) • pleasing • pleasing, relaxing • relaxed • safety • subtle, peaceful • want to be active	• ? illegible • acceptance, I must share • expected • feet on gravel • hiking • neutral (2) • none • normal noise • only a few people	

Walking Sticks		
Positive	*Ambiguous*	*Negative*
	• mine and my partner's	

Appendix C (continued). Verbatim Feelings and Emotions – Steam Vents Area Attended Listening

Group, Talking		
Positive	*Ambiguous*	*Negative*
• community • fun • happy (2) • lively • these are the sounds of people enjoying park and nature	• acceptance • as long as not loud, neutral • neutral (2) • none (2) • normal noise • people • people like to share- accept • unaffected	• annoyed • busy • frustrating because I'm trying to relax • quiet preferred

Adult(s), Talking		
Positive	*Ambiguous*	*Negative*
• comfort • community • happy • interested in comments • lively • pleasant • quiet • sometimes interested in how others are experiencing the park	• neutral (2) • normal noise • ok (2) • ok if not too loud • see otherside • unaffected	• annoyance • annoyed • frustrating because I'm trying to relax • loud, annoying • noisy at times/normal • slightly annoyed

Child/Children, Talking		
Positive	*Ambiguous*	*Negative*
• curiosity-great • enjoyment/inquisitive/youth/fun • family • happy • happy attitude • happy, they are enthusiastic • hope • pleasant (2) • they sounded curious, I enjoy that	• fine unless too loud • neutral • none • ok	• quiet preferred

Appendix C (continued). Verbatim Feelings and Emotions – Steam Vents Area Attended Listening

Group, Loud or Yelling		
Positive	*Ambiguous*	*Negative*
	• ? illegible • gratis? • normal noise	• annoyance/ disrespect • stop it • takes you out of your relaxed state • rude

Adult(s), Loud or Yelling		
Positive	*Ambiguous*	*Negative*
	• ? illegible	• annoyance • grumpy • irritation • stop it • too many groups and buses, disturbing

Child/Children, Loud or Yelling		
Positive	*Ambiguous*	*Negative*
• excitement- good	• if they were long lasting it would have been annoying	• annoyed (2) • ruckus • stop it • very annoyed

Child/Children, Crying		
Positive	*Ambiguous*	*Negative*
	• if they were long lasting it would have been annoying	• annoyed • annoying

Appendix C (continued). Verbatim Feelings and Emotions – Steam Vents Area Attended Listening

Leaves Rustling		
Positive	*Ambiguous*	*Negative*
• beautiful, calmness • calm (2) • calming (2) • close to nature • contentment • enjoying • happy • love this sound, serene • lovely • nice (2) • peace (2) • peaceful (7) • peaceful, calming • peacefulness • pleasant (2) • pleasant, natural • pleasing, soothing • quiet • relaxed by the soothing sound • relaxed, at ease on vacation • soothing (3) • soothing/ invigorating • tranquil • very relaxing	• grass	

Appendix C (continued). Verbatim Feelings and Emotions – Steam Vents Area Attended Listening

Wind		
Positive	*Ambiguous*	*Negative*
• all good • calm (2) • calm, relaxing • calming because it keeps the temp cool • cooling • enjoyable • excitement • feel at one with nature • freshness • happiness • I'm in nature • involved/immersed in nature • joyful • light wind, cooling, pleasant • mysterious • nature • nice (3) • peaceful (3) • pleasant • pleasant, pleasing • pleasing/ relaxing • powerful • refreshing • relaxed (2) • relaxing • soothing (4) • strength • this is what we should be hearing here • tranquil • we like it	• very windy • unsure • sound of wind is nice, but the wind itself was a bit strong • ? illegible	• busy, danger • cold (6) • I don't like wind! • loud, cold • slight worry • tiring • wariness

Appendix C (continued). Verbatim Feelings and Emotions – Steam Vents Area Attended Listening

Rainfall		
Positive	*Ambiguous*	*Negative*
• all good • chilly, refreshing • cleansing • peaceful/hurried • soothing		• discouraging

Shifting Rocks & Sand		
Positive	*Ambiguous*	*Negative*
• all good • in touch with nature • nature • nature/beach/hiking	• beach • people	

Bird Song		
Positive	*Ambiguous*	*Negative*
• all good • comforting • happiness (3) • happy (2) • intriguing, lovely, requires attention to hear • joyful • love birds • nature • nice • park is alive • peaceful (3) • peaceful because it is only the occasional sound • pleasant • pleasure, curiosity • soothing (2)		

Appendix C (continued). Verbatim Feelings and Emotions – Steam Vents Area Attended Listening

Insect(s)		
Positive	*Ambiguous*	*Negative*
• happiness • interest • like home • nice • peaceful	• indiferent because I'm used to insects	• annoying

Appendix D

State Residency of Respondents – Steam Vents Area
Attended Listening

Appendix D. Complete list of state of residency for all respondents – Steam Vents Area Attended Listening.

State	Basic Stats (n=115)	
	Count	*Percent*
California	23	20.0
Hawaii	12	10.4
North Carolina	6	5.2
Ohio	6	5.2
Washington	6	5.2
Texas	5	4.3
Colorado	4	3.5
Florida	4	3.5
Maryland	4	3.5
New Jersey	4	3.5
New York	4	3.5
Arizona	3	2.6
Indiana	3	2.6
Massachusetts	3	2.6
Minnesota	3	2.6
Oregon	3	2.6
Arizona	2	1.7
Georgia	2	1.7
Illinois	2	1.7
Nevada	2	1.7
Virginia	2	1.7
Alabama	1	0.9
Connecticut	1	0.9
Louisiana	1	0.9
Maryland	1	0.9
Michigan	1	0.9
New Hampshire	1	0.9
New Jersey	1	0.9
New Mexico	1	0.9
Rhode Island	1	0.9
South Carolina	1	0.9
Vermont	1	0.9
Wisconsin	1	0.9

Appendix E

Hawaii Volcanoes National Park Attended Listening Survey
Data Codebook

Appendix E. Hawaii Volcanoes National Park Attended Listening Survey Data Codebook
Pertaining to files HAVO_AL_SurveyData.xls and HAVO_AL_SurveyData.sav

Variable	Question #	Description	Values
Date	Front Cover	Date when survey was completed	dd/mm/yy
Time	Front Cover	Time when survey was completed	Military Time – 00:00:00
ID	Front Cover	Unique ID for each completed questionnaire	ID number
Aircraft	Front Cover	Indicates whether aircraft was present while respondent was completing survey	0 = Aircraft not present 1 = Aircraft present
AircraftNotes	Front Cover	Comments about the presence of aircraft	Text
Location	Front Cover	Indicates Sampling Location	1 = Steam Vents 2 = Thurston Lava Tube
S1	Aircraft, Jet	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S1Text	Aircraft, Jet: Feeling	Reported feelings associated with sound	Text
S1Code	Aircraft, Jet: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S1A	Aircraft, Jet: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S1P	Aircraft, Jet: Personal Interpretation.	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S2	Aircraft, Propeller	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S2Text	Aircraft, Propeller: Feeling	Reported feelings associated with sound	Text
S2Code	Aircraft, Propeller: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S2A	Aircraft, Propeller: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S2P	Aircraft, Propeller: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S3	Aircraft, Helicopter	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S3Text	Aircraft, Helicopter: Feeling	Reported feelings associated with sound	Text
S3Code	Aircraft, Helicopter: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S3A	Aircraft, Helicopter: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S3P	Aircraft, Helicopter: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S4	Aircraft, Unknown	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S4Text	Aircraft, Unknown: Feeling	Reported feelings associated with sound	Text
S4Code	Aircraft, Unknown: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S4A	Aircraft, Unknown:	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S4P	Aircraft, Unknown: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S5	Automobile	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S5Text	Automobile: Feeling	Reported feelings associated with sound	Text
S5Code	Automobile: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S5A	Automobile: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S5P	Automobile: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S6	Motorcycle	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S6Text	Motorcycle: Feeling	Reported feelings associated with sound	Text
S6Code	Motorcycle: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S6A	Motorcycle: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S6P	Motorcycle: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S7	Trail Work/Maintenance	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S7Text	Trail Work/Maintenance: Feeling	Reported feelings associated with sound	Text
S7Code	Trail Work/Maintenance: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S7A	Trail Work/Maintenance: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S7P	Trail Work/Maintenance: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S8	Walking Sounds	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S8Text	Walking Sounds: Feeling	Reported feelings associated with sound	Text
S8Code	Walking Sounds: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S8A	Walking Sounds: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S8P	Walking Sounds: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S9	Walking Sticks	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S9Text	Walking Sticks: Feeling	Reported feelings associated with sound	Text
S9Code	Walking Sticks: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S9A	Walking Sticks: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S9P	Walking Sticks: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S10	Leaves Rustling	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S10Text	Leaves Rustling: Feeling	Reported feelings associated with sound	Text

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S10Code	Leaves Rustling: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S10A	Leaves Rustling: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S10P	Leaves Rustling: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S11	Group, Talking	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S11Text	Group, Talking: Feeling	Reported feelings associated with sound	Text
S11Code	Group, Talking: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S11A	Group, Talking: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S11P	Group, Talking: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S12	Group, Loud or Yelling	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S12Text	Group, Loud or Yelling: Feeling	Reported feelings associated with sound	Text
S12Code	Group, Loud or Yelling: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S12A	Group, Loud or Yelling: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S12P	Group, Loud or Yelling: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S13	Adult(s), Talking	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S13Text	Adult(s), Talking: Feeling	Reported feelings associated with sound	Text
S13Code	Adult(s), Talking: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S13A	Adult(s), Talking: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S13P	Adult(s), Talking: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S14	Adult(s), Loud or Yelling	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S14Text	Adult(s), Loud or Yelling: Feeling	Reported feelings associated with sound	Text
S14Code	Adult(s), Loud or Yelling: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S14A	Adult(s), Loud or Yelling: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S14P	Adult(s), Loud or Yelling: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S15	Child/Children, Talking	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S15Text	Child/Children, Talking: Feeling	Reported feelings associated with sound	Text
S15Code	Child/Children, Talking: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S15A	Child/Children, Talking: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S15P	Child/Children, Talking: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S16	Child/Children, Loud or Yelling	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S16Text	Child/Children, Loud or Yelling: Feeling	Reported feelings associated with sound	Text
S16Code	Child/Children, Loud or Yelling: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S16A	Child/Children, Loud or Yelling: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S16P	Child/Children, Loud or Yelling: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S17	Child/Children, Crying	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S17Text	Child/Children, Crying: Feeling	Reported feelings associated with sound	Text
S17Code	Child/Children, Crying: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S17A	Child/Children, Crying: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S17P	Child/Children, Crying: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S18	Technology, Cell Phone	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S18Text	Technology, Cell Phone: Feeling	Reported feelings associated with sound	Text
S18Code	Technology, Cell Phone: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S18A	Technology, Cell Phone: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S18P	Technology, Cell Phone: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S19	Technology, Radio Headset or IPOD	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S19Text	Technology, Radio Headset or IPOD: Feeling	Reported feelings associated with sound	Text
S19Code	Technology, Radio Headset or IPOD: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S19A	Technology, Radio Headset or IPOD: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S19P	Technology, Radio Headset or IPOD: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S20	Technology Sounds, Unknown	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S20Text	Technology Sounds, Unknown: Feeling	Reported feelings associated with sound	Text
S20Code	Technology Sounds, Unknown: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S20A	Technology Sounds, Unknown: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S20P	Technology Sounds, Unknown: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S21	Camera	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S21Text	Camera: Feeling	Reported feelings associated with sound	Text
S21Code	Camera: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S21A	Camera: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S21P	Camera: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S22	Wind	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S22Text	Wind: Feeling	Reported feelings associated with sound	Text
S22Code	Wind: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S22A	Wind: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S22P	Wind: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S23	Thunder	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S23Text	Thunder: Feeling	Reported feelings associated with sound	Text

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S23Code	Thunder: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S23A	Thunder: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S23P	Thunder: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S24	Rainfall	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S24Text	Rainfall: Feeling	Reported feelings associated with sound	Text
S24Code	Rainfall: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S24A	Rainfall: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S24P	Rainfall: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S25	Shifting Rocks & Sand	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S25Text	Shifting Rocks & Sand: Feeling	Reported feelings associated with sound	Text
S25Code	Shifting Rocks & Sand: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S25A	Shifting Rocks & Sand: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S25P	Shifting Rocks & Sand: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S26	Bird Song	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S26Text	Bird Song: Feeling	Reported feelings associated with sound	Text
S26Code	Bird Song: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S26A	Bird Song: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S26P	Bird Song: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S27	Insect(s)	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S27Text	Insect(s): Feeling	Reported feelings associated with sound	Text
S27Code	Insect: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S27A	Insect(s) : Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S27P	Insect(s): Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S28	Horses	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S28Text	Horses: Feeling	Reported feelings associated with sound	Text
S28Code	Horses: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S28A	Horses: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S28P	Horses: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S29	Animal, Unknown	Indicates whether or not the sound was heard	0 = Did not hear sound 1 = Heard sound
S29Text	Animal, Unknown: Feeling	Reported feelings associated with sound	Text
S29Code	Animal, Unknown: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S29A	Animal, Unknown: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S29P	Animal, Unknown: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S30	S31	Indicates whether reported “other” sound	0 = Did not report other sound 1 = Reported other sound
S30Other	S31: Other	Describes the other sound heard	Text
S30Text	S31Other: Feeling	Reported feelings associated with sound	Text
S30Code	S31: Code	Categorizes feelings-related responses	0 = ambiguous 1 = positive 2 = negative
S30A	S31Other: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S30P	S31Other: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S31	S32	Indicates whether reported "other" sound	0 = Did not report other sound 1 = Reported other sound
S31Other	S32: Other	Describes the other sound heard	Text
S31Text	S32Other: Text	Reported feelings associated with sound	Text
S31Code	S32: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S31A	S32Other: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S31P	S32Other: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
S31	S33	Indicates whether reported "other" sound	0 = Did not report other sound 1 = Reported other sound
S32Other	S33: Other	Describes the other sound heard	Text
S32Text	S33Other: Feeling	Reported feelings associated with sound	Text
S32Code	S33: Code	Categorizes feelings-related responses	0 = Ambiguous 1 = Positive 2 = Negative
S32A	S33Other: Acceptability	Acceptability rating of the sound	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
S32P	S33Other: Personal Interpretation	Personal interpretation rating of the sound	-4 = Very Annoying 0 = Neutral 4 = Very Pleasing
Q1	Question 1	Designates whether or not group has visited this area of the park previously	0 = No 1 = Yes

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q2	Question 2	Number of previous visits to this area of the Park	Number of visits
Q3	Question 3	Number of people in group	Number of people
Q4	Question 4	Designates whether or not part of a commercial tour	0 = No 1 = Yes
Q5	Question 5	Gender of respondent	1 = Male 2 = Female
Q6	Question 6	Year born	YYYY
Age	Question 6	Respondent's birth year subtracted from 2007	Age in years
Q7	Question 7	Country of residence	1 = US 0 = Other
Q7Zip	Q7: Zip	Zip Code of residence	5-digit Zip Code
Q7Country	Q7: Country	Country of residence	1 = Canada 2 = United Kingdom 3 = Hong Kong 4 = Netherlands 5 = Australia 6 = Thailand 7 = Indonesia 8 = Mexico 9 = Germany 10 = Taiwan 11 = Ireland 12 = New Zealand 13 = Italy

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q8	Question 8	Level of education	1 = Some high school 2 = High school graduate or GED 3 = Some college, business or trade school 4 = College, business or trade school graduate 5 = Some graduate school 6 = Master's, doctoral or professional degree
Q9	Question 9	Indicates if the respondent is Hispanic of Latino	1 = Yes 0 = No
Q10a	Question 10a	American Indian or Alaskan Native	1 = Checked 0 = Not Checked
Q10b	Question 10b	Asian	1 = Checked 0 = Not Checked
Q10c	Question 10c	Black or African American	1 = Checked 0 = Not Checked
Q10d	Question 10d	Native Hawaiian	1 = Checked 0 = Not Checked
Q10e	Question 10e	Pacific Islander (Not Hawaiian)	1 = Checked 0 = Not Checked
Q10f	Question 10f	White	1 = Checked 0 = Not Checked
MultiRace	Question 10	Indicates if the respondent reported more than one race	0 = Reported no race 1 = Reported 1 race 2 = Reported 2 races
Q11	Question 11	Indicates the hearing capacity of the respondent	1 = My hearing is normal 2 = I am somewhat hearing impaired 3 = I am very hearing impaired 4 = I don't know about my hearing capacity

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Comments	Comments Throughout Survey	Comments about the survey either written by the survey administrator or survey respondent	Text
S_Aircraft	All Aircraft Sounds	Indicates whether or not the respondent heard any of the sounds in the category (S1, S2, S3, and S4)	0 = Did not hear any sounds in the category 1 = Heard at least one sound in the category
S_Vehicle	All Vehicle Sounds	Indicates whether or not the respondent heard any of the sounds in the category (S5 and S6)	0 = Did not hear any sounds in the category 1 = Heard at least one sound in the category
S_Walking	All Walking Sounds	Indicates whether or not the respondent heard any of the sounds in the category (S8 and S9)	0 = Did not hear any sounds in the category 1 = Heard at least one sound in the category
S_Talking	All Talking Sounds	Indicates whether or not the respondent heard any of the sounds in the category (S11, S13, and S15)	0 = Did not hear any sounds in the category 1 = Heard at least one sound in the category
S_LoudVoices	All Loud Voices	Indicates whether or not the respondent heard any of the sounds in the category (S12, S14, S16, and S17)	0 = Did not hear any sounds in the category 1 = Heard at least one sound in the category
S_Technology	All Technology Sounds	Indicates whether or not the respondent heard any of the sounds in the category (S18, S19, S20, and S21)	0 = Did not hear any sounds in the category 1 = Heard at least one sound in the category

Appendix E (continued). Hawaii Volcanoes National Park Attended Listening Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
S_Nature	All Nature Sounds	Indicates whether or not the respondent heard any of the sounds in the category (S10, S22, S23, S24, S25, and S29)	0 = Did not hear any sounds in the category 1 = Heard at least one sound in the category
S_Animal	All Animal Sounds	Indicates whether or not the respondent heard any of the sounds in the category (S26, S27, S28, and S30)	0 = Did not hear any sounds in the category 1 = Heard at least one sound in the category

Appendix F

Frequency Distributions of Acceptability and Personal Interpretation Ratings of Sounds Heard During Thurston Lava Tube Area Attended Listening

Table F.1. Detailed ratings of the acceptability of aircraft sounds in the Thurston Lava Tube area and personal interpretations of aircraft sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Aircraft, Jet	Count	2	2	0	1	1	0	1	0	0	1	1	2	0	2	0	1	0	0
	Percent	28.6	28.6	0.0	14.3	14.3	0.0	14.3	0.0	0.0	14.3	14.3	28.6	0.0	28.6	0.0	14.3	0.0	0.0
Aircraft, Propeller	Count	0	1	1	3	3	2	2	1	0	1	1	2	3	6	0	0	1	0
	Percent	0.0	7.7	7.7	23.1	23.1	15.4	15.4	7.7	0.0	7.1	7.1	14.3	21.4	42.9	0.0	0.0	7.1	0.0
Aircraft, Helicopter	Count	6	7	7	4	3	0	3	1	2	10	2	9	4	4	0	0	0	1
	Percent	18.2	21.2	21.2	12.1	9.1	0.0	9.1	3.0	6.1	33.3	6.7	30.0	13.3	13.3	0.0	0.0	0.0	3.3
Aircraft, Unknown	Count	1	2	2	3	3	1	0	0	1	1	0	5	2	2	1	0	1	1
	Percent	7.7	15.4	15.4	23.1	23.1	7.7	0.0	0.0	7.7	7.7	0.0	38.5	15.4	15.4	7.7	0.0	7.7	7.7

Table F.2. Detailed ratings of the acceptability of vehicle sounds in the Thurston Lava Tube area and personal interpretations of vehicle sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Automobile	Count	4	12	13	15	32	6	6	4	4	9	12	26	14	27	0	2	0	0
	Percent	4.2	12.5	13.5	15.6	33.3	6.3	6.3	4.2	4.2	10.0	13.3	28.9	15.6	30.0	0.0	2.2	0.0	0.0
Motorcycle	Count	0	1	2	0	1	0	0	0	0	1	0	2	2	0	0	0	0	0
	Percent	0.0	25.0	50.0	0.0	25.0	0.0	0.0	0.0	0.0	20.0	0.0	40.0	40.0	0.0	0.0	0.0	0.0	0.0

Table F.3. Detailed ratings of the acceptability of trail work / maintenance sounds in the Thurston Lava Tube area and personal interpretations of trail work / maintenance sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Trail Work/ Maintenance	Count	0	0	1	0	1	0	0	1	1	0	0	1	0	1	0	0	0	1
	Percent	0.0	0.0	25.0	0.0	25.0	0.0	0.0	25.0	25.0	0.0	0.0	33.3	0.0	33.3	0.0	0.0	0.0	33.3

Table F.4. Detailed ratings of the acceptability of technology sounds in the Thurston Lava Tube area and personal interpretations of technology sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Technology, Cell Phones	Count	14	4	6	3	3	1	1	0	1	17	5	4	2	4	0	0	0	1
	Percent	42.4	12.1	18.2	9.1	9.1	3.0	3.0	0.0	3.0	51.5	15.2	12.1	6.1	12.1	0.0	0.0	0.0	3.0
Technology, Radio Headset or IPOD	Count	1	0	0	1	3	0	0	0	0	1	0	0	1	1	0	0	0	1
	Percent	20.0	0.0	0.0	20.0	60.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	25.0	25.0	0.0	0.0	0.0	25.0
Technology Sounds, Unknown	Count	3	0	1	0	2	0	1	0	0	3	0	1	1	1	1	0	0	0
	Percent	42.9	0.0	14.3	0.0	28.6	0.0	14.3	0.0	0.0	42.9	0.0	14.3	14.3	14.3	14.3	0.0	0.0	0.0
Camera	Count	0	1	3	2	33	6	7	6	23	0	0	4	7	50	4	3	1	8
	Percent	0.0	1.2	3.7	2.5	40.7	7.4	8.6	7.4	28.4	0.0	0.0	5.2	9.1	64.9	5.2	3.9	1.3	10.4

Table F.5. Detailed ratings of the acceptability of walking sounds in the Thurston Lava Tube area and personal interpretations of walking sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Walking Sounds	Count	4	1	1	5	31	6	15	28	51	0	0	3	8	63	12	16	11	19
	Percent	2.8	0.7	0.7	3.5	21.8	4.2	10.6	19.7	35.9	0.0	0.0	2.3	6.1	47.7	9.1	12.1	8.3	14.4
Walking Sticks	Count	1	0	0	0	6	2	3	0	6	0	0	0	0	8	2	1	2	3
	Percent	5.6	0.0	0.0	0.0	33.3	11.1	16.7	0.0	33.3	0.0	0.0	0.0	0.0	50.0	12.5	6.3	12.5	18.8

Table F.6. Detailed ratings of the acceptability of talking sounds in the Thurston Lava Tube area and personal interpretations of talking sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Group Talking	Count	5	6	21	20	42	5	23	24	10	5	6	30	24	59	5	4	7	3
	Percent	3.2	3.8	13.5	12.8	26.9	3.2	14.7	15.4	6.4	3.5	4.2	21.0	16.8	41.3	3.5	2.8	4.9	2.1
Adult(s) Talking	Count	2	5	15	13	55	8	25	17	19	2	4	23	25	71	8	4	5	6
	Percent	1.3	3.1	9.4	8.2	34.6	5.0	15.7	10.7	11.9	1.4	2.7	15.5	16.9	48.0	5.4	2.7	3.4	4.1
Child/children Talking	Count	2	7	7	8	41	5	11	15	19	2	4	12	19	51	5	4	1	10
	Percent	1.7	6.1	6.1	7.0	35.7	4.3	9.6	13.0	16.5	1.9	3.7	11.1	17.6	47.2	4.6	3.7	0.9	9.3

Table F.7. Detailed ratings of the acceptability of loud voices / yelling in the Thurston Lava Tube area and personal interpretations of loud voices / yelling.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Group, Loud or Yelling	Count	14	5	7	17	4	0	1	0	2	18	5	9	5	3	0	1	0	1
	Percent	29.8	10.6	14.9	29.8	8.5	0.0	2.1	0.0	4.3	42.9	11.9	21.4	11.9	7.1	0.0	2.4	0.0	2.4
Adult(s), Loud or Yelling	Count	12	12	10	2	6	0	0	0	1	14	6	10	3	5	0	0	0	1
	Percent	27.9	27.9	23.3	4.7	14.0	0.0	0.0	0.0	2.3	35.9	15.4	25.6	7.7	12.8	0.0	0.0	0.0	2.6
Child/children, Loud or Yelling	Count	7	10	7	6	9	2	0	0	3	9	10	10	7	3	0	0	1	2
	Percent	15.9	22.7	15.9	13.6	20.5	4.5	0.0	0.0	6.8	21.4	23.8	23.8	16.7	7.1	0.0	0.0	2.4	4.8
Child/children Crying	Count	5	1	5	2	5	0	1	0	2	5	0	5	3	6	0	0	0	1
	Percent	23.8	4.8	23.8	9.5	23.8	0.0	4.8	0.0	9.5	25.0	0.0	25.0	15.0	30.0	0.0	0.0	0.0	5.0

Table F.8. Detailed ratings of the acceptability of nature sounds in the Thurston Lava Tube area and personal interpretations of nature sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Leaves Rustling	Count	6	0	0	0	2	1	5	6	121	1	0	0	0	9	3	11	15	95
	Percent	4.3	0.0	0.0	0.0	1.4	0.7	3.5	4.3	85.8	0.7	0.0	0.0	0.0	6.7	2.2	8.2	11.2	70.9
Wind	Count	3	1	0	0	5	3	4	6	136	0	1	0	1	7	1	8	17	120
	Percent	1.9	0.6	0.0	0.0	3.2	1.9	2.5	3.8	86.1	0.0	0.6	0.0	0.6	4.5	0.6	5.2	11.0	77.4
Thunder	Count	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	Percent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Rainfall	Count	1	0	1	0	3	0	5	5	53	0	0	1	0	5	0	4	8	49
	Percent	1.5	0.0	1.5	0.0	4.4	0.0	7.4	7.4	77.9	0.0	0.0	1.5	0.0	7.5	0.0	6.0	11.9	73.1
Shifting Rocks & Sand	Count	1	0	0	0	3	0	3	0	15	0	0	0	0	8	1	1	1	11
	Percent	4.5	0.0	0.0	0.0	13.6	0.0	13.6	0.0	68.2	0.0	0.0	0.0	0.0	36.4	4.5	4.5	4.5	50.0

Table F.9. Detailed ratings of the acceptability of animal sounds in the Thurston Lava Tube area and personal interpretations of animal sounds.

		Acceptability of Sound at this Location									Personal Interpretation of Sound								
		Very Unacceptable		Slightly Unacceptable		Neutral		Slightly Acceptable		Very Acceptable	Very Annoying		Slightly Annoying		Neutral		Slightly Pleasing		Very Pleasing
Sounds		-4	-3	-2	-1	0	+1	+2	+3	+4	-4	-3	-2	-1	0	+1	+2	+3	+4
Bird Song	Count	2	0	0	0	2	1	2	5	158	0	0	0	0	1	1	4	8	148
	Percent	1.2	0.0	0.0	0.0	1.2	0.6	1.2	2.9	92.9	0.0	0.0	0.0	0.0	0.6	0.6	2.5	4.9	91.4
Insect(s)	Count	2	0	1	1	4	1	2	5	59	2	1	2	1	3	2	4	7	53
	Percent	2.7	0.0	1.3	1.3	5.3	1.3	2.7	6.7	78.7	2.7	1.3	2.7	1.3	4.0	2.7	5.3	9.3	70.7
Horses	Count	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Percent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animals, Unknown	Count	0	0	0	0	1	0	0	2	10	0	0	0	0	2	0	0	2	8
	Percent	0.0	0.0	0.0	0.0	7.7	0.0	0.0	15.4	76.9	0.0	0.0	0.0	0.0	16.7	0.0	0.0	16.7	66.7

Table F.10. Respondents were given the opportunity to report additional sounds heard that were not listed in the survey. The table below presents the "other" sounds heard during attended listening in the Thurston Lava Tube area, the emotions associated with those sounds, acceptability of hearing the sounds in the Thurston Lava Tube area, and the personal interpretation of the sounds.

Other Sounds Reported	Feelings Associated With Sound	Acceptability of Sound At this Location [a]	Personal Interpretation Of Sound [b]
car horn		-3	-4
tour bus		4	4
cars and buses		3	0
bike tires on path		1	0
bicycle	how fun! Felt slightly jealous	4	0
bicycle with rider		0	0
gate clinking		2	0
dad		0	
child giggling	content	0	1
human bird call		-4	-4
adult laughing		0	0
adult shushing		0	0
steps		0	0
footsteps	common	4	-1
VT student	uh oh, civilization	0	0
person asking about a survey	interested	2	2
wind in crater		4	0
water drops		4	4
water dripping	pleasing	4	4
water dripping		0	3
water drops	peaceful	4	4
drops of water	pleasant	4	2
drops of water	pleasant	4	4
water trickling		4	4
moving leafes		4	4
twigs snapping			
branches creaking	slightly scary	4	4
birds		4	4
insects		4	4

[a] Scale ranged from -4 = "Very Unacceptable" to +4 = "Very Acceptable"
[b] Scale ranged from -4 = "Very Annoying" to +4 = "Very Pleasing"

Appendix G

Verbatim Feelings and Emotions Associated with Sounds Heard During Thurston Lava Tube Area Attended Listening, Organized by Sound

Appendix G: Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening
(Note: Number in parentheses indicates number of times response was mentioned.)

Aircraft, Jet		
Positive	*Ambiguous*	*Negative*
	• inevitable • necessary "evil" ☺	• impatience, lasted too long • noisy

Aircraft, Propeller		
Positive	*Ambiguous*	*Negative*
• happy • interest	• Here comes an air tour • modern world	• takes away from natural sounds • too commercial

Aircraft, Helicopter		
Positive	*Ambiguous*	*Negative*
• interest	• curiosity • distant hum • short time, understandable	• anger • annoyance • annoyed, but expected everywhere • annoying • disruptive • distracted • disturbance, anxiety • invasion • much louder • startled • These suck!!! • uptight

Aircraft, Unknown		
Positive	*Ambiguous*	*Negative*
• liberated		• annoyed that it covered up other sounds • irritated • uptight

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Automobile		
Positive	*Ambiguous*	*Negative*
• purposeful	• car horns • faint hum of traffic • I know they have to be there • just tuned it out • necessary • neutral (3) • neutral (necessary for visitors) • ok, not many cars • o'well • people, work • tourism	• annoyed, frustrated • annoying • anxious (2) • buses-bad • busy • busy, irritation, impatient • distracted • esp buses • in distance, not too disturbing; buses are noticable feels unnatural • irritated (2) • noisy • ok, except for the honking (annoyed) • reminds me of city stress • rush • slightly invasive • too many buses • unpleasant • uptight

Motorcycle		
Positive	*Ambiguous*	*Negative*
		• loud

Trail Work/Maintenance		
Positive	*Ambiguous*	*Negative*
• positive		

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Technology, Cell Phone		
Positive	*Ambiguous*	*Negative*
	• electric • on vibrate	• anger/ shouldn't be allowed • angry • annoyed (3) • annoying • disruptive • extremely irritating • frustrated, annoyed • rude • sad, should turn it off • Unnatural annoyance, for emergency situation

Technology, radio headset or IPOD		
Positive	*Ambiguous*	*Negative*
	• neutral	• annoyed

Technology Sounds, Unknown		
Positive	*Ambiguous*	*Negative*
• comfortable	• park radio	• annoyed • annoying

Camera		
Positive	*Ambiguous*	*Negative*
• good pictures? • good, only way to take from natuer • happy • patriotic • reassured • travel	• almost unaudible • curiosity • fine • life • n/a • neutral • none (2) • normal • ok (2) • promotion of park • typical	• slightly annoyed • Why do people use the sound function on digital cameras or phone cameras?!?

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Walking Sounds		
Positive	*Ambiguous*	*Negative*
• arroused • calming (2) • comfort- other humans • comforting • felt relaxing • good to hear people • happy (2) • happy others were enjoying the trail • interest • interest, curiosity, normal • nice • pleasant (2) • positive • relaxed • restful • very pleasing	• ambivalent • birds • fine • indifference • n/a • neutral (3) • none • normal, natural • not alone • ok • others enjoying the area- ok • part of life • people around • typical	• annoying if too many • disruptive

Walking Sticks		
Positive	*Ambiguous*	*Negative*
	• neutral • none	• confused

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Group, Talking		
Positive	*Ambiguous*	*Negative*
• educational • good • good hearing happy people • good- people enjoying themselves • happy • people enjoying themselves • positive • positive feelings, sense of wonder • safety • they were having as much fun as we	• bus groups • fine • indifference • neutral (2) • neutral, normal, but interrupted • none • ok (2) • ok because you wait til they move on • part of • tour groups	• angry • annoyance • annoyed • annoying • annoying-baby crying • anxious • crowded • disruptive • disturbs the peacefulness • feel like too many people • frustrated • frustrating • frustration • irritated • overuse of area, annoyed • slightly annoyed • stressed • would rather not hear them

Adult(s), Talking		
Positive	*Ambiguous*	*Negative*
• good hearing happy people • good, esp. explaining things to kids • happy • interest • interested • low voices-comfort • positive • respectfully good • safe • safety	• adults having fun • fine • indifference • neutral (4) • neutral, normal • none (3) • normal • ok (2) • people enjoying themselves	• a bit annoying and intrusive to the peace • angry • annoyed (2) • annoyed with volume, should be hushed • annoying (2) • bothered • disruptive • distracting • not cool • overuse of area, annoyed • rushed • some too loud, they should know better • takes away from nature • uneasy

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Child/Children, Talking		
Positive	*Ambiguous*	*Negative*
• comforting • cute, patience • excitement • good • good hearing happy people • good, asking questions • happiness • happy • interest • ok, laughing, fun • pleasant	• fine • neutral (2) • none (2) • ok • people enjoying themselves	• angry • annoyed • annoying • disruptive • frustrated • irritated • rushed

Group, Loud or Yelling		
Positive	*Ambiguous*	*Negative*
• interest • people enjoying themselves	• giggliing • ok	• anger • angry • annoyed (4) • annoyed-interferes with experience • disturbing • frustration • negative • overuse of area, annoyed • people should accept other people are here too • rude/annoying

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Adult(s), Loud or Yelling		
Positive	*Ambiguous*	*Negative*
• interest	• people enjoying themselves	• anger • angry • annoyance • annoyed • it was my wife, so the noise was irritating • not necessary • regretful • rude • some too loud, they should know better • unease • very annoyed, displeased

Child/Children, Loud or Yelling		
Positive	*Ambiguous*	*Negative*
• they were enjoying the lava tube	• none	• angry • annoyed (3) • annoyed with volume, should be hushed • milding annoying • overuse of area, annoyed • parents should tell them to pipe down • rude • rushed • takes away from nature

Child/Children, Crying		
Positive	*Ambiguous*	*Negative*
• happy • interest		• angry • annoyed (2) • distracting • embarassed as it was my kid • slightly annoyed

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Leaves Rustling		
Positive	*Ambiguous*	*Negative*
• appreciation of nature • back in nature • calm (2) • calm, peace, happy • calming (4) • calming, natural • calming, peaceful • calming/soothing • calmness • contentment • good • happy (2) • natural sound • nice • one natuer • peace and tranquility • peace, calm • peace-close with nature • peaceful (4) • peacefulness • pleasant (4) • pleasing-wind w/ leaves • positive, happiness • refreshing, calming • relaxed • relaxed/calm • relaxing (7) • relaxing and peacful • relaxing, enjoyable • soothing (3) • very positive, relaxing	• fine • its raining/wind • neutral • none (2)	• paranoid

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Wind		
Positive	*Ambiguous*	*Negative*
• calm • calm- close to nature • calm, natural • calming (5) • calmness (2) • contentment • energizing • excellent • exhilerating, active • felt calm • freedom (2) • good (3) • happy (3) • natural • nice (3) • one with natuer • peace (2) • peaceful (5) • peacefulness • pleasant • pleasing • pleasing, refreshing • refreshing (2) • relaxation • relaxed (5) • relaxing (7) • relaxing music • restful • soothing (5) • soothing, relaxed • This is why we are here!!! • through the trees, very relaxing	• gassy	

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Rainfall		
Positive	*Ambiguous*	*Negative*
• best part • calming • calmness • cleanliness • enjoyable • good • invigorated • natural • peace • peaceful • peacefulness • refreshed • relaxed (3) • relaxing (3) • soft • soothing (4) • this is why we are here!!! • wet, peaceful, alive	• not bad • sprinkling wet	

Shifting Rocks & Sand		
Positive	*Ambiguous*	*Negative*
• calm • calm- close to nature • good • happy • peace	• moved • none	• anxious

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Bird Song		
Positive	*Ambiguous*	*Negative*
• 2nd best • beautiful • being in a forest • calm (2) • calm- close to nature • calming • content • cool • glorious, peaceful • good (2) • good emotions • gorgeous • happiness (2) • happy (4) • happy, amused • happy, proud • interesting • joy, happiness • lovely music • nice (2) • one with natuer • peace (2) • peace and calm • peaceful (5) • peaceful, very pleased • peacefulness (5) • pleasant (4) • pleasing (2) • relaxed (2) • relaxing (6) • relaxing, natural • restful • soft • soothed • soothing • soothing/delightful • This is why we are here!!! • tranquilizing • very calming • very relaxing	• not enough, seems like I should hear more	

Appendix G (continued). Verbatim Feelings and Emotions – Thurston Lava Tube Area Attended Listening

Bird Song		
Positive	*Ambiguous*	*Negative*
• wanted to find the birds • wonderful • wood, birds, etc. are best part of experience		

Insect(s)		
Positive	*Ambiguous*	*Negative*
• calm (2) • calm- close to nature • good (2) • interesting • one with natuer • peace • peaceful (4) • peacefulness • pleasant • relaxed (2) • relaxing (2) • soothing • this is why we are here!!! • wonderment	• background • buzzed	• slightly annoyed

Animal, Unknown		
Positive	*Ambiguous*	*Negative*
• amused • nice • relaxed	• curious (2) • lizard • mongoose • neutral	

Appendix H

State Residency of Respondents –
Thurston Lava Tube Area Attended Listening

Appendix H. Complete list of state of residency for all respondents – Thurston Lava Tube area Attended Listening.

State	Basic Stats (n=143)	
	Count	*Percent*
California	35	24.5
Hawaii	16	11.2
New York	7	4.9
Illinois	6	4.2
Massachusetts	6	4.2
Ohio	5	3.5
Texas	4	2.8
Washington	4	2.8
Alabama	3	2.1
Arizona	3	2.1
Colorado	3	2.1
Florida	3	2.1
Indiana	3	2.1
Minnesota	3	2.1
Missouri	3	2.1
Nevada	3	2.1
Virginia	3	2.1
Connecticut	2	1.4
Georgia	2	1.4
New Hampshire	2	1.4
Maryland	2	1.4
New Jersey	2	1.4
North Carolina	2	1.4
Oregon	2	1.4
Pennsylvania	2	1.4
Utah	2	1.4
West Virginia	2	1.4
Wisconsin	2	1.4
Iowa	1	0.7
Kansas	1	0.7
Kentucky	1	0.7
Maine	1	0.7

Appendix H (continued). Complete list of state of residency for all respondents – Thurston Lava Tube area Attended Listening.

State	Basic Stats (n=143)	
	Count	*Percent*
Michigan	1	0.7
Nebraska	1	0.7
Oklahoma	1	0.7
Rhode Island	1	0.7
South Carolina	1	0.7
Tennessee	1	0.7
Vermont	1	0.7

Appendix I

Hawaii Volcanoes National Park Audio Recording Survey Questionnaire

OMB # 1024-0224 (NPS #07-014)
Expiration Date: 01/30/2008

Hawaii Volcanoes Soundscape
Audio Recording Evaluation

2007

ID: _____ **Location: _____**

Date: _____ **Time: _____AM / PM**

Version: Air Ground

A. Trip Description

1. How many people are in your personal group (family/friends) today?

Group size: _____

2. Is your personal group part of a commercial tour in the park today? (Check <u>one</u>.)

□ Yes
□ No

3. Have you ever visited Hawaii Volcanoes National Park before? (Check <u>one</u>.)

□ Yes (CONTINUE TO QUESTION 4)
□ No (SKIP TO QUESTION 5)

4. Approximately how many times have you visited Hawaii Volcanoes National Park before today?

Approximate number of visits: _____ **<u>OR</u>** Don't know/Not sure

5. Please rate the importance of each of the following reasons for your visit to Hawaii Volcanoes National Park today. (Check <u>one</u> box for each item.)

	Not at all important	Somewhat important	Very important
a. Seeing the active lava flows on the Chain of Crater Roads	☐	☐	☐
b. Seeing the summit caldera of Kīlauea volcano	☐	☐	☐
c. Enjoying peace and quiet	☐	☐	☐
d. Being with family/friends	☐	☐	☐
e. Learning about nature	☐	☐	☐
f. Learning about Hawaiian culture and history	☐	☐	☐
g. Experiencing solitude	☐	☐	☐
h. Appreciating the natural scenery	☐	☐	☐
i. Hearing the sounds of nature	☐	☐	☐
j. Getting exercise	☐	☐	☐
k. Hiking on Wilderness trails	☐	☐	☐
l. Seeing the Thurston Lava Tube	☐	☐	☐

6. Which of the following places in the park have you visited or plan to visit today? (Check <u>all</u> that apply.)

	Have Visited	Plan to Visit
Kīlauea Visitor Center	☐	☐
Jaggar Museum	☐	☐
Kīlauea Caldera/Halema'uma'u	☐	☐
Chain of Craters Road	☐	☐
Active Lava Surface Flow	☐	☐
Thurston Lava Tube	☐	☐
Other (please specify):	☐	☐
Other (please specify):	☐	☐
Other (please specify):	☐	☐

FOR THE NEXT SET OF QUESTIONS, PLEASE ASK THE SURVEY ATTENDANT FOR ASSISTANCE.

B. The Park Soundscape

7. We would like you to listen to several short recordings of sounds from Hawaii Volcanoes National Park. Please rate each recording by indicating how acceptable you would find the sounds heard in the audio clip while visiting this area of the park. (Circle <u>one</u> number for each recording.)

Very Unacceptable			**Recording 1**					Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

A. Briefly describe any sounds in Recording 1 you found <u>pleasing</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 1 to be <u>pleasing</u>.**

B. Briefly describe any sounds in Recording 1 you found <u>annoying</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 1 to be <u>annoying</u>.**

PRESS PLAY AND RESUME YOUR LISTENING SESSION.

Very Unacceptable			**Recording 2**					Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

A. Briefly describe any sounds in Recording 2 you found <u>pleasing</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 2 to be <u>pleasing</u>.**

B. Briefly describe any sounds in Recording 2 you found <u>annoying</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 2 to be <u>annoying</u>.**

ADVANCE YOUR PLAYER AND RESUME YOUR LISTENING SESSION.

Very Unacceptable			**Recording 3**					Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

A. Briefly describe any sounds in Recording 3 you found <u>pleasing</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 3 to be <u>pleasing</u>.**

B. Briefly describe any sounds in Recording 3 you found <u>annoying</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 3 to be <u>annoying</u>.**

ADVANCE YOUR PLAYER AND RESUME YOUR LISTENING SESSION.

Very Unacceptable			**Recording 4**					Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

A. Briefly describe any sounds in Recording 4 you found <u>pleasing</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 4 to be <u>pleasing</u>.**

B. Briefly describe any sounds in Recording 4 you found <u>annoying</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 4 to be <u>annoying</u>.**

ADVANCE YOUR PLAYER AND RESUME YOUR LISTENING SESSION.

Very Unacceptable			**Recording 5**					Very Acceptable
-4	-3	-2	-1	0	+1	+2	+3	+4

A. Briefly describe any sounds in Recording 5 you found <u>pleasing</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 5 to be <u>pleasing</u>.**

B. Briefly describe any sounds in Recording 5 you found <u>annoying</u>.

_____

_____

_____

<u>OR</u> ☐ **I did not find any of the sounds in Recording 5 to be <u>annoying</u>.**

YOU HAVE COMPLETED THIS PORTION OF YOUR LISTENING SESSION.
CONTINUE TO THE NEXT PAGE.

8. Which of the five recordings you just heard sounds most like what you heard while visiting this area of the park today? (Check <u>one</u>.)

□ Recording 1
□ Recording 2
□ Recording 3
□ Recording 4
□ Recording 5

For the next question,
please ask the survey attendant for assistance.

9. We would like to know how often you think it would be acceptable to hear a helicopter air tour during your visit to this area of the park. To help judge this, please listen to a short recording of a helicopter air tour and then rate the acceptability of each of the following scenarios based on how frequently you would hear the sounds in the recording. (Circle <u>one</u> number for each scenario.)

Hear the helicopter sounds once…	Very Unacceptable								Very Acceptable
Every 5 minutes	-4	-3	-2	-1	0	+1	+2	+3	+4
Every 15 minutes	-4	-3	-2	-1	0	+1	+2	+3	+4
Every 30 minutes	-4	-3	-2	-1	0	+1	+2	+3	+4
Every 60 minutes	-4	-3	-2	-1	0	+1	+2	+3	+4
Never hear the sounds	-4	-3	-2	-1	0	+1	+2	+3	+4

10. Did you hear any aircraft while you were in this area of the park today? (Check <u>one</u>.)

□ Yes (CONTINUE TO QUESTION 11)
□ No (SKIP TO QUESTION 12)

11. Please indicate how pleasing or annoying you found the sounds of aircraft you heard while you were in this area of the park today. (Check <u>one</u>.)

□ Very pleasing
□ Somewhat pleasing
□ Neutral
□ Somewhat annoying
□ Very annoying

12. Have you ever taken a scenic air tour over Hawaii Volcanoes National Park or any other national park? (Check <u>all</u> that apply.)

□ Yes, I have taken a scenic air tour over Hawaii Volcanoes National Park
□ Yes, I have taken a scenic air tour over another national park
□ No, I have never taken a scenic air tour over a national park

13. If given the opportunity to take a scenic air tour over Hawaii Volcanoes National Park, would you do so even if park visitors could hear the aircraft during their visit? (Check <u>one</u>.)

□ Yes
□ No
□ Don't know/not sure

14. Please indicate the extent to which you would support or oppose each of the following potential management actions at Hawaii Volcanoes National Park. (Please check <u>one</u> box for each item.)

	Strongly Support	Support	Neither Support nor Oppose	Oppose	Strongly Oppose	Don't Know/ Not Sure
Reduce the number of scenic air tours allowed to fly over the park.	☐	☐	☐	☐	☐	DK
Maintain the number of scenic air tours allowed to fly over the park at the current level.	☐	☐	☐	☐	☐	DK
Increase the number of scenic air tours allowed to fly over the park.	☐	☐	☐	☐	☐	DK
Require scenic air tours to be flown over the park only during specially designated dates and times.	☐	☐	☐	☐	☐	DK
Require scenic air tours to use designated flight paths over limited areas of the park.	☐	☐	☐	☐	☐	DK
Prohibit scenic air tours from flying over the park.	☐	☐	☐	☐	☐	DK

C. Background Information

15. What is your gender? (Check <u>one</u>.)

- □ Male
- □ Female

16. In what year were you born?

Year born:_____

17. Do you live in the United States? (Check <u>one</u>.)

- □ Yes (What is your zip code? _____)
- □ No (What country do you live in? _____)

18. What is the highest level of formal education you have completed? (Check <u>one</u>.)

- □ Some high school
- □ High school graduate or GED
- □ Some college, business or trade school
- □ College, business or trade school graduate
- □ Some graduate school
- □ Master's, doctoral or professional degree

19. Are you Hispanic or Latino? (Check <u>one</u>.)

- □ Yes
- □ No

20. What is your race? (Check <u>all</u> that apply.)

- □ American Indian or Alaska Native
- □ Asian
- □ Black or African American
- □ Native Hawaiian
- □ Pacific Islander other than Native Hawaiian
- □ White

Thank you for your help with this survey!
Please return the completed questionnaire to the survey administrator.

PRIVACY ACT and PAPERWORK REDUCTION ACT statement: 16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. The permanent data will be anonymous. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. BURDEN ESTIMATE statement: Public reporting burden for this form is estimated to average 15 minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to

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Hawaii Volcanoes National Park
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catherine_lentz@nps.gov

Appendix J

Verbatim Responses: Sounds Respondents Identified as Pleasing in Audio Recordings

Appendix J.1.

Pleasing Sounds in Recording 1

Appendix J.1. Verbatim responses to the following question, organized by category of response: (Note: Number in parentheses indicates number of times response was mentioned.)

Briefly describe any sounds in Recording 1 you found <u>pleasing</u>.

Birds	
Steam Vents	**Lava Tube**
• beautiful bird sounds • bird blend • bird calls (4) • bird chanting • bird like sounds • bird songs (2) • Bird song pleasing but prefer real sounds vs. artificial. • bird sound (15) • birds (76) • birds are always pleasing • birds but too frequent in calls • birds chirping (14) • birds pleasing (3) • birds singing • birds singing chirping • birds talking • birds very pleasing • birds were pleasing • chirping • different birds seemed to be "happy" • listening to birds • local bird life • love birds (3) • peaceful bird calls • peaceful sounds of birds • pleased to hear the noise of some kind a bird noise • the bird sounds were soothing • the sound of birds is interesting • Tweeting of a bird or more • various bird sounds • various birds • very pleasing but unlikely in the ecosystem-birds	• at least three species of bird • bird calls • bird chirp • bird noises • bird song (7) • bird sound is pleasing • bird sounds (6) • bird sounds-Actually they did not bother or excited me • birds (100) • birds (trills) • birds birds birds! • birds chirping (11) • birds chirping, variety of birds • birds singing (8) • birds sound very pleasing (2) • birds! Excellent • birds-cool • birds-just love it! • chirping (2) • chirping birds (2) • I like hearing the birds sing in their natural environment • I liked the birds chirping • liked the bird sounds • love the birds • multiple birds • natural bird songs great • sound of birds very nice • the birds sounds were pleasing • the high pitch bird sounds • the sound of birds • wild birds

Appendix J.1 (continued). ***Briefly describe any sounds in Recording 1 you found <u>pleasing</u>.***

Bugs, insects, crickets	
Steam Vents	**Lava Tube**
• insect chirps • insect sounds • crickets (8) • crickets or static • insects (8) • insects? Chirping	• background insects • bugs (4) • bugs humming • creatures (crickets) • cricket (6) • crickets, insects • crickets? (3) • insect (14) • insects-nice • the sounds of the bugs

Sounds like nature	
Steam Vents	**Lava Tube**
• I enjoyed listening hearing nature sounds that are not to loud • natural (2) • natural sounds • natural sounds in nature are acceptable in this environment • nature (2) • Orient you to the environment • sounded natural	• nature (4) • The overall sound of nature are very pleasing • various nature sounds • very natural

Wind, breeze	
Steam Vents	**Lava Tube**
• always did like the wind • light wind • wind (3) • wind blowing • wind from windy day • wind noise	• background air through trees? Hiss • breeze • the sound of the breeze in the trees • the wind in the background • wind (13) • wind blowing • wind in background • wind in trees • wind noise

Appendix J.1 (continued). ***Briefly describe any sounds in Recording 1 you found <u>pleasing</u>.***

Quiet, serene, peaceful, etc.	
Steam Vents	**Lava Tube**
• 1st pleasant • extremely pleasing but didn't fit the scene for me • soothing (2) • soothing sounds • sure, they were pleasing • very comforting, soothing sounds • very peaceful	• all pleasing • all was pleasing (2) • quiet • pleasing +4 • sounds generally appropriate and pleasing • very pleasing!!

Wildlife (other than birds/insects)	
Steam Vents	**Lava Tube**
• +/- frogs • animal calls • animals (2) • frogs • sounds like evening @ a pond • the wildlife is very soothing • wildlife is always pleasing indigenous	• animals (2) • frogs (4) • tree frogs • wildlife

Rainforest, forest sounds, etc.	
Steam Vents	**Lava Tube**
• enjoy tropical sounds • forest-kind sounds • jungle sounds • rain forest (3) • tropical	• forest • forest sounds • pleasant “rain forest" sounds • trees

Appendix J.1 (continued). ***Briefly describe any sounds in Recording 1 you found <u>pleasing</u>.***

All, everything	
Steam Vents	**Lava Tube**
• all (2) • all fine • all sounds (2)	• all (4) • all good (2) • all of it • all of them • all ok • all was good • everything

Water, steam, waterfall, etc.	
Steam Vents	**Lava Tube**
• flowing water • loved the water • water in the background • water? Good	• flowing water (3) • Loved the sounds of water • or water • or water in background • rain (2) • running water (4) • something like water flowing • stream • water (14) • water flow • water flowing (5) • water noise • water running • water sounds • water? (2) • waterfall (2)

Other	
Steam Vents	**Lava Tube**
• All the rest were @ random @ different lengths and frequencies • eruption of lava • good birth	• hissing sound • I liked the sounds, but I would rather listen to the real sounds around me. • poor auditory memory

Appendix J.2.

Pleasing Sounds in Recording 2

Appendix J.2. Verbatim responses to the following question, organized by category of response: (Note: Number in parentheses indicates number of times response was mentioned.)

Briefly describe any sounds in Recording 2 you found <u>pleasing</u>.

Birds	
Steam Vents	**Lava Tube**
• again with the birds • all other bird sounds • and birds are good • beautiful bird sounds • bird calling • bird calls (3) • bird calls cool • bird song (92) • bird sound (loudest noise tends to dominate sound system) • bird sounds (9) • bird sounds good • birds (82) • birds also • birds always good to hear • birds are always pleasing • birds chanting • birds chirping (9) • birds singing (2) • birds sound like in forest • birds sounds fluctuating • birds very pleasing • cannot differentiate from first (chirping) • chirping • chirping was fine • different kinds of birds • I think there were less birds, which was nice • local birds • love birds! • more birds • same as #1 (bird sounds pleasant) • the bird sounds were soothing • the birds in the background • the other birds (the rest) • various bird sounds • various chirping	• bird calls • bird singing is pleasing • bird song (4) • bird sounds (7) • birds (100) • birds again • birds chirping (6) • birds chirping, variety of birds • birds sing • birds singing (5) • birds sound very pleasing (2) • birds whistling • birds-cool • birds-did not sound that different to me • birdsong • chirping (3) • chirping birds (3) • Hi-volume bird chirping • I like hearing the birds sing in their natural environment • I liked the birds chirping • I liked these bird sounds a little more. They sounded more varied. • more birds • multiple birds • natural bird songs great • pleasing birds • sound of birds • the bird song that wasn't there before • the birds sounds were pleasing • the high pitch bird sounds

Appendix J.2 (continued). ***Briefly describe any sounds in Recording 2 you found <u>pleasing</u>.***

Bugs, insects, crickets	
Steam Vents	**Lava Tube**
• cricket/bugs • crickets (6) • crickets or static • insects (9) • maybe crickets • mixture of insects (and birds)	• bugs (5) • chirping bugs • crickets (8) • insects (16) • insects chirping • insects, breeze • many crickets • the bugs

Water, steam, waterfall, etc.	
Steam Vents	**Lava Tube**
• like running water sound • ocean • ocean noise? • water sounds • plus swash zone • rain • rain fall • water (7) • waterflow	• H2O • louder water • more water • ocean (3) • ocean sound • rain (3) • running water (3) • something like water flowing • sound of flow • water (21) • water flowing (4) • water moving • water running • water rushing • waterfall (2) • waves crashing

Wind, breeze	
Steam Vents	**Lava Tube**
• light breeze • maybe wind • wind (8) • wind blowing • wind from windy day	• ocean breeze • same as first with wind • wind (26) • wind in background • wind in the trees (2) • windy

Appendix J.2 (continued). ***Briefly describe any sounds in Recording 2 you found <u>pleasing</u>.***

All, everything	
Steam Vents	**Lava Tube**
• all (4) • all fine • all of it • all of them • all ok but some faint bumps • all sounds	• all (3) • all but beeping • all good • all of it • all was still good • loved it all!! • most sounds

Sounds like nature (general)	
Steam Vents	**Lava Tube**
• culimination of sounds blended to make feel were out in nature • natural • nature (5) • sounded the same as #1 (sounded natural)	• nature (3) • nature noises good • The overall sound of nature are very pleasing • various nature sounds

Other	
Steam Vents	**Lava Tube**
• All the previously annoying cricket had varied pitch and intensity sounded more natural • found it to be much last that last recording • more variety • not water • sounds were fine when it was not a constant sound • steam • the shrill part was better than recording 1-longer • underlying sounds	• good • hissing sound • low-level low freq sound-little spooky (v. little) • ok • whistle

Appendix J.2 (continued). ***Briefly describe any sounds in Recording 2 you found <u>pleasing</u>.***

Quiet, serene, peaceful, etc.	
Steam Vents	**Lava Tube**
• again very soothing • all pleasing • all sounds pleasing • extremely pleasing but didn't fit the scene for me • reflective	• all pleasing (4) • pleasing, but some unidentifiable background noise • sounds like #1 but I found it very pleasing

Wildlife (other than birds/insects)	
Steam Vents	**Lava Tube**
• animal (2) • animal sounds • sounds like evening @ a pond • wildlife is pleasing	• animals • creatures • frogs (4) • liked animal noises • tree frogs • wildlife

Rainforest, forest sounds, etc.	
Steam Vents	**Lava Tube**
• forest-kind sounds • rain forest (2) • similar jungle sounds • sounds like this previous recording with a little white noise (jungle sounds)	• forests • jungle sounds are okay • very tropical

Aircraft noises, vehicles, etc.	
Steam Vents	**Lava Tube**
• highway	

Appendix J.3.

Pleasing Sounds in Recording 3

Appendix J.3. Verbatim responses to the following question, organized by category of response: (Note: Number in parentheses indicates number of times response was mentioned.)

Briefly describe any sounds in Recording 3 you found <u>pleasing</u>.

Birds	
Steam Vents	**Lava Tube**
• beautiful bird sounds • bird calling • bird calls • bird noises • bird song (3) • bird sounds (5) • birds (88) • birds always good to hear • birds are louder • birds chanting • birds chirping (7) • birds chirping fine • birds good • birds in the background • birds sound like in forest • birds sound more pleasant than first 2 • can't tell difference from 1&2 (chirping) • chirping • different kinds of birds • distinct bird calls • good bird sounds • I heard many birds • I like the bird sounds • local birds • louder birds • love birds! • more bird calls cool • more birds • not much diff. w/ 1 or 2 (birds) • quick chirping in background • singing birds • some of the chirping birds • sounds like the first recording (pleased to hear the noise of some kind a bird noise) • the other birds (the rest) • various bird sounds	• bird noises/ sounds • bird song (2) • bird sounds (5) • bird sounds pleasing • birds (111) • birds all of first two recordings • birds chirping (3) • birds singing (3) • birds were good • birds whistling • birds, chirping • birdsong • chirping (4) • I liked the birds chirping • more birds • sounds of birds • the high pitch bird sounds • The more I listen the more I can pick our certain birds.

Appendix J.3 (continued). ***Briefly describe any sounds in Recording 3 you found pleasing.***

Bugs, insects, crickets	
Steam Vents	**Lava Tube**
• bugs • crickets (4) • crickets fine • crickets ok • insect (10)	• bugs (6) • cricket (6) • insect (11)

Sounds like nature (general)	
Steam Vents	**Lava Tube**
• natural sounds • nature (6) • nature sounds were fine • same nature sounds • sounded the same as #1&#2 (sounded natural)	• nature (11) • nature noises • nature sounds (2) • the natural sounds (3) • The overall sound of nature are very pleasing

All, everything	
Steam Vents	**Lava Tube**
• all (3) • all fine • all of it • all of them (2) • all sounds were very harmonious • overall	• all (2) • all but beeping

Wind, breeze	
Steam Vents	**Lava Tube**
• too windy • wind (6) • wind blowing	• louder wind • wind (2) • wind in trees • wind sounds again • wind, I don't mind the aircraft noise

Appendix J.3 (continued). ***Briefly describe any sounds in Recording 3 you found <u>pleasing</u>.***

Other	
Steam Vents	**Lava Tube**
• background humming • Better! More variability with the sound but there was a lot more noise • good sounds, but maybe too many at once • I don't know why • no difference • ticking again!	• hissing sound • roaring sound • same as 1 & 2 (everything-ok) • same as above

Wildlife (other than birds/insects)	
Steam Vents	**Lava Tube**
• animals (2) • frogs • wildlife (2)	• animals (3) • creatures • frog (2) • frogs? • wildlife (2) • wildlife sound

Water, steam, waterfall, etc.	
Steam Vents	**Lava Tube**
• ocean • sound like the stream • sounded like your underwater • water	• and waterfall • flowing water • H2O • ocean • rainfall • running water • water (12) • water flowing

Appendix J.3 (continued). ***Briefly describe any sounds in Recording 3 you found <u>pleasing</u>.***

Quiet, serene, peaceful, etc.	
Steam Vents	**Lava Tube**
• all pleasing except one • all sounds were peaceful and calming • more soothing "less action" • sure they were pleasing	• all were pleasing • I continue to find these noises pleasant. • most pleasing

Aircraft noises, vehicles, etc.	
Steam Vents	**Lava Tube**
• aircraft • plane	• aircraft • background airplanes/helicopters • car • helicopter • helicopter, plane

Rainforest, forest sounds, etc.	
Steam Vents	**Lava Tube**
• rain forest • Still a nice tropical setting sound but getting louder	• forest • jungle sounds are okay • nice tropical

Appendix J.4.

Pleasing Sounds in Recording 4

Appendix J.4. Verbatim responses to the following question, organized by category of response: (Note: Number in parentheses indicates number of times response was mentioned.)

Briefly describe any sounds in Recording 4 you found <u>pleasing</u>.

Birds	
Steam Vents	**Lava Tube**
• bird calling • bird calls (2) • bird song (2) • bird sound (5) • birds (72) • birds (barely) • birds again • birds and such • birds are good • birds chirping (4) • birds chirping fine • birds chirping/singing • birds in background • birds in background • birds sound like in forest • birds sound more pleasant than first 2 • birds, a loud bird • chirping • louder bird nice • low bird's in background • low sound birds • many birds • more birds • the bird sounds were soothing • the birds chirping • well, still birds	• bird noises and nature sounds-barely heard • bird sounds (2) • bird sounds pleasing • birds (88) • birds (when audible) • birds are nice! • birds chirping (3) • birds good! • birds singing • birds songs (2) • birds, chirping • birds, The more I listen the more I can pick our certain birds. • birds-but drowned out • birdsong • chirping • multiple birds • slight bird sounds • some birds • the high pitch bird sounds

Bugs, insects, crickets	
Steam Vents	**Lava Tube**
• better with the insect noise • bug chirps • bugs • cricket ok • crickets (3) • insects (8)	• bugs (5) • crickets (4) • insects (2)

Appendix J.4 (continued). ***Briefly describe any sounds in Recording 4 you found <u>pleasing</u>.***

Sounds like nature (general)	
Steam Vents	**Lava Tube**
• (Almost drowned out) natural sounds • I like the sounds of nature • nature (4) • nature fine • nature sounds • other nature sounds are fine • sounded the same (sounded natural)	• nature (7) • nature of what I sould hear • nature sounds (2) • nature sounds are hard to hear • out doors noise-ok • some nature muffled by mechanical noise • some nature sounds • The overall sound of nature are very pleasing

Water, steam, waterfall, etc.	
Steam Vents	**Lava Tube**
• love the sound of water in this one • ocean (2) • rushing sound • sounds like a loud stream • sounds of water and waves • water	• and waterfall • flowing water • ocean • rain (2) • rain water • running water • torrential rain • water (4) • water flowing

Wind, breeze	
Steam Vents	**Lava Tube**
• really windy • wind (6)	• wind (6) • wind in trees • wind sounds again

Appendix J.4 (continued). ***Briefly describe any sounds in Recording 4 you found <u>pleasing</u>.***

Other	
Steam Vents	**Lava Tube**
• background • good sounds, but maybe too many at once • I'm now missing the birds • more white noise • much the same as the last • roaring	• "It had jazz" 6yr old says • (illegible) sand • except can't hear water running • same as 1 & 2 (everything-ok)

Wildlife (other than birds/insects)	
Steam Vents	**Lava Tube**
• animals • frogs • natural wildlife • the wildlife • the wildlife is what we want	• animals • creatures • frogs (2) • wildlife (2) • wildlife sounds

Aircraft noises, vehicles, etc.	
Steam Vents	**Lava Tube**
• aircraft • plane noise • sounded like helicopter, cool • turbofan jet noise	• heli • helicopter • I liked the jet sound it is relaxing • planes/aircrafts

All, everything	
Steam Vents	**Lava Tube**
• all • most • most all sounds	• all but aircraft • like all w/exception of helicopter in background

Appendix J.4 (continued). ***Briefly describe any sounds in Recording 4 you found <u>pleasing</u>.***

Rainforest, forest sounds, etc.	
Steam Vents	**Lava Tube**
• forest • rain forest	• can barely hear them but the forest is nice • jungle • leaves crunch

Quiet, serene, peaceful, etc.	
Steam Vents	**Lava Tube**
• all sounds were soothing	• I continue to find these noises pleasant.

Appendix J.5.

Pleasing Sounds in Recording 5

Appendix J.5. Verbatim responses to the following question, organized by category of response: (Note: Number in parentheses indicates number of times response was mentioned.)

Briefly describe any sounds in Recording 5 you found <u>pleasing</u>.

Birds	
Steam Vents	**Lava Tube**
• bird chirps • birds (23) • birds (hardly) • birds are good • birds chirping • birds faintly • birds fine • birds(barely) • birds-hardly • chirping (2) • faint bird calling • I think I heard a bird call • slight bird life • some birds and crickets • some birds, not many • still birds • the birds in the background • the few birds • This was great. The sounds of the birds were not overpowering, but the helicopter was.	• barely heard birds (2) • birds (36) • birds (barely) • birds chirping • birds, but hard to hear • chirping • faint birds • I can hear birds, but not tell them apart • low sounds on birds • one lonely little bird in the background

Sounds like nature (general)	
Steam Vents	**Lava Tube**
• natural • natural sounds • nature (2) • nature noises are fine • still sounds of nature	• few nature sound • just about none except undertones of nature • nature diff to hear • nature in the background • nature sounds • outdoor noises-ok

Appendix J.5 (continued). ***Briefly describe any sounds in Recording 5 you found <u>pleasing</u>.***

Other	
Steam Vents	**Lava Tube**
• a lot of white noise • louder hmmmmm made more earie • roaring • sounded like more human activity which was okay to have • Where did the birds go?	• no birds

Wildlife (other than birds/insects)	
Steam Vents	**Lava Tube**
• animal (2) • wildlife (2)	• animals • barely heard animal noises • frogs • wildlife

Water, steam, waterfall, etc.	
Steam Vents	**Lava Tube**
• liked water sounds • sounds like water flowing • waterfalls	• flowing water • rain • thunderstorm • water (3) • waterfall

Bugs, insects, crickets	
Steam Vents	**Lava Tube**
• insects • some crickets	• bugs (2) • cricket (3) • insects (2)

Rainforest, forest sounds, etc.	
Steam Vents	**Lava Tube**
• jungle • the tropical sounds	• jungle sounds

Appendix J.5 (continued). ***Briefly describe any sounds in Recording 5 you found <u>pleasing</u>.***

Aircraft noises, vehicles, etc.	
Steam Vents	**Lava Tube**
• a crashing plane • heli blades/jet noise	

Wind, breeze	
Steam Vents	**Lava Tube**
• wind	• wind (3)

Appendix K

Verbatim Responses: Sounds Respondents Identified as Annoying in Audio Recordings

Appendix K.1.

Annoying Sounds in Recording 1

Appendix K.1. Verbatim responses to the following question, organized by category of response: (Note: Number in parentheses indicates number of times response was mentioned.)

Briefly describe any sounds in Recording 1 you found annoying.

Birds, crickets, frogs	
Steam Vents	**Lava Tube**
• birds (3) • birds out of place • crickets (2) • high pitched continuous chirp • initial bird sound piercing to the ears • slightly annoying-crickets • too frequent in calls	• crickets • high pitch chirpy • high pitched birds • The birds sounded too Disney-World. • too many birds

Other	
Steam Vents	**Lava Tube**
• but not annoying but not appropriate for this area • do not think it goes here. More of a wooded area • not annoying, but are they naturally occurring in the area? • prefer natural sounds • repeats • repetativeness • sounded unnatural same pitch frequency length • to much going on • too constant	• to consecutive

Appendix K.1 (continued). ***Briefly describe any sounds in Recording 1 you found annoying.***

High pitch, screech	
Steam Vents	**Lava Tube**
• a bit shrill • A scritchy, whining song • high pitch at the beginning of recording • initial high pitch • initial screeching • shrills • squeaking • the whistle	• something which sounded like a high pitch whistle

Water, wind	
Steam Vents	**Lava Tube**
• wind noise	• water flowing • winds

People (talking, stepping, etc.)	
Steam Vents	**Lava Tube**
	• cell phones • coughing • people • talking • voice

Cars, traffic, parking lot, etc.	
Steam Vents	**Lava Tube**
	• I thought I heard traffic • traffic noise??

Background noise	
Steam Vents	**Lava Tube**
	• buzzing

Appendix K.2.

Annoying Sounds in Recording 2

Appendix K.2. Verbatim responses to the following question, organized by category of response: (Note: Number in parentheses indicates number of times response was mentioned.)

Briefly describe any sounds in Recording 2 you found annoying.

Birds, crickets, frogs	
Steam Vents	**Lava Tube**
• birds (4) • chirp • crickets • frogs peeping • high pitched continuous chirp • initial bird chirping • insect sound • insects • one sound in particular sounded like a woodpecker and was distracting • reminds me of crickets • repeating chirp-almost mechanical • shrill bird sound (one in the mix) • sounded like bugs chirping	• cricket sound • crickets (3) • high pitched birds • insects-only slightly • mosquito? • maybe too many bird/insect sounds at same time • the chirping insects were a little much • the loud repetitive bird songs were louder • too many birds

Other	
Steam Vents	**Lava Tube**
• a little too "busy" • bumping sounds • do not think it goes here. More of a wooded area • just this wind blowing against the headphones • repeats • some sound not pleasant • too frequent	• more peaceful • noise right at the end • only one sound

Appendix K.2 (continued). ***Briefly describe any sounds in Recording 2 you found annoying.***

High pitch, screech	
Steam Vents	**Lava Tube**
• a bit shrill • beeping sound in right ear • initial screeching • long whistling, high pitch too much • screaching was annoying • squeaking	• Hi-pitch sounds • repeated beeping

Background noise	
Steam Vents	**Lava Tube**
• ticking noise	• a humming sound? • background noise • buzzing • clicks • hum in background-not good • rhythmic ticking • some kind of deep sound (bass) but barely audible

Loud, annoying, noisy, etc.	
Steam Vents	**Lava Tube**
• too loud	

Cars, traffic, parking lot, etc.	
Steam Vents	**Lava Tube**
	• background auto? • car (2) • I thought I heard some road noise • road noise?? • sounded like traffic • traffic • traffic possibly • truck • vehicles

Appendix K.2 (continued). ***Briefly describe any sounds in Recording 2 you found annoying.***

Water, wind	
Steam Vents	**Lava Tube**
	• background water or whoosh sound? • low waterfall sounds • ocean/stream/waterfall type sound • the wind or water sound • water • wind (2) • wind blowing • wind sound is too loud

Aircraft, helicopters, etc.	
Steam Vents	**Lava Tube**
	• airplane sound? • plane/road in background

People (talking, stepping, etc.)	
Steam Vents	**Lava Tube**
	• talking • the noise of people

Motor sounds	
Steam Vents	**Lava Tube**
	• electric sounds training missions • maybe mechanical noise

Appendix K.3.

Annoying Sounds in Recording 3

Appendix K.3. Verbatim responses to the following question, organized by category of response:

Briefly describe any sounds in Recording 3 you found annoying.

Aircraft, helicopters, etc.	
Steam Vents	**Lava Tube**
• air • aircraft (4) • aircraft sounds • airplane (16) • airplane interrupting nature • airplane noise (2) • airplane noise was irritating • airplane not annoyin, but not pleasin • airplane sounds (2) • airplane sounds-louder • airplane, helicopter (3) • airplanes are not fine • air traffic sound (2) • began to hear airplane • helicopter (2) • I heard airplanes, bad sound • jet (2) • low level hum (train or plane) • plane (18) • plane in background (2) • plane in background-not looking for that at a volcano • plane noise • plane overflying • plane, helicopter • sounds like a plane is in the air • the airplane sound in the mix • was that an airplane passing over?	• aeroplane • air traffic (2) • aircraft (7) • aircraft noise • aircraft noise "out of place" • airplane (33) • airplane engine • airplane flying over • airplane noise in background • airplane noises • airplane or helicopter • airplane or helicopter (mild) • airplane, air traffic • airplane, helicopter (4) • airplane, helicopter flight path • airplane, maybe • airplane? Distracting from natural sounds • background aircraft noise • background aircraft? helicopter? Noise • Goll darn Jack's Adventure tour! • helecopter sound • helicopter (11) • helicopter noise • helicopter sounds • helicopter, airplane (4) • helicopter, jet • helicopter, plane (4) • helicopter/plane noise • helicopters (2) • helicopters in background • hum, high flying plane? • jet airplane • jet sound • jets, aircrafts • overhead aircraft • plane (16)

Appendix K.3 (continued). ***Briefly describe any sounds in Recording 3 you found annoying.***

Aircraft, helicopters, etc. (continued)	
Steam Vents	**Lava Tube**
	• plane background sounds • plane flying • plane flying over, helicopter in distance • plane motor sound • plane noise was annoying • plane overhead • plane sound (2) • plane, aircraft • plane, chopper • plane, helicopter • plane? (3) • planes flying • planes overhead • planes, jet sound (engine) • planes. Gah • roaring-like a helicopter whirring • sounds like a plane in the background • the airplane in the background • the airplane noise was not so pleasing • the plane sounded like a lawn mower • w/exception of helicopter in background

Birds, crickets, frogs	
Steam Vents	**Lava Tube**
• "cricket" sound • a certain bird that chirped at a little to high pitch • bird (3) • bugs • chirp • chirping • crickets (2) • frogs! • high pitched frogs • insects • insects too many • reapiting crickets	• crickets (3) • high pitched birds • insects • little less cricket

Appendix K.3 (continued). ***Briefly describe any sounds in Recording 3 you found annoying.***

High pitch, screech	
Steam Vents	**Lava Tube**
• constant beeping in ear • occasional trill • screaching not fine • screaching sound • screeching • squeaking • There was a higher pitch "squeeking" that was a little annoying. • too high pitched • whistle	• beeping • whistle (high tone)

Cars, traffic, parking lot, etc.	
Steam Vents	**Lava Tube**
• highway • the background of traffic takes away from the natural sounds • traffic (2) • traffic type sounds? • train	• background truck? • buses • car door slamming • cars (6) • civilization sounds-autos? Trains • truck • road noise • traffic (6) • traffic noise (2) • traffic? (2)

Background noise	
Steam Vents	**Lava Tube**
• "rattling" • background noise • hissing was distracting • low hum in background? • some background noise (illegible)	• background noise? • background? • hum • roaring sound in the background • same rythmic ticking • some annoying ants or an electric sound

Appendix K.3 (continued). ***Briefly describe any sounds in Recording 3 you found annoying.***

Other	
Steam Vents	**Lava Tube**
• do not think it goes here. More of a wooded area • frequency of sounds has increased too much • music also? • noise outside birds • repeats	• non nature sounds • same as above • sounds like war

Motor sounds	
Steam Vents	**Lava Tube**
• motor not ok • or other industrial • or some type of machinery • sound of engine	• engines, motors, ICK! • the motor sounds • very annoying machinery

Loud, annoying, noisy, etc.	
Steam Vents	**Lava Tube**
• good noises drowned out by airplane sounds	• background noise too loud • noises • too much

People (talking, stepping, etc.)	
Steam Vents	**Lava Tube**
• voices	• people

Water, wind	
Steam Vents	**Lava Tube**
• wind slightly loud	

Appendix K.4.

Annoying Sounds in Recording 4

Appendix K.4. Verbatim responses to the following question, organized by category of response:

Briefly describe any sounds in Recording 4 you found annoying.

Aircraft, helicopters, etc.	
Steam Vents	**Lava Tube**
• air traffic	• air noise
• air traffic noise	• air traffic
• aircraft overheas couldn't hear birds	• aircraft ANNOYING
• airplane (31)	• aircraft noise
• airplane annoying	• aircraft too loud
• airplane getting louder very interrupting	• aircraft too low
• airplane louder	• aircraft very annoying
• airplane louder!	• aircraft, helicopters
• airplane noise (3)	• aircraft/helicopter right on top of me
• airplane noise too loud (2)	• aircrafts
• airplane sound (4)	• airplane (16)
• AIRPLANE!	• airplane flying
• airplane, helicopter	• airplane noise (3)
• airplanes in the back take and srown out the natrul sounds	• airplane noise too loud • airplane ruins everything else
• airport sound	• airplane sounds
• am I at an airport?	• airplane, aircraft
• Do not like sound of helicopter	• airplane, helicopter (2)
• fixed wing plus helicopters	• airplane, helicopter?
• get rid of the plane!	• airplane, helo
• helicopter (10)	• airplane, jet
• helicopter sound	• airplane, or helicopter-loud
• helicopter very loud!	• airplanes, helicopters
• helicopter, airplane	• airplane-too loud
• helicopter, jets	• airtraffic and heliocopter
• helicopter, plane	• chopper
• helicopter/aircraft (tolerable)	• constant aircraft noise would be a bit loud but it depends on how often they are
• jet (3)	
• jet flying over, helicipter?	
• jet noise overwhelming	• engine from plane or vehicle
• jet sound	• engine/aircraft noise
• jet sounds in background	• Goll darn Jack's Adventure tour!
• jets, helicopter too near	• helecopter ever louder not good
• loud airplane	• heli, aircraft
• loud plane (3)	• heli, plane
• loud plane overhead	• helicopter (18)
• more airplanes	• helicopter in background

Appendix K.4 (continued). ***Briefly describe any sounds in Recording 4 you found annoying.***

Aircraft, helicopters, etc.	
Steam Vents	**Lava Tube**
• more planes • oh no, not an airplane again! • partly planee • plane (23) • plane has to go • plane landing • plane like sounds • plane not ok • plane overhead very annoying • plane sounds • plane, helicopter (3) • planes, helicopter • slightly-plane • sound like an airplane • sounds like a plane (2) • sounds like Los Angeles International airport • sounds of a large airport • sounds of a plane passing by • sounds of planes • the jet was louder with the plane sounds • the plane • the plane sound detracted but would not say annoying • think I hear airplane or highway-louder • too loud plane noise • too loud-sounds like planes • too much "airplane" noise • very loud airplane • very loud planes overhead, ambient unnatural noise	• helicopter sound • helicopter very very very annoying • helicopter, aircraft • helicopter, closer airplanes • helicopter, plane (5) • helicopter, plane louder • helicopter, planes very annoying • helicopter/airplane noise • helicopter/plane • helicopter-loud! • helicopters, airplanes! • helicopters, plane engine • jet plane • jet too noisy, we must be near an airport! • jet, chopper? • jets • lots of airplanes • lots of plane roar • loud aircraft noises • loud helicopter (3) • loud helicopter, plane noise in background • loud helicopters, airplane • loud jet plane engines • loud jet sound • loud plane (3) • loud plane blah takessound away from wildlife • loud plane helicopter • loud planes • loud planes, helicopters • low plane • More intense helicopter amd plane • plane (23) • plane noise (2) • plane too loud • plane, aircraft • plane/helicopter annoying • planes and helicopters too loud! • planes flying over

Appendix K.4 (continued). ***Briefly describe any sounds in Recording 4 you found annoying.***

Aircraft, helicopters, etc. (continued)	
Steam Vents	**Lava Tube**
	• planes flying overhead • planes louder • planes, helicopter • planes, jets • planes/aircrafter @ peak of noise • propellor aircraft • sounds like a helicopter in the background • sounds like jets • The airplane sounds were very annoying. • the airport noise was annoying • The hell? Planes, helicopters • the lawn mover plane • There is a plane going overhead-annoying • too loud airplane • too loud planes flying overhead • very loud air traffic-potentially helicopter • very loud airplane • very loud helicopter • very low flying aircraft • very very loud airplane noises

Cars, traffic, parking lot, etc.	
Steam Vents	**Lava Tube**
• cars (3) • cars or some vechicles • highway (2) • or is it a truck driving by • traffic (5) • traffic (air) • traffic noise in the background? • traffic, train • train (2) • trucks	• car loudly • car, traffic • cars (3) • cars or something loud • highway noises • hwy • it's like living on a highway • more sounds of vehicles • other metro sounds • road noise (3) • traffic (7)

Appendix K.4 (continued). ***Briefly describe any sounds in Recording 4 you found annoying.***

Cars, traffic, parking lot, etc. (continued)	
Steam Vents	**Lava Tube**
	• traffic noise in the background • traffic noise (3) • traffic. I could go home and hear that • traffic-like noise • train? Not good • truck/car • trucks (2) • vehicles • vehicle traffic

Loud, annoying, noisy, etc.	
Steam Vents	**Lava Tube**
• a little much sounds • other noise overpowered everything else • awful • barely hear the birds • excess noise-distraction • loud noise • louder • sound not related to nature • sound louder • the loud sounds • very annoying-felt like I was in the city	• airplane over all sounds!!! • birds and water got drowned out • birds drowned out!, on balance this was annoying because of vol. • busy not relaxing • can no longer focus on bird sounds because of the overwhelming jet sound • can't hear much else • excessive noise in background • lots of noise! • loud! • louder air noise • noise pollution • too loud • too much noise • very loud

Appendix K.4 (continued). ***Briefly describe any sounds in Recording 4 you found annoying.***

Other	
Steam Vents	**Lava Tube**
• Any transportation noises damage the environment-really noticeable • busy congested area not acceptable • repeats • sound is too continuous • sounds • too frequent in calls • unnatural	• deep roaring sound • outside noise • yuck

Background noise	
Steam Vents	**Lava Tube**
• background noise • buzzing • high level of background noise • lots of background noise • static • the loud background behind the birds	• background noise • background of air • constant grinding • hum • hum, interference noise bad

Birds, crickets, frogs	
Steam Vents	**Lava Tube**
• birds (2) • chirp • crickets • too much insect noise	• crickets

Motor sounds	
Steam Vents	**Lava Tube**
• machinery • mechanical sounds • or engines • over-riding engine sound	• construction • engine • engines not as bad as #3. But I still hate 'em • intrusion of mechinal sound • motor (2)

Appendix K.4 (continued). ***Briefly describe any sounds in Recording 4 you found annoying.***

High pitch, screech	
Steam Vents	**Lava Tube**
• beeping • screeching	

All, everything	
Steam Vents	**Lava Tube**
• all	• all • all noises

Water, wind	
Steam Vents	**Lava Tube**
• wind	

Appendix K.5.

Annoying Sounds in Recording 5

Appendix K.5. Verbatim responses to the following question, organized by category of response:

Briefly describe any sounds in Recording 5 you found annoying.

Aircraft, helicopters, etc.	
Steam Vents	**Lava Tube**
• air noise • air traffic (3) • aircraft (8) • aircraft noise is very offensive • aircraft, helicopter noise • airplane (12) • airplane commerical airline • airplane drowns out all nature sounds • airplane flying too loud • airplane landing on my head!!, loud plane • airplane noise • airplane too loud • airplane/helicopter pretty annoying • airplanes loudly • airplanes overpowered everything else • airplanes! • airport sounds • all the aircraft, lots of planes and jets • also as plane • Am I at the AIRPORT! • and the planes! • commerical jets • ear damaging air, helicopter sounds • helicopter (11) • helicopter drowns out nature • helicopter sound loud • helicopter sounds • helicopter was loud • helicopter, jet (2) • helicopter, plane (6) • helicopter-loud • helicopter-worse • jet (2) • jet plane • jet planes-helis-bad • jet, helicopter • like planes flying by • lots of airplane sounds	• air traffic (5) • aircraft (4) • aircraft ouch! • aircraft too close • aircraft, helicopter horrible • aircraft, jet • aircraft, jet aircraft, helicopter • airplane (14) • airplane roar (2) • airplane sound • airplane, helicopter (3) • airplane-very annoying • airport • airport/chopper • all helas planes • anything like 4 but much louder (airplanes & helicopter) • apache helicopter fleet • chopper • constant aircraft noise would be a bit loud but it depends on how often they are • dam helicopters • extreme sounds of air traffic • helicopter (14) • helicopter (close) • helicopter (explosive!) • helicopter engine, flight path • helicopter is disturbingly loud, dark contrast of peaceful park-scape and business noise in the sky • helicopter loud! • helicopter very annoying • helicopter, airplane (7) • helicopter, plane louder • helicopter/planes takes over • helicopter?, lower flying plane? • helicopters right over head! • jarring-loud plane noises

Appendix K.5 (continued). ***Briefly describe any sounds in Recording 5 you found annoying.***

Aircraft, helicopters, etc. (continued)	
Steam Vents	**Lava Tube**
• loud aircraft (4) • loud aircraft close by • loud helicopter hovering • loud noise of helicopters, planes • loud plane noise (7) • mainly plane sounds • much louder plane/s • plane (17) • plane has to go • plane noise too loud • plane noise too loud-feels like an airport • plane noise was very distracting and overwhelming • plane sound • plane, overhead noise • planes too close • planes too loud • planes totally not ok • planes, air traffic • planes, helicopter (5) • planes? Too loud • planes-aweful! • plane-too loud • plenty of noise from a plane • really loud airplane • sound as if you are standing next to an aeroplane engine starting • the heavier traffic/planes • the helicopter sound is super annoying • the plane on top of me • the plane? Was somewhat annoying seeing as it muffled the sounds. • too many other sounds. I could stay of the airport to hear this • too loud airplanes • too loud sounds of planes • traffic/plane noise mixed with bird noise • very annoying helicopter • very loud air traffic • very loud airplane • very loud plane overhead • way too much "plane" noise	• jet noise • jets taking off-louder that tree frogs! • loud airplane • LOUD ANNOYING JET SOUNDS • loud helicopter (3) • loud plane, helicopter • loud-airplane • low flying helicopter in background • plane (15) • plane (very loud) • plane noise very intrusive • plane was loud • planes bad • planes flying overhead • planes overhead • planes too loud • planes, choppers • planes, helicopter (6) • planes, helicopters very loud • propellors • really loud air traffic and helicopter • same aircraft • sounds like an airport (3) • sounds like helicopter • sounds of aircraft • super loud plane/jet • the helicopter and airplane noise was annoying • the planes were to loud. I couldn't hear the nature sounds • too loud helicopter • too much plane/helicopter sounds • very loud aircraft (8) • very loud helicopter, or plane • very loud noise pollution from aircraft • very loud plane in backgroung only thing you could hear • very noisy aircraft • very noisy jet • very prominent aircraft/auto sounds. I felt like I was downtown • very very loud airplane

Appendix K.5 (continued). ***Briefly describe any sounds in Recording 5 you found annoying.***

Loud, annoying, noisy, etc.	
Steam Vents	**Lava Tube**
• are there still birds? Did the plane scare them off? • birds crickets drown out • can't hear any nature • can't really hear birds/nature • hard to hear birds in background • hard to hear the birds • it was difficult to listen to the jungle sounds • loud noise • loud rushing sound • not relaxing • other noise overpowered • poor wildlife! I would move to Lo Ihi! • sounds too loud! • Take cover, the Russians are coming!!! • the bird sounds were basically drowned out • to noisy • too loud • too much background noise • too much noise • too noisy • very annoying-what was that? • worse yet	• all kinds of annoyances • Bloody Hell • cannot hear birds • cannot hear them (in reference to pleasing sounds) • can't hardly hear the birds • could barely hear birds • could barely hear the sounds of nature • could not hear birds • couldn't hear nature • 'couldn't really hear much (in reference to pleasing sound section) • extremely loud noise from background • hard to hear the birds • horrible!!! • I couldn't hear anything • I felt like I was boarding a helicopter in Vietnam • loud sounds • loud-annoying • much louder, nature is almost entirely drowned out • 'no birds! on the runway and would guess these would be more planes • noise (3) • ridiculous noise pollution, can barely hear birds • sounds from 1 & 2 are bearly audible • sounds like a warzone! • sounds like full scale war. This is what I came on vacation to get away from • strong roaring that drowns all other sounds • the bombs are next! • too loud (3) • very annoying, too loud to describe, non nature • very loud (3) • yes noisy

Appendix K.5 (continued). ***Briefly describe any sounds in Recording 5 you found annoying.***

Cars, traffic, parking lot, etc.	
Steam Vents	**Lava Tube**
• "railway" • car traffic • cars • get rid of the highway! • other transportation vehicles not acceptable • really loud traffic noise • sounds like a freeway • traffic (3) • traffic noise • traffic-drowning out the birds • traffic-very loud • train • trains • trucks (2) • urban pollution • vehicle	• any other than traffic-bad • bus • cars • cars, buses • cars, traffic • city life, traffic • highway noises • highways (2) • other metro sounds • overwhelming traffic • road noise • road traffic • same as 4, but worse (it's like living on a highway) • traffic (4) • traffic noise (2) • traffic sounds • traffic-Yeh! • train • trucks • vehicles?

Motor sounds	
Steam Vents	**Lava Tube**
• all sorts of industrial crap! • engine noises • industrial noise • loud motor sounds • machinery • machinery type noises • motor • too loud-sounds mechanical • way to much motorized noise	• and construction site • engine • engine sound • loud mechanical roar • machinery • machines • machines • mechanical noise overpowered nature sounds • or factory? • possibly machinery noises • The machine sounds were very annoying and detracted from the atmosphere.

Appendix K.5 (continued). ***Briefly describe any sounds in Recording 5 you found annoying.***

Other	
Steam Vents	**Lava Tube**
• can't distinguish • don't bother coming out if this is what it's like • increased activity • no way • other stuff • sounds do not like	• hell • rude

All, everything	
Steam Vents	**Lava Tube**
• all (2) • all noise annoying • everything but birds • everything else	• all (2) • all annoying • all man-made sounds • all noise, can hardly hear birds • all of it • all other noise • all was annoying • everything (11) • nothing pleasing, couldn't hear any • the whole thing is annoying

Background noise	
Steam Vents	**Lava Tube**
• background • some other interference • the background behind the chirping	• background noises • hacking • hum sound • thumping

People	
Steam Vents	**Lava Tube**
• I didn’t like the introduction of the tourists sounds • other human noises are not welcome	• phone

Appendix K.5 (continued). ***Briefly describe any sounds in Recording 5 you found annoying.***

Birds, crickets, frogs	
Steam Vents	**Lava Tube**
• birds • crickets	

Water, wind	
Steam Vents	**Lava Tube**
• the sound of water was too overwhelming in this clip	• wind tunnel

High pitch, screech	
Steam Vents	**Lava Tube**
• beeping	

Appendix L

State Residency of Respondents – Hawaii Volcanoes National Park Audio Recording Survey

Appendix L. Complete list of state of residency for all respondents – Hawaii Volcanoes National Park Audio Recordings.

State	Steam Vents (n=139)		Lava Tube (n=152)	
	Count	*Percent*	*Count*	*Percent*
California	32	23.0	40	26.7
Hawaii	13	9.4	12	8.0
Texas	8	5.8	8	5.3
Virginia	7	5.0	5	3.3
Colorado	7	5.0	3	2.0
Massachusetts	6	4.3	5	3.3
New York	6	4.3	5	3.3
Oregon	6	4.3	2	1.3
Maryland	6	4.3	2	1.3
Pennsylvania	5	3.6	6	4.0
Florida	5	3.6	4	2.7
North Carolina	4	2.9	5	3.3
Ohio	4	2.9	4	2.7
Washington	3	2.2	8	5.3
Wisconsin	3	2.2	7	4.7
New Jersey	3	2.2	4	2.7
Utah	3	2.2	0	0.0
New Hampshire	3	2.2	0	0.0
Illinois	2	1.4	4	2.7
Minnesota	2	1.4	3	2.0
Nevada	1	0.7	3	2.0
Arizona	1	0.7	2	1.3
Indiana	1	0.7	1	0.7
Georgia	1	0.7	1	0.7
South Carolina	1	0.7	1	0.7
Tennessee	1	0.7	1	0.7
Arkansas	1	0.7	0	0.0
Delaware	1	0.7	0	0.0
Louisiana	1	0.7	0	0.0
Mississippi	1	0.7	0	0.0
Wyoming	1	0.7	0	0.0

Appendix L (continued). Complete list of state of residency for all respondents – Hawaii Volcanoes National Park Audio Recordings.

State	Steam Vents (n=139)		Lava Tube (n=152)	
	Count	*Percent*	*Count*	*Percent*
Missouri	0	0.0	2	1.3
West Virginia	0	0.0	2	1.3
Alabama	0	0.0	1	0.7
Connecticut	0	0.0	1	0.7
Iowa	0	0.0	1	0.7
Kansas	0	0.0	1	0.7
Kentucky	0	0.0	1	0.7
Michigan	0	0.0	1	0.7
Military Mail	0	0.0	1	0.7
New Mexico	0	0.0	1	0.7
Oklahoma	0	0.0	1	0.7
Rhode Island	0	0.0	1	0.7

Appendix M

Hawaii Volcanoes National Park Audio Recording Survey
Data Codebook

Appendix M: Hawaii Volcanoes National Park Audio Recording Survey Data Codebook
Pertaining to files HAVO_AC_SurveyData.xls and HAVO_AC_SurveyData.sav

Variable	Question #	Description	Values
Date	Front Cover	Date when survey was completed	dd/mm/yy
Time	Front Cover	Time when survey was completed	Military Time – 00:00:00
ID	Front Cover	Individual number within a group	ID number
Location	Front Cover	Location where the survey was given/taken	1 = Steam Vents 2 = Lava Tube
Aircraft	Front Cover	Denotes if an aircraft flew over during survey	0 = No 1 = Yes
Q1	Question 1	Number of people in group	Number of people
Q2	Question 2	Designates whether or not part of a commercial tour	0 = No 1 = Yes
Q3	Question 3	Designates whether or not group has visited this area of the Park	0 = No 1 = Yes
Q4	Question 4	Number of previous visits to Hawaii Volcanoes National park	Number of visits 99 = Don't Know
Q5a	Question 5	Importance of seeing the active lava flows on the Chain of Crater Roads	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5b	Question 5	Importance of seeing the summit caldera of Kīlauea volcano	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5c	Question 5	Importance of enjoying peace and quiet	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5d	Question 5	Importance of being with family and friends	1 = Not at all important 2 = Somewhat important 3 = Very important

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q5e	Question 5	Importance of learning about nature	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5f	Question 5	Importance of learning about Hawaiian culture and history	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5g	Question 5	Importance of experiencing solitude	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5h	Question 5	Importance of appreciating the natural scenery	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5i	Question 5	Importance of hearing the sounds of nature	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5j	Question 5	Importance of getting exercise	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5k	Question 5	Importance of hiking on wilderness trails	1 = Not at all important 2 = Somewhat important 3 = Very important
Q5l	Question 5	Importance of seeing the Thurston Lava Tube	1 = Not at all important 2 = Somewhat important 3 = Very important
Q6a Have	Question 6	Indicates if the respondent has visited Kīlauea Visitor Center	0 = Not checked 1 = Checked
Q6a Plan	Question 6	Indicates if the respondent plans to visit Kīlauea Visitor Center	0 = Not checked 1 = Checked
Q6b Have	Question 6	Indicates if the respondent has visited Jaggar Museum	0 = Not checked 1 = Checked

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q6b Plan	Question 6	Indicates if the respondent plans to visit Jaggar Museum	0 = Not checked 1 = Checked
Q6c Have	Question 6	Indicates if the respondent has visited Kīlauea Caldera/Halema'uma'u	0 = Not checked 1 = Checked
Q6c Plan	Question 6	Indicates if the respondent plans to visit Kīlauea Caldera/Halema'uma'u	0 = Not checked 1 = Checked
Q6d Have	Question 6	Indicates if the respondent has visited Chain of Craters Road	0 = Not checked 1 = Checked
Q6d Plan	Question 6	Indicates if the respondent plans to visit Chain of Craters Road	0 = Not checked 1 = Checked
Q6e Have	Question 6	Indicates if the respondent has visited Active Lava Surface Flow	0 = Not checked 1 = Checked
Q6e Plan	Question 6	Indicates if the respondent plans to visit Active Lava Surface Flow	0 = Not checked 1 = Checked
Q6f Have	Question 6	Indicates if the respondent has visited Thurston Lava Tube	0 = Not checked 1 = Checked
Q6f Plan	Question 6	Indicates if the respondent plans to visit Thurston Lava Tube	0 = Not checked 1 = Checked
Q6g Description	Question 6	Text of the self-specified location for Q6g	Free response
Q6g Have	Question 6	Indicates if the respondent has visited another self-specified location	0 = Not checked 1 = Checked

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q6g Plan	Question 6	Indicates if the respondent plans to visit another self-specified location	0 = Not checked 1 = Checked
Q6h Description	Question 6	Text of the self-specified location for Q6h	Free response
Q6h Have	Question 6	Indicates if the respondent has visited another self-specified location	0 = Not checked 1 = Checked
Q6h Plan	Question 6	Indicates if the respondent plans to visit another self-specified location	0 = Not checked 1 = Checked
Q6i Description	Question 6	Text of the self-specified location for Q6i	Free response
Q6i Have	Question 6	Indicates if the respondent has visited another self-specified location	0 = Not checked 1 = Checked
Q6i Plan	Question 6	Indicates if the respondent plans to visit another self-specified location	0 = Not checked 1 = Checked
Q7R1	Question 7.1	Acceptability of Recording 1	-4 = Very Unacceptable 0 = Neutral 4 = Acceptable
Q7R1A	Question 7.1A	Denotes if respondent reported any specific pleasing sounds in Recording 1	0 = Didn't find any pleasing 1 = Reported a sound
Q7R1AS1	Question 7.1A	First free response to pleasing sounds in Recording 1	Free response

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q7R1AS1_Code	Question 7.1A	Coded value for Q7R1AS1	1 = All, everything 2 = Birds 3 = Wind, breeze 4 = Water, stream, etc. 5 = Quiet, serene, etc. 6 = Sounds like nature 7 = bugs, insects, etc. 8 = Aircraft noise, cars, etc. 11 = Other 12 = wildlife 13 = rainforest, tropical, etc.
Q7R1AS2	Question 7.1A	Second free response to pleasing sounds in Recording 1	Free response
Q7R1AS2_Code	Question 7.1A	Coded value for Q7R1AS2	Same as Q7R1AS1_Code
Q7R1AS3	Question 7.1A	Third free response to pleasing sounds in Recording 1	Free response
Q7R1AS3_Code	Question 7.1A	Coded value for Q7R1AS3	Same as Q7R1AS1_Code
Q7R1AS4	Question 7.1A	Fourth free response to pleasing sounds in Recording 1	Free response
Q7R1AS4_Code	Question 7.1A	Coded response for Q7R1AS4	Same as Q7R1AS1_Code
Q7R1B	Question 7.1B	Denotes if respondent reported any specific annoying sounds in Recording 1	0 = Didn't find any annoying 1 = Reported a sound
Q7R1BS1	Question 7.1B	First free response to annoying sounds in Recording 1	Free response

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q7R1BS1_Code	Question 7.1B	Coded value for Q7R1BS1	1 = Aircraft, helicopters, etc. 2 = Cars, traffic, etc. 3 = Birds, frogs, etc. 4 = Background noise 5 = People 6 = Motor sounds 7 = All, everything 8 = Loud, annoying, etc. 9 = Other 10 = High pitch, screech 11 = Water, wind
Q7R1BS2	Question 7.1B	Second free response to annoying sounds in Recording 1	Free response
Q7R1BS2_Code	Question 7.1B	Coded value for Q7R1BS2	Same as Q7R1BS1_Code
Q7R2	Question 7.2	Acceptability of Recording 2	-4 = Very Unacceptable 0 = Neutral 4 = Acceptable
Q7R2A	Question 7.2A	Denotes if respondent reported any specific pleasing sounds in Recording 2	0 = Didn't find any pleasing 1 = Reported a sound
Q7R2AS1	Question 7.2A	First free response to pleasing sounds in Recording 2	Free response
Q7R2AS1_Code	Question 7.2A	Coded value for Q7R2AS1	Same as Q7R1AS1_Code
Q7R2AS2	Question 7.2A	Second free response to pleasing sounds in Recording 2	Free response
Q7R2AS2_Code	Question 7.2A	Coded value for Q7R2AS2	Same as Q7R1AS1_Code
Q7R2AS3	Question 7.2A	Third free response to pleasing sounds in Recording 2	Free response
Q7R2AS3_Code	Question 7.2A	Coded value for Q7R1AS3	Same as Q7R1AS1_Code

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q7R2AS4	Question 7.2A	Fourth free response to pleasing sounds in Recording 2	Free response
Q7R2AS4_Code	Question 7.2A	Coded value for Q7R2AS4	Same as Q7R1AS1_Code
Q7R2AS5	Question 7.2A	Fifth free response to pleasing sounds in Recording 2	Free response
Q7R2AS5_Code	Question 7.2A	Coded value for Q7R2AS5	Same as Q7R1AS1_Code
Q7R2B	Question 7.2B	Denotes if respondent reported any specific annoying sounds in Recording 2	0 = Didn't find any annoying 1 = Reported a sound
Q7R2BS1	Question 7.2B	First free response to annoying sounds in Recording 2	Free response
Q7R2BS1_Code	Question 7.2B	Coded value for Q7R2BS1	Same as Q7R1BS1_Code
Q7R2BS2	Question 7.2B	Second free response to annoying sounds in Recording 2	Free response
Q7R2BS2_Code	Question 7.2B	Coded value for Q7R2BS2	Same as Q7R1BS1_Code
Q7R3	Question 7.3	Acceptability of Recording 3	-4 = Very Unacceptable 0 = Neutral 4 = Acceptable
Q7R3A	Question 7.3A	Denotes if respondent reported any specific pleasing sounds in Recording 3	0 = Didn't find any pleasing 1 = Reported a sound
Q7R3AS1	Question 7.3A	First free response to pleasing sounds in Recording 3	Free response
Q7R3AS1_Code	Question 7.3A	Coded value for Q7R3AS1	Same as Q7R1AS1_Code
Q7R3AS2	Question 7.3A	Second free response to pleasing sounds in Recording 3	Free response
Q7R3AS2_Code	Question 7.3A	Coded value for Q7R3AS2	Same as Q7R1AS1_Code

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q7R3AS3	Question 7.3A	Third free response to pleasing sounds in Recording 3	Free response
Q7R3AS3_Code	Question 7.3A	Coded value for Q7R3AS3	Same as Q7R1AS1_Code
Q7R3AS4	Question 7.3A	Fourth free response to pleasing sounds in Recording 3	Free response
Q7R3AS4_Code	Question 7.3A	Coded value for Q7R3AS3	Same as Q7R1AS1_Code
Q7R3B	Question 7.3B	Denotes if respondent reported any specific annoying sounds in Recording 3	0 = Didn't find any annoying 1 = Reported a sound
Q7R3BS1	Question 7.3B	First free response to annoying sounds in Recording 3	Free response
Q7R3BS1_Code	Question 7.3B	Coded value for Q7R3BS1	Same as Q7R1BS1_Code
Q7R3BS2	Question 7.3B	Second free response to annoying sounds in Recording 3	Free response
Q7R3BS2_Code	Question 7.3B	Coded value for Q7R3BS2	Same as Q7R1BS1_Code
Q7R3BS3	Question 7.3B	Third free response to annoying sounds in Recording 3	Free response
Q7R3BS3_Code	Question 7.3B	Coded value for Q7R3BS3	Same as Q7R1BS1_Code
Q7R4	Question 7.4	Acceptability of Recording 4	-4 = Very Unacceptable 0 = Neutral 4 = Acceptable
Q7R4A	Question 7.4A	Denotes if respondent reported any specific pleasing sounds in Recording 4	0 = Didn't find any pleasing 1 = Reported a sound
Q7R4AS1	Question 7.4A	First free response to pleasing sounds in Recording 4	Free response
Q7R4AS1_Code	Question 7.4A	Coded value for Q7R4AS1	Same as Q7R1AS1_Code

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q7R4AS2	Question 7.4A	Second free response to pleasing sounds in Recording 4	Free response
Q7R4AS2_Code	Question 7.4A	Coded value for Q7R4AS2	Same as Q7R1AS1_Code
Q7R4AS3	Question 7.4A	Third free response to pleasing sounds in Recording 4	Free response
Q7R4AS3_Code	Question 7.4A	Coded value for Q7R4AS3	Same as Q7R1AS1_Code
Q7R4AS4	Question 7.4A	Fourth free response to pleasing sounds in Recording 4	Free response
Q7R4AS4_Code	Question 7.4A	Coded value for Q7R4AS3	Same as Q7R1AS1_Code
Q7R4B	Question 7.4B	Denotes if respondent reported any specific annoying sounds in Recording 4	0 = Didn't find any annoying 1 = Reported a sound
Q7R4BS1	Question 7.4B	First free response to annoying sounds in Recording 4	Free response
Q7R4BS1_Code	Question 7.4B	Coded value for Q7R4BS1	Same as Q7R1BS1_Code
Q7R4BS2	Question 7.4B	Second free response to annoying sounds in Recording 4	Free response
Q7R4BS2_Code	Question 7.4B	Coded value for Q7R4BS2	Same as Q7R1BS1_Code
Q7R4BS3	Question 7.4B	Third free response to annoying sounds in Recording 4	Free response
Q7R4BS3_Code	Question 7.4B	Coded value for Q7R4BS3	Same as Q7R1BS1_Code
Q7R5	Question 7.5	Acceptability of Recording 5	-4 = Very Unacceptable 0 = Neutral 4 = Acceptable
Q7R5A	Question 7.5A	Denotes if respondent reported any specific pleasing sounds in Recording 5	0 = Didn't find any pleasing 1 = Reported a sound

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q7R5AS1	Question 7.5A	First free response to pleasing sounds in Recording 5	Free response
Q7R5AS1_Code	Question 7.5A	Coded value for Q7R5AS1	Same as Q7R1AS1_Code
Q7R5AS2	Question 7.5A	Second free response to pleasing sounds in Recording 5	Free response
Q7R5AS2_Code	Question 7.5A	Coded value for Q7R5AS2	Same as Q7R1AS1_Code
Q7R5AS3	Question 7.5A	Third free response to pleasing sounds in Recording 5	Free response
Q7R5AS3_Code	Question 7.5A	Coded value for Q7R5AS3	Same as Q7R1AS1_Code
Q7R5B	Question 7.5B	Denotes if respondent reported any specific annoying sounds in Recording 5	0 = Didn't find any annoying 1 = Reported a sound
Q7R5BS1	Question 7.5B	First free response to annoying sounds in Recording 5	Free response
Q7R5BS1_Code	Question 7.5B	Coded value for Q7R5BS1	Same as Q7R1BS1_Code
Q7R5BS2	Question 7.5B	Second free response to annoying sounds in Recording 5	Free response
Q7R5BS2_Code	Question 7.5B	Coded value for Q7R5BS2	Same as Q7R1BS1_Code
Q7R5BS3	Question 7.5B	Third free response to annoying sounds in Recording 5	Free response
Q7R5BS3_Code	Question 7.5B	Coded value for Q7R5BS3	Same as Q7R1BS1_Code
Q8	Question 8	Which recording sounded most like what you heard in the park today?	1 = Recording 1 2 = Recording 2 3 = Recording 3 4 = Recording 4 5 = Recording 5
Q9a	Question 9	Acceptability of hearing helicopter sounds every 5 minutes	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q9b	Question 9	Acceptability of hearing helicopter sounds every 15 minutes	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
Q9c	Question 9	Acceptability of hearing helicopter sounds every 30 minutes	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
Q9d	Question 9	Acceptability of hearing helicopter sounds every 60 minutes	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
Q9e	Question 9	Acceptability of never hearing helicopter sounds	-4 = Very Unacceptable 0 = Neutral 4 = Very Acceptable
Q10	Question 10	Did you hear any aircraft while you were in this area of the park today?	0 = No 1 = Yes
Q11	Question 11	Indicate how pleasing or annoying you found the sounds of aircraft you heard in the park today.	1 = Very pleasing 2 = Somewhat pleasing 3 = Neutral 4 = Somewhat annoying 5 = Very annoying
Q12a	Question 12	Have you taken a scenic air tour over Hawaii Volcanoes National Park?	0 = Not checked 1 = Checked
Q12b	Question 12	Have you taken a scenic air tour over another national park?	0 = Not checked 1 = Checked
Q12c	Question 12	I have never taken a scenic air tour over a national park.	0 = Not checked 1 = Checked
Q13	Question 13	Would you take a scenic air tour over the park even if park visitors could hear the aircraft during their visit?	1 = Yes 0 = No 99 = Don’t Know

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q14a	Question 14	Please indicate the extent of support or opposition to reducing the number of scenic air tours allowed to fly over the park	1 = Strongly Support 2 = Support 3 = Neutral 4 = Oppose 5 = Strongly Oppose 99 = Don't Know
Q14b	Question 14	Please indicate the extent of support or opposition to maintaining the number of scenic air tours at the current level	1 = Strongly Support 2 = Support 3 = Neutral 4 = Oppose 5 = Strongly Oppose 99 = Don't Know
Q14c	Question 14	Please indicate the extent of support or opposition to increasing the number of scenic air tours allowed to fly over the park	1 = Strongly Support 2 = Support 3 = Neutral 4 = Oppose 5 = Strongly Oppose 99 = Don't Know
Q14d	Question 14	Please indicate the extent of support or opposition to requiring scenic air tours to the flown over the park only during specially designated dates and times	1 = Strongly Support 2 = Support 3 = Neutral 4 = Oppose 5 = Strongly Oppose 99 = Don't Know
Q14e	Question 14	Please indicate the extent of support or opposition to requiring scenic air tours to use designated flight paths over limited areas of the park	1 = Strongly Support 2 = Support 3 = Neutral 4 = Oppose 5 = Strongly Oppose 99 = Don't Know
Q14f	Question 14	Please indicate the extent of support or opposition to prohibiting scenic air tours from flying over the park	1 = Strongly Support 2 = Support 3 = Neutral 4 = Oppose 5 = Strongly Oppose 99 = Don't Know
Q15	Question 15	Gender of respondent	1 = Male 2 = Female

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q16	Question 16	Year born	YYYY
Age	Question 16	Respondent's birth year subtracted from 2007	Age
Q17	Question 17	Country of residence	1 = US 0 = Other
Q17Zip	Question 17	Zip Code of residence	5-digit Zip Code
Q17Country	Question 17	Country of residence	1 = England 2 = Manica, PI? 3 = Canada 4 = Mexico 5 = Australia 6 = Japan 7 = Germany 8 = India 9 = Croatia 10 = Ireland 11 = UK 12 = France 13 = Indonesia 14 = New Zealand 15 = Italy 16 = Switzerland
Q18	Question 18	Level of education	1 = Some high school 2 = High school graduate or GED 3 = Some college, business or trade school 4 = College, business or trade school graduate 5 = Some graduate school 6 = Master's, doctoral or professional degree
Q19	Question 19	Indicates if the respondent is Latino	1 = Yes 0 = No
Q20a	Question 20	American Indian or Alaskan Native	1 = Checked 0 = Not Checked
Q20b	Question 20	Asian	1 = Checked 0 = Not Checked
Q20c	Question 20	Black or African American	1 = Checked 0 = Not Checked

Appendix M (continued). Hawaii Volcanoes National Park Audio Recording Survey Data Codebook			
Variable	**Question #**	**Description**	**Values**
Q20d	Question 20	Native Hawaiian	1 = Checked 0 = Not Checked
Q20e	Question 20	Pacific Islander (Not Hawaiian)	1 = Checked 0 = Not Checked
Q20f	Question 20	White	1 = Checked 0 = Not Checked
MultiRace	Question 20	Indicates if the respondent reported more than one race	1 = Reported 1 race 2 = Reported 2 races
Comments		Things of note about survey respondent	Free response